

SPECIAL DOUBLE ISSUE!

ANALOG

SCIENCE FICTION AND FACT

JANUARY/FEBRUARY 2011

**At Cross
Purposes**

Juliette Wade

Michael F. Flynn
Stephen L. Burns
Domingo Santos

www.analogsf.com

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Reader's Departments

Saturday, January 1, 2011

EDITORIAL

Stanley Schmidt

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Jeffery D. Kooistra

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IN TIMES TO COME

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BRASS TACKS

Dear Stan, Well, this is a first. I haven't even finished reading this month's issue yet (September 2010), and I'm already dropping everything to write you and let you know that this one is the best ever. The “Leviathan” story (Eric James Stone) was a pure joy. Its simplicity and sincerity were just...

2010 Index

Here is the Index to 2010, Analog's Volume CXXX. Entries are arranged alphabetically by author, with month and page. When the author's name and/or part of the entry's title is omitted, it is the same as that of the previous entry. Multiple entries by the same author are listed alphabetically...



IT'S ANALAB TIME AGAIN

Welcome to the year 2011! As usual, we're asking you to choose your favorites via the Analytical Laboratory. Not only will your votes provide tangible awards for authors and artists, but your feedback...

UPCOMING EVENTS

Anthony Lewis

4–6 March 2011 POTLATCH 20 (Non-profit, literary event for the readers and writers of speculative fiction; proceeds benefit Clarion West) at Domain Hotel, Sunnyvale CA Book of Honor: Earth Abides by George Stewart. Membership: \$55 until 30 November 2010 (check website for updates), Youth (7-17)...

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EDITORIAL

ALTERNATIVES PAST AND FUTURE

Stanley Schmidt

It's often been said (and not without reason) that there are probably as many definitions of science fiction as there are people defining it. The same can probably be said of other genres, too, such as alternate history.

I bring that up now because recently I've seen quite a few submissions, some of them of very high quality, that I consider alternate history but not science fiction. Many readers have made it clear, frequently and in no uncertain terms, that they consider Analog one of the few places where they can count on finding stories that fit a pretty stringent definition of science fiction—and they therefore consider its pages valuable turf that should be reserved for such stories and not opened to others, no matter how good, that don't meet those criteria.

As editor, I ultimately report to you, the readers. You're the boss, and my job is to give you what you want a large percentage of the time. (I have no delusions that I, or anyone else, can realistically hope to do it all the time.) My decisions about what to buy or not buy are determined by what I think you'll like. So it's to our mutual benefit if I occasionally try to tell you plainly what criteria I'm using, and get a feel for how much

you agree with them.

Ideally, the science fiction I'm looking for here should meet these two tests: Some element of speculative science (or its applied offshoot, technology) should be so integral to the story that it can't be removed without making the story collapse.

The author should make a reasonable effort to make whatever science is in the story, including the speculative part, plausible. This may mean that it's careful extrapolation based on science we already know, but it doesn't have to. It can equally well be based on completely new science, postulated by the author, that hasn't so far been discovered (and quite possibly never will) but conceivably could be in the future.

Note carefully that the story may not be primarily about the new science or technology per se. Usually it won't, though it can be if the speculation is extremely original and interesting. These days readers generally expect more, and want the story to explore not just the idea itself, but how it might affect human (or other) life. The primary focus of the story will be on the characters, even though what happens to them is inextricably wrapped up with some external change resulting from a new discovery or invention.

Or, to put it another way, science fiction typically explores, in Harry Turtledove's words, "the effect of ideas on human history."

So does alternate history.

Therein lies the potential for differences of opinion about

what is science fiction, alternate history, or both. And the answer, as I see it, is not trivially simple.

Some would say that any alternate history is a subtype of science fiction because they both postulate some change in our world—either the way it might be in the future because of some change that hasn't happened, or a change in what our present world might be if something had gone differently in the past. Some would say that the difference is just that in science fiction the pivotal change lies in our future and in alternate history it lies in the past.

I don't think it's that simple. I can't offhand think of anything I'd call alternate history that isn't set in the past or present, because since the future isn't yet defined, there's nothing for a future story to be "alternate to." But while most science fiction is set in a potential future, I can easily think of examples that aren't. Michael F. Flynn, early in his career, seemed to be specializing in stories that were very clearly science fiction yet were set in the past, present, or very near future. Some of them I wouldn't call alternate history at all, because they don't necessarily require the world to be any different than it is, but rather show one possible version of how we may have got where we are when the real details aren't known. "Ashes" (Analog, December 1986) shows a very early technological turning point that conceivably actually happened, but left no record that we can read directly. "Eifelheim" (November 1986, later expanded to the impressive novel of the same name [Tor, 2006]) deals with a settlement of marooned extraterrestrials

that, for all we can know at present, could actually have existed in medieval Germany.

Some other science fiction set in the past clearly is alternate history. One of my favorite examples is *A Different Flesh* by Harry Turtledove, generally regarded as the foremost practitioner of alternate history (and to whom I am grateful for thought-provoking discussions leading in part to today's musings). Now best known as a 1988 novel from Congdon & Weed or a 1994 reissue by Baen, this originated as a series of shorter stories here and in Asimov's exploring a past in which the first Europeans to colonize the Americas found that things had gone a little differently than in our world. Their New World was already occupied not by Amerindians, but by "sims," or *Homo erectus* (and assorted surviving megafauna). That's quintessentially alternate history, because it traces the evolution of an Earth that developed quite differently from the one we live in. It's also quintessentially science fiction, because it postulates a big, fundamental, yet plausible change in the facts of anthropology and paleontology, and asks, "What if?"

As those examples suggest, I consider science fiction and alternate history to be separate but overlapping fields. A given story can be either, neither, or both. The defining difference, as I see it, is not whether the event that separates the speculative world from our world occurs in the past or the future, but the nature of the splitting event. *A Different Flesh* is clearly and admirably not only alternate history but science fiction because it imagines the large and small changes in our world that might

have resulted if certain massive extinctions had not occurred—which was a real possibility.

Many other alternate histories are just as clearly not science fiction because they involve no significant changes in the laws of nature or how they play out in the large-scale development of the world. Examples include stories in which Hitler is killed before coming to power, the American Revolution is squashed by the British, or Napoleon returns triumphant from Waterloo. In any of these cases, human history would diverge so drastically from the course it took that our lives would be dramatically different—but the essential nature of the world would not. The details of who won a battle or an election just aren't that important in the cosmic scheme of things.

On the other hand . . .

It's not hard to imagine cases in which the border doesn't look so clear. If the reversal of a battle that went one way in our world started a chain of events that led to a different kind of science developing in our world—say, someone's making discoveries that wouldn't happen in our world because cultural biases keep a particular kind of research from being done—the resulting story would have a strong claim on science-fictional territory.

How about an alternate history in which the change in the past didn't alter what kind of science was known, or how the physical world developed, but simply who did a particular kind of work first? Such a story, by virtue of exploring how science

and technology develop and what makes revolutions in them happen, could certainly make a case for being considered science fiction. But it wouldn't convince everybody, if the content of the science is not significantly different from ours.

That fuzzy borderland is the area that gives me problems in choosing stories for Analog. My sense from extensive comments from you, the readers, is that most, but not all, of you will balk at our publishing stories don't involve a significant change in the science itself—what it says or what happens as a result of it, not just who discovers it or when. But some of you do like some stories, even here, that postulate alternate histories of science, even if the science itself is unchanged. We've published some such stories that were warmly received, such as Harry Turtledove's "But It Does Move" (June 2009), in which a thinly disguised Sigmund Freud convinces Galileo he's actually wrong.

But that was a novelette, a relatively short story that developed an intriguing idea enough to tickle readers' imaginations, but well within the confines of a single issue. The longer the story is, the harder it is to hold the readers' fascination unless it can continue to build with more ideas of comparable originality and power. And the longer a story is, the more essential it is to keep a large percentage of readers thoroughly engaged.

One of the things that make editing a magazine fun is that, since we have several stories in an issue, we can take an occasional chance on something that some readers will

consider perfect for the magazine and others will consider unsuitable. That's a luxury that book publishers, with an entire package riding on a single story, don't have. But when stories get very long, and especially when they occupy large parts of several consecutive issues as a serial, we have to start thinking more like book publishers. A story based on a single idea that fascinates readers at 10,000 words may dangerously annoy them if it runs to 80,000 over four issues.

So when considering an alternate history that some readers will consider science fiction and some won't, I must weigh very carefully how many I think will welcome it for how long. That means I must think long and hard about where to draw the line; and the longer the story is, the harder I must think.

I've tried to give you a feel for where I think the line should be drawn. Both alternate history and science fiction explore the consequences of a change in our world, either past or future. But for alternate history to be science fiction, the change must have something directly to do with science (and, with few exceptions, not just the history of science).

What do you think?

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BIOLOG

JULIETTE WADE

Richard A. Lovett



Juliette Wade knows what it's like to be an alien, trying to communicate. Partly that's because she did a Ph.D. thesis studying cultural linguistics. But she's also had personal experience. "A lot of my inspiration comes from [living] in Japan or visiting France," she says. "I've been put into 'Here, you're a visiting alien' situations quite a few times."

In her Ph.D. work (technically in education) she got to

observe the process from a neutral perspective, sitting in on classes where Japanese teachers taught American students. Her research involved observing the frequency with which students and teachers used formal versus informal words. "In Japanese, there is no neutral form," she says. "It's either formal or casual. You really can't say anything without committing yourself to either a formal or casual stance."

The result is a language full of traps for outsiders. "It doesn't just reflect on your ability to speak the language," she says. "It reflects on your character. People don't say, 'She's speaking overly casually because she's a learner.' They say, 'She's speaking overly casually because she's rude.'"

Wade never set out to be a science fiction writer, but she can't remember a time when she didn't love the genre. "I wrote lots of stories as a kid." By high school, however, she'd switched to science, planning to major in biology—a plan that faltered in college. "I couldn't stand organic chemistry," she says. Still, she thinks the background helps her writing. "At least I am familiar with the scientific mindset."

From biology, she switched to her second love, linguistics, and from there to linguistic anthropology so she could focus on the interplay of language and culture.

But soon enough, she shifted back to her childhood love of writing. "Once I started, it was like I'd opened a spigot," she says. "It was actually quite frightening. Here I was two years into a Ph.D. program, and all I wanted to do was write!"

Like many beginners, she started with a novel. Or more like a trilogy: 350,000 words of fantasy she hopes someday to beat into marketable form. Then, after a few efforts at short fantasy, she wrote a science fiction story and showed it to a well-known author, who advised her to send it to Analog editor Stanley Schmidt. “I had researched fantasy magazines,” she says, “[but] I had to ask, ‘Who’s Stan Schmidt?’ I was so embarrassed!” The story, “Let the Word Take Me” (July/August 2008) became her first sale.

Given her background, it’s no surprise she likes linguistics-related stories of how culture can make aliens alien. “I’m not so interested in code cracking,” she says. “What I’m interested in is what happens after the code cracking, when you think you have the answer but you really don’t.”

She also likes stories that shed light on our own humanity. The science fictional milieu, she says, frees you to think about things that would otherwise be either too “normal,” or too uncomfortable. And that, she says, is what makes such stories powerful.

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THE ALTERNATE VIEW

JEFIMENKO'S LAST WORD ON GRAVITY

Jeffery D. Kooistra

For those of you who already understand electromagnetic retardation, you may skim the first few paragraphs. For those of you who “think maybe” you understand it, or know you don’t, read the first paragraphs carefully and bear with me—it’s worth the exercise.

Consider a long, uniformly charged rod at rest in “thought experiment space” (I’m picturing something the size and shape of a spear handle). At a point P many rod lengths away from the rod and near, but not on, an imaginary line drawn through the long axis of the rod, we place a charge detector. The detector tells us the magnitude and direction of the electric force due to the rod at the point P at a time t . Looking more closely at the rod itself, we realize that the portion of the rod closest to point P (let’s call it the front)—because electromagnetic interactions take place at the speed of light—posted (or sent out) its contribution to the measurement taken at P a tiny bit later than the portion contributed from the very back end, just late enough so that both contributions arrived at P at exactly the time t .

Indeed, every portion of the rod, from back to front, sent out its contribution slightly in advance of the portion in front of it.

Also, given where we picked P to be, even though the rod is uniformly charged, the back is farther away than the front, so though the signal starts sooner at the back, it is weaker when it gets there.

That little time delay is retardation, but as long as the situation is static (no relative motion) the details about exactly when each portion sent out its contribution don't matter. Since the measured value is independent of time, the speed of electromagnetic propagation could just as well be instantaneous, or three rods per fortnight—it won't make any difference.

Now let's assume the rod was approaching P, in motion along its long axis. Again we make our measurement at P at time t , at the instant the position of the rod is the same as in the static case. Now things are a bit different. As in the static case, the contribution from the back had to leave sooner than from the front to arrive at P at the same time. However, with the rod moving, the back end was not where it was in the static case, but farther away from P. Being farther away, the contribution is also smaller. So despite being the same charged rod in the same position in both cases, the motion affects what is measured at P. (The astute reader will have noticed that I ignored the magnetic field associated with moving charges. I ignored it, but I haven't forgotten it.)

To finish out this thought experiment, let's assume the rod is uncharged, but simply massive, and ask what Newton's gravity law tells us about the forces due to gravity at the point P.

Well, it's much simpler—it doesn't matter one bit whether or not the rod is moving because Newtonian gravity is instantaneous: the field in both cases will be the same. However, even though the "speed of gravity" hasn't been definitively measured (see here:

<http://wugrav.wustl.edu/people/CMW/SpeedofGravity.html>), it is generally assumed that it propagates at the speed of light, and I would be shocked if it didn't. If the speed of gravity is the same as the speed of light (or any other non-infinite speed), then matter in motion must behave at least somewhat analogously to charges in motion, and at minimum, retarded effects must be present.

Dr. Oleg D. Jefimenko sent me a copy of his latest (and unfortunately, last) book at the very end of 2006, which he had signed and dated on December 28. I read it the first time shortly after it arrived, and knew that eventually I would write about it, either as a straight review or in the context of a larger issue. I didn't want to discuss it immediately because I had talked quite a bit about Jefimenko in my January/February 2006 Alternate View, "Length Contraction." A few years later I reread it thinking maybe it was time to write about some of Jefimenko's recent work, but then the global warming stuff started heating up and I got distracted. I was also faced with the question of just how to approach it. I had already talked enough about retardation, and this book just represented the application of that concept to gravity. That makes almost the entire book an exercise in pure theoretical physics and heavy on the math (even though it's just

vector calculus in retarded form). Some of the implications of the math were fascinating and perfect for a science fiction venue, so I absolutely had to talk about those sometime. But I hoped to do so in the context of “here’s a result found in this book” as opposed to “here’s a book and this is one of the things you’ll find in it.”

Then fate stepped in and forced the issue. I think Jefimenko’s work on gravity is important enough that it needs wide dissemination, so the sooner after his death I discuss it, the better one’s chances of obtaining his book. I don’t expect it to replace General Relativity; indeed, I think GR is already on the right track. But the fact is that if the speed of gravitational interactions is limited to the speed of light, then in the ordinary cases in which GR reduces to Newtonian gravity, it reduces to Jefimenko’s extension, not Newton’s original.

Jefimenko’s book, with full title, is Gravitation and Cogravitation: Developing Newton’s Theory of Gravitation to Its Physical and Mathematical Conclusion (ISBN: 0-917406-00-1). It is a continuation of a project begun by Oliver Heaviside in a paper from 1893 called “A Gravitational and Electromagnetic Analogy.” You can find the paper online here at <http://www.electretscientific.com/author/heavisid.html>. This is an unedited version of the original, except that Jefimenko did us all the favor of having “converted some formulas and all vector equations appearing in the article to modern mathematical notation.”

On his Electret Scientific Co. author webpage

(<http://www.electretscientific.com/author/author.html>) Jefimenko described his current research interests this way: "I am also working on the generalization of Newton's gravitational theory to time-dependent systems. By analyzing causal gravitational relations, I find that there is no objective reason for abandoning Newton's force-field gravitational theory in favor of a metric gravitational theory..." This is a significant claim, and whether or not it is correct, since we use Newton's theory all the time, the least we should learn to do is apply it in a way that doesn't treat gravity as instantaneous. He goes on to say: "I base such an expansion, or generalization, on the existence of the second gravitational force field, the 'cogravitational, or Heaviside's, field' (except for a numerical factor, the cogravitational field is the same as the 'gravimagnetic' field of the general relativity theory). This field was first predicted by Oliver Heaviside in his 1893 article 'A Gravitational and Electromagnetic Analogy.'"

The "gravimagnetic" field is more often called the gravitomagnetic field. It is a force created by moving masses that acts only on other moving masses. I did a quick Google search on the term and it turned up a lot of crap, but this link yields a brief, accurate description: <http://www.aip.org/pnu/1996/split/pnu295-2.htm>. It says: "A gravitomagnetic field, according to the theory of general relativity, arises from moving matter (matter currents) just as an ordinary magnetic field arises from moving charges (electrical currents)." This is why I said above that I hadn't forgotten that moving charges create magnetic fields—because moving

masses also produce a force analogous to magnetism, in both GR and the generalized Newton's theory. Wikipedia isn't always a good source, but for a bit more information, this entry seems okay: <http://en.wikipedia.org/wiki/Gravitomagnetism>.

Recall that Jefimenko said there's "no objective reason for abandoning Newton's forcefield gravitational theory in favor of a metric gravitational theory..." If true then in principle experimental results will allow us to discriminate between the two theories, but I'm not holding my breath waiting for that to happen. It's hard enough just trying to measure the gravitational constant "big G" to high accuracy. And the full theory of generalized gravity predicts several other forces besides the first two (for instance, the "gravikinetic" force, associated with accelerating masses) which makes it even more complicated than it looks at first glance. It will be awhile before we can make predictions numerically accurate enough to check one against the other. That having been said, perhaps we can look to the heavens and see if the generalized theory might explain some phenomena that we as yet don't understand too well.

As I skim through the pages I am once again astounded by the number of examples worked out for simple systems moving at ordinary velocities (much less than c), and the implications of them. For instance, the title of chapter 14 is "Torque Exerted by a Moving Mass on a Stationary Mass" and therein Jefimenko applies the generalized theory of gravitation to multiple examples of this phenomenon. Example 14-3, derives the torque for a point mass moving in a circular orbit, analogous to

a planet revolving around a star. The result shows that a planet exerts a torque on the star, making it rotate faster in the same sense that the planet is revolving. Since a star is not solid, planets in her equatorial plane would cause the equatorial region to rotate faster than the polar regions. Jefimenko, having “looked to the heavens” before us thinks this effect may explain why the equator of our own Sun rotates faster than at the poles.

Chapter 7 is called “Differential Equations for Gravitational and Cogravitational Fields; Electromagnetic Analogy.” This chapter shows how very similar the generalized theory of gravitation is to Maxwell’s electromagnetism. Jefimenko puts the value of this as simply as one can: “An important consequence of this similarity is that many methods and techniques originally developed for solving electromagnetic problems can be used for solving problems involving gravitational and cogravitational interactions.” It is not so simple as substituting one Greek letter for another, however. For instance, there is a gravitational induction analogous to electromagnetic induction, but is there anything analogous to assorted magnetic materials? Or dielectrics? Or even an ordinary conductor, let alone a superconductor? Jefimenko is well aware of this and quite clear that we are speaking of an analog here.

To even things out, we have chapter 19 called “Gravitation and Antigravitation.” Here we find “gravitational equations depicting ‘nonlinear’ gravitational effects (that) do not have their electromagnetic counterparts.” Unfortunately, though I could

hack out a brief description of what's in the chapter, I can't do it and have it make sense to you without your first reading the previous 18 chapters. Suffice to say that the generalized theory of gravitation allows for the existence of stellar and intergalactic antigravitational mass configurations. This is not about ordinary matter being put into some magical shape that makes it repel other matter. Rather, it is that the net gravitational field in free (empty) space, like between galaxies, can be repulsive rather than attractive.

What might we see if we consulted the heavens about that possibility? Cosmic acceleration perhaps?

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IN TIMES TO COME

Our March issue features a mix of fiction and fact varied in all ways, from writers old and new, on scales from very large to very small, and in settings from very near to very far. Paul Carlson, who made his debut here a couple of years ago with “Shotgun Seat,” his quietly sneaky tale of robotic revolution, is back with a follow-on called “Rule Book” (but you don’t have to have read the earlier story to enjoy this one). John G. Hemry offers another of his unique variations on time travel; Bud Sparhawk covers everything (and I mean everything) in “Astronomic Distance, Geologic Time”; and Jerry Olton looks at another way changes in how we live can permeate how we think, feel, and judge.

Edward M. Lerner’s article “Say What? Language, Communication, and Science Fiction” we’re billing as a science fact article, and it is— but we could just as easily have called it a how-to for science fiction writers. It’s both, and whether you’re interested in language for its own sake, or for how you might use it (or be tripped up by it) in writing your own stories, I think you’ll find it fascinating.

THE REFERENCE LIBRARY

Don Sakers

Science fiction is unusual among the genres because it routinely appears in all different lengths. This isn't quite the case with other types of fiction. It's rare to see romance stories shorter than novella-length; historical fiction and thrillers almost exclusively appear in novel length or longer. Fantasy and mystery short stories do appear, but the dominant form in both genres is the series of novels. Only in science fiction do readers regularly find works of all lengths from the short-short all the way up to the novel series, and everything in between.

I should pause here for some definitions. Most SF readers are accustomed to a division of short fiction by word counts, as codified in the rules for the Hugo and Nebula Awards. A short story is anything up to 7,500 words; 7,500 to 17,500 is a novelette; 17,500 to 40,000 is a novella; and anything over 40,000 words is a novel. This system, while useful and necessary for the fair administration of awards, leaves something to be desired from a literary criticism standpoint.

In lit-crit circles, a primary distinction is made between the short story and the novel. A novel generally features many characters and multiple subplots, has a broad range in time and space, and explores the world (or worlds) and culture(s). A short

story, by contrast, focuses on a small number of characters (generally three at most) and has at most one subplot, is sharply limited in time and space, and illuminates one aspect of a world or culture.

A novelette is essentially a long short story, with the same focus and economy; a novella is a short novel, sharing the novel's broad range only in fewer words.

This whole scheme is complicated by the economics of publishing. Prior to the mid-1970s, it was uneconomical to publish science fiction books of much over 200 pages (about 60,000 to 70,000 words). Nowadays, the average novel runs between 300 and 400 pages (about 100,000 to 150,000 words) and 500+ pages is not unusual. In today's terms, most of the classic works of the past—most of books of Poul Anderson, Isaac Asimov, Arthur C. Clarke, Gordon R. Dickson, Robert Heinlein, Ursula LeGuin, Anne McCaffrey, and a hundred others—would be considered novellas. At the time they were published, though, they were full-grown novels one and all.

I need to make special mention of some length categories that aren't covered above. If a short story is focused, then a "short-short" is a laser beam, usually clocking in at under 1,000 words and concentrating on one single event or idea: Analog's "Probability Zero" stories are short-shorts. And the series is definitely a literary form in its own right—I covered the various kinds of series in the June 2010 issue.

In the beginning, there were only novels. The first

recognized short story writers were Edgar Allan Poe and Nathaniel Hawthorne in the 1840s, but short stories didn't become commercially widespread until the arrival of the pulp magazines in the early 1900s. The ascendancy of Street & Smith Publications in the 1910s brought about the era of genre pulps: magazines dedicated to romance, mysteries, adventure, sports, westerns . . . and, of course, science fiction. (The magazine you're reading is perhaps the last remaining vestige of that era, having started its life as the pulp *Astounding Stories* in 1930.) Even in those days, science fiction magazines regularly published novel-length works in serial form.

World War II paper shortages damaged the pulps—competition from comic books, paperbacks, and television destroyed them. Writers in most other genres moved almost exclusively to novels—but science fiction magazines thrived, and writers continued producing short fiction. Books of short stories appeared, whether single-author collections or multi-author anthologies. Although the magazines faced difficulties (and still do), short fiction remained a perfectly viable length for science fiction . . . as it does even today.

At the other end of the scale, science fiction novels expanded. The 1960s brought Heinlein's *Stranger in a Strange Land* and Herbert's *Dune*, both considered exceptionally long novels for the time. Trilogies and longer series proliferated. Science fiction settled into its current range across all lengths of fiction.

The obvious question is why: what is it about science

fiction that allows it to thrive at all lengths? One is tempted to credit tradition, the historical accident of the SF magazines' survival and their continued outlet for short fiction—but that merely begs the question. Why did SF magazines survive, of all other genres?

I believe that the true answer lies in the unique nature of science fiction. All fiction is entertainment, but SF aspires also to stimulate the intellect and provoke thought. In the postwar world, comics and television could supply entertainment, but not intelligent thought. Science fiction is, and always has been, primarily a literary form.

Ideas come in all sizes, short and long, simple and complex, focused and broad. Concerned as it is with ideas, science fiction likewise fits a variety of lengths. That, I believe, is why you'll find SF in every length from short-short to twenty-volume series.

Warrior Wisewoman 3

edited by Roby James

Norilana, 306 pages, \$12.95 (trade paperback)

ISBN: 978-1-60762-061-7

Series: Warrior Wisewoman 3

Genre: Anthology

I mentioned above that science fiction short stories continue to appear, and not just in the magazines. The anthology of original stories has been a mainstay of science

fiction since Frederik Pohl edited the first volume of the Star Science Fiction series in 1953.

For the third year in a row, editor Roby James has put together an anthology of science fiction stories that feature powerful and remarkable women. These stories are all quite definitely science fiction, and there's something here to please every taste. Among the standouts are Aimee C. Amodio's "Tourist Trap," which describes an alien world with a uniquely dangerous ecosystem; Al Onia's "The Envoy," featuring a peacekeeper whose methods are truly unexpected; and "Katyusha's First Time Out," a story of a teens rebellion against her mother set in a post-apocalyptic world. "Dark Mirrors" by John Walters turns military science fiction on its head, examining the choices that a woman of conscience must make in the face of war.

In her introduction, editor James counters a widely-held misconception about the Warrior Wisewoman anthologies: she does not exclusively publish stories by women. In fact, this volume very nearly achieves gender parity: ten of the stories are by women, nine by men.

If you like good short science fiction, you'll definitely want to get a copy of Warrior Wisewoman 3.

After the Sundial

Vera Nazarian

Norilana, 222 pages, \$9.95 (trade paperback)

ISBN: 978-1-60762-077-4

Genre: Single-Author Collection

Vera Nazarian has become primarily known as a publisher; she's been making quite a name for herself with Norilana Books, one of the newest and most prolific small presses in SF/fantasy. But Nazarian is also a writer, and a darn good one. Best known for lyrical fantasy such as *Lords of the Rainbow* and *Dreams of the Compass Rose*, Nazarian also does science fiction, and *After the Sundial* is a collection of short stories, poems, and a novella. If there is a common thread among these pieces, it is that each of them deals with time in some fashion.

"The Ballad of Universal Jack" tells the story of a space-station worker who makes a fundamental discovery about the power of words. In "Mount Dragon" a human helps an ancient intelligence achieve the goal it has forgotten, while "The Ice" concerns an exploration mission crashed on Titan.

The bulk of the book, clocking in at over 100 pages, is the lyrical novella "The Clock King and the Queen of the Hourglass." This story is set on a marvelous far-future Earth whose major feature is the mysterious River That Flows Through the Air. Young Liaei, the Queen of the Hourglass, has a destiny. She is born of pure ancient human DNA, preserved for millennia, in order that she might mate with the Clock King. Their children, it is hoped, will survive the coming collapse of civilization and preserve knowledge through the coming dark ages.

"The Clock King and the Queen of the Hourglass" reads like vintage Roger Zelazny, with an added flavor all Nazarian's

own.

All things considered, this collection is definitely worth your time.

Dragongirl

Todd McCaffrey

Del Rey, 464 pages, \$26.00 (hardcover)

E-book: \$26.00 (Fictionwise) \$9.99 (Kindle, Nook)

ISBN: 978-0-345-49116-9

Series: Dragonriders of Pern 24

Genre: Animal Companions, Beloved Worlds, Dragons

The Dragonriders of Pern series started as short stories published in Analog. Over the decades the books (like the series itself) have grown longer; at 482 pages, Dragongirl is longer than the first two Pern books put together. It is also the sixth book of a sub-series set before and during the Third Pass, when civilization on Pern is threatened by two different menaces, which together may destroy all human life on the world.

If all of the above is gibberish to you, then you must not have had the fortune to read the Pern books—and Dragongirl is not the book for you. Go back to the beginning of the series, Dragonflight, and start reading there.

For the rest of you, Dragongirl takes up where the previous book, Dragonheart, ended. In that book, a plague was killing dragons all across Pern—just when the all-consuming menace

called Thread was beginning to fall. Since the telepathic dragons and their human riders are the only defense against Thread, things looked bad. Fortunately, dragons have the ability to travel through time as well as space. Fiona, who rides the gold dragon Talenth, accompanied the injured dragons and riders to the past, where they could take time to heal and recuperate.

Now, in *Dragongirl*, Fiona and her charges return—three years older on their own timelines, but coming back after only days after they departed. Although the plague is still killing dragons, the returnees are strong enough to fight Thread. After being in charge for three years, Fiona has trouble fitting in as a junior . . . until tragedy strikes and she is thrust once again into a position of authority. Her charges are happy to follow her, but some of the stay-behinds are reluctant to take orders from someone they see as only an inexperienced girl.

Characters from the earlier books return, including the harper Kindan whom Fiona loves, as crisis follows crisis and Pern hangs in the balance.

This is Todd McCaffrey's third solo Pern book (he co-authored three others with his mother, Anne McCaffrey). He channels his mother well; if not for the byline, one would be hard-pressed to guess whether this was a solo effort or a collaboration. Everything we love about Pern is here: world-menacing threats, family and romantic relationships among characters we really care about, love between alien dragons and their human riders, and especially the all-important sense

of wonder. As always, the immediate story comes to a satisfying conclusion, but plenty of room is left for the next book.

Fans of Pern will be enchanted and delighted at this book.

Noise

Darin Bradley

Spectra, 222 pages, \$15.00 (trade paperback)

E-book: \$9.99 (Kindle) \$10.12 (Nook)

ISBN: 978-0-553-38622-6

Genre: Cyberpunk, Dystopian Futures

Since this month's theme is stories of different lengths, I am tempted to call Noise "short and sweet"—except "sweet" just doesn't apply, in so many ways. Let me simply note that in the past, this would have been classified as a standard-sized novel; nowadays it is perhaps a long novella. Which shows you exactly how artificial such length divisions ultimately are.

Set in the very near future, Noise is a story of economic and social collapse, and of those who live through it.

Hiram and Levi are hackers and Dungeons & Dragons players when the collapse comes. Fortunately, they are prepared with The Book, which tells them everything they need to know. They compiled The Book from the pirate broadcasts of an anarchic group known as Salvage, broadcasts that went out on the unused airwaves after the switch to digital TV was complete. Amid static and noise, Salvage has been warning of the coming collapse, and giving advice on how to survive in the

chaos of a fallen world.

So Hiram and Levi set forth, prepared for the newly-violent world around them, in search of a place of safety called Amaranth, where they can begin to build the world anew. Along the way they gather a band of hackers, malcontents, and misfits.

But in the real world, things aren't as cut-and-dried as The Book makes them seem, and cold-blooded decisions aren't as easy to make as the boys thought they would be. In the final analysis, Hiram and Levi are left with choices to make . . . and their choices will affect the sort of society that finally emerges from the collapse.

Edgy and disturbing, Noise is a worthy successor to all those post-holocaust books of yesteryear.

Wookiee-Ookies

Kevin Bolk

Interrobang Studios, 16 pages, \$5.00

Ensign Sue Must Die

Clare Moseley and Kevin Bolk

Interrobang Studios, 32 pages, \$6.00

Purchase from interrobangstudios.com

Genre: Parody comics

And now, as they say, for something completely different. I know I said science fiction was primarily a literary form, but SF

is also movies, and comics, and humor. These two full-color books of comic strips combine all three in a package that's enchanting, whimsical, and too funny for mere words.

Artist Kevin Bolk draws his characters in the style that the Japanese call "chibi" and we refer to as "cute." With oversize heads and enormous eyes, even the obvious adult characters appear to be a well-seasoned ten years old. Yet these aren't Peanuts kids...their humor owes more to South Park than to Charles M. Schulz.

Wookiee-Ookies is, as you'd expect, a series of twisted Star Wars parodies. Each four-panel strip stands on its own and makes a definite joke, usually irreverent and always funny. Princess Leia's reaction to dinner with Jabba the Hutt ("I hate Internet dating") is only one of the treats.

Ensign Sue Must Die is a continuing story set in the universe of the most recent Star Trek movie. It chronicles the adventures of a perky newcomer to the Enterprise, Ensign Mary Amethyst Star Enoby Aiko Archer Picard Janeway Sue, as she inspires dread and hatred in the other members of the crew. The poor crewmembers try everything they can think of to get rid of Ensign Sue, but she keeps coming back for more.

The story and art are funny enough on their own terms, but Ensign Sue Must Die is also a clever meta-commentary on the so-called "Mary Sue" phenomenon, in which fan writers insert themselves as characters ("Mary Sue") in their favorite TV shows or movies. Ensign Sue Must Die skewers every dreadful

trope of the Mary Sue story, and ends with a horrifying evil loosed on the worlds of fiction.

There you have it: long and short and everything in between, another assortment of fine SF to start the new year off right.

Don Sakers is the author of *The Leaves of October* and *WA Voice in Every Wind*. For more information, visit www.scatteredworlds.com. Genre and series information is based on listings at www.readersadvice.com.

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BRASS TACKS

Dear Stan,

Well, this is a first. I haven't even finished reading this month's issue yet (September 2010), and I'm already dropping everything to write you and let you know that this one is the best ever.

The "Leviathan" story (Eric James Stone) was a pure joy. Its simplicity and sincerity were just right from a thematic standpoint. When the theme of a story is integrity, it makes sense for that story to have a straightforward structure. And Stone's clear language fits the theme perfectly also.

I hope I can be forgiven for reading the stories in Analog as if through the eyes of my father. Ira Thomas Myers was a subscriber for decades. He passed away in 1995 at the age of 70. Part of the reason I started my subscription just about two years ago was that I remembered seeing Analog around the house when I was a child, and I knew how much enjoyment he got from it.

Each time I read a story, I find myself wondering how Dad would have reacted to it. I know what his reaction would have been. He would have loved it.

Dad was a high priest in the Mormon Church, and Stone's story captures with perfect accuracy the beliefs, attitudes, and

behavior of Mormons. An astonishing achievement, and I know that Dad would have been beside himself with joy.

The ending of the story was very satisfying also.

So that story blew me away. Then the fact article was by H.G. Stratmann, who is my favorite. You should publish something by him every month. I prefer his fiction, but the fact article was a marvel of clarity and informativeness. I like listening to people who are actual experts.

Rusch works magic. Her story "Red Letter Day" affected me so intensely that I was moved to write my own letter to my 17-year-old self. I held back all the bad news—that's what most people do, right? Anyway, I'm not sure what I had to tell him was bad news. Most people would think so, but I don't know.

At any rate, that's what science fiction is supposed to do—that's what it's supposed to be. Thought provoking, with emotional impact, and based upon a hypothetical technology.

"Pupa" was great (David Levine). Extremely creative. I like to read writers that set themselves hard technical challenges, and the point of view in "Pupa" definitely constitutes a challenge for an author. It is so easy to accidentally (unconsciously) let human-specific attitudes slip in. (Or rather, since we have no idea what attitudes are human-specific, I guess the mistake I'm referring to would actually be letting an alien character demonstrate attitudes which displease the acute reader by seeming human-specific.) Furthermore, how does an author advance his plot? It's possible, of course, and Levine pulls it off.

A treat.

Well, I can't let you go without a little criticism. A letter with nothing but glowing praise in it would be awfully boring, wouldn't it? Here's a little constructive criticism—how about a few more illustrations? I like illustrations. Don't go crazy, but one or two more per issue would be nice. They could be small, even.

And here's a warning on time-travel stories. I know I just praised Rusch's offering, but still. Be careful, Stan. I measure time-travel stories against "By His Bootstraps" and very few measure up. I'm just saying that my recommendation is you should look askance at time-travel stories.

But I'm reaching, I know, because what is there really to criticize Analog for? Nothing, that's what. You guys are great. Thank you for the good work that you and your team does.

Sincerely,

Christopher Myers

Lovelock, NV

Dear Stan,

In the media frenzy following hurricane Katrina, I was quite gratified to see that, for the most part, the scientists interviewed made a point of emphasizing that there was no reason to think that Hurricane Katrina had been caused by global warming. In fact, there was, at the time, not a clear consensus that the number of hurricanes would be increased by global warming (although there were some preliminary models suggesting that

they might be).

So I was quite baffled by Jeff Kooistra's recent column discussing anthropogenic global warming ("AGW"), where he crows about his success in "confronting the claims being made that hurricanes were going to be more frequent and powerful than ever due to AGW." Wait—what claims? Kooistra refers to the April 2007 column, which referred to a two-page Popular Science article from 2006. Reading that article, I found the text that mentioned global warming: two sentences that quoted no scientists and made no actual predictions.

So, when he says that he was right, and the non-scientist writing for Popular Science was wrong, because "the years following Katrina had relatively calm hurricane seasons"—this relates to the science of global warming not at all. Even if hurricane frequency would be affected, this would be seen over a time scale of many decades, not one or two years. He is "confronting" a popularization, not the science.

This is, unfortunately, the problem with most of the so-called skeptics—they get their science from popularizations, not from the real science.

The greenhouse effect, in its basics physics, is quite simple. Like anything with a temperature above absolute zero, the Earth emits infrared radiation. Some of this infrared radiation is absorbed by trace gasses in the atmosphere. This energy is eventually re-radiated (also in the infrared) in all directions, and some fraction of it returns downward. That

downwelling energy from the atmosphere adds to the total energy budget heating the Earth. (This is called “radiative forcing function.”) So the question that needs to be addressed by the skeptics is: why shouldn’t the average temperature of the Earth increase if the input power heating it increases?

I use a simple test to distinguish true skeptics, people who want to understand the real science, from people who only repeat information that confirms pre-set opinions: I ask, have they read the science? Or only the critics? In the case of anthropogenic global warming, I ask whether they have read the IPCC Working Group I report, “The Physical Science Basics.” This is the basic report explaining the underlying science—it’s easy enough to find; it’s on the web.¹ But here is a remarkable fact: although dozens of people claiming to be skeptics write to me, talk to me, and send me their opinions, when I ask if they’ve actually read the report they’re criticizing, the answer, so far, has always been “well, no, I haven’t actually read it.”

Okay: if you haven’t read the report, why not? You don’t want to learn the science, or what the data is that supports the science—but you will uncritically accept all the criticisms?

That isn’t skepticism—that is denial.

Geoffrey A. Landis, Ph.D.

<http://www.geoffreylandis.com>

1. The IPCC Fourth Assessment Report: Working Group I Report “The Physical Science Basis” can be found, among other places, at <http://www.ipcc.ch/ipccreports/ar4-wg1.htm>.

This report is a review—in its way a popularization, not primary science—and the real student will want to delve into the references, peruse the related textbooks, and find the associated literature. But it's a good place to start. Dear Dr. Schmidt, There is a scenario or subplot (or worse, a plot) that occurs often enough in ASF to be a trite cliché. It appears in military, government, commercial, etc. milieus. In it we have a junior and a senior member of the crew, scientific group, engineering, etc. organization. There is (of course) a problem to be solved. The senior member gives the junior member explicit instructions to be followed. The junior member argues for a different course of action but is overruled by the senior member.

The junior member goes off on the mission. He decides he knows better and follows his own path, disobeying his orders. It turns out that he was correct and the senior member was wrong. A terrible tragedy is averted. The senior member chares the junior member with disobedience to orders, resulting in an investigation, trial, court martial, etc. The defense counsel (perhaps a beautiful woman?) successfully saves the junior member and causes the senior member to be punished in some manner.

Of course there are large numbers of variations on this theme possible, so there is unfortunately no danger of running out of them.

In my own experience in the military and the aerospace industry I have never seen or heard of anything even close to this scenario actually taking place. Senior members know

better than to give detailed instructions to the man in the field. Give him his goals and let him work out his actions.

Nowadays if the actual situation is not what was originally estimated it to be, the junior just gets the senior on the phone and requests new instructions. If the two are out of contact for some reason, the junior is on his own. If he deviates from his instructions and turns out to be right, he is congratulated for his initiative. If he deviates from his instructions and turns out to be wrong then some court or board or panel, etc. Decides whether his actions were justified by the situation as he found it. This might not be a yes or no verdict, but a nuanced judgment of his actions taking into account the “fog of war.”

People in authority just aren't as stupid as this scenario implies.

If you want to see a real screw-up read about Adm. Halsey and the Battle of Leyte Gulf. (Chose a recent book. Victory at Sea [TV] and the books written while Halsey was still a living hero were cover-ups.)

Yours Truly,

James C. Wilcox

Palos Verdes Estates, CA

You've been lucky—I've seen plenty of cases in which people in authority did behave stupidly, including micromanaging jobs that they didn't understand at the “hands-on” level. And in any case, interesting stories are likely to be that way in part because they deal with unusual rather than

routine situations.

The course of history can be changed but not halted.

—Paul Robeson

Opinion is that exercise of the human will which helps us to make a decision without information.

—John Erskine

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2010 Index

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Welcome to the year 2011! As usual, we're asking you to choose your favorites via the Analytical Laboratory. Not only will your votes provide tangible awards for authors and artists, but your feedback will help guide the selections we offer you in the future. Your vote is important!

Look over all your copies of Analog dated 2010, or refer to

the index on the following pages. Pick your three favorites in each of the following categories: novella, novelette, short story, science fact article, and cover. If you're not sure about a piece's category, you'll find it listed both in the Table of Contents for the issue in which it appeared, and in the Index. In the event of a disagreement between the Table of Contents and the Index, the Index should be considered correct. List your choices in order of preference (your favorite in each category is #1) on the ballot below, and either mail it in or send it by e-mail. You can also vote at our website, www.analogsf.com. The ballot is intended to make it easier for you to vote, but if you don't want to cut it out, feel free to copy it.

To be sure your vote counts, please have it reach us by February 1, 2011.

Please, only vote once! Thank you very much!

Votes via snail mail: AnLab, Analog, 267 Broadway, 4th Floor, New York, NY 10007.

Votes via the Internet: www.analogsf.com or analogsf@dellmagazines.com

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UPCOMING EVENTS

Anthony Lewis

4–6 March 2011

POTLATCH 20 (Non-profit, literary event for the readers and writers of speculative fiction; proceeds benefit Clarion West) at Domain Hotel, Sunnyvale CA. Book of Honor: *Earth Abides* by George Stewart. Membership: \$55 until 30 November 2010 (check website for updates), Youth (7-17) \$25, Under 6 free (must be accompanied by adult member). Info: <http://potlatch-sf.org/>; Potlatch 20, c/o Lyn Paleo, PO Box 3400, Berkeley, CA 94705.

4–6 March 2011

WILD WILD WEST CON STEAMPUNK CONVENTION & FESTIVAL at Old Tucson Studios & Hotel, Tucson City Center, Tucson, AZ. Concerts, discussion panels, workshops, stunt shows, dinner theater, gaming, fashion show, art show & more. Guests: League of S.T.E.A.M., Bruce & Melanie Rosenbaum, Victoria Moore & Thomas King. Memberships: three levels of passes plus event tickets—see website for details. Info: <http://wildwildwestcon.com/>

11–13 March 2011

FOGcon (literary-themed: *The City in Speculative Fiction*) at Holiday Inn Golden Gateway, San Francisco, CA. FOG-

Friends Of the Genre. Guests: Pat Murphy, Jeff VanderMeer. Memberships: \$65 until 1 February 2011, \$75 at the door if available. Youth (11-17) \$45, Child (0-10) free but must be under constant direct supervision of a parent or guardian. Info: <http://fogcon.org/>; fogcon@fogcon.org; FOGcon, PO Box 3764, Hayward CA 94540.

16–20 March 2011

International Conference on the Fantastic in the Arts (academic conference: The Fantastic Ridiculous) at Airport Marriott Hotel, Orlando, FL. Guests of Honor: Connie Willis, Terry Bisson, Andrea Hairston. Registration and tickets: see website for details. Info: <http://www.iafa.org/>.

25-27 March 2011

NOVA ALBION STEAMPUNK EXHIBITION (theme: Wild Wild EAST) at Hyatt Regency Santa Clara, Santa Clara, CA. Guests of Honor: Cherie Priest, Paul Guinan, Annina Bennet. Outdoor kinetics and steam enclosure, hands-on maker workshops, academic presentations, panel discussions, book signings, 3 vendor areas, a museum of curiosities, art gallery, game room, Miss Kalendar's Salon, and features the Asian steampunk art of James Ng. Tickets: \$40 (subject to increase). Info: <http://steampunkexhibition.com/>

17–21 August 2011

RENOVATION (69th World Science Fiction Convention) at Reno-Sparks Convention Center, Reno, NV. Guests of Honor: Ellen Asher, Charles N. Brown, Tim Powers, Boris Vallejo.

Membership from 1 October 2010 until some later date (see website for latest details): Attending Adult: \$180; Attending 17-21: \$100; Attending-0 to 16: \$75; Supporting: \$50. [Ages as of 17 August 2011]. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Nominate and vote for the Hugos. Info: <http://www.renovationsf.org/>, info@renovationsf.org, PO Box 13278, Portland, OR 97213-0278. Facebook: [http://www.facebook.com/pages/Renovation -The-69th-World-Science-Fiction-Convention/112169025477179?ref=ts](http://www.facebook.com/pages/Renovation-The-69th-World-Science-Fiction-Convention/112169025477179?ref=ts); LiveJournal: <http://community.livejournal.com/renovationsf/>

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At Cross Purposes

Before you come to an agreement with somebody else, you have to understand what they want—on their terms, not yours.

Juliette Wade

1. Lynn

The more sector done; we shuck off our helmets with a groan and strap into the shuttle, guys in back and me in the pilot's seat. Six hours in a suit dusting rigs and adjusting chemical mixes will pretty much wear you out. I take us up in a wide circle, as a kind of salute to the part of me I've left in each of these big machines over the years. In glaring sunlight, the newly cleaned rigs twinkle like a pattern of tiny stars against the gray desolation of Kasemsarn's world—a.k.a. our big experiment.

But eyes can't see what we've really accomplished.

When I look at K's world, I see the color of numbers flowing. Numbers in the ice trees that branch under the soil; numbers in the still-too-thin atmosphere that tell me our machines are working, shifting molecule by molecule until the balance tips. Numbers will bring life to this place, they say, in our lifetimes.

As I pull out of the curve, a shadow on the instruments

grabs me by the heart.

A cloud?

It's ultra-high altitude, around 200 kilometers. I can't help my adrenaline reaction—I'm tempted to abandon course and go looking for it.

"Sung, Kenneth," I say over my shoulder. "Can you guys see this?"

No answer. The guys always like to gossip in back, and right now they seem awfully excited. I glance over my shoulder, dip in an ear just as Kenneth says, "Bloody hell, you got this from the Headmistress? I'd heard the rumor, but—"

"Seriously," says Sung. "A hacker in the system."

My blood vessels freeze stiff. We might call her Headmistress, but Doris Grabko is Chief of Information Security. "Kenneth, what are you talking about? A hacker?"

"I know, unbelievable, right?" he says. "But people have been talking about it, even though there isn't a ship anywhere near enough to pick up our comm traffic, much less hack our systems."

Sung snorts, "So either she's imagining things, or someone's hacking from the inside."

"It can't be," I say, and my voice breaks. "Everybody knows Doris is a control freak." I just hope she doesn't have Sung's grasp of logic! Could she have found what I did?

"Don't stress, Lynn," says Sung. "It'll be okay—if there is a

hacker, the Headmistress will destroy him long before he can ruin all our work.”

As if I'd ever ruin our work! I'm trying to save this project—from an oncoming asteroid, an earthquake, or who-knows-what disaster. Dr. Kasemsarn struts and puffs about his genius terraforming concept, but he hasn't given a single thought to the devil in the details, not since they gave him a planet with his name on it. He spent almost ten years gambling the entire project's success on a centralized control program. Single point of failure, hello?! Anyway, I didn't really hack his baby; it's still purring along in its own little machine. I've just borrowed enough processing power from each rig we visit to give that baby a twin inside a distributed, virtual machine—a backup that no single catastrophe can shut down.

“Guys,” I say, grateful for an excuse to get off the topic. “Can you look at this reading? Does that look like a cloud to you?”

Kenneth and Sung sit up straighter. “Cloud! Where?”

“I'm not sure.” Suddenly the red comm light flashes beside my right hand. “Just a sec—” I punch it. “Shuttle Five here.”

“Hey, Shuttle Five.” It's Kelly from Base, and she sounds scared. “We've got an emergency shaping up. Three unidentified shuttlecraft, incoming.”

“What?!”

“They'll be down here in less than a minute—George is taking the defense team out to meet them. You guys better hold

tight there for a while until we can confirm their intentions.”

“Okay.”

Stunned silence in the cabin. We pass our coordinates for the next set of rig checks without even slowing down.

At last Sung says, “How can there be unidentified shuttles with no mother craft?”

“Shuttles don’t come out of nowhere,” Kenneth agrees.

A thought clenches my heart into a fist. “Unless what I’m seeing isn’t a cloud. Two hundred kilometers is low orbit. ”

“Shit,” says Kenneth. “If Base is in trouble . . .”

My hands are already flying over the controls.

2. Tsee

Unexpected aliens—truth! Oh sing, sing!

I dance eager rhythms with my feet, even while we maintain control of our planet-diver. By my side, Chkaa my brother shares this excitement, observed: His eyes are bright, his whiskers held forward in anticipation. Together we bring the planet-diver down to rest on the gray glimmering dust, and leap from our control station in the same second, exhilarated, ready.

This planet was supposed to be lifeless, witnessed. It was supposed, overheard a thousand times, to be for the Purpose of others. How surprised, then, were the architects and constructors, choreographers and dancers when we discovered live creatures in our ship’s witness! For a dead planet may serve the designs of the Form Purpose and the celebrations of

the Performance Purpose, yes, but aliens properly belong to followers of the Great Tree Purpose.

To us—joy!

Hereby we claim them, bringing down our own planet-diver alongside those of the other Purposes, landing beside the largest of the alien constructs—the alien nest-place, speculated.

Quickly we prepare a linguistic model-projector for the interaction. Hail the Great Tree Purpose, which beckons to us from outside this door, calling, Pursue, pursue! Chkaa looks at me—we touch noses—ready. We activate our protective bubbles and hop out.

The aliens come to meet us. Eight, counted. In physiology their heads resemble the inhabitants of the Diditsaatsi planet, observed, inside transparent helmets; beneath their opaque suits the similarity continues, likely, for the limb positions match. Pointed at us are weapons, deduced—these aliens are as wary as the Rodhrrrdkhi, suspected. But unlike Rodhrrrdkhi they allow us to step free of the planet-diver into their midst.

“Oh, Tsee, sealed suits. They really are spacefarers,” croons Chkaa, merging our bubbles, leaning his whiskers close to mine. He touches our hands together in rhythmic patter—his habit when excited with Purpose.

“Speculated,” I caution him. But my heart drums, truth! For to travel space, a creature must possess the glimmer of higher intelligence, necessarily, and higher intelligence requires an

understanding of a pfaa—the duality that holds agreement in one hand and conflict in the other. Apfaa is a law of nature: for one side, always the other to match—truth!—and for one force, always its equal opposite. Those who live as isolates are planetbound, witnessed. And no aliens have ever lived as apfaa, like us, but neither have any traveled the stars.

The nearest aliens cry out thin sounds that wake the model projector between my hands, a subtle vibration within its dome, and they wave their weapons at us, keeping their bodies between us and their low, ugly building. Energy weapons, deduced—but whether strong enough to penetrate our bubbles, unknown. They need our reassurances, surely, and we need more of their talk. So we set the projector in the dust and hold out our hands. The most successful approach to wary aliens, witnessed, is that of joy.

“We are ChkaaTsee GreatTreePurpose. We dance our apfaa,” I say, and Chkaa, “Apfaa, apfaa.” We raise our voices in harmony and dance for them. My brother is big, his movements fluid. Chkaa is the deep-water shadow, beauty, his dark fur a mystery beneath the white labyrinths he has painted on his body. I am smaller, sharper. Tsee is the glint of light on ripples, and my golden cape-net sparkles with jewels, beauty, in the unnatural bright light. We are the apfaa ChkaaTsee, truth, and our dance brings the spirit of the river to this lonely, dry dust.

The aliens slowly lower their weapons—oh, welcome! They speak more sounds. Projected from their helmets, speculated. The sounds are thin in the half-breathed atmosphere of this ice

desert, but enough, it seems, for capture by the flickering model projector.

“We come here for Purpose,” says Chkaa. “Our species is named Cochee-coco: Pursue-Purpose, pursue, pursue.”

“Truth,” I chime. “And our ship is Star-Pattern-Celebration.” We’ll have to say this again later when the projector is fully functional, certain, but for now it’s enough just to make talk. “What is your species?”

“Hear, hear,” says Chkaa. “And what is your Purpose?”

A dark-faced alien takes a step toward us, speaking sounds. We strain to catch vowels, consonants, but then, ow!

A terrible shrieking sound breaks all understanding—it’s coming from the low building behind them, observed, where lights now flash crazily, red and white. The aliens raise their weapons at us—ah, no—four of them run away toward the building and the remainder yell at us. Anger, certain.

“Ship,” I cry, “speak, what has happened?” And Chkaa, “Speak, speak!”

The aliens scream when they hear our voices. They shoot weapons at the model projector, and energy reflects from its curved surface—bounces away, observed, but leaves behind a dull glow that suggests power enough to damage it, possibly, certainly enough to damage u s. The weapons are at our faces now; if we try to f lee, do they shoot? I recurve my back, making myself smaller, and raise my hands to them.

“Peace, peace . . .”

“Peace,” says Chkaa.

Then voices from the ship speak out of the sphere-of-witness strung around my neck. “The Form Purpose pursue the improvement of this ugly alien edifice, but the aliens attack them!” “Unprovoked, witnessed!”

Not unprovoked, perhaps—I speak low. “Have the Form Purpose tried to construct? Have they changed the edifice?”

Aliens jump at us, screeching, weapons pointed at our noses. Punished for speaking? Oh, disaster! Another grabs the model projector. Now we’re seized by the arms and dragged through the rough dust into the building.

A room of no color, tables and couches all squared, observed, and around it lie long-limbed alien bodies, unmoving. Dead or alive? Impossible to tell.

This is the Form Purpose’s doing, truth! We must speak!

“Ship, stop the Form Purpose fast!” I cry, and Chkaa, “Fast, fast, put back what you’ve changed, the aliens are dying!” And I, “Truth, witnessed!”

An alien shoots me. The bolt of energy hits my bubble, which spits and heats—I smell my fur singed—Chkaa shrieks in horror. I recurl myself, quick, and shut my mouth. Forceful hands against our bubbles shove us forward, help, we’re propelled down a hall toward a door and through. Inside is another featureless room, flat image-projections of the gray planet on its

walls, observed, and below them banks of colored lights and switches. One alien is lying on the floor, motionless, while another alien, wearing a suit, is standing.

One alive, one dead, oh horror! Has this one been severed? Does it berserk?

It draws a weapon.

What to hope for, oh, that this alien be isolate, knowing nothing of apfaa so it may not behave as the severed and kill us in rage? But how can we hope for this, how, how, when we've dreamed of alien spacefarers for so long?

Quick bursts of talk come from the aliens who hold our arms, answered by this lone creature who guards the inmost room. Is it enough, hoped? Will the model projector be satisfied with its intake soon, oh please, enough to allow us to pursue our Purpose, at least to try to communicate, to right this terrible wrong? We could call to the Martial Purpose for help—oh tempting—but to call them would be to relinquish our claim on these aliens in return for aid. No, truth, we must pursue!

The aliens who brought us here release our arms, but—late realization—they're leaving. They abandon our model projector on a raised table alongside the armed alien, observed; it's flickering silently. The armed alien continues to threaten us, alarming, and doesn't speak again.

Chkaa invites my gaze to his—welcome, but how shall we pursue Purpose now?

Chkaa gives a low whistle, brave, brave, and starts to sing.

Oh, I can't breathe! The armed alien listens a second, two, then speaks a sharp sound, disapproving. The projector flickers—oh please—but doesn't wake. My brother sings again; I dare a note—

The alien whirls toward me and shoots. Pain—Chkaa shrieks in fear and rage—the alien turns on him instead and shoots once, twice, three times, sparks flying—

“CHKAAAA! Brother, apfaa!” Oh, he lives but his bubble sputters—if it fails, only a single held breath keeps him from death. I dive to him, merge our bubbles, oh, let it be enough!

We will not be severed, truth! As together we were born, so together let us die!

3. Lynn

That's not a cloud.

I'm looking at the thing, and I'm still guessing. I adjust the view, magnify. “Damn.”

“It's no pirate frigate,” says Kenneth. “No configuration I recognize.”

Sung murmurs, “Guess it's not company goons from New World or Awaken Enterprises, then.”

“But you guys agree it's a ship.” It has to be. It's shaped like a coral reef, a lakeweed, or a sea sponge—but it's too symmetrical, and too solid at the middle. It shimmers with a million colors. “It has no edges—that's how it screwed up our sensors. Take a look at this energy reading.”

“That could be weapons,” says Kenneth grimly. “We’re not equipped to fight something of that size. I’d bet it’s not even Allied Systems.”

None of us say anything, but we’re all thinking it: We’ve made a serious mistake. If there’s a third spacefaring species out there, we’ve just entered a whole different game—lost our chance to try stealth, and these guys could shoot us down any second.

My airways contract and my voice shrinks. “You think I should hail them?”

“Base first,” says Sung.

We haven’t heard from Base since the claxons stopped. I swallow and depress the button. “Shuttle Five to Base. Is anyone there?”

A voice comes from the comm. “Shuttle Five, the defense team needs backup. Get down here now. ”

That’s Doris, her voice tight enough to strip gears. It scares me almost as much as the cloud ship. I take us down, praying we don’t get vaporized before we land. The hairs on the back of my neck rise, waiting for lightning.

Base looks weird. Emergency lights flashing—that I’d expect, but something else— they’ve painted it? Red, purple, green, gold, white. I can see the beginnings of a complex pattern from here. What the hell? And there’s another pattern on the ground around it, less color, more random; maybe if I magnify—

Bodies.

Oh my God, it must be half our crew, lying in the pale gray dust. No sign of whatever killed them.

I bring the shuttle down—crappy landing—and fumble on my helmet; Sung hands me a weapon, but my hands are shaking so much I don't know if I'll be able to use it. Terrafirm Inc. never trained us for Armageddon. I follow Kenneth out the door warily, with an eye for trouble that doesn't seem to be coming. Yet.

We walk among the bodies. The defense team is past needing us—there's George, recognizable because he's lying face up. I lift his arm, but I can tell there's no saving him, even though I can't see damage to the enviro-suit, or any injuries. These marks in the dust could be footprints, but they're vague, like the print of a knee, or a ball. Through the rasp of my own breathing, I hear Kenneth start to sing a lament.

"Guys, quick," I say. "Let's get to the lock."

Dust puffs under our running feet. We shut ourselves in and activate the airlock. No green light; the inside door opens anyway.

They're all dead.

Our workmates, fallen on the floor, or slumped on the tables where we used to talk numbers, play cards, or share the occasional piece of chocolate.

Sung's voice comes quietly from the speaker at my ear.

“They’ve destroyed the life support.”

“Goddamn,” says Kenneth. “Do you think these bastards killed everyone just for the hell of it? Or was it to kill the project?”

The project! Central Control—I’m already running down the hall.

“Lynn!” barks Kenneth’s voice in my ear. “They could still be in there!”

The door opens as I approach it. I jerk backwards in terror.

No, that’s not an alien or a pirate. It’s Doris. She’s standing side-to-the-door, pointing her weapon at something—someone?—across the control room. “George, quick,” she says.

“Doris, it’s Lynn.”

She wheels around.

I gulp. “George is dead.”

Doris stares for a second, pale behind the faceplate of her helmet. Then she grabs my arm. “Come on.”

She hauls me in—I almost trip over a body as she drags me to the main console. Oh, shit, that’s Kelly. . . . I crane over my shoulder, but can’t see what Doris was aiming at.

“What are we doing?”

“Kelly panicked and didn’t get to her suit,” Doris says, clipped and severe. “I need a second voice code.”

She’s hurting my arm. I blink stupidly. “Voice code?”

"To wipe the control program," she snaps. "These dancing creatures are just a diversion, some backwater species picked up on the other side of the Systems."

"Dancing—creatures?! Where?"

"Awaken Enterprises has been working toward active camouflage for years; what better way to test their new prototypes?"

"But there's an alien ship!"

"Well, obviously they've fooled you." She keys in a sequence of numbers, and an icy-calm computer voice speaks out of the air. "Terrafirm Incorporated, Kasemsarn Operation, omega omega omega. Requesting authorization one."

"Doris Grabko, Chief of Information Security."

The voice replies, "Accepted. Requesting authorization two."

I can't speak. Why should we gut the system now? These are aliens, not industrial spies! I could give the authorization and trust my backup system to come online, but that would expose everything I've done. Doris would kill me.

"Lynn Gable!" Doris shakes me hard. "Dr. Kasemsarn is dead—the project isn't salvageable. They're poised to take everything. You're a Terrafirm employee, now act like one."

"But that's ridiculous," I say. "Dr. K isn't the only one who—"

"Just shut up and—"

A sudden light fountains into the room. I turn—there's a

glowing dome on one of the consoles, and it's spouting gold light like crazy. Doris shoots. The bolt ricochets off it and sears one of our screens on the other side. The light from the dome splits and forks over and over, and then abruptly the tip of every tiniest branch glows brilliant red, and it stops.

I'll be damned if it doesn't look like a red and gold tree. Are we looking at some kind of alien fiber optics? A hologram?

"God—what is that thing?" When I speak, the tree moves, connections forming and reforming inside it. Reminds me of the fractal simulation I sometimes run on my personal terminal, numbers in color to model the effect propagated by our terraforming array. A moment later there's this weird chirping, clucking, and whistling, and then a choppy voice speaks.

"A language—Don't shoot—mistake—Purpose—talk—hear, hear."

It's some kind of holographic translator?

Doris's hand grips my shoulder, but I look past the bright glow of the tree to the wall. There they are: Two large furred bodies lie curled around each other, one painted with elaborate designs in white, the other with sparkles in its fur. They're both coated in a flickering sheen of light. Slowly, in perfect synchrony, the two aliens raise their faces toward me.

Pointed, whiskery faces.

Holy shit. We've been killed off by giant otters?!

No—I shouldn't trust my own snap judgment. These

creatures' limbs aren't short enough for otters, and their black fingers are too long, furless and half-webbed. Plus they have no eyebrows; above each of their wideset eyes a strip of pebbly black skin extends up to the ear.

Non-Systems creatures, or I'm a codfish.

They begin shaking their heads, chattering agitatedly. "Color suits—truth," stutters the translator. "Fight Purpose! Wait—please—Great Tree Purpose claims aliens—talk—"

Doris growls, "Shut up or I'll shoot you again."

Suddenly I get the awful feeling they're not talking to us. Something moves in the corner of my eye—I whirl around—see nothing, but pieces of the room distort into bulky alien shapes all around me. A yellow flash in an invisible hand expands to fill my vision. I can't move.

4. Tsee

We didn't ask to be rescued, truth! We didn't want to be rescued!

Yes, to be returned to Star-Pattern-Celebration and the meticulous care of TshinKai GreatTreePurpose, welcome; to groom Chkaa, reassuring ourselves of apfaa while we participated in their scans, wondrous relief!

But to be disconnected from the beauty of the Great Tree, preempted by the Martial Purpose? Torture! More painful than the minor injuries which TshinKai so kindly remedied. Being of the Great Tree Purpose like us—hail!—they understood our

need to pursue, pursue, and encouraged us when we plunged into the interconnecting arteries of the ship.

Now we swim the glass mosaic tunnels, fast, knowing that once again our Purpose lies ahead—oh, such relief! Chkaa is the stronger one of our apfaa, undeniable, so he cuts water while I skim wake. The linguistic model projector is safe, ready, tucked against my chest; its precious learnings remain hidden within, for now. Silently agreed, we hold our breaths long for speed through the bright water, following guidance markers at each junction toward the region of the ship where the aliens have been nested.

We must not allow our claim on these creatures to be stolen by the Martial Purpose—resolved!

Here a marker indicates we're getting close, but look beside it; the next one shows another apfaa present, by name, KirHaa MartialPurpose, working in the last chamber before that of the aliens. There's the doorway—I worry, unavoidable. An apfaa of the Martial Purpose, placed thus, must be intended to guard the aliens, too likely—They emerge into the artery! Oh, no!

I push with tail and feet, push, push, closing distance with Chkaa, who skims a whisker's distance from the mosaic wall, tight! Twisting, we barely miss the noses of KirHaa MartialPurpose—slick past, but no relief, truth. They're following us. Ahead, the silvery field of an arterial breather wobbles amidst the rays of colored light—my breath is growing stale,

worrisome, but if we stop KirHaa will confront us. Try to stop us, no doubt!

Chkaa slows when he sees the bubble—ah, what sweet apfaa; he understands that I push my breath. In the second of his hesitation, I overtake him, unplanned. The breather falls behind us, and I glimpse a shadow breaking the patterned light—surprise. A pursuit profile, almost familiar; at one tenth that size it might be a taahitsikho, delectable—Is this an alien?

But their suits were taken, witnessed, and they have no length of breath! They should not attempt the arteries, no—their disadvantages will drown them.

Resolved: None must die under our claim!

I flick my tail and speed straight for the alien. It won't have breath enough to return to the room it came from, probably; the breather is closer. Matching my head to its head—there—I flip and roll out, a full direction switch that sends my own wake over me. Chkaa, following, rolls in behind the alien's back in another rush of water. We take its arms—risky, but it makes no struggle, perhaps understanding now that our arteries possess no surface. We swim fast. This one needs air, truth—KirHaa or no KirHaa!

It doesn't breathe like a Diditsaatsi, fervently hoped, or it won't survive.

Without decelerating, we punch straight through the field into the breather. Chkaa curls, tumbles, and hits the wall. The alien lurches into him. I twist—ineffective maneuver in air—and

hit both of them. The linguistic model projector rolls off to one side, no no; I dive after it.

The alien vomits water, draws a little air, falls to hands and knees on the mosaic shelf and starts a gasping, gurgling cough. Its clothing sucks wet to the skin, revealing distinct chest protuberances—mammaries, speculated, so this is a female, probably. Long strings of hair dangle from its head, observed, much like the natives of the Oaaatsih planet.

“Look, sister.” Chkaa bends over her rubbing his hands, observed—half worry and half eagerness. “No webbing on hands or feet.”

I nod. “Truth, brother. She hasn’t enough water speed to get anywhere.”

“Obvious, that.” He shakes his whiskers, disapproving. “To have attempted the arteries, especially hampered by clothing, she is either stupid or out of her senses.”

“Probably ignorant?” I suggest, but then, glimpse her face. Ah, no, out of her senses she may be, indeed—this is the alien who shot us, witnessed! “Chkaa!” I cry.

Apfaa brings him diving to me; we press together our shoulders and tails—oh, grateful—and he touches his hand to mine.

Then two noses break the force bubble.

“We are Kir!” says the first, and the other, “Haa; MartialPurpose, truth!”

They move with fierce grace, intimidating. Both have prominent, masculine brow-character—attractive—but Kir bears a pattern like thorns, while Haa has deep folds like cooled lava. Deduced: These two were not born as one, but instead, chose each other for apfaa. Each wears a belt, or the appearance of one—color-mimetic suits, recognized, safe for water and scant atmosphere alike. Likely, these two were among our invisible, unwished-for rescuers.

“We are Chkaa,” my brother answers.

“Tsee,” I chime. “Born of TsaaTso; GreatTreePurpose, truth.” We will not show disrespect, but together, we move to place the recovering alien between us and the artery wall. Quarters are close with five bodies in a single bubble—alarming, that. At any time, attack might come from before or behind. We must be sure not to invite it in any way, certain, or we’ll have no chance!

“Give the alien to us,” Kir says, his voice high and vicious. Haa chimes, “Comply. You are in error, for you have no claim on these creatures.” They push their heads into our faces. Says Kir, “Resolved.”

Chkaa looks uncertain, observed; his muscles go taut but he stays quiet. Intelligent choice, that.

I stand taller, match noses with Chkaa, and declare, “We listen to you, KirHaa. ‘Resolved,’ we hear you say. Resolved, but not witnessed.”

In our whiskers I feel Chkaa’s satisfaction. “Yes, sister

—speak.”

“Trace the claims if you wish; ours is previous to yours. Our Purpose is proven, or our linguistic model projector wouldn’t function.”

“Truth,” Chkaa agrees. “Look.”

Together we stroke the pattern on the projector’s surface to bring forth the Great Tree of the aliens’ language, marvelous, and I stamp my feet. “Our Purpose has not been ceded to Martial Purpose or any other. The Great Tree must not grow in shadow.”

“Hear, hear,” says Chkaa.

The alien’s coughing has slowed, noticed. She shifts behind me—oh, the hairs on my back rise in fear of blows, truth. . . . The machine has begun translating, but whether she understands us from translation alone, unclear.

Haa says in a low whistle, threatening, “These aliens attacked the Form Purpose, killed two apfaa, and severed three.” Adds Kir, “Witnessed. Their violations of apfaa prove our Purpose.”

I wave off their words. “Your claim is on the dead, KirHaa—a claim ceded to you by the Form Purpose, who prematurely exercised Purpose on the ugly edifice on the planet.”

Says Chkaa, “Your claim touches only that edifice, and its defenders. The aliens here on our ship took no part in your Martial Purpose, neither killing nor severing any Cochee-coco.”

I nod. "Hear, hear. Their attacks on us, we accepted, never turning our noses away from our Purpose toward yours."

And Chkaa, "Witnessed. Sometimes the cause of communication requires sacrifice."

KirHaa shift foot to foot impatiently—understanding the strength of our claim, no doubt. They know what all Cochee-coco will see in witness when the claims are traced, oh, yes; We've argued well enough. Haa punches Kir in the shoulder and the two fight hands and feet for a moment, a surge of Purpose tempered by apfaa.

Kir snaps his head toward us. "Ungrateful ChkaaTsee GreatTreePurpose," he whistles, "captured among such creatures, you needed rescue." Haa adds, "Obvious, that! They are low and violent." KirHaa grind their feet on the mosaic shelf, insulting. "Truth," Kir chirps. His lips pull back from his sharp teeth slyly. "Even worse, their violence is graceless, as if they had no Purpose at all." Says Haa, "Observed."

Oh, sickening! "What?" I cry. "No Purpose?!" The accusation raises hairs on my face, appalling. Chkaa finds my hand and we squeeze together, apfaa. "KirHaa, you insult needlessly. They must!"

"Surely," Chkaa agrees, though his fingers quiver in mine. "They are proven to have language, the first prerequisite. And they travel through space."

KirHaa interject before I can speak. "One says they travel through space—" "The other says nothing?"

“Deduced!” I shriek. How dare they force between our words to accuse me of failing apfaa?

“Crcrcr,” Kir laughs, deep in his muscled chest. “They travel through space. To say this, as if such aliens could approach our intelligence.” “Ridiculous,” chimes Haa. “They can’t even create proper shielding from our weapons.”

Now, behind us, the alien stands. Bad, bad—Chkaa shifts to flank her before she can decide to rush out into the artery, and I block her aggressive step toward KirHaa. Just in time—fortunate, that.

She utters language sounds, her eyes narrowed and teeth bared, then curls, coughing. The language projector relays, “We do travel space—we have friends—”

KirHaa hiss with derision. “Neither witnessed,” says Kir and Haa, “Nor spoken for; truth.”

Ah, but now we have them! “KirHaa,” I cry, “you unspeak yourselves, for if you expect apfaa of this alien, then you imply she must have Purpose.”

“Oh, sister,” Chkaa laughs, “deduced and witnessed!”

KirHaa shift irritably and tense their hands, observed. But now we swim in our own Purpose, and we’ll be victorious, resolved!

I pat Chkaa’s hand in excitement. “KirHaa can’t expect apfaa behavior of an isolate.”

“Speak, sister,” says Chkaa.

“Such insults they make, yet we may find this alien species is apfaa to our own, and what then?”

“Surely, sister, what then?”

Haa gives an explosive snort. “Impossible.” Kir echoes, “Impossible.”

Yet it’s not impossible, truth! All we who pursue the Great Tree Purpose—pursue, pursue!—know that as each unit enters a pattern, always that pattern forms a unit on a larger scale. As patterns grow in crystals, thus they also grow, observed, in winds and in speech—so, deduced, they should grow in apfaa. Ah, the beauty of what we pursue!

The alien speaks again, her body in closed and guarded posture. “What are you saying?”

We smile at her and nod our heads. “We won’t leave you to speak alone, but will return you to your people.”

Chkaa chimes, “Truth!”

The alien grimaces and coughs.

“Not without us,” Kir says. “Resolved,” chimes Haa. “If you don’t want to kill her taking her back, then we come with you. We’ve brought breath-bubbles.” Kir chirps a laugh as sharp as the thorns of his brow-character. “Deliberate, that.”

Maddening—KirHaa aren’t without intelligence, clearly. But my brother presses his shoulder to mine, and apfaa raises my courage, water under a stranded boat. “KirHaa MartialPurpose,” Chkaa says, “We accept your offer of aid to

the Great Tree Purpose.”

I nod. “Witnessed.”

But, truth, now we must carry our danger with us.

5. Lynn

I shouldn’t have let Doris swim out there.

Maybe if I’d told her about my hack, she wouldn’t have toggled straight from theyre-going-to-steal-our-data to they’re-going-to-destroy-our-project-with-one-shot. Maybe she would have believed Sung and Kenneth when they tried to tell her the three of us could run the array and keep the project going long enough to get help—and been in less of a rush to risk her life going after the aliens’ plans.

I’m pretty sure she wouldn’t have killed me if I told her; not now, when there’s no one left. Since there’s nothing in this surreal room we can use to rig a signal, Sung and Kenneth and I can only wait. We huddle together, listening to alien voices sing softly while light shimmers across the curved walls in a blue-green dance. At the same time we count the seconds since Doris swam out, waiting to see if four lives become three.

“Damn it!” says Kenneth finally, and shakes his big hands like he’s pissed that they’re still trembling. “I just don’t get it. Why would aliens come all this way to stop the project? What’s in it for them?”

Sung’s lips stop moving, but you can bet he’s still counting seconds in his head. “Nothing.”

I snort. “There’s got to be something.”

Sung casts his dark eyes around the room. “Not really. We’re surrounded by noncompatible technology. Maybe this is about territory, or plain old xenophobia, but it’s not going to be about terraforming.”

I can’t help but flinch. Our habits of secrecy are well ingrained—the Headmistress forbade certain words even for routine comm traffic. “Is that it?” I ask. “We just have to wait to see if Doris learns anything?”

Sung frowns. “Four minutes . . .”

“I’ve about had enough of this.” Kenneth stands up and walks toward the door. “I should have gone with her to rig a signal.”

“Kenneth,” I say, “if she gets an opportunity she can do it herself. It’s a beacon, not a massive array.”

He doesn’t look at me, but folds his arms. “You should have told her.”

My stomach drops. Has he found out about my hack? “Told her?”

“That we can run the array, like we said.”

I can’t help feeling relieved—but it’s embarrassing. We’ve been kidnapped onto an alien ship, for God’s sake. Why should I even care any more if Kenneth knows?

“You have to put aside how much you hate Doris,” he says. “She does care about the project.”

"I wanted to—she hates me, too, you know."

He runs one hand through his salt-and-pepper hair. "We need everybody on the same side here, Lynn. What about those gorgeous color simulations you showed us when we were refining the mix strategy in sector 1249? If you told her about those, she'd see that you get it."

I sigh. "Kenneth, I did, long ago." It was part of what got me hacking. "She was there when I showed the sims to Dr. K. He blew me off. Couldn't see the added value, he said. And Doris told me to keep them to myself."

Sung looks at me, his face greenish in the flickering light. "To yourself? Why?"

"Because they'd be distracting."

"Distracting? To have a visual model where we can simulate the effects of our chemical alterations—that's distracting?"

I rub my face. "It's not an art to them. Only an equation that ends in money."

Kenneth harrumphs. "I don't know how much money was in it for Doris. She doesn't understand how a butterfly can cause a hurricane, but that was never in her job description. Dr. K was the one who was too high and mighty to take advice." He glances over his shoulder, then straightens. "Hey, guys—visitors."

Doris has been caught. I scramble to my feet as she

comes in with an escort of four, drenched and coughing, but alive. The two biggest aliens stop on either side of the force field door—sleek, muscular guards wearing metal belts, and necklaces with black spherical pendants. Their faces are bizarre: The bare skin above their eyes looks transplanted, one from a horned lizard and the other from a shar pei. The two slightly smaller ones herd Doris toward me.

Wait a second—aren't those the aliens she was holding hostage in Central Control?

They have to be. It's a miracle they haven't killed her. They've got sphere necklaces just like the other two, but they've got that pebbly skin over their eyes, and the bigger one has the maze design in his fur, while the smaller wears a long net of gold and jewels that makes me guess she's female.

When they release Doris, we take her in a huddle. Kenneth is right; we're already too few, and we need every member of this team. "Are you okay?" I ask. "I'm sorry. I really should have gone with you."

Doris shakes her head. "No," she rasps. "It's all water out there. It's either get caught or drown." She starts coughing.

Sung murmurs. "Aquatic aliens . . ."

Doris gets a breath. "They don't seem to know about the array," she says. "If we say nothing, we might be able to keep it safe. We have to get a distress signal out as soon as possible."

I try to look her in the face. "Don't risk yourself again. We need you, and the array—well, it isn't as fragile as all that."

She narrows her eyes at me, but we're interrupted by a surge of light. The aliens have just activated their translator.

The female alien steps forward, her sparkly net defying gravity as if it were underwater. She and her pattern-furred partner wave hands at one another, execute an incongruous little dance step, and begin chattering at us. The tree shivers, and here comes an English translation—choppy, with little delays.

"Well come. We show respect. We are DarkLight, born of GiveReceive; GreatTreePurpose. Truth!"

Ho-boy. When is English not English? At least it's not threats or interrogation.

Doris clears her throat. "So you're playing nice, suddenly?"

The aliens look at me, as if expecting me to speak—but what can I say? I shake my head.

"Sung," whispers Kenneth. "Any clue on the dark light stuff?"

Sung shrugs. "Introducing themselves maybe?"

At once the aliens jump into a dance step, and pat one another's hands. "Yes, yes, we speak ourselves," says the small one. "Light!"

"Dark," says the maze-patterned one.

"Light!"

"Dark."

Something's localizing the translation to their positions. They repeat the words several times before announcing in unison, "We are DarkLight. Truth!"

I can't help a nervous laugh.

"Truth, hell, " Doris mutters, and clears her throat. "Tell us your demands."

Both the aliens look at me again.

I lean to Doris's ear, whisper, "If they're being helpful, could we maybe ask them to send a signal. . . ?"

Doris snorts. "Five minutes ago they were arguing about which of them owned us." She steps in front of me. "Look here. We work for a company called Terrafirm. I'm the senior representative here, so if you want to talk, you can talk to me."

Dark and Light look at each other, then cast a glance back toward the door. The guards are shifting from foot to foot now, which makes me nervous.

"We pursue Purpose," says Light, with a wriggle that makes her cape swirl and sparkle. "We speak, and you want to speak to us."

"Hoped," says Dark. "Not to DodgeStrike. Their Purpose is not to speak, but to fight. If you fight, they claim you. But if you speak, you are ours."

Doris reddens. "But we don't belong to any of you!"

Dark and Light look at me again. I can see Dodge and Strike moving nearer, oh so gradually, and my gut says they're

bad news. I'm not getting all of this, but the ugly truth is we do belong to these guys—they've got us. And I'd far rather deal with Dark and Light, because I'm betting Dodge and Strike could kill us easily.

"We'd rather talk than fight," I blurt out. "We're humans, my name is Lynn, she's Doris, and those guys are Sung and Kenneth. We don't want to die. We need to send a signal to Terraform—"

"Lynn!" Doris gasps. She starts coughing.

Light and Dark dance and pat their hands together. Light cries, "Oh sing, sing, they speak! Oh LynnDoris, SungKenneth, the die-ing is our sadness, a terrible mistake!"

Dark echoes, "Terrible, terrible mistake. The Form Purpose saw your home ugly, and changed your tools without knowing their function."

"Witnessed," says Light.

Holy moly—what was that, an apology? I guess I didn't think about how they might answer. Dodge and Strike are close to charging distance now, and panic is rising in my chest. If only Doris would take over . . . but she's still coughing, tears leaking into the wrinkles beside her eyes. Then, thank God, Sung murmurs behind me.

"Our home . . . that could be Base. Our tools—life support?"

My stomach churns. "Or it could mean . . ." The array. But

now that the aliens are translating I can't say that out loud.

Kenneth shakes his head. "What about all the people they killed outside the Base?"

Dark and Light press their shoulders together and blink at us. "When the Form Purpose pursued upon your home, humans came out and killed some of us," Dark says. "The Form Purpose called to the Fight Purpose for help. The Fight Purpose took claim."

Light nods vehemently. "Witnessed, that."

Doris finally draws an indignant breath. "Does this mean you're blaming us? "

One of the big guards cuts her off. "DarkLight are kind," he barks.

"Too much," shrieks his companion. "Truth!"

I flinch. Coming from these two, the word "truth" sounds righteous and dangerous. Next thing I know they're fighting each other, striking with their hands, dodging with the craziest limbo moves I've ever seen—their backbones are like water. It only lasts a second, but now I'm sure they could jump us any time.

"DarkLight, you and your Great Tree," one of them says.

"No sense," says the other. "These aliens talk, but you forget the most important test of new species. We must determine their value in Purpose."

"Hear, hear," says the first. "Humans, what is your Purpose?"

Doris tenses. "What do you mean?"

"Uh, to send a signal?" I'm guessing. "To talk? Um, to stay alive?"

"Careful, Lynn," Doris murmurs. "We can't trust them—they could well be messing with us. Who knows what they might really be after?"

"Purpose! Always, first and last," says Light. Her eyes brighten, and the pebbly skin flexes above her eyes. "We pursue Purpose: Everything fits into the pattern."

Dark echoes, "Pursue, pursue."

Whatever Purpose is, they want it bad.

"Look here," says Doris, clearing her throat. "I don't see why this is any of your business. Let us call our people for help, and then we'll talk."

Dodge and Strike let out an eerie trilling sound. Dark and Light stare at me with their mouths open, and for the first time since they came in, all their little motions have stopped. Every vestige of cuteness is gone from their reptilian-mammal faces, and their white teeth are needle sharp. I think we've made a dangerous mistake.

I say quickly, "How about you tell us your purpose first? Tell us why you came to this planet."

Everyone looks at me.

"What in hell are you thinking?" hisses Kenneth. "They'll kill us—" But Dark and Light jump in the air and clap their hands

together as if they've just scored points. "Tell our Purpose, oh yes," says Light. She picks up the translator.

"Yes, yes," says Dark. "Come to the Heart."

I hope I haven't done something fatally stupid. But even Dodge and Strike seem happy with the proposal; they come forward and give each of us individual force fields.

"Hmph," says Doris, as they clip hers to her waist. "Not a bad idea, Lynn."

"Thanks."

Sung fiddles with his field generator. "This is one nice piece of tech. These guys are way ahead of us."

Kenneth nods. "Imagine if we could crack one open and—" "No," snaps Doris. "Don't give them any reason to expect a look at our tech." She comes over and puts her hand on my shoulder. "Try to stay by me. They seem to expect you to back me up."

I swallow. "Yeah, okay."

I'm not comfortable with the force field—it feels wet on my face and hands—and I don't have the nerve to match Dark and Light's enthusiastic dives through the door. With a deep breath, I walk through.

My feet immediately float off the floor. We're not in a pool—this is a water-filled tube of translucent material, about two bodylengths in diameter and seemingly endless. As we go, the tube widens and joins others, coming from left, right, above, and below. The junctions are marked with floating clusters of

holographic symbols. Pairs of aliens swim near us, but none show any curiosity. They pass by in a rush of water, trailing colorful baubles from their patterned bodies, and disappear into rooms while we bob and spin in their wake. Every so often we pass glimmering room-sized bubbles with more alien pairs reclining inside them. One door, blue instead of gold, has multicolored fish swimming behind it.

Our guides move languidly, while the rest of us pant and struggle and need lots of breaks—there isn't much swimming on K's world. At last we reach a huge bright nexus where at least twenty tubes come together. Dark and Light swim upward to a force door surrounded by glowing symbols, and lead us through into breathable air. I switch off my force field.

"This is the Heart," says Light.

Dark nods. "Truth! Come, come in."

I'll be damned. It's an otter nightclub.

The room is big and shadowy, its curved walls almost invisible. To our left, alien couples recline together on curved interconnected couches, grooming each other or sleeping. On our right is the blue-glowing entrance to a room full of fish. Dark and Light lead us toward the dancers—more alien couples, each pair twisting and waving arms amidst a flashing spherical whirl of holographic confetti. The only thing that doesn't seem to fit here is the low volume of the music, a weird undercurrent to the whistling chatter of alien voices.

I think we're all too confused to speak. Even Doris, though

she's trying to look assertive by keeping us close behind our hosts' tails. They lead us up to a dancing pair at the center of the room—two albinos, with white fur and pink skin. Both are wearing long earrings, but given their size difference, I'd guess they're a male and a female.

As we reach them, Light turns and bobs her head at us. "These are BlueOrange, born of BlackWhite, PatternPurpose, who cut water among us."

"Hail," says Dark.

I hope the translator isn't faltering. Dark and Light don't interrupt the two albinos, but stand and wait. I'm scanning around for anything that looks like it could be hot-wired as a transmitter when Kenneth's voice behind me hisses, "Guys. Tactile holograms."

I frown at him, but he points me back toward the dancing aliens. It's serious brain overload—Kenneth has a better eye for whirling, flashing lights—but then I glimpse something I can follow. The big albino makes a lightning snatch and catches a ball of light in his hand. As he pulls it toward him it flashes into a three-dimensional image, and he pokes at it, then passes it to the smaller one, who does the same before pushing it away, back into the whirl.

I glance at Sung. He's watching, mouth open. No kidding—I'd give my eyeteeth to know how those things are generated!

Finally the big albino turns away from his images. His facial fur is dyed blue to match the color of his jingly earrings, while

the skin above his eyes stands out in sagging lobes like pink fungus. "Well come, humans," he says.

How does he know who we are?

"Speak, brother," calls the smaller one, never stopping her dance.

He nods. "It is our joy to share our Purpose. This ship is named Star-Pattern-Celebration, following the Pattern Purpose before all others. We come to this planet, tracing a line of color in the great star pattern. Once here, we'll celebrate together with the Form Purpose and the Performance Purpose, building and dancing. Then we'll seek another path to continue the pattern."

"Truth!" calls the small albino. "The great star pattern lives in four dimensions."

I glance at Kenneth and Sung, but they look baffled.

"We don't understand," says Doris.

The aliens look at me again.

"What does that mean?" I ask, and Doris gives me a satisfied nod. "I mean, to start with, what's a pattern purpose?"

"Orange," says the big albino.

"Here," answers the small one. She jumps, catches an image, and pulls it down, turning toward us for the first time. Her facial fur is dyed orange, and she's got lobes above her eyes, but less exaggerated, hardly protruding beyond her fur. She pokes the image she's caught, and it expands in the air, to a

sphere about a meter in diameter.

It's a star map. A sophisticated one, with glowing symbolic notations hovering at its surface. The only regions I recognize are in the lower near quadrant—all non-Allied areas except for the K's world system.

"Joy," says Blue. "Watch the great star pattern."

Orange nods, echoing, "Joy, joy!"

A star flashes near the center of the sphere, and glowing curved lines expand outward from it. When they hit star systems or planets they spark with colors, then continue onward and outward. Orange and Blue start dancing, Dodge and Strike clap rhythms as they watch, and Dark and Light burst into song—it's strangely easy to get caught up in the blooming pattern, the alien rhythms, and the music. After some minutes, the very last line curves and curls into our system here, and the aliens fall silent.

Doris breaks the spell. "You honestly expect us to believe that you came to this planet for no better reason than to draw a gigantic picture?"

Spined, wrinkled, and lobed furry faces turn to me.

"Well?" I shrug. "Is it a picture?"

"Not a picture," says Light.

And Dark, "No, no; a drive, a beauty."

He can't mean anything like FTL drive. "I don't know," I say, "but it is beautiful. And you have to admit, it's awfully elaborate

to be a lie.”

Sung nods. “She’s got a point. That pattern would take days to make, even just drawing it on a computer.”

“Decades,” adds Kenneth, “if they actually drew it with ships.” His eyes go wide. “That’s a huge territory.”

“You’re right, Kenneth.” Doris scowls. “The picture is a distraction; it’s why they’re trying to claim us that matters. These guys have impressive tech. They’ve killed enough of us to fit K’s world into their pretty pattern—they might consider forcing the whole Allied Systems to fit.”

Goddamn—am I supposed to back that up? I glance away from Doris’s pale determination and the inscrutable aliens, to my friends. Kenneth is wringing his hands, and even Sung looks worried. “Guys,” I say, “don’t you think this Purpose thing seems pretty vague? Wouldn’t they have told us if they wanted—”

Doris cuts me off before they can answer. “Lynn Gable. You’re an engineer. You don’t know anything but your numbers. I can understand you not seeing the bigger picture, but if you don’t see the need to pry past this front of childish enthusiasm, you’re an idiot.”

“Doris,” Kenneth objects, and Sung hisses in a breath.

Me, not seeing the bigger picture—what a load of crap! Here I thought she wanted me on her side! Dark and Light are staring at me, and my ears are burning. “But what if this was all a mistake? Shouldn’t we consider asking them to help us contact our people?”

Dodge and Strike interrupt, clapping their webbed hands sharply. “Purpose first.”

Light is calm, but firm. “LynnDoris, we’ve told you our Purpose, and now you must respect—” There’s a word in there that the translator can’t handle. “For one side, always the other to match.”

“Truth!” says Dark. “What is your Purpose?” They lean closer, while Dodge and Strike move in from behind like menacing shadows.

Oh shit. I started this tit for tat, and now we owe them. What if this question of Purpose is the only thing keeping them from wiping K’s world clean? I have to say something!

“My purpose—is my job,” I say. “Is that what you mean? I can draw pictures, too, you know—I have some in my computer, if you want to see. . . .”

“You’ll show them nothing!” Doris roars. A blur comes at my face—

6. Tsee

Violation!

Doris has hit Lynn, no chance to stop her, truth! SungKenneth leap forward but KirHaa leap too, faster. Lynn’s knees fail— “Chkaa!” I shriek. Holding the translator I’ve no hands, oh, oh!

Chkaa catches Lynn—relief—but KirHaa are already on Doris. Kir’s hand strikes; Haa’s foot sweeps, observed, and

Doris lands wheezing on her back. KirHaa whirl around with whiskers extended, seeking more Purpose, certain, but SungKenneth don't invite them. Instead they fall to their knees beside Doris, observed, and turn only twisted faces toward Lynn—perhaps too frightened to approach my brother.

“Enough!” “Resolved!”

Ah, the commanding voices of TsorrPfiirr PatternPurpose, welcome! With a shake of their ear chimes and a wave of their unpigmented hands, they stop us all at once.

“Hail, TsorrPfiirr,” I say.

And Chkaa, “Hail.”

I bow my head, respectful, pressing my shoulder to my brother's beneath Lynn. Observed: She breathes, but she isn't conscious. “We've made an error,” says Chkaa softly, “expecting apfaa between these two.”

I struggle not to fail my reply. The pattern we envisioned was so perfect, truth: two spacefaring races, each graced with apfaa as a foundation of their superior intelligence! I can't ignore Chkaa's reasoning, certainly—for if we maintain our vision, Doris has just indicted herself within it. But to deny the pattern—oh, how can we not pursue?—would be such a tragedy!

“Maybe,” I murmur at last. “Perhaps another one was the true apfaa, and she seeks healing with Doris, unsuccessful.”

Chkaa answers gravely. “Possible.”

KirHaa have also bowed their heads before TsorrPfiirr, observed, but their bodies are restless. “Hail,” they begin, but then Kir declares, “We’ve been invited in our Purpose.” “Witnessed,” chimes Haa. “Great Tree Purpose must now cede their claim to these creatures.”

I raise my head. “Untrue!”

“And unfair,” says Chkaa. “Doris invited, but you have already delivered her answer.”

“Witnessed!” I say. “It’s enough. She may be severed, and invite conflict blindly; we’ve seen her with a dead one of her species at her feet.”

And Chkaa, “Possible, as this was witnessed.”

Kir stamps his foot. “If she were severed, the other humans would never skim her wake, and yet they do.” Haa chimes, “Observed.”

“Not only hers,” I say. “SungKenneth also allow the one named Lynn to cut water.”

“Witnessed,” Chkaa agrees, nodding. “And these few look to still others to cut water—the ones they speak of contacting. They are not alone of their species.”

“Deduced.”

We speak too fast for the partially trained model projector, I think, or perhaps SungKenneth don’t understand what it tells them. Observed: They’re watching us with tension in their faces.

TsorrPfiirr take a step back, gazing at one another—hail!

—deep in apfaa. Tsorr gives soft clicks of his tongue, pensive, while Pfiirr counterpoints, tapping her pale claw tips together. “In fact, Tsorr,” she says, “we’re cutting water when Cochee-coco discover another species in the great star pattern.” Tsorr purrs solemnly, “Witnessed. Enough argument. We should seek immediate consensus.” Says Pfiirr, “Resolved.”

Serious, that! I glance across Lynn to meet eyes with Chkaa; he’s worried, observed, and KirHaa seem nothing but eager, overtaken with the Martial Purpose.

Oh, hoped, if Lynn would only wake! Her unconscious body is a terrible accusation against Doris, even against her entire species. Doris hasn’t yet gained sufficient breath to speak, observed, but she is claimed by KirHaa, and will invite them again, likely enough—while SungKenneth, seemingly, are unwilling or afraid to speak for themselves. Our claim is in danger, truth!

TsorrPfiirr reach into their controls, swift, fishing out apfaa for the consensus: ones who cut water upon their ships, ones who direct the Form and Performance Purposes upon Star-Pattern-Celebration, one even from the Rodhrrrdkhi planet, found available for immediate witness. The faces of each apfaa hover in conjoined globes above TsorrPf iirr’s shoulders, observed, but they don’t speak. Their eyes still glance about to their own controls while they seek past witness to understand what has happened here.

“The test of a new species falls to consensus,” says Tsorr.

And Pfiirr, “Not simply to the few.” Tsorr chimes, “Truth!” He waves his hand, observed, to us and to the consensus watchers. “The species, humans, possesses language.” Pfiirr adds, “First claim, ChkaaTsee TsaaTso GreatTreePurpose: witnessed.”

“Second claim, KirHaa MartialPurpose,” says Kir. “Witnessed,” chimes Haa.

TsorrPfiirr nod at them. “Yes,” says Pfiirr, shaking her blue ear chimes. “The second claim is also recognized.” Says Tsorr, “Truth! But our consensus does not trace claim; it evaluates this species’ capacity to grasp Purpose.” And Pfiirr, “Resolved. KirHaa, do you offer observations to serve the test?”

“Yes,” says Kir. “These creatures fight with no grace, no pattern, and no conviction.” “Witnessed,” says Haa. “They have the hysterical drive of panicked animals, but to our view they possess no Purpose.” And Kir, “No Purpose.”

Oh, how it makes me shiver, like a severing or a death!

The consensus listeners speak in shock, all at once. Pfiirr leaps swiftly to the controls, dexterous, untwining their voices.

“No Purpose?” “Awful!” “But they speak, which suggests intelligence.” “Truth!” “There must be another explanation.” “Surely; only on three planets have such impaired species been found.” “Not another impaired species!” “But your planet there is half breathed, its ice frozen underground.” “Truth—how could you find such creatures there?” “Certainly they are not native.” “Concurred, but how could they have arrived there?”

Tsorr speaks. “ChkaaTsee GreatTreePurpose say that these creatures are a spacefaring species.” “Witnessed,” agrees Pfiirr, “but it is not necessarily so.” Tsorr bends his nose to his claw tips and ruffles the fur of his broad white shoulders, observed. “They may be pets, kept in an enclosure on this planet by someone else.” Says Pfiirr, “Possible.”

Now Kenneth gets to his feet, observed, and cries out. Unfortunate: The model projector does not catch everything. “We are—not pets!”

I await Sung’s answer, but from the floor, Doris wheezes, “I knew it.”

More murmurs from the consensus listeners, observed. Chkaa looks at me—in his eyes, unmistakable, a call to notice that Sung and Kenneth may not be apfaa either. Oh, I take his meaning, certain, but if Sung won’t chime for Kenneth, I will—resolved.

“These creatures aren’t pets,” I say.

“Truth!” says Chkaa. “We’ve entered their halls; witness, all apfaa here, that the controls and accommodations in the edifice that the Form Purpose damaged are fitted to this species and no other.”

I nod and stamp my feet. “Witnessed.”

Among the consensus listeners, the apfaa from the Rodhrrrdkhi planet speaks, observed. “We agree that these are not pets.” “Indeed—yet if they direct themselves, travel through space, and yet have no Purpose, this is a catastrophe.”

“Concurred.”

TsorrPfiirr look down at us, solemn. “To discover Purposeless spacefarers would be an unimagined circumstance,” says Pfiirr, and Tsorr, “Truth, that! It would require an unprecedented response.”

Oh, does Chkaa my brother feel in his heart the agony I now feel in mine? The three impaired species, each without the capacity for Purpose, caused great mourning, truth! Avoiding them changed the entire composition of the great star pattern. And now, shall such creatures travel into our pattern? Unthinkable!

“It can’t be,” I say.

“Surely,” says Chkaa. “For if they have no Purpose, how can they be spacefarers at all?”

“How indeed, brother?” I stamp feet, keeping my eyes up toward the consensus and away from KirHaa. “Theory suggests that spacefaring requires apfaa.”

“Speak, sister.”

“And even if this were not so, such advancement requires Purpose.”

“Surely!” chimes Chkaa. “For how could their artifacts and artificial atmosphere be created without Purpose?”

“How, how?”

Lynn stirs on our shoulders, observed, but doesn’t wake. Could she be a Purposeless entity, truly? Could she be so

utterly alien? No, no! She is too sane to be severed, observed. Possible: She may be isolate. But not Purpose-less! That we have not discovered Purpose in humans means only that we have not yet seen it, resolved! We need more time, truth—Lynn would speak to us, but for now she cannot.

KirHaa aim blows at one another. “Look, all apfaa here,” chirps Kir, “No impaired species must be permitted to alter the great star pattern.” “Hear, hear,” Haa agrees.

Sounds of agreement come from the consensus listeners, unwelcome.

“Speak, KirHaa,” says Pfiirr, and Tsorr, “Speak.”

“Martial Purpose alone can stop this,” Kir whistles. “Resolved,” says Haa. “This much we have learned from our mistake: That humans are unable to shield from our weapons, and are easily eradicated.” Says Kir, “Witnessed.”

“Be patient,” says Tsorr. “This may be true—” “Possible,” chimes Pfiirr. “But such a mobilization of the Martial Purpose—” “Can be swift as snatching fish!” Kir declares, and Haa, “Resolved!”

Lynn moves on my shoulder, forcing me to rebalance—hope!—but she only takes a deeper breath and then subsides.

She still stands at the heart of this, decided. She tries to understand, truth—she speaks of Purpose when no one else does. If she is apfaa to Doris, to speak to her alone would be violation, awful! But if Chkaa is right—I relinquish my pattern,

but save something more important, perhaps—and I still carry our model projector . . .

I turn with Lynn on my shoulder toward the door. Chkaa yips in surprise but follows, and soon we're running. KirHaa come after us, observed—but they're too late, Purpose-blind as they have been in their petition to the consensus. Chkaa activates Lynn's bubble—just in time, truth!

We pierce the water.

7. Lynn

Ohhh my jaw hurts.

What happened? The whole world is moving—and why do I feel wet?

Holy shit! Otters!

I open my eyes, but can't focus—too close. Something round is right beside my nose, a sphere with a pattern behind it, white and dark.

Dark.

That's his fur. And those must be his hands under my arms; suddenly I'm sure that Light is right behind me. My heart pounds. Bubbles twirl past. I crane my neck and glimpse the water tunnel we're in, just as a doorway field comes at us. The otters pull on my arms, flipping their hindquarters forward as we punch through—I'm going to fall on my stomach—!

I stumble onto a white surface, smooth and hard but uneven, it curves into crazy translucent shapes that fill half the

room, as if we've been frozen inside a wave.

Why have they brought me here?

Knees quivering, I pull away and fumble off the nasty wet force field. Dark and Light chatter briefly at one another, then turn to look at me. Dark holds his whiskers forward; his pebbled brows drip water. Light steps to his side, her fur gleaming wet, her gold net swirling behind her. She sets down the translator dome and summons its holographic tree.

"Where is this place?" I ask.

Light pats the air with her hands. "We haven't come far from the Heart. This is a room for Celebration of Form."

And Dark, "Truth. We want to talk."

I swallow hard. "Why did you bring me here? Please, take me back to the others."

Light shakes her whiskers. "Please, please, Lynn. We need to talk to you. We're trying to help you. The Fight Purpose want to claim humans."

Dark gives a chirp. "Truth!"

"Like DodgeStrike?" My chest contracts. "Wait, what do you mean, humans? Do you mean, all humans?"

Light nods. "DodgeStrike argue that humans are a limited species without the capacity for Purpose."

"Witnessed," says Dark. "Our species always avoids such limited creatures."

“Truth! If such creatures traveled the stars, they would create chaos in the great star pattern, and they must not do this.”

“Resolved!”

“So the Fight Purpose wishes to stop you.”

“Truth!”

“Unless, Lynn, you can tell us humans are capable of knowing Purpose.”

“I’m trying . . .” My sore head isn’t up to this; I sink down on the floor. Dark and Light follow me down with a liquid-backbone curl, landing on their stomachs.

“Please, Lynn,” Light says. “The dying of any of your species is not our wish.”

Dark echoes, “Please.”

I rub my face with both hands. “I told you my work was my Purpose. That’s not good enough for you?”

“Even species too limited for language can work,” says Light.

“Certain,” Dark agrees. “But work itself is not Purpose. Advanced species turn their work to serve Purpose.”

Light adds, “Truth.”

This is going to drive me crazy. “But I don’t know what you mean, so how can I answer? Why is this so important that DodgeStrike want war over it? What is Purpose, anyway?”

“Oh, sing, sing!” cries Light, and they both burst into song.

I watch helplessly until they stop.

Finally Light says, “Any creature with the capacity for Purpose can feel the call of many Purposes, but always one they will choose to answer.”

“Truth,” says Dark. “One Purpose above all that floats us higher. Purpose is our reason to live, to strive. The force behind all creation—this is Purpose.”

And Light adds, “Hail!”

No way. Could there be anyone less well qualified than me to discuss the meaning of the Universe? I search through every human spirituality I can think of, but how can I explain them? I have to, though—if I’m the only one standing between humanity and mass attack by these bizarre creatures who’ve just wiped us out!

Hyperventilating—my lips and fingertips are getting numb. The fact is, I can’t save the human race. I don’t know anything that would give all of humanity a purpose. All I really know is my numbers.

“Please ask someone else,” I say. “I can’t help you—I don’t even know if I believe in God. I just—” I clench my fists on my knees, feeling tears in my eyes. “Doris was right; I’m just an engineer. All I want to do is go back to my project—my machines and their beautiful numbers. They’re down there waiting for me. I built them the best protection I could, but they can still drift off course if we leave them too long. That’s all I

care about right now.”

Silence.

When I look up, Light and Dark are staring at me, softly patting hands with one another. “Tell us more about your beautiful numbers,” says Light.

And Dark, “Tell how beautiful, tell why.”

“Please, oh, please.”

Oh, boy. I shouldn’t have mentioned the project—shouldn’t even have hinted at the existence of the array. But I’ve never seen these guys so intense. They obviously think I’ve said something important. If it means averting a war, how can I refuse to answer my favorite question in the world?

“It’s a question of numbers converging,” I say, hoping the translator can keep up. “You know those pictures I told you about? They’re a graphic, um, picture simulation of two massive number sets coming together.” I hold out my open hands, cradling one set lovingly in each, closing my eyes to savor their colors, their flavor, and complexity. “The planet conditions here. The array function over here. And then—then it gets awesome.”

Dark and Light start this weird purring sound.

As I bring my hands together slowly I can see it in my head, like falling in love with the project all over again. “Here’s the thing. If you shoved them together, they’d crash. All the effects would be lost. But if instead you slide them into each other slowly—you intertwine the ice trees, and the microvortices in the

atmosphere—of course, it requires a special variety of chaotic responsiveness, that was the fundamental breakthrough—then you can magnify the effect exponentially! Eventually, the colors won't just be in the simulation. They'll color the whole planet blue and green. Imagine it." My throat tightens up. "God—we have to keep it running! Somehow—though with all our crew lost . . ."

I hear a long, trilling whistle. It's Light. She says softly, "Purpose . . ."

"Truth, sister," Dark answers. He and Light stand up and shake from nose to tail, fur rippling, and start tapping rhythms with their web-toed feet.

Light cries, "Hail the Great Tree!"

"Hail!" echoes Dark, and next thing I know they've picked me up, one on each arm, and they're dancing me in a circle.

"Whoa—stop, you're making me dizzy!"

Light stops with her black nose right beside mine; her whiskers tickle my cheek.

"You've shown us your Purpose," she says. Her chuckling speech comes from her throat, but the translation comes out lower: It's the necklace that's been localizing the translation. That thing has more functions than I thought.

Her brother declares, "Truth, witnessed! You are of the Great Tree Purpose, just like us."

I shake my head. "I don't know—"

"Listen," says Light. "All who pursue the Great Tree

Purpose know this: As each unit enters a pattern, always that pattern forms a unit on a larger scale. If you can speak of ice trees, and change patterns in atmospheres, you know this also.”

“Observed,” Dark agrees.

Unbelievable. Their Great Tree—it’s fractal structure? It has to be; it’s staring right at me, in the holographic translator, the cloud ship, the very shape of this room.

“Okay, I see it.” I frown. “But that isn’t Purpose, is it?”

“The Great Tree is only the particular nature of our Purpose,” says Light. “Purpose is seeing the beauty of that nature—the instinct that drives us to create, to pursue, pursue.”

“And drives you also,” says Dark.

“Witnessed!” Light declares. “Let’s return to the consensus.”

“Resolved.”

We find the others waiting: Sung frowning; Kenneth white-knuckled; Doris trying to shrug off the unforgiving grip of Dodge and Strike; Blue and Orange standing in the midst of a holographic array of alien faces. Every one of them watching us.

Light activates the translator dome, and she and Dark bow their heads, saying in unison, “Hail, BlueOrange.”

“So,” says Blue. “We see that the minds of humans are capable of understanding Purpose.”

“Witnessed.” That’s not just Orange answering, but all of them—Dodge, Strike, and the stranger otters too.

Witnessed?

Doris growls, her face flushed with rage. “Damn you, Lynn Gable—I’ll have your head for this breach of contract! You’ll never receive clearance anywhere again.”

When I look at the guys in horror, Sung murmurs, “We heard everything.”

“What? Everything?!”

“Handing Terraform’s proprietary information over to aliens,” Doris snarls. “And now that I know who hacked our systems, I can’t say I’m surprised.”

I gulp. “Doris, they were going to declare war—” “Our security has been compromised. I’m shutting down the project.”

Kenneth bursts out, “No!”

“You can’t do that.” “Truth!”

That wasn’t Sung.

Light stamps her feet. “The claim to this project is not yours, Doris,” she says. “It belongs to Lynn GreatTreePurpose.”

“It belongs to the late Doctor Kasemsarn and Terraform, Incorporated,” says Doris.

Dark snuffs indignantly. “To Lynn GreatTreePurpose, witnessed,” he says. “But if Doris wishes, then she may ask to trace the claim.”

Light nods. “Do, do.”

Orange sorts through holographic shapes and fishes out

two closely conjoined spheres, exactly like the images of the otters above her head. I see Dark and Light, one in each sphere; my own head floats in the intersection of the two. My face grimaces, and words come from my mouth.

All I want is to go back to my project—my machines and their beautiful numbers. They're down there waiting for me. I built them the best protection I could, but they can still drift off course if we leave them too long. That's all I care about right now.

Orange says, "This is the first statement. There is no witness of prior claim."

Blue turns to Doris. "Truth, that! If you wish to dispute, you must prove your Purpose upon the project. Show us that you pursue."

"Show, show," Orange agrees. "Explain the beauty of this project from the eyes of your Purpose, as Lynn has done."

"That's ridiculous," says Doris. "Dr. K was the expert, and you killed him."

"Then you have no claim," says Blue.

"Truth," says Orange. "The project belongs to Lynn GreatTreePurpose."

"Witnessed."

Doris flushes red. "This is outrageous! I'll have Terraform on all of you for this, and anyway, you'll find there is no project. You killed it when you killed everyone with your stupid mistake—four

people on Base isn't enough, no matter how much Lynn thinks she knows."

Doris is right. I hold out my hands to Blue and Orange, and the alien faces above their heads. "Please—can you help us? Do you have a transmitter we could modify?" I suspect transmitting to Terraform will be the easy part—knowing what to say will be much harder.

A webbed hand touches my left shoulder and Light peers into my face. "You may call for help," she says.

"Certainly," agrees Dark from my right, "but for now the Great Tree Purpose can mobilize to skim your wake."

I blink at them. "When you say mobilize, do you mean—"

Light holds up one hand. "Possible," she says, nodding toward the albinos and the holographic witnesses. "If other Purposes do not wish to contest the claim."

Blue shakes his head so his earrings jingle. "The Pattern Purpose is already satisfied in its pursuit, for we have touched the planet."

"Truth, that!" says Orange, and turns her face upward. "Let the Form Purpose and Performance Purpose speak claim if they wish."

"The Performance Purpose maintains claim without dispute," comes a voice, one of two aliens with thin parallel ridges above their eyes. Its twin adds, "Resolved. Our dance celebration can go forward without harming the Great Tree

Purpose.”

Another pair speaks. “We speak for the Form Purpose,” says one, and the other, “Truth. Why not pursue as we began, upon the existing structure?” “Hear, hear. In this way the human breath-bubble may be restored, and the structure be improved as a fitting monument to Form.” “Proposed.”

Orange and Blue don’t look for my approval, but give a decisive nod. Looks like there’s some kind of party coming, and Base will probably never be the same—but it’s clear the aliens are helping us now, and I really like the human breath-bubble part. Remodel or not, life gets a hell of a lot easier if Base is livable until Terrafirm gets here.

Blue announces, “Resolved!”

“The consensus is released,” says Orange. She waves an arm and the holographic faces shrink back into the whirl.

My eyes and temples ache after too much input. “What do we do now?” I ask. “How long until we can get started?”

“We can start now, swift as snatching fish!” says Dark.

“Witnessed!” cries Light with a delighted trill. She pats the sphere at her neck. “Oh Lynn, the creation of a living planet, what a sparkling project for the Great Tree Purpose, a jewel in the great star pattern.”

“Truth,” Dark agrees. “Tell us how to begin.”

“Tell us.”

With Doris giving me the look of death, I can’t answer. “Uh

—can I talk to the guys for a minute first?”

“Yes.” “Certain.”

I try to take Sung and Kenneth aside, but Dark and Light are following us. “Privately?” I ask.

Dark extends his whiskers. “Why?”

“Yes, why?” asks Light. “Why would you endanger your claim to ideas by expressing them without witness?”

“Oh, dear God,” says Kenneth.

“Lynn,” murmurs Sung, “what have you just gotten us into?”

I swallow hard. “Look, I don’t know—but it’s not a war, and right now we need their help. Don’t we?”

Kenneth takes a deep breath. “I guess we do. Of course, when Terrafirm gets here we’ll be in a royal mess.”

Sung nods. “And then come the diplomats.”

“Yeah, well—I guess we deal with those guys when they get here.” What matters right now is that we can pursue a common purpose: restore our Base and honor the work of our lost colleagues by keeping the numbers flowing, painting the barren dust, creating a work of art unlike anything the Universe has ever seen. I look around at them all: Kenneth, Sung, Dark, and Light. We need every member of this team. “So,” I say, “let’s go find ourselves a shuttle.”

The sooner we get started, the sooner we’ll see a real cloud.

The Unfinished Man

By Dave Creek



The ignominy of boyhood; the distress
Of boyhood changing into man;
The unfinished man and his pain...
—William Butler Yeats,
A Dialogue of Self and Soul

Mike Christopher couldn't tell which felt stronger, the fury of the gale-force winds assaulting the rover or the pounding of his

pulse behind his right ear. And the worst of it, he thought, is that I was sent here to rescue someone who doesn't think he needs to be rescued.

Those winds pummeled the small vehicle, seemingly threatening to overturn it despite the claw-like supports dug several meters into the hard ground of the planet Keleni. Through the narrow slits in the rover's armor, Mike saw a landscape where the only plant life huddled close to the ground, presenting as little surface area to the buffeting winds as possible. Winding rivulets of water poured down narrow, well-worn paths as dark, thick clouds rushed across a moonless sky. Mike shouted to his companion over the din: "Shouldn't we turn on the gravitics? If those supports let go—"

"Nonsense," Leo Bakri yelled back. He and Mike were sitting across from one another in a cramped galley and sleeping area immediately behind the pilot's module. "This is how I read the storm." The veteran explorer was eighty-five years old, barely into late middle age, but time had been unkind to him. Leo's face was as furrowed as the surrounding landscape, and his body was thin and frail, largely supported by a smart-metal exoskeleton beneath his clothing that enhanced his fading physical abilities and his provided his body with both chemical and nanotechnological assistance as needed. He said, "This is just a little zephyr—one day I'll take you into the Great White Spot!"

"And you say we're going out into this?" Mike asked.

“You can’t explore from a rover, son. You gotta get out there and feel the wind in your face and reach down and scoop up some dirt with your hands.”

“I thought we were going to examine some of the planet’s life forms.”

The lines at the corners of Leo’s eyes and mouth grew deeper as his smile grew wider. “It’s all of a piece, Mike. Can’t separate one from the other.” Leo placed his hand against the side of the rover. “Feel that?”

Mike did the same with his own hand. “The storm’s letting up.”

“Winds are down to about seventy-five kph and falling fast—that’s pretty calm here.” Keleni’s rapid spin, nearly three times Earth’s, generated constant thunderstorms, more violent jet streams, and hurricanes that maintained themselves over months or years. “You ready to take that walk? Sun-up was nearly an hour ago—we barely have three hours of daylight left.”

“I came here to rescue you,” Mike said. “But who’s going to rescue me?”

Leo reached for the latch on the inner airlock door. “Don’t worry, Mike. I admit I came here to die—but not just yet.”

As Leo opened the hatch, Mike pressed the middle finger of his left hand into his palm and his lifesuit nanotech activated—it would protect him from small debris and harden into armor if anything large enough to crush his body or even break a bone came hurtling toward him.

As for Leo, besides his own lifesuit, he depended on his exoskeleton to allow him to make headway against the wind. Mike made a fist and checked the wrist sensor on his left hand—winds were down to sixty-five kph, but Mike still had to keep low and push against the wind to make any progress.

Leo's broad strides took him quickly away from the rover, across a muddy field festooned with various species of plant life, none of which grew higher than his knees. The dominant vegetation featured broad cylindrical leaves of red and blue along with wide roots that anchored the plants deeply into the soil. "I call these sunnysiders," Leo said. "Do you know why their leaves are cylinders?"

"Uh . . . no, I don't."

"They face toward the track the sun will take in the sky. That's a movement they can make day to day. But when it comes to tracking the sun across the sky hour by hour, that's beyond them. The cylinder shape means they can catch the sun's rays the entire day."

"Anytime it's not storming, you mean."

"All the more reason to soak up as much as you can when you can."

The cloud cover was just beginning to lift, and Keleni's primary glowed softly in the east, about halfway to zenith. Leo made his way toward a shallow ravine, went to one knee and motioned for Mike to do the same. Mike did, as Leo pointed to a narrow rock outcropping about fifty meters distant. "Keep

looking right there.”

“For what?”

“Your first glimpse of the animal life here—it doesn’t waste a lot of time once the winds start to die down. Look—here come some trackers.”

Those were animals about the size of armadillos, with similar armor. They ran out from behind the rock outcropping and rushed around sticking their long beaks into the soft soil nearby. Their chests were broad to accommodate the strong lungs needed to draw a breath in high winds.

“They feed on a type of grub, mostly,” Leo said. “Look at their legs—they’re as pointy as their beaks.”

“They get a grip on the soil by sticking their legs down into it,” Mike said.

“You got it. They have a hard time scrambling over rocky areas, but they like to live near them for protection.”

“Sounds like life is tough for them.”

Leo turned his wizened face toward Mike. “No different than for most living things. My so-called friends who sent you here should’ve realized that.” Mike’s ship, the Earth Unity exploratory craft Asaph Hall, had been asked to divert on its way back to Earth to check on Leo.

Mike had agreed to be the one dropped here on Keleni, mostly hoping this task would keep his mind off the disturbing news that the same message had delivered to Mike, something

he hadn't shared with anyone else yet, even his closest friends aboard ship.

Mike swept one hand to indicate their surroundings. "Winds so strong there's hardly a grain of dust left to blow around, not a single plant that dares to lift itself more than knee-height, and oceans with eternal hurricanes—don't you think you've made it a little tougher for yourself than you needed to?"

Leo's eyes were hooded for a long moment, then his wide smile reasserted itself. "Hell, Mike, the tough thing is sitting around in a care home talking about the good old days. Especially when some of them weren't so goddam good to begin with." He nodded toward the trackers. "Those things are a lot better company sometimes."

Mike said, tentatively, "I heard some of what you went through during the Great Human War."

"Hmmpf! Wasn't so great. Just a lot of death and destruction, like all wars. And don't you realize why those trackers are better company?"

"They . . . don't ask a lot of nosy questions?"

Leo slapped him on the back, and Mike's breath whoofed out of his lungs, Leo's exoskeleton giving the slap more power than he expected. "Now you're getting it. Look there—now the manta gliders are coming out."

Mike's eyes widened at the sight of these five new creatures; they looked like nothing more than Earthly manta rays adapted for land travel. Anywhere from half a meter to two

meters wide, their wing-shaped bodies glided across the ground. "How the hell do they do that?" Mike asked.

"Tens of thousands of tiny legs," Leo said. "Like flagella, only a lot stronger. They can also literally glide a little bit—they tilt their bodies so they get a bit of lift underneath in these winds."

The manta gliders moved smoothly across the plain, and the trackers that happened to be in their path scurried away. Mike asked, "Do the mantas eat the trackers?"

"No—mostly they live on insects I call grippers, and the same grubs as the trackers. But they're especially fond of some smaller animals I call nesters. As you can imagine from the name, they're pretty sedentary. The gliders sting them with a poison that immobilizes them. Only problem is, then the manta's slowed down quite a bit if it has that big a meal. It could end up being eaten by other beasties—mud walkers, wind sprinters, any number of things faster or stronger than they are."

Mike watched as the trackers continued to feed on the grubs they plucked up from the mud and the manta gliders glided past them for now in search of easier prey. The storm clouds finally departed as quickly as they'd arrived and the sun finally shone down in full force. "Is it even possible to make weather forecasts on this planet?" Mike asked.

"You can try, but it's a waste of time," Leo said. "Everything's just too volatile." Leo gave Mike another grin and said, "My mother cried—she was so scared—when I told her I

wanted to live out in space. That's seventy years ago, mind you. But how could I pass up the chance to experience a world like this?" Leo stood up, so Mike did, as well. "C'mon, we can follow those manta gliders—I bet they're looking for a pretty good nest of grippers up ahead."

Suddenly Leo paused, and pressed one hand to his chest. "Are you all right?" Mike asked.

"Fine. Just . . . a little twinge there. And I'm a little faint. Nothing . . ."

Leo collapsed. Several of the trackers looked up, startled, then ran away.

Mike went back down on one knee and grasped Leo by the shoulders. Leo was conscious and his eyes were alert. "Are you all right?" Mike asked. "Can you stand?"

"I'm fine," Leo insisted. "Just stand back."

"I can help you get back to the rover."

"You have to let me do this myself."

Leo got his legs underneath him and stood as if his strength had miraculously returned. The exoskeleton, Mike realized. It's lifting his limp body. Leo turned and strode with a mechanical gait back toward the rover. Mike trotted ahead, meaning to open the vehicle's hatch, but Leo told him, "No—it opens on its own." Mike stood aside and watched as the hatch eased open and Leo's body marched past him as if it were a marionette.

Leo stepped into the rover, with Mike right behind. "What can I do?" he asked as Leo sat in his previous position in the galley again.

"Just sit and watch," Leo said. "This will actually be good for you to see."

As Mike looked on, Leo sat back and closed his eyes. His breathing grew shallow, and Mike wondered if the other man had fallen asleep or even lost consciousness. But Leo took a sudden deep breath, his back arched, and he opened his eyes. When he saw Mike looking at him, his smile was open and reassuring. "See? Just that simple."

"Simple, hell—what happened back there?"

Leo's eyes narrowed. "Every once in awhile I overexert myself. This was one of those times. I'm glad you saw I can take care of myself."

"So your exoskeleton drags you back here—"

"Just to make sure some predator doesn't get hold of me, and to give my personal biotech time to check me out and give me a boost. I'll sit here a minute, and be fine."

"So your friends were right to be worried."

"My friends are jealous. They may be healthier than I am, but I'm more alive. They need to take a lesson from my mother."

"I take it she finally got over your decision to become a spacer?"

"Oh, yeah. In fact, she's lived on Minerva Habitat for the

past fifty-something years.” A resigned shrug. “Now I can’t ever convince her to leave there, even for a holiday.”

Mike said, “Tell me you’re not going back out there right away.”

“If it’ll make you feel better, I won’t just yet. But you’re an explorer. I looked up some things about you—first contact with the Drodusarel, your work on Splendor, taking on the Jenregar, all that. Do you ever expect just to sit at home and read or view other people’s adventures?”

“I just don’t want to see anyone else die. I’ve had enough of that for awhile.”

“Coming back from a tough mission?”

“From the Moruteb system. There and back has taken nearly a year. Another star, Neska, grazed it with a couple planets. We saw some amazing things, learned a lot.”

Leo said, “But the cost was high?”

“Yeah.”

“Someone you loved?”

“Yeah.”

“I noticed you’re down to one shuttle. That’s why they dropped you off and took it back up.”

Mike said, “I notice we’re talking about me now, instead of you.”

“You look like a man with something on his mind.”

"Maybe I am," Mike said. "But that's not the point."

Leo stood. "You know, there really isn't any reason to go back out there right now. Let's keep moving." He went to the pilot's module and sat in the left seat. Mike moved forward and took the right-hand seat. Once again, Leo asked that Mike just sit and watch as Leo operated the controls that raised the rover's armor and retracted the support claws from the earth around them. The next task was to redeploy the rover's six wide wheels from their protective wells. As those wheels extended outward, then touched the ground, the rover lifted gently, gaining the ground clearance it needed to move forward.

"So where are we going?" Mike asked.

"Where else? Home."

Home for Leo Bakri on the world he inhabited was only a couple of hours away—a simple three-room house with an ocean view and a Unity shuttlecraft hunkering next to it. Like everything else on this planet, the home huddled close to the ground to protect itself from the frequent windstorms and hurricanes. The modular structure currently sat at the top of a gentle slope that would make for an easy walk down to the sea, but in an emergency it could dissolve away into its component atoms. While Leo made his escape in the rover, his shuttle could travel to a new site and nanotech builders would use whatever raw materials were available to create a new version of his house and make sure it was assembled and ready by the time Leo arrived at its new site.

Leo brought the rover to a halt and stepped out, using the main hatch next to the galley. Mike followed. The sun was about halfway toward the western horizon, and another brief day was near its end. Keleni rotated three times faster than Earth, making its days about eight hours long, and its daylight periods only about four hours.

The breeze off the ocean was pretty brisk, and Mike had to raise his voice to make sure Leo heard him: "How do you get into the house during one of those windstorms?"

"The closest wall morphs into a hatch," Leo said. "I land the shuttle as close as I can, and an enclosed walkway folds out from the house and attaches to the airlock." Leo looked past his home toward the blue ocean and the rapidly setting sun. "You barely get started at dawn, and soon it's night again. And I prefer doing most of my exploring during the day."

"So what do we do now? A siesta, then back to work?"

"Actually, I do that more than you may think. One experiment I've been trying is adjusting my circadian rhythms to let me sleep instantly and deeply for four hours at a time during a dark period, then maybe stay awake for twelve, then a deep sleep again during the next four."

"Maximizing the time you're awake when it's light. How's it working out?"

"Well," Leo said as he led the way into his house, "I'm sleepy a lot."

Leo's living room was little bigger than a hotel room, but

the view was spectacular: he and Mike sat, each drinking a bottle of beer and watching the sun sink toward the ocean. A flock of iridescent-winged birds flitted past in the distance. Mike said, "This is much calmer than the way we started the day—well, almost four hours ago."

Leo said, "Yeah, but this planet can make another storm pop up in an instant, and we'll be huddled in here like we were in the rover. Don't worry—the house is already dug in, and it has the same armor."

Mike looked at Leo, who seemed aware of the examination and ignored it. "So, you seem pretty satisfied here."

Leo said, "As satisfied as I'm ever going to be. I don't mind the occasional visitor. But I'm not made for constant companionship anymore."

Mike took a sip of beer, then asked, "Wasn't there ever, say, a woman?"

Leo said, "I'm sure you looked at my records before you came down here."

"I did."

"So you know the answer to that."

"I'd like to hear you tell the story."

"Not much to tell. It was during the Great Human War. Marie and I were both serving on the Earth Alliance ship Solar Eagle."

Mike said, "And there was a battle, and you saved her."

"By overriding security codes to keep the blast doors in engineering from closing right away."

"Your superiors didn't like that."

Leo said, "They conditioned us to forget our relationship. It was that or a court-martial. After the war, I found out what happened. It was very strange—I didn't recall the feelings I had for her, but I had to see her." Leo took a final sip, placed the beer bottle on a table, folded his hands in his lap. "I visited her at her home in Boston. But when she opened the door, and I first looked into her eyes, I didn't see the 'spark' I'd hoped for. She was married, pregnant. She remembered me from the ship, of course, but only as an acquaintance." Leo looked down and squeezed the bridge of his nose with thumb and forefinger. "It all comes back at once, almost fifty years later."

"I'm sorry."

Leo said, "Don't be. That kind of thing is one reason I came here. Remembering that makes me appreciate living here alone all the more." He gave Mike a curious look. "So why did you come here? I know you won't stay long, but it looks like you've got something to think about, too."

"You're doing it again."

"Talking about anything but myself?"

"Yeah."

"You're pretty good at it, too."

Mike raised his beer bottle in salute. "You're what they

called a New Human, aren't you?"

Leo's pleasant expression faded, and the stark lines in his face became more pronounced. "I'm damn tired of talking about myself. Is this leading to up something about you?"

Mike looked straight at Leo. "It is."

"All right. It was an experiment that didn't turn out so well. The physical part did—faster reflexes, more strength—that's how I've managed as well as I have despite not having taken any anti-aging tech."

The sun had set, leaving red, cloud-flecked skies that grew darker by the moment. Mike said, "You were supposed to be more moral, too."

"More bullshit—maybe a little less likely to become violent when it wasn't appropriate. That was about it. I did fight in a war, you know. But I was arrogant when I was younger—calling anyone who wasn't a New Human a Volatile, and all that. Another regret."

Mike said, "I'd guess the biotech that created you led to me. I'm an artificial Human."

"That's hardly a revelation, Mike. I told you I looked you up. That's the first thing mentioned."

"But the people I grew up with didn't take it so casually. We're a rare thing, hardly a few tens of thousands of us. I've never even met another artificial. But it was the topic of teasing and jokes in school, as you can imagine. I managed to grow

tough pretty fast, though. I could even have become a bully, but I managed not to.”

“You didn’t want to become what you hated.”

Mike said, “You’ve got that pegged. Anyway, no one could find me a foster home. A couple religious leaders said artificials didn’t have souls—we could be killed, and it wouldn’t be murder.”

“I can see why you left Earth.”

“As soon as I could. Never been back. Until now.”

Leo asked, “That’s where Asaph Hall’s headed?”

“We need to bring on crew to replace the ones who died. As soon as I’m done here. If I decide to stay with the ship.”

“So you’re stalling.”

Mike stared into the dark skies to the west. “I hope things have changed there. But it just takes a few people hating you for no good reason . . .”

“I can understand that.” Leo suddenly sat up and looked into a far distance, as if an unheard voice was speaking to him. “There’s a problem.”

“Another storm?”

“Not ‘another’ one. An ongoing one.”

Mike scooted to the edge of his chair. “The Great White Spot.”

“I have a probe that stays there, orbiting around inside it.

But it's failing. Using its last bit of power to tell me that."

"So what happens now?"

"We take another little trip," Leo said. "Just like I promised. Think you're ready for the Great White Spot? Because we're not just going over it, we're going into it to drop a new probe."

"Isn't that just a little . . ."

"Crazy?"

"Uh . . . yeah," Mike said.

"The crazy thing would be sitting on my ass talking over old times with people who have given up on life. Believe me, Mike, whatever is concerning you, I promise what I'll show you will wash those concerns away."

Leo lifted the shuttle onto a suborbital path across the ocean. The craft soon "caught up" to the sun as it headed westward. But the skies ahead were dark, due to the massive hurricane that Leo had dubbed the Great White Spot, after Jupiter's Great Red Spot. But while Jupiter's storm was centuries old, the Great White Spot had been confirmed to exist only for about ten years so far. It gave no signs, however, of being a temporary phenomenon, instead maintaining station over this world's largest ocean, never striking land.

Mike said, "I'm hoping that during this ride you'll keep the gravitics on."

Leo tilted his head toward Mike in a playful expression, then said, "They'll stay on, don't worry. I'm only foolhardy, not

stupid.”

Soon storm clouds appeared from beyond the horizon—the first clear sign that they were nearing the Spot. Within moments, rain pelted the forward viewport and Mike saw the ocean below roiling with waves as much as twenty meters high. Dark clouds obscured the sun and a glance at the shuttle’s attitude readout told Mike that strong winds were already battering it. True to his word, though, Leo maintained the gravitics, so none of the shuttle’s gyrations disturbed them. The outside audio pickups, however, were set to allow in just enough sound to give a good impression of the storm that enveloped them.

Leo spared a look at Mike. “Isn’t this exhilarating?”

“You might call it that. Why don’t you just drop the new probe from orbit?” That probe sat in the shuttle’s cargo bay behind them, a smooth, blunt-nosed cylinder about three meters long.

“You try to take the fun out of everything. People used to fly airplanes into hurricanes back on Earth, you know—wings, propellers, no gravitics. Can you imagine the noise, and how much you’d feel the turbulence?”

“People used to eat animals and perform surgery with knives, too. Doesn’t mean I think it’s a good idea.”

Leo just shook his head. “The Spot is about 480 K across. When we get about 150 K inside, I’m going to have you launch the probe while I keep us as stable as I can.”

"What would you have done if I wasn't here with you to help out?"

"Do it without you, of course. I'm not making it convenient for myself, Mike. I'm letting you in on—try to guess it—the fun."

"Next time I'll remember. What do you learn from the probe?"

"It has temperature and pressure sensors. Wind speed and direction—all kinds of stuff."

"Does that change much here in the Spot?"

"It doesn't, except on a purely local basis. But I keep looking, to see if it might break up someday."

Mike said, "Or grow stronger?"

"That's a point. But it's not like hurricanes on Earth that form and then disappear within a matter of days. We're coming up on the launch point."

"I'm ready."

"It's not an exact science, here—one place is about like another. I just want to make sure to keep the shuttle as steady as I can for the launch. Okay, anytime."

Mike pressed the launch control. "Probe away. Not much of one for countdowns, are you?"

"Countdowns just make you wait and give the probe's tech a chance to screw up. Probe looks good, getting a great signal. Should last quite a while out there."

“Now what?” Mike asked.

“Now we go look at something pretty.”

For several more minutes, all Mike saw outside the shuttle was gray as their utterly smooth ride continued. A small part of me, he thought, wishes the gravitics were off so we could have a sense of speed and of the force of the storm.

A very small part.

A glance at the attitude readout revealed that the winds jolted the shuttle even more harshly than before. The next readout to catch his eye wasn't the attitude but the altitude. Mike told Leo, “We just took a pretty good jump!”

“Nothing to worry about. A tornadic updraft, not uncommon when you're surrounded by winds of about 300 kph. But now things become much different.”

The shuttle broke into daylight. Mike had never seen sunshine so blue, so beautiful, its rays bright and sharp against the dark complexity of the storm still swirling all around them. “We're in the eye,” Mike said.

“Breaking through the eyewall exposed us to the worst of the storm. This is the reward.”

“How wide is it?”

“This one? Just over sixty K. About average for an Earthly hurricane. Look at the eyewall—it widens out at the top, like a stadium.”

“But this hurricane never goes away. That's one of the

things you're trying to figure out?"

"Exactly," Leo said.

Mike looked down toward the ocean. "That's the only part that's still violent—those waves are still topping twenty meters, I'd say."

"You'd be right. Imagine flying that airplane through this only to break out into this chaos. That's why I named the planet Keleni, you know—it's the Cetronen word for chaos."

"Why not name it with a Human word?"

Leo said, "I didn't like 'chaos' itself as a name. Looking up synonyms just gave me words like 'bedlam,' 'pandemonium,' and my favorite, 'topsy-turviness.' Keleni gives us the meaning, but it's a prettier-sounding name."

They flew onward for a time, then Mike asked, "How are you feeling?"

Leo gave Mike a resigned look and said, "I'm not about to faint away, if that's what you're asking." The light from above set Leo's smiling face aglow. "I'm going to show you something those old-time fliers couldn't do." Leo tilted the shuttle's nose upward and boosted vertically. The sides of the eyewall passed by faster and faster, moved farther away as they spread apart. Within moments, the entirety of the Great White Spot was lying beneath them as Leo leveled off.

From near-orbit, it appeared serene, a mass of white clouds that just happened to have descended upon this portion

of the planet. It gave no clue of the natural violence it represented. Mike said, "It's shaped differently than an Earthly hurricane—smoother at the edges."

"Exactly," Leo said. "That's why I named it the Great White Spot—it has more in common in many ways with that structure than a regular hurricane. I suspect it's the planet's rapid rotation that causes it."

Another quiet moment as they enjoyed the beauty of the Spot, then Leo aimed the shuttle back the way they'd come.

For the first few minutes of the trip back, Leo didn't say anything, and once the glories of the Great White Spot were well behind them, Mike felt a vague discomfort filling the silence. Either Leo wants to say something, or he's expecting me to say something, Mike thought.

Is now the time to talk to him about the subject I've been avoiding?

"Leo—" "Mike—"

They looked at one another and laughed. Leo said, "You first."

Mike looked out the front viewport as the shuttle continued eastward toward the encroaching night. "I'm worried about going back to Asaph Hall."

"Why would you be worried? You've been there, how long—nine years?"

"Going on ten. But there's something about me they don't

know.”

Leo took a moment before he spoke. “It can’t be something you’ve done since you’ve been on the ship. They’d know about it.”

“It’s nothing I’ve done. It’s who I am and how I came about.”

“That’s the part I never saw any detail about in the standard records.”

“That’s the part I never knew,” Mike said. “Just that I was artificial, something about a lab in San Diego that created Humans from scratch. Turns out it was something called the Genome Advancement Plan.”

“Never heard of it.”

“Few people have, apparently. Until now. Historical records just uncovered.” Mike ran out of words, didn’t want to make this awful truth more real by describing it to someone else.

Leo said, “You’ve got to tell someone, Mike. You said it right. I’m a New Human. Much like the Old Human model, it seems. But you, and those like you, were a breakthrough.”

“Only after a catalog of horror. Babies that developed with a single giant eye in the center of the face. Or without a mouth, nose, or lungs. Or with an empty brain cavity or only vestigial limbs.”

“Mike, you had nothing to do with—”

“I know that. But they suffered all the same, and then were ‘disposed of,’ is the phrase they used. Eventually the

researchers involved had their successes. I'm one of them. But my life, my very existence, is built upon the suffering of others."

"Suffering that is long past, Mike."

"Don't try to make it seem somehow unreal, or as if it doesn't matter because it happened so long ago."

"I'm sorry," Leo said. "That wasn't what—"

"I know. I know you didn't . . ."

"Listen . . . I used to think my problems were caused by other people. And in a way they were. I haven't told you about Samuel Troyer, have I?"

"No."

"I was a Triage Officer sixty years ago. Had to take him into exile from New Lancaster Habitat down on Earth. Simple assault charge, but enough to banish him. I was delivering him down to the English Strait Reclamation Project to work there. Terrorists attacked just after we landed, and he died."

Mike said, "I get it. You blamed yourself."

"For a long time."

"But you shouldn't have. You didn't kill Samuel."

"I understand that now. It was just as Samuel's mother told me—I wouldn't find forgiveness out here among the stars, but only within my own heart. She was right. But I found peace out here. And purpose. And they led me to my forgiveness."

"And knowing better than to blame other people for your

guilt.”

“That’s right,” Leo said.

“But my problem isn’t guilt. It’s grief. I keep seeing all those horribly deformed fetuses. And I’m afraid when this comes out, that’s all anyone else will see when they look at me.”

When the silence within the shuttle fell again, it remained until they landed at Leo’s home.

As they entered the house, Mike told Leo, “You look tired. I suppose you might want to catch some sleep.”

“Now that you mention it, I would. All part of my circadian rhythm experiment, you know. And I’m going to let the exoskeleton remove itself for a while, just feel like myself a little bit.” Leo padded toward his bedroom, paused at the door. “We’ll talk some more later.” He went into the bedroom, and the door shut quietly, leaving Mike alone with his thoughts.

He couldn’t long endure them, and he knew they would never let him sleep, not just yet. So while Leo rested, Mike called up some of the reports on the planet. He’s learned so much here, Mike thought as he read through several articles. “A World Without Jungles” showed that Keleni’s constant windstorms prevented jungles from forming, and that Leo obviously eschewed the usual dry titles of scientific papers. “Cue Ball Planet” explained how a world smaller and cooler than the Earth with such a rapid spin lacked plate tectonics and the tall mountains and deep ocean basins that went with them. “Moonless Sky” looked at how Keleni’s axis, which tilted back

and forth chaotically across millions of years, might have settled down if the planet had formed with a natural satellite. He's a one-man science factory, Mike thought.

After a couple of hours reading, Mike settled into his chair and managed to doze, though he was haunted by vague dreams of manta gliders filling the skies and the Asaph Hall skimming the oceans of this rapidly spinning world.

As the sun made its all-too-quick reappearance, Mike awakened as the bedroom door opened and Leo returned to the living room.

Mike sat up in his chair. "I read a bunch of your reports."

Leo favored Mike with a grin as he sat. "They're good, aren't they?"

"You're doing important work here."

"The most important work of my life."

"All of which has led me to a decision. I'm going to talk to your concerned friends—"

"Who weren't concerned enough to come check on me themselves."

"Anyway, Leo, I'm going to tell them of the great work you're doing here, and how happy you are. And that they shouldn't be worried about you. You're where you should be."

"I appreciate that."

"That's something I've known about myself for nearly ten years on Asaph Hall."

“But now—?” Leo prompted.

“I lost the woman I loved. Her name was Linna Maurishka, and she was an empath.”

“A rare gift.”

“A rare woman.”

“And you don’t know if you can keep exploring. What does it all mean, is it worth it compared to someone’s love?”

Mike folded his arms and held down the resentment Leo’s words evoked within him. “You make it sound like none of that’s important.”

“Of course it’s important. But when you don’t have it, you’ve still got an entire galaxy full of surprises and wonderment all around you.”

“It’s not a substitute.”

“No, it’s not. But it is a comfort.”

“Sometimes,” Mike said, “I find the sheer size of this galaxy daunting. My greatest blessing and eternal curse. In a way, I envy you for your focus on a single world.”

“Don’t. Even this one world is more than I can encompass in a single lifetime—or as much of one as I have left.”

“How did your sleep experiment go?”

Leo said, “It was more of a nap.”

“Yeah. This would be a tough world for Humans to colonize.

"I suppose I'm a colony of one. How'd you like to take another trip?"

Mike asked, "Is this all you do? Go out on these little missions all the time?"

"Do you see a problem with that? I don't have a lot of time left, Mike." Leo grinned. "Each nap could be the last one. I savor them, but then I get back to work."

Mike stood up. "Let's go, then."

It was back into the crawler for the next jaunt. Leo told Mike as they pulled away to the south from Leo's home, "I know a place about ninety K from here that has the most marvelous animal life."

"More interesting than the trackers and manta gliders?" Mike asked.

"You can decide that for yourself. The amazing part is that they could be the closest thing this world has to intelligent life."

"But this world's too unstable, isn't it? This business with the axis tilting—in a few million years the poles are going to be pointing toward the sun, and not for the first time. Each ecological niche changes completely. I'd bet some just disappear."

"So what you're wondering is how any one species has the chance to survive long enough to develop intelligence."

"Well, Mike, I guess they'd just have to be a bunch of mean sons-a-bitches."

“Or very smart ones?”

“I’d say a bit of both. Wait until you see what’s waiting for us up ahead.”

A couple of hours later, Leo halted the crawler at the top of a low rise overlooking a broad plain to the south and got out, Mike close behind.

The usual wide, red and blue plants with the cylindrical leaves that Leo called sunnysiders dominated here, though Mike also spotted some tall, thin shoots that bent down low in the slightest gust only to snap upright again during a rare calm moment. Leo saw Mike looking at them, and said, “I call those spring willows. Not for the season—because they spring back up all the time.”

Just to the southwest, Mike saw about a dozen trackers foraging, their pointy legs digging into the dirt, sharp beaks thrusting for those tasty grubs. Just beyond them stood a low rock formation that Mike guessed was their refuge when they felt they were in danger.

Leo pointed to the southeast, to what looked like a barren patch of ground. “See that?”

“Yeah. What keeps the plants from growing there?”

“Be patient.”

The patch moved, and began undulating among the sunnysiders. “So it’s not a patch,” Mike said as the creature neared the trackers. “Is it a manta glider?”

"You'd think so from above. But it's actually very different. I call it a daggerhead."

"Why do you call it—"

The daggerhead's broad, flat body folded itself in an instant into a spear shape with two thick legs. Its thin, narrow head, now revealed, thrust itself forward and impaled a tracker's body against the soft ground as the other trackers fled. The wounded tracker squealed in agony as its body thrashed around, oozing brownish blood. But it had nowhere to go and bled out in moments.

"Next time I'll just shut up for another two seconds and have my answer," Mike said, raising his voice again to be heard over the wind, which was starting to pick up.

The daggerhead's small eyes, situated toward the back of the head, peered at the now-still tracker. It placed a foot on the tracker's body and pulled free, then began to feed, taking small, almost dainty bites, as if it were a finicky eater.

"The daggerhead resembles a much more benign beastie from beneath, the copper-crawler. At the same time, looking like a manta glider from above protects it from predators that don't happen to find the gliders tasty." Leo tilted his head, as if listening for something in the distance. "Hear that?"

Mike didn't hear anything unusual. "What am I listening for?"

"A low tone, beneath the sound of the wind. It's the daggerhead, calling the rest of its tribe."

More daggerheads appeared, this time in what Mike thought of as their “folded” mode. The other trackers were long gone, but the daggerheads gathered around the dead tracker and took their share. Leo said, “With all of them going at it, they’ll have it down to a pile of bones in just a few minutes.” A sudden gust made Leo stumble. Mike reached out to him, but Leo held up a hand. “I’m fine. One thing I need to do, though...” He touched behind his left ear to activate his datalink. “Crawler—settle.”

The crawler eased itself to the ground, its wheels retracted, and its claw-shaped supports dug into the earth. “Can’t be too careful,” Leo said.

Mike said, “So the daggerheads communicate with those low tones?”

“And high ones,” Leo said, bracing himself against the wind. “Whatever tones they can find to either side, you might say, of the sounds of the wind. But they have other tricks, too. At night they expand into that mode where they resemble the mantas from above and they glow and change colors. They apparently have pretty good eyesight, too. I’ve done some tests, and I think they can even perceive starlight.”

“Pretty important on a world with no moon. So you think they could develop intelligence?”

“If they’re given a chance. But there’s that business of Keleni’s axis tilting. In a few tens of thousands of years, the poles will be lined up with the primary. Keleni will be rolling

along its orbital path like a bowling ball down a lane. Who knows what conditions will be like then?”

Another sharp gust, the sky grew dark, and this time Mike did grab hold of Leo to keep him from falling. And this time Leo didn't object, he just said, “We'd better get into the crawler. These storms can come up quicker than you'd imagine.”

“I don't know,” Mike said. “I can imagine a lot.” But he followed Leo toward the crawler without an argument. In the distance, he saw several trackers, no doubt stragglers, headed toward the safety of their rock formation. The daggerheads' bodies flattened out into their manta-resembling mode and hunkered down.

Leo's purposeful strides, courtesy of his exoskeleton, brought him to the crawler, then inside to the small galley and sleeping area. Mike was close behind. As the hatch closed behind them, Leo sat on a bench and said, “We'll sit this one out right here.”

Mike asked, “Any idea how strong this will be, or how long it'll last?”

Leo reached past Mike to activate a bank of sensors. “Oh, I've got it all here—satellite views, deep radar, real-time updates—it tells me pretty well what's happening right now, and none of it's worth a damn in predicting what's going to happen two seconds from now. The whole planetary weather system's just too chaotic.”

The crawler shook from the force of a particularly violent

gust. Leo reached past Mike again. "Excuse me. I'm putting on the gravitics for this one." He touched a control, and the crawler's movements became imperceptible.

"Thank goodness."

"I do it reluctantly, Mike. You spend a lifetime in your shell of a starcraft, protected from everything." Leo indicated the gravitic control. "Not that I take needless risks. But if you don't let yourself feel the bumps in the road, nothing ever disturbs you."

Mike said, "Plenty has disturbed me. I've told you what we've gone through on Asaph Hall these past few months."

"And I'm not making light of that. But live a life a bit more visceral, and your emotional needs fall into proper context."

Mike peered through the porthole in the hatch. "Is that a tornado out there?"

Leo peered over Mike's shoulder. "Yep. There's another one right behind it. If we get a lightning flash or two, I bet we'd see a couple more. Nothing they don't see in Kansas 'bout every year."

Though they couldn't feel the wind buffeting the crawler, the noise from outside revealed the intensity of the storms all around them. Mike said, "I'm guessing we're up to hurricane-force winds?"

"Sure are," Leo said. "Over 120 kph, and straight-line winds. You can imagine what it's like inside those tornados."

The roar of the winds grew again. Mike's eyes widened and he asked Leo, "Isn't the ground starting to tilt?"

Leo looked out the hatch window again. "It's not—we are!"

Mike instinctively looked for something to grab onto, despite not being able to feel the crawler tilting—but there was nothing. "Don't you have a strap or a seat belt or—something?" he asked Leo.

"Never needed it. But I think the ground itself is giving way beneath us—one of those tornados must have struck us dead-on."

"Don't say 'dead,'" Mike told Leo, the other man's concerned expression perhaps more frightening than the view outside.

Leo said, "We're like a tree being uprooted!"

Even though the gravitics kept him from feeling the crawler rise up or tilt, Mike found himself holding on to the bench and one corner of the equipment module next to him.

The view outside the crawler rushed past much faster, then became obscured, and then Mike felt an impact, was thrown into a wall, the lights went out, and the winds rushed over him for a time he couldn't measure.

By the time Mike's eyes fluttered open, the winds had abandoned them, at least for a time. He raised his head just enough that he was eye-level with a tracker. Its slit-like eyes regarded him dispassionately. The little brain behind those

eyes apparently decided he was neither food nor threat, and the tracker went back to its search for grubs. Its sharp feet sank into the earth several centimeters with each step. I'd trip trying to walk, was Mike's thought as he watched the creature spear a tasty grub. Then he remembered he had more important matters to focus on.

Where's Leo? Where's the crawler? Where the hell am I?

He rolled onto his back and saw clear skies, smelled the lingering scent of rain. A glimpse across the landscape revealed debris from the crawler all around him, scattered around a rock outcropping. The storm smashed the crawler, Mike thought, but the internal gravitics held on just long enough that I wasn't killed.

But what about Leo?

Mike rolled over again and tried to push himself up. But he didn't have the strength, and even that minimal effort made his head start to swim, his consciousness begin to fade. Then he caught a glimpse of Leo, watched helplessly as he realized Leo's exoskeleton was in action, lifting the other man like a puppet. I can't tell if he's alive or dead, Mike thought. I know he came here to die, but he said he wasn't ready yet. Not yet.

Mike slumped to the ground again as roaring filled his ears and he wondered whether the distant roar becoming louder by the moment was the advent of yet another storm.

As Mike's consciousness returned again, all was quiet. Without opening his eyes, he could tell he was sitting up with his

head slumped against his chest. He tried to move, but something restrained him; not straps of any kind, but something that touched his arms, legs, and body at countless points beneath his clothing.

Mike emitted a groan and immediately heard Leo's voice: "Thank goodness, Mike—I was beginning to worry you weren't coming back."

Mike opened his eyes. He was sitting in a chair in Leo's living room. A portable nanodoc module stood next to him. "How the hell did I get here?"

"I called the shuttle," Leo said. He was slumped on a couch across from Mike, his shoulders hunched, face seeming to sag more than Mike had seen before. "It homed in on my datalink and picked us up."

"How'd you get me onto the shuttle?"

Leo smiled. "I didn't. I got myself on board and settled into the pilot's seat. Then I had a little help getting you in."

Mike shifted in his chair, suddenly realizing what was restraining him. "Your exoskeleton!"

"It's a one-size-fits-all model. I had it detach itself from me and pick you up, which I couldn't have done on my own even with its help. Ready to sit up on your own now?"

"More than ready. With all respect to it, and to you, it creeps me out a little bit."

Leo touched behind his left ear to activate his datalink.

“Retrieve,” he said, and it was as if an electrical pulse went down Mike’s spine as the exoskeleton detached itself. I wouldn’t have said something metal could slither, he thought as the exoskeleton slid down Mike’s body and limbs, formed into the outline of a man, and walked itself toward Leo. Another round of slithering motion, and the exoskeleton disappeared beneath Leo’s clothing. Leo, in response, sat up straight, shoulders back. Even his facial features seemed firmer.

A transformation as much psychological as physical, Mike thought. Not that it’s any less real for that. “Thank you,” Mike said. He glanced at the nanodoc. “How’m I doing?”

“You’ll be fine,” Leo said. “A bit of a concussion, breath knocked out of you. I’ve been through worse.”

“And will be again, I’m sure.”

“If I’m lucky.” Leo said. “In the sense of surviving, I mean.”

Mike grasped the chair arms, flexed his legs, tried to stand. After a moment, he quit trying. “I guess I should’ve learned that lesson before. I suppose I’ll stay here a nighttime cycle or so, then call up for the Asaph Hall to come get me.”

“I’m glad you came here, Mike. And you’re welcome anytime.”

“But you’ll be glad to have the planet to yourself again.”

“Can’t deny it. Tell my friends they shouldn’t be concerned about me.”

“Wouldn’t dream of telling them anything else.”

Leo leaned forward. "And what are you going to tell them when you get back to Asaph Hall?"

"About myself, you mean?"

Leo gave a nod, then an expectant look.

Mike said, "I told you about what I called a catalog of horror. How I was afraid everyone would see that, and not who I really was. How I began, and not what I've become."

"Anyone who spends more than two minutes with you and doesn't see who you really are is a fool. Just keep in mind that other thing you told me."

"What's that?"

"About the sheer size of this galaxy. Blessing and curse, you said. Come across a place that doesn't appreciate you, and there's always someplace else, and another beyond that, and another beyond that."

"Or the one right place. Like Keleni is for you."

"Either way, Mike, the important thing is never to think your life is finished. Look forward to that next day, that next hour, that next breath. Don't worry about those images other people might see when they look at you."

Mike shifted in his chair, trying to find a more comfortable position. "The real problem," he said, "is trying not to see them myself."

(EDITOR'S NOTE: Mike Christopher has appeared previously in "No Traveller Returns" [May 2008] and "Some

Distant Shore” [September 2007], and Leo Bakri in “Unbound” [September 2004] and “The Human Equations” [November 2002].)

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Enigma

By Sean McMullen



Enigma hung beneath us like a mighty display screen in space, alive with colors, yet showing no picture that we could understand. There were no seas, mountains, or polar caps; neither were there clouds or forests. There was, however, a city. The entire planetary surface was a vast, empty, incomprehensible city. It was a city that could not be lived in, our robotic probes had told us that. All its surfaces were curves, arches, light wells, and tunnels. There were no roads or

walkways, the mighty halls had no floors that could be walked on, the towers were hollow, and there were no rooms, offices, balconies, windows, or steps. Because the material of the city absorbed radio-frequency signals, our probes had been lost when they went deeper than one mile into the caverns and tunnels.

The actual planet was a mass of contradictions too. Its atmosphere contained oxygen, the Hawking telescope told us that within hours of the original discovery. The presence of oxygen seemed a guarantee of life. Pure oxygen reacts with most elements, so it cannot last long without plants to renew it. Because of that, there was never any doubt that Enigma harbored life. Then came the unthinkable discovery. Spectrometers found that Enigma's atmosphere had no water or carbon dioxide, which are also part of the life cycle as we understand it. An atmosphere of oxygen, but no life! This was beyond comprehension.

There was no radio noise, yet edge-of-resolution interferometry showed a surface texture like vast expanses of buildings. Buildings and pure oxygen indicated a highly advanced civilization, one that had progressed beyond electronics and had outgrown industrial pollution. Obviously we had merely misunderstood alien life processes. That gave the Earth hope. Enigma's people would show us how to manage our world, they would have all the answers we needed. Now we had arrived there, but the mysteries kept piling up and we had not a single answer.

Andrean was slightly wolf, and was commander of the lander Cumulus. Five of us would share a space no bigger than a small apartment until we died, but that was no problem. We would not live long.

I was a woman who was somewhat rat. The other three had traces of terrier in their DNA. An alpha wolf, an ultraloyal pack, and an outsider—me. Someone's computer model had once concluded that it was the near-perfect exploration team.

"Too soon, our turn," Andrean said as we waited for the launch window.

There was a certain quality of gloom in his voice. It told me that he did not like taking chances, and that was reassuring.

"You don't sound happy," I prompted.

"Clever Kerris Rat. This star's planetary system has no precedent. That worries me."

"Why? Nine other systems have two gas giants and a single rocky planet."

We had been engineered to disagree without actually coming to blows because that was the current theory of team dynamics. We were also just a little repelled by each other sexually, which simplified interpersonal relations.

"For anyone frightened of meteor impact, Enigma is really configured to last," Andrean replied.

"Configured? Who could configure an entire system?"

"Who indeed, but the evidence suggests it. Here the gas

giants have no moons or rings, and there are no asteroids, comets, or even meteors. Dust is at the levels of interstellar space. Enigma's orbit even leaves it untouched when the star eventually swells into a red giant."

I knew all of that, but it did not worry me. Wolf paranoia is different from rat paranoia because rats live their lives in danger. Rats have dwelt in the shadows of a more advanced species ever since humans evolved, but wolves live separately, in wilderness.

All six thousand planetary systems examined by the Hawking Telescope had detectable Oort clouds. Enigma's system was the sole exception. The star's galactic orbit took it nowhere near any other star's Oort cloud for a hundred million years, and possibly longer.

The lander detached from the Turing with a slight lurch and began its long, long fall to the outer atmosphere.

"Okay, the system has been swept clean," I said. "So what? We humans have done that with threatening asteroids in our own system."

"Enigma's system has been swept clean out to a distance of two light-years, Kerris Rat. Think about it. Pi times a radius of two lightyears cubed is over twenty-five cubic lightyears. What sort of power can do that? Just getting the Turing to Enigma pushed Earth's orbital fabricators to the edge of capacity for three decades."

"You seem to be driving at something."

"I have fears, Kerris Rat. After going to so much effort to save Enigma from impact damage, don't you think the builders might have left defenses to protect it from aliens like us? Landing the Cumulus on Enigma might be like a fly landing on the Mona Lisa."

Andrean had a gift for unsettling imagery. I shivered.

"Our probes were not destroyed," I said, as hopeful as a rat slinking past a sleeping cat on a cushion. "Besides, a curator would not squash a fly against a valuable artwork."

"Only if it behaves."

"So we must behave."

"Behave? Relative to what rules?"

In a sense we were safe, because the expedition had been planned as a type of suicide mission. The Turing would reach Enigma, but without enough fuel to return to Earth. The Cumulus and Nimbus would descend to the surface, but could not return to orbit. When our work was done we would all suicide, but that was fine. Echo technology would bring us home.

We were attached to our echoes by streams of brain telemetry carrying our memories, sensations, and experiences. Our echoes lived in suspension tanks. To return to Earth, all that we had to do was die. Our clones would be revived once the telemetry ceased, and those clones would be us.

So were I to die, my clone would be revived, and I would be my clone. I would wake with some alarming memories of dying,

but I would be alive. Were my signal to be lost, I would be considered dead, and my clone would also be revived. If all signals from the Turing ceased, Earth would assume a catastrophe and revive all of our clones at once. As a strategy it had its flaws, but it was still easier than returning our physical selves to Earth.

There had been years of legal wrangling about both our status and even the morality of constructing our echoes, yet when the time came for the Turing to leave, we originals were aboard. This was largely because the whole idea of being “human” was slipping away. Cyberlibs were campaigning for android-human marriage, lattice-heads had more RAM than synapses, and the poochers were having themselves genetically morphed to have recreational sex with their pets. Throw a stone into a crowd on Earth and your chances of hitting a template human were not good and getting worse.

Thoughts of being blotted out by some gargantuan fly swatter were with me as the Cumulus entered the outer atmosphere of Enigma. In preparation for this moment Risc Hound had piloted dozens of descents to the surfaces of Venus, Mars, Titan, and of course, Earth. Compared to all that, Enigma’s atmosphere presented him with no real challenges. After tracing a line of fire through the cloudless oxygen, the Cumulus slowed to subsonic speeds by twelve thousand feet, deployed its huge parasail, then inflated it with hydrogen. Three hours after entering the atmosphere, we were hanging a hundred feet above the spires, funnels, tubes, towers, and

galleries of the city.

Although we were all wearing environment suits, these did not stop the sounds of the surface from reaching our ears and resonating through our bodies. The probes dropped by the Turing had already transmitted the symphony produced by the gentle winds of Enigma blowing through the city, but probes' microphones did not give anything like the full effect of being down there. All the rat heritage in me shrieked for caution, yet I was just a little allured. Every tunnel, air vent, and light well, every functionless yet exquisite tube and hollow tower in the structure of Enigma's city contributed to the sounds that caressed us.

"The music must be a lure," said Merek Hound, the security officer.

His voice was relaxed yet halting, as if he were fighting his better judgment.

My body was shivering with the chords reverberating through it, yet I did not seem to be quite as entranced as the others. Apparently a few rat genes made a subtle but effective difference.

"Lure or not, we cannot return to orbit," said Andrean.

"Our probes found no evidence of life or power sources," said Elsk Hound.

"Then I judge Enigma to be safe," concluded Merek.

This gave me no comfort. Merek was a dog chimera, and

dogs can be bribed by a burglar with a slice of chicken pie. A rat would just bite his finger and run.

"Captain Leonne, will you give an opinion, over?" Andrean asked into his mouthpiece.

Leonne was back on the Turing, and thus likely to be impartial.

"There may be dangers that we can't begin to imagine," she said slowly, "but we can see none. Dr. Becter reports that the biosensors on your body and brain echo monitors display a state of tranquility. This may have been induced by the city's sounds. Over."

"So they could be a lure, over?" asked Andrean.

"They could also be a welcome, over," said Leonne.

I looked out over the landscape of ludicrous, nonfunctional architecture that was producing the eternal music. There was no obvious threat, but that could mean anything.

"I can see no threat," said Andrean, "but who am I to decide? From now on we shall have to rely on Kerris Rat to sense any danger."

The caution of rats is in every cell of my body, even though I am human. The very specifically chosen rat DNA spliced into mine made me a highly effective but very cautious explorer. Uncounted millennia of sharing caves, houses, ships, and palaces with humans had taught rats to treat everything new and strange as a possible snare or trap. Unless forced to, I

would not explore. Thus Andrean forced and the Hounds backed us both. There was strength in our diversity.

One never really got used to the sounds of Enigma, but it was possible to push them into the background of one's thoughts. I could not avoid the feeling that I was like a rat in some gallery of wonderful artworks, surrounded by beauty, yet forced by my limitations to ignore what was on the walls while hunting for garbage bins to raid.

Across the entire surface of the planet there was just a single anomaly, and that was our first objective. A probe had identified it as wreckage, and from a technology not entirely different from our own. It was a mechanical arm, and it was grasping the top of a spire with its cluster of metal fingers. The other end trailed cables and torn metal, as if whatever it had been attached to had been ripped away. Long exposure to the pure oxygen and sunlight had not yet eaten into its structure, but there would come a time when it would crumble and vanish into the huge funnel at the base of the tower. How far would it fall, and to where? I did not want to think about that.

We sighted Becter's probe standing sentinel in the distance and steered for it. It was rather like a small airship trailing six tentacle manipulators, each a hundred feet long. One of those was anchoring the probe to the spire. We approached slowly, then circled several times. The spire was one of fourteen at the edge of a field of tubes shaped like immense, inverted saxophones. At a command from Becter, back on the Turing, the probe released the spire and departed to continue its

survey. With the solar-powered impellers of the Cumulus holding us steady, Andrean was lowered from the belly hatch on a cable.

“No sign of threat, over,” he reported.

“Mind your first step, over,” said Merek.

“There is nowhere to step, but I will be careful. Over.”

Only inches above the spire, Andrean hesitated.

“Commander, is there a problem, over?” asked Merek.

“Just being cautious, over.”

Andrean’s boot touched the spire’s tip.

“The surface is stable, over,” he announced.

These were not the most inspiring or auspicious words that someone could have uttered when first stepping upon an alien world. Seventeen years in the future many people on Earth would be disappointed with him, but what did that matter to a wolf? He attached himself to the spire by a loop of cable, then with exaggerated caution, descended to the mechanical arm.

“The probe identified the arm’s material as a titanium alloy,” I reminded Andrean. “Very hard, lightweight, and almost inert. Over.”

“I see corrosion, especially on the joints. Assessment, Kerris Rat? Over.”

This was all leadership and protocols. Andrean was the alpha wolf, so he had to prove his credentials by being first to

go down and face the unknown. I was better qualified to investigate, but I had to be second.

“We do not know what mechanism maintains the arm’s grip on the spire,” I pointed out. “If it slips loose it will vanish into the funnel below and be lost. I suggest that you use your personal tether to secure it to the spire, then return to the Cumulus. I will then winch down to do more detailed scans and tests. Over.”

“Suggestion good. Over.”

I descended to the scrap of wreckage with a field analysis kit and utility platform. With the platform attached to the spire, I had a firm and safe footing. I began my tests.

“I can confirm the probe’s analysis: The arm’s age is 5.7 million years, over,” I reported presently.

“Humans could still interbreed with chimps when it was new,” said Andrean. “How is the structural integrity? Over.”

“Surprisingly good. I suggest on-site analysis, then winch it into the Cumulus for detailed work. I will need to work into the night for what I have to do. Over.”

“Suggestion good. Over.”

Andrean now decided to survey the immediate area from the Cumulus and promised to return the following day. I was left to study the artefact alone.

At first I took microsamples from the arm. Scraps of metal tubing, wires, cables, fibers, and even corrosion went into my

snap-top phials. An ultrasonic scan gave me a good idea of its internal structure. Each joint had its own linear motor, each digit on the hand had a tiny camera above the fingertip, and there were eleven control processors. There were four fingers and two thumbs, each cushioned by layers of carbon lattice. Very hard at the molecular level, yet soft to the touch.

I ran my gloved hand along the surface of the spire. It was covered in fine oxide, and was as slick to the touch as wet ice. I rubbed off a sample of the oxide, then returned my attention to the arm. Somehow I felt strangely guilty.

All around me the city played its music, oblivious to the fact that it now had an audience. The motion of the wind through the buildings of Enigma played a strangely tranquilizing symphony that was not music, yet not random either. Chords boomed, lingered, then faded, trills rippled out in the distance, and sometimes a background like the drones of bagpipes resonated until the winds shifted again.

The sky was deep blue, due to the way oxygen polarizes sunlight. Heat shimmers made the light reflected from the varied oxides on distant buildings dance and sparkle. The colors and patterns of the buildings seemed to teeter on the edge of making sense, but they never quite did so for me. I was intrigued, but not captivated. Rats are not easily impressed.

The site was forty degrees south of Enigma's equator, and I had been left there six hours before sunset. The plan was that I should overnight there, alone. Should anything nocturnal live on

Enigma, I might be the first to see it. Or be eaten. Still, death held no terrors for me because I had an echo, on Earth, seventeen light-years away.

I extended the platform until I had two meters of space to lie down on for the night. The wind regime changed at sunset, and I discovered that the spires produced their own music. They resonated, combining individual notes into chords, yet they were not entirely pleasing to the ear. I soon realized that the ancient robotic arm plus my utility platform were acting as dampers on my base spire, spoiling its contribution to the overall effect. I was the fly on the Mona Lisa, and that gave me a little spasm of dread. Still, the robotic arm had clung there undisturbed for nearly six million years, so perhaps my fears were groundless.

Sunset was a very strange inversion of what I was used to on Earth. The buildings lit up, sparkled, glowed, flashed, morphed color, and sang their symphonies, but the sky merely faded from blue into starlit black, with a band of gold along the horizon. Beyond dusk, the darkness on Enigma was more profound than was possible anywhere on Earth. Amid the stars was the Turing, a point of light on the celestial equator, never moving.

Rat caution counseled me against turning on any lights. Countless caverns gaped open on the surface. What might emerge from them? We had detected no power sources below, yet Enigma had power available. Solar radiation drove the wind regimes, and the winds generated sounds, vibrations and who

could guess what else? Tidal forces from the star's gravity flexed the planet and might well have driven engines by compression and expansion. Sunlight falling on the surface was reflected as colors and patterns, but could also be accumulated as electrical energy. Power was definitely available for defenses.

I switched my goggles to starlight enhancement and looked around. Immediately I saw scrape marks in the mouth of the funnel below me. This was an important discovery. Enigma was designed to be viewed at its best by day, but at night one could see occasional evidence of wear. Something the size of an old-style automobile had fallen into the funnel nearly six million years ago. Time and oxidization had blurred the scrape marks, but in starlight the scoring stood out. Something had clung to the spire until the arm had ripped away, then it had fallen into the funnel.

I waited for some grisly end at the taloned hands of the unknown. It did not come. The winds played night music in Enigma's tubes, spires, and galleries. Three hours into the fifteen-hour night I decided that I would try to sleep. The combination of mesh stretcher and environment suit was more comfortable than it sounds, and in spite of my forebodings, I eventually slept.

At the very least I had expected dreams of terrifying wonders, nightmare visions full of things incomprehensible yet horrific. I had expected to wake screaming. Instead, I awoke after a long and pleasant sleep, an hour before dawn. I had not

been eaten. The gas giants Mega and Giga had risen, and steady among the moving stars was the dot of light that was the Turing. Glancing about with the starlight enhancement goggles, I quickly reassured myself that nothing had been disturbed. The intrusion monitor reported nothing either. No nocturnal visitors had called past to inspect me, molest me, or even have a taste.

Then I saw it, on the surface of a neighboring spire. It was a circle that was just slightly darker than the background oxide in the enhanced starlight. I brought my equipment to bear on it at once. It was a shallow pit, but that was as much as I could make out at distance.

After hearing of my discovery Andrean began the return trip just as fast as the impellers would move the Cumulus, and was hovering above me just two hours after dawn. First we gently detached the ancient robotic arm from the spire and winched it into the lander, then Merek and Andrean attached another platform to the neighboring spire. The scans and tests on the little pit went on until after the planet's noon. When no more could be learned, we were all winched back into the Cumulus.

Some hours of frantic analysis followed. I examined the arm, while the others worked on scanning and interpreting the flaw in Enigma's otherwise perfect surface. I discovered a dozen hermetically sealed pipes, and from these I extracted air samples and spores. There was also some script etched into the metal structure.

"The pit is apparently an ancient weapons strike," Merek

announced at a meeting late in the afternoon. "Some type of high-energy beam was fired from near where we found the arm."

"Kerris Rat?" asked Andrean.

"I agree with Merek Hound."

"Risc Hound?"

"We are left with the question of why the shot was fired," he said, stating the absolutely obvious.

"I disagree," I interjected.

Andrean Wolf and the three Hounds turned to me.

"Explain," said Andrean.

"We should be asking why the probe was there, grasping the spire."

"Well, do you have the answer?" asked Elsk Hound.

I projected several images of the spire in the area where the arm had been attached.

"See here, this oval is where I rubbed some oxide away for analysis. Now look at this, a circle of very slightly paler material, two feet farther down. This circle is why the ancient aliens were docked at the spire."

That ended the meeting almost instantly. Within minutes we had adjourned down to the spire, but it took the rest of the afternoon to deduce what the pale patch might be. The material was a good mimic of Enigma's surface, but it was not original.

Before long we had made another discovery. There was a structure sealed beneath the circle. It was a type of data lattice. The pit below all this seemed to have been a strike from an interstellar meteorite.

Something had repaired the damage and had embedded a time capsule in the packing material. The robotic arm was 5.7 million years old, but the repair job had been done fourteen million years ago. The impact was another three million years older. A molecular scanner was left attached to the spire, reading the data arrays of what seemed to be the time capsule. I returned to examining the mechanical arm.

Late that night our meeting was reconvened.

"The arm's chambers contain non-local air," I reported. "Composition: 18 percent oxygen, 11 percent argon, 69 percent nitrogen, and 2 percent carbon dioxide and trace gases. To me the technology looks to be roughly parallel to that of Earth's, but highly refined."

"I don't follow. It should be either inferior or ahead of us," snapped Elsk Hound, who seemed to resent me for also being female.

"They seemed to take longer to do what humans did, and to refine everything to a greater degree, but overall, they were ahead of us. The linear motors rely on energy exchange parameters that are not possible, according to the websites where I learned physics, yet I actually got them to work."

"So their technology is superior but comprehensible," said

Andrean.

“Yes.”

“And they were examining the time capsule left by the earlier visitors?”

“Almost certainly.”

“Very good. Continue your work. Merek Hound, what have you learned from the lattice capsule?”

“The information is in a quantum five-state convention and is structurally different from the script found on the robotic arm. We are definitely dealing with two species and cultures. So far I have identified a representation of this solar system in the data, and I am using that as a key to open up the remaining files.”

“Elsk Hound, you are working on a tissue sample, you said?”

“Yes, Andrean Wolf.”

“Explain.”

“I am running a gestation simulation from a few skin cells that Kerris Rat found in the robotic arm.”

“I thought it would have been assembled under sterile conditions,” said Andrean.

“Probably, but I think someone did field repairs to it, and in circumstances that were not quite clean-room standard. So far the unrefined DNA-analogue has provided an adult image that looks like this.”

The holo-projector conjured something in the middle of the table that combined the very worst features of a cat and a dragon. Elsk made the projection glare at me and growl. I tumbled from my seat and was backing away across the floor before I managed to fight down my fears. The Hounds were very amused. Andrean just looked slightly annoyed, as if distracted from the serious business of worrying.

The creature was apparently capable of rearing nine feet tall, and had four fingers and two opposable thumbs. The brain was structurally unlike that of a human, but of a similar capacity by volume.

“Our first look at an intelligent alien,” said Elsk.

“Its fangs mark it as a predator,” said Merek.

“I’d say its ancestors had been stalking their prey in supermarkets for centuries by the time they found Enigma,” was my opinion.

“I can’t believe this thing’s species was civilized,” said Risc.

“I can,” I said. “Two thumbs, retractable talons, and all the digits are finely formed and gracile. It was a tool maker, just as we are.”

“But the skull is long and narrow. It should be optimized and hemispherical, like ours.”

“You’re thinking like a human, Risc Hound. Birds’ brains are nothing like ours, yet crows score about as well as chimps

as tool makers and users.”

Andrean now reluctantly declared that Enigma was free of hazards, so the Nimbus was sent down from orbit to help with the research. Its crew was also one of chimeras, but the composition was a little different. Silzan Hawk commanded three Hounds, and Rel Fox was the science vector. We sent the first samples up to the Turing on a small sample ascent rocket, and included some of the oxide from Enigma’s surface.

Over the days that followed a scanning survey for surface texture anomalies located dozens, then hundreds of repair sites. Most were damage from interstellar meteorites, and a third contained time capsules that we could scan. The rest seemed to have been repaired for the sake of keeping Enigma looking complete and pristine.

Back on the Turing, Becter and his people analyzed our findings, drew no sensible conclusions, then sent us in search of yet more data. From equator to poles, Enigma was covered in buildings. The style was not uniform, but the individual structures blended into each other seamlessly and each style framed the next without clashing. Backscatter-radiation sounding indicated that the material of the city was some type of silicon ceramic, highly resistant to corrosion yet slightly rubbery. Its composition varied slightly from place to place, causing the differences in surface color.

All planets shrink slowly and Enigma was no exception, but the city was designed so that no part would fracture within the

estimated remaining age of the Universe. There was no rain or sand on the wind, so there was no weathering of the surface. The ceramic did react with oxygen, but only to form a thin, protective layer against further corrosion. We discovered that trace oxides in the air seemed to disrupt microbial structures at the molecular level. It was a self-sterilizing planet; even bacteria could not colonize Enigma.

The oxidation was also a dry lubricant. Everything dropped onto Enigma's surface slid down until it reached one of the many yawning funnels and was lost to sight. This was garbage disposal on a planetary scale; the builders had really thought of everything to keep it perfect.

All of this was fascinating, but it told us nothing!

Our practical, usable discoveries were made from the mechanical arm and the time capsules dotted about on the surface. That made sense. Give a hunter from a Stone-Age tribe the choice between a good titanium alloy knife and an orbital battle platform, and he will take the knife every time. What is comprehensible is always preferable. The technology of the other alien visitors was on a par with our own, in a time period between roughly decades and millennia. On the other hand, those who had built Enigma were well beyond description, imagination, and comprehension.

Using the data files from one of the time capsules, Becter built a simulation of a planetary system that had been explored by the visitors. Included were images of what were probably

ruins, shattered crystals from some type of nanotech community intelligence. They came from a water world sheathed in ice and orbiting a gas giant. The system had no star, it was just a gas giant and its moons, adrift in interstellar space. Tidal effects provided heat to maintain a layer of liquid water on two of the moons. The intelligences resided in relays arranged in crystal lattices, and these were interfaced in larger or smaller clusters depending on what sort of processing was required for a problem. They were almost unimaginably alien, but at least comprehensible. Enigma's builders were not. Enigma had been only the second system where the visitors' race had discovered ruins . . . if Enigma could be described as ruins.

"Andrean Wolf, I want you to look at some images," I said. "First, the fourteen-million-year-old repair to the meteorite strike."

"I know it well, Kerris Rat."

"Next, the little crater left by the shot fired 5.7 million years ago."

"No, this is one of the repaired craters."

"I'm afraid it is the right one."

"But it has been repaired."

"Correct. Between today and the day we arrived, it has been repaired. I checked the activity logs. Nobody has entered the work as a job. I revisited the site. The material used for the job was aceramic used for lightweight repairs in our field maintenance kits, and it was colored to blend in with the spire."

“Who would have done this, Kerris Rat?”

“One of us.”

“But why?”

“Because Enigma has ways of maintaining itself, Andrean Wolf.”

While the Hounds surveyed Enigma, I mapped, scanned, disassembled, refurbished, and powered up the robotic arm. Reverse engineering the thing turned out to be relatively straightforward, as the alien processors were based on layered crystal neural electronics. The power buffers for the linear motors were drained but viable, and electricity is always electricity. After some blind experimentation I charged it up, then developed some methods of control and slowly worked out the interfaces for the nodal processors.

“They were deliberately kept simple, presumably to make repairs in the field more easy,” I explained to Andrean. “Allow me to demonstrate.”

As he watched, I powered up the cameras in the fingertips. Very slowly, I used my laboratory computer system to point the unit at Andrean. An image of his face appeared as a hologram above the bench.

“And this is all being done by the alien artifact?”

“Yes. Note how the six cameras allow a three-dimensional representation. Now observe the high degree of motor control.”

With the speed of a striking snake I lunged the robotic

hand at Andrean's wrist and seized it firmly. He yelped and pulled away, beating at the mechanical fingers. I released him.

"Observe also how durable the technology is, even after millions of years in sunlight and oxygen," I pointed out.

"Yes, I had noticed," he said, rubbing his wrist and scowling. "Kerris Rat, I have been thinking about the images you showed me nine days ago. The repairs to the little crater."

"Yes, yes. Do you know who did it yet?"

"All hounds deny it, as does the crew of the Nimbus. I went back over the work schedules. Look here." He projected collection schedules onto the screen. "It had been my intention to collect samples of the many hundreds of variations of oxide that gave Enigma its patina of colors."

"I don't see anything unusual."

"Look again. Really concentrate."

I made a real effort this time, aware that he was driving at something.

"There are three hundred requests," he said presently. "How many samples have been collected?"

"I . . . I see . . . one acknowledgment. It's . . . early in the program."

"Look again. How many Enigma days?"

"Three, five, two, seven . . . and the only sample taken was by me on the day we arrived!"

"Now you see it," he concluded. "The requests are assigned to Merek, Risc, and even yourself. It gets better. I scheduled you to take samples of the underlying material of several sites in the city. How many have you drilled out?"

"None," I managed, after some concentration.

"Yes indeed, none. Kerris Rat, Enigma is protecting itself. It has messages in the windsongs, subsonics and visual patterns. The city seems to have a way of compelling visitors like us to do no damage and to help with its upkeep."

"But I feel no urge to rush out and repair things."

"Were you to find some damage, I think you would have a change of heart."

"This . . . ought to feel alarming," I conceded.

"Once again, Enigma at work. Becter asked for some laser ionization sampling to be done fifteen days ago. Not only did you forget about it, but he did too. I remembered. Strength in diversity."

"Becter forgot? Becter is in orbit. How could he be influenced?"

"From orbit he can see Enigma's surface. Even viewed from space, the changing light on the surface seemed to generate subliminal effects on some brains. It's . . . taking control of us, no matter where we are."

"So Enigma was designed to influence us, but how?" I wondered, "We were blobs of jelly in some Pre-Cambrian sea

when it was built.”

“All true, Kerris Rat.”

“How?”

“I do not know, but we are definitely changing. All of our experiences are being streamed back to Earth. That means our echoes are changing too. The—the infection may already be back on Earth with our echoes.”

“How can we know that?”

“We cannot know, that is all that I cling to. We are doomed, Kerris Rat, but there may still be time to save Earth.”

“Garbage, Andrean Wolf. I have a . . . a feel for Enigma. It does not threaten me.”

“I have a feel for Enigma as well, and all that I feel is menace.”

“Wolves are outsiders, they do not have empathy as rats do. Nobody is better qualified to cope with a more advanced species than someone with a few rat attitudes.”

“Then teach me, Kerris Rat. Teach me before it is too late.”

I submitted a proposal to return to where we found the mechanical arm. Andrean signed off on my proposal, but was distracted and remote, like a terminally ill patient who was focused on the approach of death. I took a scout parasail, which was just a seat frame, an impeller, and some controls hanging beneath an airfoil filled with hydrogen. I had a supply cache that would last a week, and the seat could be extended into a

sleeping bunk.

Anchoring the parasail presented me with a dilemma. Were I to attach a tether to one of the spires, it would act as a damper when it vibrated in the wind. Use the electric impeller to hold my position, and there would be a low hum to interfere with the sounds from Enigma. Positioning myself above the spires, I turned off the impeller and prepared to measure how fast I would drift with the wind. To my astonishment, I did not drift at all. Many hundreds of millions of years ago, something had anticipated that a visitor might try to hover at that place, and had designed the buildings to produce a wind anchor.

Sitting on the platform, I exposed myself to Enigma's sounds while monitoring my brain activity and hormone levels. I found definite anomalies, but could not understand them. Enigma's builders had never seen a human, yet they could control me. I was aware of the control, perhaps because I was a chimera. No template human had descended to Enigma. What would happen if Leonne was exposed to what I was experiencing? I stayed at that position for three days.

It is said that the most effective raids take place in the small hours of the morning. I had developed a habit of waking an hour or two before dawn and looking up at the stars while listening to Enigma and feeling its deeper sounds reverberating through my body. Something flashed for a moment at the celestial equator, exactly where the Turing was positioned. Immediately I sat up and checked my Earthlink, whose alarm had started beeping. The downward poll signal was dead. This

meant that the upward link, with my brain telemetry, was going nowhere.

I keyed the manual link at once. There was no response. I turned the imager to the sky and boosted the resolution all the way. The Turing was still there, but amid a twinkling cloud of fragments. At this distance I could not tell what had been damaged. I kept transmitting, but was returned only hiss. The Cumulus and Nimbus relied on the Turing to communicate with each other, and with me.

“Anyone, can you hear me? This is Kerris Rat, over!”

Silence. Minutes passed. I continued to transmit. Suddenly I got a response.

“Kerris, can you hear me, over!”

It was Leonne, with a very weak signal.

“Leonne Sapiens, I receive you. What happened? Over.”

“An ascent rocket rigged with power packs and scrap metal. It was meant to be a sample delivery. When we saw that it was coming at us full velocity, we managed to turn the starship so that it impacted on the Earthlink module. That dispersed the blast, but killed Earthlink. Over.”

“Who sent the rocket? Over.”

“The Cumulus. Over.”

“The Cumulus fired the rocket? Over.”

“Confirmed, confirmed, and both landers have since self-destructed. We managed to rig comms, but only you are

responding. Over.”

It took little effort to work out what had happened. Andrean had spent days struggling with Enigma’s influence. Like me, he had failed. Unlike me, he had despaired. He had not been able to destroy the Turing, but he had broken the link. As far as Earth was concerned, we were dead. Seventeen years in the future, our echo clones would be revived. My last memory of Enigma would be of looking up at the night sky, blissfully unaware of any problem.

“Kerris Rat, are you still there? Over.”

“Leonne Sapiens, this is Kerris. Over.”

“Becter Lattice has got the sensors working again. Thermal wavelengths show that the wreckage of both landers has vanished into the funnels of the city. There is one anomaly left. It looks like a liaison parasail, traveling at about one hundred miles per hour and heading straight for you. Over.”

It had to be Andrean. He would be coming to save me from Enigma, the same way he saved everyone on the Cumulus and Nimbus.

“Leonne Sapiens, I have a bad feeling about this. Over.”

“Have you any mobility? Over.”

“I can flee at the same speed as the incoming parasail. Over.”

“Kerris Rat, you are cleared to flee or fight, according to your judgment. Over.”

Flee or fight. That was what Andrean would expect. There was a third option, however.

“Leonne Sapiens, stand by. Don’t be alarmed when you lose my signal. Over.”

After engaging the impeller and advancing it to full power, I stepped off the parasail.

I fell into the blackness of the funnel. It was about a hundred feet before I hit the steep slope and plunged down into its absolute darkness. After the first minute I turned on my helmet light, but it showed little. The deep, soothing, musical chords and flourishes from the city’s airways were continually with me as I descended.

My personal doppler radar unit gave my speed relative to the oxide-slick surface, and from this I could calculate distances. At three miles I entered a vast cavern that seemed to act like the soundbox of a guitar for all the tunnels that fed into it. On the roof were drawings and script, glowing down as a different texture in the oxide layer. Landers and aliens were depicted, and I even recognized some of the surface features visible from my base. The graffiti of other visitors, I decided as I slid into the next tunnel. Obviously there were no damage control inhibitors down here. Minutes later I entered another graffiti gallery, then another. Were all visitors meant to leave some similar testament, I wondered, or was it optional?

I scanned and recorded what I could as I plunged onward. In a few minutes I had learned more about the alien races of our

galaxy than in the rest of human history put together. Gallery after gallery flashed by, all covered with imagery and script from earlier visitors. I passed the five-mile point. So far I had dropped only two miles vertically, but now the inclination of the tunnels began to flatten out, and with this my speed slowed too. There were dozens more galleries decorated and inscribed by earlier visitors, but traces of the alien machine's descent continued to be visible as well. More than once the thought that I might have made a terrible mistake by jumping passed through my mind, but rats survive by taking chances. Clever chances.

After ninety-one miles of travel and at seven miles depth I finally slid out into what resembled a vast indoor sports stadium. The floor was ankle deep in powdery dust that flowed like black mercury. Shapes were visible, some towering, others mere scraps. One dark shape about the size of an old-style automobile was all ridges, scales, spikes, and mechanical arms.

It had the right dimensions for whatever had fallen into the funnel that I had entered, and it was stylistically identical to the mechanical arm.

For once the archeological evidence was absolutely beyond doubt. Five shots from a plasma weapon had hit the craft, all of them passing through the pilot—who was now just a skeleton in an environment suit. Both of the mechanical arms were attached and undamaged. Scattered about that vast chamber I soon found fragments of another, identical craft, one that had apparently exploded. In the very remote past the aliens

had moved beyond rational discussion of Enigma. It was the second craft that had left its arm on the surface.

Words are not adequate to describe how it felt to be working in that place. The only light came from my helmet, but sounds were all around me, echoing down for miles through Enigma's warren of caverns and galleries. As I had suspected, solid jetsam found its way down here, but the chamber was also built for the dust of eons to settle out.

Even though rats are bold, we are not fools. A cluster of spiky violet crystals about the size of a basketball floated enticingly just above the dust. I was about to reach out to it when I had second thoughts. I tossed a scrap of metal at it instead. The metal vanished. No bang, no flash of light, it just ceased to be. Not far away was a sphere of nothingness. Not a single gleam or highlight was visible, it was just a depression in the liquid dust. I skirted it carefully. My foot discovered a badly corroded device that resembled an assault rifle built for a squirrel.

Later analysis would show that the dust was partly from interstellar micrometeorites falling over hundreds of millions of years and partly oxides from the surface. Enigma's surface bound with water and carbon dioxide, removing the products of our respiration from the atmosphere, to drift down to these dust traps. Enigma passively maintained itself to perfection.

With the caution of a rat scouting an unfamiliar kitchen I circled the intact vehicle. The vital parts were coated in a

smooth material that looked like chrome but felt like plastic. It apparently did not react with oxygen, and so was in pristine condition. I then realized something even more fundamental. The engine was no more than a force-field balance. My backscatter scanner told me that it was like the Turing's antimatter resonance converter—except that there was no antimatter. From the mechanical arm I had learned how to find and release the access plates in dragoncat devices. I now methodically removed the vehicle's plates in order to trace the damage from the retaliation shots. Before long I accepted that repairs were way beyond me, and turned my attention to the other artifacts in the chamber. To my surprise I found that most were intact.

Andrean was traveling slowly as he entered the chamber. I had suspected that he might try to follow me once he caught up with my empty parasail, and so had set up a short-range radar sensor to give myself a few minutes of warning. I hid behind some wreckage in case he arrived shooting. My visor's infrared display showed him as a shape crouched warily amid the swirling dust and alien machines.

"Andrean Wolf, I hoped you would visit," I said in the darkness.

"Kerris Rat?" he asked, seeing what was visible of me as an infrared glow, just as I saw him.

"The original Kerris, accept no echo. They lead very sheltered lives in those suspension tanks."

"No heroics please, my beacon mortar is armed," he said. "One move and I shoot."

"I am marooned down here until I starve. Why should I care?"

"You are not moving. This tells me that you do care."

"Then I invite you to put my ghost to rest," I said, hoping there was no tremor in my voice.

Andrean considered this option, allowed some moments of silence to pass to see if my nerve would crack, then realized that a lengthening silence meant loss of face for him.

"We are both ghosts, so we have all the time in the world," he said, still wary.

Now I had the advantage. There is nothing that a guru, prophet, messiah, or alpha wolf wants more than followers. Even one will do. Andrean would be regarding me as a challenge.

"Who else is still alive?" I asked.

"The Hounds have sacrificed themselves."

"How very dog."

"Eagle and Fox were not as willing, but they too are dead."

"You failed to destroy the Turing."

"We broke Earthlink. That was enough. My echo will awake in seventeen years and explain."

Andrean switched his helmet light on and shone it at my

face across the distance separating us. Coming across to me, he satisfied himself that I was not armed. Only now did he glance over the detritus in the chamber.

“So even an eternal city has junkyards. Is that why you came down here? To examine junk?”

“Of course. Junkyards are the lifeblood of archeology.”

“I suppose you will try to tell me you have discovered Enigma’s secret.”

“Work it out for yourself.”

“Perhaps I will. We have plenty of time.”

“Until the food runs out and my portable recycler degrades.”

Killing me would mean he was left alone down here. For someone intending to suicide, that should not have mattered, but perhaps he hoped to lure those in the Turing down to help.

He sat down on a device with rather Gothic-looking outlines that seemed to serve no purpose at all. His helmet light panned across a mixture of wreckage and ancient, intact equipment amid the swirl of black, liquid dust.

“Enigma was set up specifically to be found and visited by civilizations that have just obtained the capability of interstellar travel,” he began.

“Very good, but why?” I asked.

“The visitors learn the lesson, then take it home. Their races then go on to the destiny that Enigma has decreed. That

message is on the winds, in the colors of the spires, towers, and buildings, within vibrations and tremors in the surface, and in many other effects that are probably too subtle to notice.”

The rat had the wolf in a dialogue, but for how long?

“That’s all?” I asked.

“Enigma is the ultimate evangelist. Races come and go, but Enigma is eternal. It is a message given form. It travels through space, indestructible, forever ready to spread its message. It has sunk its hooks into my mind, but it has not yet seduced my will away.”

“Or mine.”

“True. We are chimeras. Perhaps Enigma’s builders did not expect chimeras. That was pure luck. That allowed me to save Earth.”

“Then why come down here to kill me?”

“Because I do not know my enemy. Your recycler can keep you alive for a few days longer. In that time Enigma might grant you the power to . . . perhaps to teleport to Earth by a mere act of will. No, best to end it all here.”

“One out of three.”

“What do you mean?”

“Enigma has been attracting visitors like us for hundreds of millions of years—true. Enigma has a message—false. Enigma seeks to influence us—false.”

“Of course Enigma influences us. Why else would we do

the repairs to its buildings?”

“So that we can be heard.”

“There is nobody to hear us.”

“Ah, but there will be, millions of years in the future. Reading the lattice databanks in the repair sites and visiting these chambers and the graffiti galleries is better than visiting the home worlds of the earlier visitors. They all arrived within a few centuries of their industrial revolutions. Their inscriptions, time capsules, and discarded equipment are still comprehensible to us.”

This was a very rat perspective. The wolf pondered this.

“You have my attention,” he conceded.

“How often does a civilization achieve interstellar flight in this galaxy? On the basis of what we have found on the surface, perhaps once every five million years. Now ask how long a civilization lasts until it becomes something unrecognizable to people at our level. A thousand years? Do the math and the chances of us meeting another space-faring race are two in ten thousand, but probably less.”

“This tells me nothing about Enigma.”

“Oh, but it does. Visits to Enigma are the only time alien civilizations will ever have anything in common. A million years earlier, and healthcare means scratching fleas, security is trying not to get eaten, and entertainment is scoring a screw when the alpha male is not looking. A million years later, and we are

totally unrecognizable. Enigma is a beautiful but puzzling piece of work, designed to draw attention to itself and attract visitors. Here we can meet the hundreds of alien races who have come and gone before us.”

“This does not make sense,” said Andrean. “The chambers and tunnels beneath Enigma are inaccessible, unless you do a one-way slide like we did.”

“I have reviewed the scans I did as I passed through the graffiti galleries and surveyed the tech in this chamber. Humanity appears to be the first space-faring race ever to visit Enigma without using some type of gravitational inversion. All the other visitors could fly down the tunnels using backpack units. We need parasails inflated with hydrogen, and they don’t fit.”

Andrean said no more for quite some time, so I was fairly sure that I had made sense. Humanity yearns for diversity. For a lack of aliens they created the latticeheads, poochers, androids, and of course we chimeras. Long ago, Enigma’s builders must have known of some innate need for intelligences to meet other intelligences. They thought it so important that they left us Enigma, so that even when separated by millions of years of evolution, development, and change, we could still know the other visitors as friends and colleagues.

“So I have destroyed humanity’s chance to use Enigma, Kerris Rat,” Andrean finally admitted. “Is that not true?”

“In seventeen years your echo will awake on Earth and tell

everyone how you destroyed the expedition and murdered us originals.”

“I did it to save humanity.”

“But humanity was not in danger.”

“When we get back to the surface I will transmit a retraction.”

“How? You destroyed Earthlink, and we are marooned down here.”

“Then what can we do?”

“We can leave our own message. Do you have anything to say to the next visitors, Andrean Wolf? Scratch it on the wall if you do.”

Again he said nothing for some time. When he did speak, it was a lateral instruction, such as a rat might resort to when trapped.

“Down here, most of the artifacts look undamaged.”

“I think this place is meant to be a sort of archeological trade fair. Most visitors leave something.”

“Some of them are floating above the ground. They must be gravitational inversion packs and sleds. We could use those to escape.”

“It takes weeks to master alien equipment, if it can be done at all. We have days.”

“The batteries I brought down as weapons will last your

equipment for many weeks, Kerris Rat.”

“But you have no supplies, and mine are almost all gone.”

“Then I had better provide something for your recycler,” said Andrean as he raised his beacon mortar to his head and shot himself.

As it happened, I took five weeks to master one of the artifacts that had remained functional after uncounted millions of years of dust, darkness, and pure oxygen. Using it, I was able to return to the surface, then seal my environment suit and reach the Turing and other survivors in orbit. In the years since then, we have been able to build a new Earthlink and explore some of Enigma’s caverns. There are enough caverns to last many lifetimes, so it is better than exploring the galaxy itself. All of our findings have been transmitted to Earth, but will anyone listen? I have a feeling that they will heed Andrean’s warning and ignore all new transmissions from Enigma.

I no longer care. We are leaving a chronicle of Earth’s history in a lattice databank embedded in a meteorite pit repair and a mural on the roof of a gallery deep within Enigma, along with a sample of our equipment in the chamber where Andrean killed himself. I am writing within the mural of how we were the boldest of the visitors to Enigma, using the most primitive and dangerous of technologies to cross the chasm of distance from Earth. I know I will have appreciative audiences, even when humanity has progressed beyond the comprehension of beings like us.

After all, that is what Enigma is for.

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If we were to wake up some morning and find that everyone was the same race, creed, and color, we would find some other causes for prejudice by noon.

—George Aiken

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Stay

When a relationship changes to something new, the last traces of the old can be very persistent...

Stephen L. Burns



The President of the United States, clearly troubled by what he has just heard, walks around behind the emissary from the Bad Lands. He bends down, sniffs the emissary's butt.

When he straightens up again his expression is thoughtful, bemused. The emissary seems to be holding his breath in wide-eyed anxiety. "Sir?" he says nervously.

The president's smile is sudden and disarming. He claps the emissary on the shoulder. "You certainly have given me a lot to ponder. I'm going to need some time to think about this."

"Of course, sir. It is, um, pretty big news."

"Absolutely. One of my aides will escort you to a reception suite while I consider how to respond to the information and proposal you have brought me."

A spark of fear lights in the emissary's eyes. "Sir?"

The president squeezes his shoulder. "You are an honored guest of the White House, my friend. No harm will come to you here now, and for as long as you choose to remain."

Once again the president's legendary charm works its magic. The emissary shows a grateful smile and bows. "Thank you."

"No, thank you." He lifts his hand, signaling for the visitor to be taken away to be plied with food and drink while his brain is being subtly picked for useful information about the enemy.

I re-enter the Oval Office once the emissary is gone. The president has headed back behind his desk. He sits down slowly, carefully, as if trying to keep all the new things piled in his head from sliding out of order.

"Well?" he says as I stand in front of him.

"He believes what he's telling us," I say.

A nod. "That's my take."

"But he hasn't personally seen what's being offered."

"No. He's just a messenger." A shrug. "He may honestly believe what he's been ordered to tell us. But I wouldn't trust the source of the message, his master, alone with a sheep."

I chuckle at the implication that the sheep would certainly get raped or eaten—more likely both.

The moment of levity passes and the President sighs. "If this is true it presents a monumental . . ."

"Quandary?" I suggest.

"One wrapped in a predicament and frosted with dilemma. Any sort of entente is going to be . . ."

This is how he habitually asks my opinion. Not directly, but leaving me to supply a word to sum up a given situation.

"Problematical?"

This makes him laugh. "What a tidy word for a barbed-wire monkey trap."

"Still, this is an opportunity, of sorts."

"Yes, but what kind?" He looks me in the eye. "So what do you think we should do about this?"

The answer to his question is obvious, although it is not one I particularly like. "We have to take the bait and investigate. Which means playing Wolf's game."

"And if what is being offered is real . . ."

There is no word I can supply that is adequate.

Instead I say, "You want me to leave immediately." This is not a question, but a forgone conclusion.

"Yes. As soon as you can."

It is a mark of how important and time-sensitive the president considers my trip that I am provided with the use of an airplane and pilot.

I am relieved to learn that my pilot is Chloe, a chunky, raucous, irreverent, self-described mongrel bitch. She loves flying, lives for it. Most of us don't.

"Hey, boss!" She calls gaily when she sees me. "Ready to go hump some clouds?" She rolls her hips to demonstrate.

"Ready as I'll ever be," I answer mournfully. "I've rewritten my will."

"Great! Leave anything to me?"

This is really a game. I have flown with Chloe many times. She is the best of the White House Pilot Corps, not that we have many of her kind; as a species we don't seem all that sold on the concept of friendly skies.

"Of course not," I reply. "I figure when we crash we both die."

"Then I guess we better not crash."

"Can I get that in writing?"

When the Change was imposed on us our physiology was altered to more closely match that of the aliens who "liberated" us. A physiology that, ironically enough, also mirrors that of our

former masters. We are taller. We can stand upright easily now, and our front paws have become hands with fingers. Our vocal apparatus has been altered, allowing us to talk.

Our minds are a patchwork amalgam of who we were before, and the minds of our now long-gone people. This is how I came to be who and what I am.

How was this done?

We have no idea, though not for lack of trying to figure it out. But we are new to science and technology; up until the Change not a one of us could use a cell phone to order a pizza, something we can easily do now.

This new skill set has made pizzerias one of our fastest growing economic sectors.

Takeoff is terrifying and uneventful. That and landing are, to my mind, the two parts of flying that most seem to flirt with suicide. Landing at least has the advantage that one can get out afterward and kiss the ground. My love for solid ground will remain unrequited for several hours.

Seen from above, Washington looks much like it did before the Change, and yet completely different. There is far less vehicular activity, more foot and bicycle traffic. The cityscape is marred in places by the burned, broken stumps of buildings, scars from unfortunate events that happened during the Change. To balance this are swatches of vivid new green where nature is being allowed to reclaim areas once rendered dead with concrete and asphalt.

“Ever been to Colorado before?” Chloe asks, interrupting my keeping an eye on the ground and willing it to stay down below us.

“Actually, yes. Back before.”

“What was it like?”

I remember running through snow, and skies so big they seemed to go on forever. I remember being deliriously happy, and utterly carefree. I shove the images away, not daring to lapse into nostalgia. “That doesn’t matter much now,” I answer gruffly.

“Because it’s part of the Bad Lands.”

“The black heart of it.”

“Are things there as bad as I hear?”

I watch Washington shrink smaller and smaller under us, and I have a forlorn feeling that I might just be leaving it forever.

“We’re about to find out, aren’t we?”

Country—that is to say nation—is not a natural concept for us, not like the less abstract and more instinctual ideas of turf and terri-tory.

We inherited a country, one called the United States of America. This was not something we built or overtly shaped, and while it was a place that treated what we used to be better than many others, it still wasn’t ours until it was handed to us.

Like, I sometimes think, the biggest squeaky toy ever conceived.

An overwhelming majority of us felt that the überpack or metapack called America should be maintained as much like it had been before the Change as possible. Why was this?

I have thought about this a lot, and spent numerous hours kicking it around with the president. I have reached no firm conclusions. Maybe some of it comes from a sense of loyalty to our former masters and what was important to them. Some of it can be chalked up to the mental overlay that came from them.

That imprint is how we came to have such a fortunate and functional diversity of interest and occupation; why we have farmers, police, politicians, medical types, teachers, chefs, and even brewmasters. Carryover.

This is, I believe, how we ended up with the self-styled General Wolf, a vicious separatist thug with the same primitive attitudes and ruthless nature as his former master.

Or maybe we're trying so hard to maintain what was in the vain secret hope that those who made it might come back again.

I wake to find myself upside down, body straining against the straps, cracked concrete whipping past just a few feet over my head. I let out a yelp and cringe deeper into my seat, certain I am a heartbeat away from dying in a fiery crash.

"Hey, boss," Chloe calls brightly. "Enjoy your nap?"

"What the hell are you doing?" I howl.

She frowns my way, unsure why I am so hysterical. Then

her eyes widen. “You mean flying like this?”

“Yes,” I growl, trying to keep from looking up—or down.

“Here, let me.” My stomach lurches as the ground surges away, then again as the plane rolls over. We settle back into level flight. “There. That better?”

I don’t usually frighten easily, and am not inclined toward overreaction, but waking to what feels like a near-death experience has scared me badly, and her blithe tone fuels the fire of my sudden anger.

“Bad dog!” I shout. “Don’t you ever—” The shocked and hurt look on her face, and my ears catching up with my mouth register at the same time, leaving me with the realization of the unforgivable thing I have just said.

My rage collapses as suddenly as it ignited.

“I’m sorry,” I say. “That was uncalled for. In my defense, you scared the living shit out of me. You’re lucky my seat doesn’t need cleaning.”

“I didn’t mean to,” she says meekly. “Really.”

“I know. I’m certain you have a perfectly good reason for flying upside-down six feet above the ground at over a hundred miles per hour.” I manage a smile. “I sure would like to hear it.”

Chloe is not the sort to harbor a grudge, and I can see that she is sorry she frightened me so badly. I am forgiven, and this means a lot to me.

The radio is gabbling for her attention, but she ignores it.

“You know how it is. We’re good at some stuff, not so good at other stuff. Airport maintenance is one of those areas we, quite frankly, suck at. I was giving the runway a careful visual inspection before setting down.”

“All proper arrangements were to have been made for our landing.”

“They were, boss. I’ve been on the radio. We’re cleared to land. A refueling crew is standing by. They’ve set up a reception area with food and stuff.” She shakes her head. “But I don’t set this crate down until I verify that some dumbass tail-chaser hasn’t left crap on my landing strip.”

“That sounds like good practice.”

“Bet your ass it is. I had a close call last month. Still not sure if it was incompetence or sabotage, and that’s not my problem anyway. Putting us down in a big enough piece to take off again is.”

“Thank you for your . . . attention to detail,” I say. “But could you warn me if you’re going to do that again?”

A bright eye regards me merrily. “Think that would have helped?”

“Probably not,” I say so dolefully it makes her laugh.

Chloe informs me that the airport at Topeka is run by a shaggy mixed-breed named Franny. Seen from above it appears well-kept and organized. The landing goes smoothly, the control tower directing us into the smaller and more secure

private aviation sector.

The flaw in the organization Franny controls only becomes apparent when we step inside the arrival lounge. News that we are coming has leaked, and the mayor of Topeka is waiting to greet us.

He pounces on me like a cat on a mouse, bursting with bubbling bonhomie. "Welcome to Topeka!" he bellows, grabbing my hand and pumping it. Chloe wisely hangs back, leaving me the one to get slobbered over.

"Thanks," I reply as I try to extricate my hand. My mind is more on taking a leak and getting some food than playing visiting politician.

"You're welcome, sir! Always glad to have someone from the Capitol come visit us here in the hinterlands!" This is boomed out like a proclamation, and I half expect to next be given a key to the city.

Franny comes to my rescue, moving in smoothly, her expression apologetic. "Sir, we know you've had a long flight. The restroom is over that way, and once you've had a chance to freshen up you can get a bite to eat while your plane is being refueled."

"Absolutely!" the mayor agrees eagerly. "Go lift a leg, then you can come back here and taste some of the best food Topeka has to offer! We've put on one hell of a spread!"

"Thanks," I mumble, heading in the direction Franny indicated and knowing my escape will only be temporary. I try to

console myself with news brought by my nose: I smell steak.

“Well, that was certainly fun,” I grumble once we are airborne again.

“Sorry, boss. We were supposed to get in and out without any fuss, but somebody blabbed. Can’t say I’m surprised.”

“Why is that?”

She gives me a look like I am being especially obtuse. “You’re from the Capitol, boss.”

“So?”

“Flying gets me around some, right? All the places out here are pretty isolated. It’s not like there are jumbo jets with folks from Washington—or much of anywhere else—coming in every day.”

“They’re not that cut off,” I argue. “There’s TV and radio and the internet. The trains are running pretty regularly. There are more buses and private vehicles on the road all the time.”

“Yeah, but mobility is still pretty low. So is visibility of you political bigwigs. Our kind have special needs. We need . . .” She pauses, searching for the right description. I wait, curious to hear what she has to say.

“We’re a lot more dependent on, um, first-order social contact. You know, face to face. See their posture, watch their eyes and tail, hell, sniff their butt. Your coming from DC helps prove it’s real. Like with the Crumble. That’s a more extreme example of where too little contact can lead.”

“What do you mean?” The Crumble is the nickname for the immediate area around the Bad Lands. A place where, despite our best efforts, Wolf’s influence continues to encroach.

“Military and police aren’t stopping it, are they?”

“Not as well as we want.”

“Wolf’s operatives go into the Crumble, lie their tongues off about what their version of governing is like, spreading dissatisfaction and dissent. Or fear, when those don’t work. They say you—the government—don’t care. You know that, right?”

“We get reports.”

She snorts derisively. “We still have our noses, boss. We can smell a fart a mile away and know what the farter had for dinner. But . . .”

“Whose butt?” I joke.

“My hairy butt,” she growls. “Here’s the deal: Smelling that fart doesn’t help us be there when the dinner that caused the fart was served.”

I have to chuckle at her crude and strangely compelling reasoning. “You’re calling the reports farts? Or our presence?”

“I’m saying that’s what they’re ultimately worth. You want to shove Wolf-ass back from the Crumble? Send a flood of folks out from DC and happy states. Show them that the US of A is something more than a really humongous, really stale fart they keep sniffing from a dinner they never get to taste.”

"That is certainly an . . . interesting way to look at it." I am tickled by the idea of, after this peculiar mission is over, going back to the president and explaining that the erosion of control around the Bad Lands has stemmed from his being the Fart-in-Chief.

Chloe shrugs. "I just call them like I see 'em."

"Or smell 'em."

She nods. "Damn skippy."

There are no walls or fences separating the Bad Lands from the rest of the country. No line in the sand, no yellow crime tape, no concertina-wire-draped walls. I know that we have entered Wolf's domain only because Chloe tells me so, and she goes on to explain that we are to follow a very specific flight path that has been sent to her.

"Is that to avoid other planes?" I ask.

"Nope. No fliers in Wolf-land that I know about, anyway."

I had heard this, and wondered if her information differed from mine. "Why is that?"

"Because us pilot types are smart," she informs me in a smug tone.

"That's funny. I heard that the only pilots who qualify are those who aren't dumb enough to stick their heads out the window while in the air."

She laughs. "Good one, boss. I've heard it before, but I like your delivery. This gig doesn't pan out, maybe you should go

into stand-up.”

“Thanks. Now tell me, why are there no pilots out here?”

“Like I said, flyers are smart. Anyone bright enough to get off the ground boogied when Wolfie started howling.”

“Because?”

“A clown like that gets pilots and he immediately starts thinking war planes. Shooting? Bombing? No thanks. Flying is too much fun to go screwing it up with shit like that.”

“You and your fellow pilots are to be commended on your sanity. So why the strictly delineated flight plan?”

“Folks down there are nuts. I hear they’ll shoot at anything that moves and eat what’s left afterward. The general level of paranoia here means a bright shiny plane like ours is probably part of an invasion—and an invitation to air-lifted lunch.”

All of that agreed with what I had heard. We have managed to place and cultivate a few sources inside the Lands, and most have reported incidents of lunatic overreaction to perceived threat and cannibalism becoming less a crime than a movement.

Not that many of us delve all that deeply into the nuts and bolts—or more properly, blood and guts—of human history.

I do. In truth, I can’t seem to help myself, any more than I was once unable to resist the provocations of squirrels. Wolf does not lack for non-canifolk predecessors and counterparts on other parts of the globe. Those he ruled would fall into two

camps: the terrified and the true believers. His fanatic followers, especially those benefiting from the regime, would see anything that kept them in power as the proper course of action.

A human named Goldwater once proclaimed the pilfered quote that “Extremism in defense of liberty is no vice.” A ringing, potentially lethal declaration in that the perpetrator of the extremism is invariably the one who defines the meaning of the justifying liberty. Wolf, like so many before him, uses his concept of liberty to defend atrocity. The Pol Pot calling the kettle white. White as a stack of skulls.

“So where are we landing?”

Chloe shakes her head. “Never Never Land, for all I know. I’m not being given that information until we get deeper into Bad Lands airspace. Past the point of no return, I guess.”

“How charmingly paranoid of them. Is fuel going to be a problem?”

“Nope. That’s why we tanked up in Topeka. That gives me enough range to spend stupid time circling and doubling back, and still have enough fuel to put a whole bunch of clicks between us and this dump.”

“Good thinking.”

“I have my moments, boss.” She is quiet a moment. “So how dangerous is this mission?”

“We’re hanging way up in the thin frigging air in a goddamned steel pipe, aren’t we?”

“Would you feel safer about three feet off the deck?”

“No, thanks. As for your question, all I can say is that the wheels are coming off Wolf’s operation, worse than is generally known. Between our embargo and their crummy practices, food shortages keep getting worse. Peace is maintained at gunpoint. Brain drain and attrition has left them with very few who know how to run and repair crucial parts of their infrastructure, and a lot of critical jobs have gone to the loyal, not the competent. He’s getting desperate. Desperate enough that he contacted us and offered something in trade.”

“Must be something special.”

“It is.”

“What is it?”

“I’d rather not say. Not just yet.”

“You don’t trust me?”

I shake my head. “I trust you just fine. I don’t trust myself.”

This is the absolute and unvarnished truth.

We circle above an airport. Chloe has been arguing with whatever passes for ground control for several minutes, insisting—quite loudly and at times breathtakingly profanely—that she is going to make at least one low pass for a visual inspection of the runway before landing. This request is being stubbornly refused.

She glances my way, rolling her eyes and making an obscene gesture. I pick up the headset hanging beside me,

adjust the microphone, then say, "Allow me."

She cocks her head quizzically. I nod.

She grins, then says, "Brace yourself, bonehead. My boss wants to talk to you."

Once my mike is live I summon my best alpha male voice. "To whom am I speaking?"

"Ralph," replies a voice greasy with officiousness.

"This is Merlin, personal representative of the President of the United States. You have two choices, Ralph. Either oblige my pilot's request this instant, or start figuring out how you are going to explain to those you answer to why we turned around and flew back to Washington without meeting General Wolf, as requested."

"Now wait—" Ralph's voice has gone shrill and panicked.

"We are done waiting," I say in a voice heavy enough to squeeze the pee out of the flunky in the tower. "Pilot, turn this plane around and chart a route back home."

"I didn't mean—" A pause. "Ah, be advised you are cleared to fly over and inspect the landing strip."

I pull off the headset. Chloe swallows her laughter. "Coming in to inspect your strip in just a minute," she says. "Air Force Ten out." She racks the mike and gives me a big loopy grin. "Just for that I'll do my flyover right side up."

"That," I reply, "Would be greatly appreciated."

For the most part our kind doesn't suffer from the same

fascination with and fondness for guns shown by our predecessors. But in the Bad Lands such weapons appear to have regained their fetishistic status. As we exit the plane we are surrounded by over a dozen heavily armed canifolk, all males, a mix of mastiffs, pit bulls, and Dobermans.

Chloe catches my eye. I can see that she is wondering if we should raise our hands in the face of this menacing reception. I answer by first giving her a slight shake of the head, and then striding briskly up to the leader of this pack. He is easily identifiable by being the proud owner of the meanest scowl, most guns, and gaudiest emblems of rank.

“Well?” I demand sharply.

His scowl deepens. “Well, what?”

“Well, are you here to escort us somewhere, or were you ordered to just stand around looking like you’d really like to be tough?”

The mastiff bristles.

I bare my teeth.

The whole pack-order, dominance/submission thing has remained a part of our psyche through and since the Change. Only those of us with a scholarly bent have given it the thought it deserves.

The primitive and the newly civilized coexist inside us all, sometimes uneasily. The nexus of tension between the two creates a sort of psychological pressure point. Understanding it

and being able to manipulate it is useful, verging on a peculiar form of behavioral kung fu.

The militia member I face is a major. He is larger than me, heavier than me, armed as if expecting war to break out at any second, and backed up by a cadre of violence-prone brutes possessing the same advantages.

Yet he is nothing more than an individual of middling rank in a much larger organizational structure/pack, answerable to who knows how many others above him. I, on the other hand, answer only to one: the president. Even there I acknowledge him as dominant out of admiration, respect, friendship, and agreement with his goals and the means he employs to reach them. Not from fear, or any feeling of inferiority.

It is no contest. The mastiff cowers, tail lowering.

“Well?” I say again, even more sharply.

“This way, please,” he says with an eggsucking smile.

Chloe and I ride in the back of a long black limousine, insulated from the heat and dust as it follows a deserted highway through a barren landscape. We are led and followed by a number of military vehicles escorting us to our as-yet-undisclosed destination.

Chloe’s presence is the result of a short, quiet disagreement. She wanted to stay with her precious plane and make sure no “braindead groundhogs” fooled with it. I insisted that she accompany me. While I could have just given her an order—with a low likelihood that she would obey it—I instead

offered one of several reasons for her to remain at my side: If things got sticky it would be easier for us to find another plane than it would be for me to find another pilot even half as good as her.

“Well, duh,” had been her response to that.

Now she watches out the window, searching for stray planes to appropriate while I attend to business on my laptop. I can't get online with it, there is no cell-phone reception inside the Lands; that has been cut off. Some of the land lines still work, any traffic on them carefully monitored. Yet we are not completely unconnected, thanks to the satellite phone I carry. I assume the compartment we ride in is bugged, and so work on a white paper concerning the psychological makeup of canifolk born after the Change. Those who don't remember before.

I wanted Chloe along for more than her ability to fly a plane. She is smart, level-headed, sharp, and funny, and her unshakable irreverence is a weapon of sorts. A friendly face will be a comfort in the depths of Wolf's disintegrating empire. Then there is one reason I keep to myself: I am not sure that whatever diplomatic immunity we enjoy would protect her back at the airport. Rapaciousness and poor impulse control are reportedly the hallmarks of Wolf's elite.

“Boss?” she says in an oddly strained voice.

I look up from the laptop screen and follow her gaze.

A rough wooden beam has been nailed to a telephone pole. Hanging from the beam are six bodies, probably a family

judging by the size range of the corpses. The limo has slowed as we pass to let us enjoy the sights.

"Those folks are most likely beneficiaries of the sort of justice system that comes with martial law," I say quietly.

"That's terrible." Her voice is hoarse.

"Yes, it is. It is meant to appall and terrify. Notice anything else?"

She had turned toward me, now she twists around to peer out the back window. "Like what?"

"All those bodies but no vultures."

"What's that mean?"

"Reportedly they have eaten any that stray into the Lands, along with anything else they can kill or dig up. Chances are if you searched the area you'd find a sharpshooter waiting to pick off any scavengers drawn by the smell."

I have shocked her. I was shocked myself when I first read about it.

"Their bodies are . . . bait?"

"Among other things, like advertising the cost of getting on the wrong side of Wolf policies."

"That's awful!"

"For all involved," I agree. I do not tell her that they shoot and eat our cousins, the coyotes, too.

My expectations are low and realistic. It is unlikely I will see

hide or hair of Wolf until after I am tempted with his prize. That will be the best time for him to strike a bargain. Despots tend to be, at least on the macro scale, fairly predictable.

As has been our destination. It is what I thought it would be: a military installation buried in the guts of a mountain, a leftover from before the Change.

The level and type of activity we encounter as we approach the place suggests that this is Wolf's official residence. This is hardly a surprise. His kind tends to den up in fortresses the same way worms hide under rocks.

This trip will write the final page on three years of vague reports that Wolf has some sort of special ace up his sleeve, one he intends to play when the time is right.

Now that ace is being dealt.

Dogs playing poker. A wildly popular postChange image that keeps coming to mind.

It would be funny if there wasn't so much hanging on it.

We are driven inside the mountain, past level after level of security, an obstacle course so convoluted it hints at the twisting levels of Wolf's paranoia. I note that the deeper we go, the fewer armed militia we see. This tells me we are nearing the part of the installation Wolf calls home. Someone in his position would not want armed individuals other than his own personal bodyguards getting that close to him. When you have staged a coup, you buy a fear that you have started a cycle that will outlive you.

Chloe looks unhappier by the moment. I can't blame her; she is no happier having half a mountain hanging over her head than I am hanging miles above the ground. This is also one of those areas where canifolk have to deal with two competing urges. On one hand, we still have the impulse to den up, to find a safe, defensible place. On the other hand, we also have a profound discomfort with confinement, be it in a cage or pen.

For my own part, I have too much else to be anxious about for being taken into what could be considered a military-grade pound to count for much.

The car stops. The minions who met us at the plane pile out of their jeeps and trucks, surrounding our car. This time they carry fewer weapons, and what weapons they do carry remain holstered.

The mastiff major I cowed at the airport gestures curtly, acting as if it is we who are making him wait. "This way."

We are taken deeper into the mountain by means of a wide, brightly lit tunnel. Our footsteps are soft, but the boots of our escorts thump and drum hollowly. The place smells of steel and concrete and fear, heavy and oppressive.

"I love what you've done with the old place," I say brightly. "What do you think, Chloe?"

"The lighting makes my fur look bad," she grouses.

"Ah, but it brings out the sparkle in your eyes."

"No talking," the mastiff growls.

"Why not?" I ask. "Afraid we'll say something that might confuse your motley little pack? Like that back outside your little ratturd republic everyone—not just half-assed excuses for soldiers—get all they want to eat?"

"Don't forget the Ice Cream For Everyone On Sunday Law, boss," Chloe says with a laugh. "Ain't buzzard-flavored either."

"I said no talking!"

"But yelling is all right?" Chloe asks with mock innocence.

I have to smile as I pat her arm. "Silence is golden," I say.

She snorts. "Yeah, and so is piss on snow."

"Which these people probably consider a Sno-cone."

Our laughter echoes brightly, making our guards scowl.

We are taken to the entrance of an even more secure area. Our original escort hands us off to a dozen hard-faced and silent Dobermans armed with Tazers and truncheons. They lead us deeper yet into the maze of tunnels.

I am the sort who thinks things out. At times I may even overthink a given situation.

How I will deal with what waits for me has been high in my mind since I first heard Wolf's emissary deliver his message and offer.

Still I have no idea how I will feel or act, or what I can make of the bargain I must strike.

Our escorts never say a word. They unlock a heavy steel

door and gesture for us to go through.

The door closes behind us, leaving us in a dimly lit chamber that was once some sort of supply office. I smell age, and fear. Mildewed paper and stale food.

A hoarse voice calls, "Who's there?"

"Merlin and Chloe," I answer. "Who are you?"

A shaggy humped shape rises from a pile of blankets and pillows over in one corner, breathing heavily and groaning slightly as it unfolds.

"Buddy."

The owner of the voice is an ancient Newfoundland, broad muzzle grizzled with age, eyes rheumy. He comes toward us, his movements stiff and slow.

"We're here to see them, Buddy," I say gently.

Those eyes meet mine. "I was told—I was told someone was coming at last. To see them. Will you—will you take them away?"

"I don't know," I answer, trying to sort the hope from the despair in his eyes, and in the angle of his ears.

Buddy steps closer to me, his voice dropping to a whisper. He looks up for a second as if checking for unseen listeners. "I hope you do. They're—they're dying here. Not fast, no, but bit by bit and sure as can be."

"You're their attendant?" I ask this to get more of a sense of where he feels his place is in all this, beyond his obvious

devotion and concern.

“Attendant. Keeper. Jailor.” He is weeping, something not all of us are able to do. “I’m their friend. The only one they have here.”

I stroke his head as if in benediction.

“I believe you. We all owe you more than we can say.”

He slumps under my hand, and in his bent back I feel how his task has broken him.

One final door.

I take a deep breath, then go through it, knowing I am entering a moment where the past, present, and future collide.

The outcome of this crash is utterly uncertain.

Wolf’s emissary told the truth. I have not come here chasing a lie or a dream. A shiver passes through me as I first smell, and then see that which only yesterday I would have said was absolutely impossible.

I see people.

Behind me Chloe gasps. “Holy shit!”

This is what I might say, were I to permit myself to lapse into ungoverned reaction. Not losing my composure takes a considerable effort. Before me are ghosts made flesh, the departed come back from the void to which they had been consigned.

“Good day,” I say, pleased to hear that my voice carries no

hint of my inner turmoil. "My name is Merlin. I'm here representing the President of the United States."

There are four women and three men, all dressed in ill-fitting fatigues. They do not look or smell well. Their color is bad, their skin bad, their gazes dull and lifeless. My arrival has provoked fear and distress, causing them to huddle together.

"Boss, are they real?" Chloe whispers behind me.

"They are," I answer. "And we've been sent to help them."

The oldest one, a woman with raggedly shorn white hair, rises, takes a step closer to me. In her eyes I see fear, but also faint glimpses of hope.

"My name is Viola," she says in a low, raspy voice. Her face is slightly lopsided, suggesting that the bones in her cheek or jaw have been broken and have healed badly. "Viola Spooner."

"Ms. Spooner." I bow slightly. "I am very pleased to meet you."

My courtly behavior emboldens and strengthens her. She stands a little straighter, and looks at me more directly. "Are you really here from the president?"

"I am. Tell me, ma'am, how much do you know about what happened, and how things are now?"

"Not much," she answers bitterly. "We've been kept locked up here, away from everyone and everything. No TV, no radio, no contact of any sort." Her shoulders slump. "Sometimes we

wonder if we've gone crazy."

"Can you tell me why?" I ask gently.

She tries to smile. "We were captured by talking dogs, were brought here by talking dogs. Buddy—another talking dog—brings us food and tries to take care of us, but he's too scared to talk about any of that. He's the only one we've seen since we were captured."

"Now I show up. Another talking dog."

A glum nod. "Yeah. Either the world has gone crazy, or we have."

"You're not crazy. There's a lot to tell you. Do you want the straight truth, or should I sugar-coat it?"

She glances back at her companions, faces me again. "I guess you better be blunt. I think we're too numb for subtle."

I collect a battered government-issue chair for her, and one for myself. Chloe looks to me for instruction. "Grab a chair," I say. "Sit beside me." I want Chloe there because there is nothing threatening about her; instead she exudes a down-to-earth likeability that may make things easier.

"By the way," I say as she goes for a chair, "this charming young female is my pilot, Chloe."

"Dogs can fly too?" Viola Spooner asks uncertainly.

"Better us than pigs," Chloe says with a laugh.

Once we are seated I launch into a capsule history of the past five years. I direct my lesson at Viola Spooner. If I can

explain it to her, she can in turn help her companions come to grips with it.

I am, as asked, blunt. "We, that is to say planet Earth, were invaded by aliens."

The look she gives me asks her question before she voices it. "Are you—"

"An alien? No. But they were extremely canine in appearance and behavior. They came, and they did not like what they found here."

"Meaning?"

"Humans in charge, and dogs as pets, possessions, and property. To them this was a . . . sacrilege. Pure unbearable blasphemy. Something so criminal that it could not be allowed to stand."

"So what did they do?"

"You have to understand that when this happened I, and all others who were alive then, were just dogs. So our perceptions, and the conclusions we can draw from them, are somewhat limited. Our kind were as much pawns to these beings as people were."

Viola Spooner frowns. "You're bracing me for something bad."

"I am. Humans were basically put down. Some sort of mental overlay from them was transferred to us. That gave us language skills, education, acquired skills, thought processes

much like yours, and in most cases, even certain attitudes.”

“By put down, you mean . . .” The word is hard for her to say. “Exterminated.”

“Yes. Sorry.”

She shakes her head, trying to settle the concept into her mind. It doesn't fit well with her, and hadn't with us. We spent that first year under a black cloud of disbelief and grief bound by a sense of guilt, even though none of the choices made were in any way ours.

“Why would they do such a thing?”

“They believed they were restoring the proper order of things. Canines on top, primates below. They left monkeys and gorillas and all non-human primates alone. Just people were wiped out. The bad uppity primates who had committed the sin of becoming the dominant species. They also left our wild brethren alone. Wolves, coyotes, and the rest remain as they were.”

“That's crazy!”

“Yes, ma'am, it is,” I agree. “We did not ask for any of this. It was imposed on us for our own good.” I hold up my hands. “We were physically altered as well. Given the ability to walk upright. Our paws changed to hands. Our brains changed to work more like yours do. All of this was done to us by a technology we couldn't and still can't understand, and we were dropkicked into running the world almost overnight. They did all that to us, to the whole planet, then just left us to cope as best

as we can.”

Viola Spooner took a deep breath before saying, “So the President. He’s a dog?”

I smile. “He was a dog. The term we use to describe what we’ve become is canifolk. A sort of amalgam of canine and human. Dog is considered derogatory.”

She pales. “I didn’t mean to offend you.”

My smile widens. “You didn’t. I think you’d like President Bill. He’s a border collie/husky mix, not a purebred. He’s smart and funny, and as president he’s trying to manage the biggest, strangest flock ever assembled, doing his best to hold this country together.”

She shakes her head. “This is like some sort of bad movie.”

“Planet of the Apsos,” Chloe suggests with a snicker. “Dawn of the Dalmatians.”

“It’s not so bad as that,” I say with a chuckle, “But there is no guarantee of a happy ending.”

“Or popcorn,” Chloe agrees.

I lean forward, wishing I didn’t have to end this brief light moment, but I do not know how much time I will be given with her, and there are questions I need answered. “So tell me, how is it that you came to be here?”

“Luck, I guess.” She makes a face. “Not sure if it was good or bad. Based on what you’ve just told me, when this invasion

happened we were several miles underground on a long-term study of a cavern system's ecosystem."

This makes sense. In the early days there were reports of humans who managed to escape being put down because they were deep underground in mines. The reports from China and South Africa were considered fairly reliable, from other places less so. In all the cases I was aware of, the people who came out found canifolk instead of people, became hysterical, and did not survive the ensuing chaos.

"What happened when you came out?"

"Talking dogs—" A wry look. "Sorry, canifolk grabbed us and took us prisoner." She touches her face. "They weren't particularly gentle. We were brought here, locked up, and have been here ever since."

"Dogs probably does describe your captors," I say to lighten the tone slightly. "Back before the Change there were a number of members of the Blood Patriot movement in the area."

"I remember them. Bunch of paranoid survivalist secessionist whack-jobs." She chuckles sadly. "Of course that was my view as a life-long NPR listener and contributor to the Southern Poverty Law Center."

"The SPLC is a lot smaller than it used to be, but NPR hasn't changed all that much," I tell her. "Your description is quite accurate. Some of the canifolk in this area took up the cause of their former masters, formed a pack—a militia—and took over."

We really weren't prepared to deal with this when it happened. Now we mostly try to contain it. As is typical of areas ruled by fanatics, the place is falling apart. Wolf wants to use you and your friends to stave off collapse. The leader of this mess is the self-styled General Wolf."

"You're here because he's losing his power?"

"He has real problems and wants to sell your safety."

"We're nothing but trade goods?"

"He doesn't have much else. Remember North Korea? That's the sort of state operating here. A hard core of fanatic true believers, the rest of the populace cowering in the shadows. The infrastructure is crumbling. Chronic food, water, and fuel shortages. Grid falling apart. The rest of the country is carrying on a version of the trade that went on before the change. This is an economic black hole. We've resisted all offers to trade with Wolf. You are the offer we're not supposed to be able to refuse."

"By selling—" She frowns. "You said by selling our safety."

I nod.

"What does that mean?"

"That's the phrase that was used when we were informed of your existence. As for its meaning . . ." I stand up. "I'm about to go find out."

She looks up at me. "Will you get us out of here?"

"I don't know if I can," I answer truthfully.

She waves her arm to take in her companions. "We're dying here."

It is difficult to keep my voice even as I say, "I know."

When we return to the outer room Buddy is no longer alone. He has retreated over to one corner, dispossessed by more visitors. He looks frightened and worried.

"Pathetic things, aren't they?" Wolf says as Chloe closes the door behind us.

"Sad, certainly," I reply as I take my first real look at the ruler of the Bad Lands. All images of him that make it out of here have been shaped for propaganda purposes. In each and every one of them he looks like he is posing for a statue, or to become the face on money.

In person he is less impressive. Smaller. Older. His jowls droop and are frosted with white. He is seated in what can only be described as a palanquin. This makes me wonder if he is carried because of style or disability. A bodyguard stands at either side of and behind him; more Dobermans with Tazers, truncheons, and cold, forbidding stares.

Wolf gestures for us to sit. It will not do for him to have to look up at us. I retrieve a chair and sit facing him. Chloe places herself beside and slightly behind me.

"Billy-boy didn't waste any time sending someone out here," Wolf says with a smirk.

I shrug. "No reason to dawdle. We have the means to move

quickly and efficiently.” This is a deflection and a dig: We have planes and pilots at our disposal, and he does not.

“You must want them very badly.”

“We wanted to verify their existence.”

His eyes narrow. “My word wasn’t good enough?”

It would be easy and pleasant to inform him that his word has the same intrinsic value as the leavings in a cat pan after a mouse dinner, but it will annoy him almost as much to sidestep his question. “You obviously expected someone to come out and see them. Maybe not this quickly, but at some point.”

He frowns, then forces a smile. “So now you have seen my little menagerie.”

“I have.”

“And?”

I spread my hands. “I have seen them.”

“Well,” he says impatiently. “What are they worth to you?”

I am silent long enough to further irritate him, and the answer I give him is not calculated to improve his mood. “I think the proper question should be this: What are they worth to you?”

He scowls and shakes his head. “I asked you a question. Answer it.”

“I have no answer. You contacted us, letting us know you have been holding these people prisoner, and offering to negotiate for their safety. From this we concluded that you must

have some sort of price in mind. I'm here to decide if it is worth paying."

Wolf is not used to any resistance to anything he says or does, and does not like my attitude or answers. He bares his teeth. "This place is mine. I set the rules here. In my lands, and in these negotiations."

"Then set the rules for what the humans are worth. If anything."

"Anything? They're worth a lot."

"Are they?" I shake my head. "This is no longer their world, and there really isn't any place in it for them. There aren't enough of them to breed and build up a viable population. At best they could become curiosities. Zoo exhibits. Lab specimens. Something to haul out and parade around on Change Day. We've done just fine without them so far. We can continue on the same way."

Wolf grips the arms of his chair, eyes popping in distress at my dismissal of their value. "But they're humans!"

We are born to hunt, to track down our prey and zero in on any weakness. In that one word and the way he says it, in his posture and the smell of him, I see and know all I need. It is as if I have become a bloodhound, and now the trail through this situation is there before my nose, luminous and palpable.

"You have never gone near them, have you?" I say, notes of mockery and wonder in my voice. "You've kept them locked away, out of sight and out of mind as much as possible."

He strikes an indignant pose. "Why would I do that?"

"Because you're afraid of them." This comes out as both a challenge and an accusation.

"Don't be ridiculous," Wolf growls, but his denial rings so falsely that even his bodyguards shift uneasily.

"Then you won't have any objection if I have one of them join us for this talk."

"I see no need for that."

"I do. We're debating their value. We should hear what one of them thinks they're worth." I turn toward Chloe. "Please ask Viola Spooner to come out here."

She frowns slightly, unsure what I'm up to, but starts to rise. Her hesitancy is just what I need.

"It will be fine," I tell her. "If Ms. Spooner is afraid, explain to her that nothing worse than what came out of our flyover at Topeka will come of it."

She gives no overt sign that she has understood my hidden instructions. "No need to be a chicken-shit like you," she says.

"I prefer the term 'overly concerned.' No one will get hurt, or be allowed to behave badly." I glance back at Wolf. "You will of course guarantee her safety."

The rebel leader looks like he's having his nose rubbed into something nasty. "I still see no need for this."

"You want to bargain. This will be part of the bargaining

process or we'll go back to Washington."

"Go back empty-handed."

I shrug. "That's the way we came. You're not offering anything we haven't been getting along fine without so far. But you, you need something for these prisoners. We might want them, but we don't need them."

When he makes no reply to that I give Chloe a nod. She goes to fetch Viola Spooner.

"Things are really going quite well," I say as I face Wolf again. "It was pretty rough at first, you know that, but we're more organized every day. No food shortages. In fact, ordinary citizens can easily find and reasonably afford such treats as fresh beef. Even steak."

When I say that magic word all three of Wolf's guards get haunted looks in their eyes. One licks his chops.

"Beer is available," I continue as I sit down. "As is ice cream. Most communities have their own medical center. There's been a craze for keeping cats, even having cat shows."

Wolf has been staring at me all through this recitation. "Why are you telling me this shit?" he demands gruffly.

"Just passing the time. I'm not sure how much news reaches you out here."

Wolf starts to say something, shakes his head. "Enough of that crap. I have questions, and I want them answered."

I settle myself comfortably. "Ask away."

He leans forward, trying to make me feel pinned down. "Why were you the one sent here?"

I laugh. "That's easy. I was available."

He does not smile. "Don't bullshit me. You're obviously one of Bill's inner circle. In answer to your earlier question, I do keep up on what you call news. You're never mentioned."

I laugh again. "I never do anything worth mentioning."

"Or nothing that leaks to the media."

"You overestimate my importance. I got sent because I'm disposable, more of a historian than anything else. Avoiding mistakes of the past and all that."

Wolf is shaking his head, refusing my answer. "I'm no fool. Billy-boy sends some big, tough, smart-mouth German shepherd, and I'm supposed to believe he's some sort of drone? If you were disposable you'd be a Chihuahua."

I waggle an admonishing finger. "You're being breedist," I say mildly.

"Spare me your bleeding-heart garbage," Wolf snaps irritably. "Better to be big and mean and pure-bred than some small, weak mongrel."

I smile. "I can see where sentiments like that have been your key to building a utopian society like this one."

The ears of the Dobermans prick up as Chloe comes back to join us, bringing Viola Spooner with her. When they see the human their ears go down. Wolf's nostrils flare, and he shifts

uncomfortably in his chair.

I rise to meet the human, smiling in welcome. "Thanks for joining us, Ms. Spooner."

She gives me a nervous nod. "You're welcome."

I direct her attention toward our host. "I'd like you to meet General Wolf. He is your de facto owner, and seems to think you're a quite valuable commodity."

She clears her throat, then says, "Do we have any voice in this?"

"Probably not."

She faces Wolf. "I hope you can find it in your heart to release us from this unconscionable imprisonment."

He stares back at her, face impassive and body stiff. "You have not been mistreated."

"Not since the roughing-up we got when we were captured." One hand strays to her lopsided face. "But we have not been treated properly, either. Bad food, confinement, no medical care. One of us has already died, and the rest of us aren't in very good shape. You have no right to treat us like this."

Wolf's eyes narrow. "No right? I run this place, and that's all the right I need. I could have the lot of you taken out, shot, and left for the buzzards. My order would be instantly obeyed because what I say is law."

"No buzzards left, dude," Chloe points out helpfully. "You guys ate them all. Me, I prefer fried chicken. Had me some two

nights ago, extra crispy, along with biscuits and asparagus.” She shakes her head. “Fact is, I like asparagus almost as much as chicken. Weird, huh?”

“Shut up,” Wolf snarls, angered that his threat has been so deftly defused by Chloe’s amazing ability to wield her irreverence like a peculiar martial art. “I will kill them if I don’t get what I want.”

I face him and spread my hands. “Then we’re back to square one, aren’t we? You still haven’t told me what you want. Quit wasting time with threats and name your price.”

Wolf chews on his words before speaking, jaws working on them like a bone. I can see the greed in his hooded gaze, powering his calculations. I already have a good idea what he is going to ask for; his situation dictates his desires the same way someone stuck down a deep hole will almost certainly ask for a rope or ladder.

“I want . . . a package of things. I want the embargo to end, and regular food shipments to start arriving. I know troops have been massing on my border—” A hard look at me. “I want them to back off, and a declaration of non-intervention. I want cell phone service restored. That’s the top of the list.”

“I see,” I say, letting my words drip carefully measured sarcasm. “You want the means to keep your cheapjack Taliban-clone amusement park from crashing down on your head.”

It takes visible effort for him to not respond to my insult. “Call it what you want,” he says at last. “I get what I want, you get

the humans. I don't get what I want, they're dead meat."

I let the threat hang there a moment, then begin dialing the pressure up by saying, "You wouldn't do that. Quit spouting nonsense."

His eyes blaze. "I will!"

I shake my head. "No, it's one thing to have anyone who frightens or disagrees with you executed, but save the posturing for your toy army. I don't buy it."

"Don't push me. I'm warning you."

"Give me a break. I'm not one of the credulous dimwits you surround yourself with. So get the shit out of your mouth, you old pussy, and talk straight."

Wolf shoves to his feet, lips peeled back in a snarl. "I'll kill them myself! I'm warning you!"

I laugh in his face. "Put up or shut up, you neutered old gasbag."

Wolf literally trembles with rage. His guards twitch uncertainly. They have never seen anyone treat their master like this, and have no idea what to do about it. Chloe stares at me, wondering why I am poking a monster with a stick. Over in the corner Buddy whimpers a low and frightened note.

Viola Spooner and I lock gazes for just a moment. There is deep fear in her eyes, but there is also an understanding of the gamble I am taking, and her part in it.

This brave woman faces Wolf and takes a step toward

him.

His hackles go up and he lets out a warning growl.

She raises her hand. Points a finger.

Wolf's growling grows more menacing and he coils himself to spring. His guards bare their teeth.

"No!" she calls sharply, then follows that up with the words I have been waiting for: "Bad dog!"

Wolf crumples like he has been shot, hitting the floor and cowering. Behind him his bodyguards whimper and lower their heads.

"Bad bad dog!" Viola Spooner hisses at him, and the lash of her displeasure keeps Wolf and his bodyguards down as Chloe, Buddy, and I move in to render them incapable of causing any more harm. One guard tries to resist and starts toward Viola Spooner with bared teeth, but Buddy lands on him like a concert grand piano landing on a piano stool made of toothpicks, the old protector of the humans never wavering in his loyalty to them.

We are coming up on a better solution to the problem of Wolf and his captives than I could have ever hoped, and yet for me, a far worse one.

My bargaining session has been transformed into a coup. Now I am alpha of the Bad Lands. Not an office I had ever aspired to or particularly wanted. But in the short term such power has its uses.

Chloe has been put in a car and is being taken back to her plane. I had a harder time getting her to follow this directive than getting the militia officers who had served Wolf to acknowledge me as their new leader. She didn't want to leave me there at that old military installation.

I didn't really want to stay.

My human, the man I loved beyond all reason when I was a dog, had been many things. He had been a warrior, a high-ranking soldier who had devoted the later years of his life to thinking and writing about ways to make war unnecessary. He was a scholar, his opinions valued in the halls of power.

He had been a patriot.

I am what is left of him, and all that he was. What that has made me leaves me with no choice but to do what I perceive as my duty.

After watching Chloe being driven away, and leaving orders to stand down to propagate out through what had been Wolf's organization, I slowly turn and go back inside to talk to Viola Spooner.

She stares at me, hurt and baffled.

"So you're not taking us out of here," she says in a voice thick with despair.

"No, I'm afraid not. I'm sorry."

"But why?"

I sigh, weary from what I've been through, and wishing

there were some way to avoid what must be done. "You have to stay here because you're gods of the old days."

She frowns and shakes her head. "I don't understand."

"I know. I wish I didn't." How to explain it to her? "Look what you were able to do to Wolf. He was afraid of you, and with good reason. You destroyed him with just a few words. Our kind may be free and in charge now, but somewhere inside us remains the love and obedience—the worship—we lived by before the Change."

"But you had Chloe tell me to say that. You knew my yelling at Wolf would do what it did."

"Knew?" I chuckle. "I was fairly sure. Knowing I was going to meet you scared me, and when I did meet you . . . I could have easily lost my dignity. You were our gods. Not everyone can meet their gods and stay off their knees. Fewer yet can withstand the displeasure of those gods."

I give her a moment to absorb that, then continue, "Like it or not, it's our world now. We didn't ask for it, and there are times I wonder if we can manage running it. We're finding our way as best we can. If you and your friends become part of that process it would be fundamentally changed. We would be constantly seeking your approval, and altering our behavior to avoid your displeasure."

There are tears in her eyes. "We wouldn't need to get involved like that."

"You might not have any choice. The power you wield

makes you a doomsday weapon, just like the missiles that were controlled from here. Our present president is thoughtful and honorable. But what if the next president or the leader of a coup was another Wolf ? He could put you on television to cow the populace into bending to his will. Or he could just use you as hostages, like Wolf did. You present, to steal a phrase from the past, a clear and present danger to the society we're trying to build. Because of that your existence has to remain a secret, and you must stay in some safe place that can resist any attempt to take you."

Viola bows her head, all hope leached out of her.

"I'm staying here with you," I say gently. "I'm not Wolf. This place is no longer your prison, but your sanctuary. I've already been on the phone with the president. Emergency food shipments are on the way. Chloe will be coming back and bringing the best physician we can find. We'll get TV and radio to you, so you can see what our world looks like. Once order is restored in the area, and a solid security cordon established, we'll all be able to get outside and spend time in the surrounding countryside. We'll have a video link with Washington. I want you and your friends to talk to the president, and I want him to get a chance to talk to you."

My assurances and plans had brought her some relief, and even hope, but now she looks perplexed. "What about what you said before? You know, not wanting to risk our approval or disapproval."

"I'll risk it. He'll risk it. We'll all have to be very careful how we treat each other, but I believe we're civilized enough to manage. We have to. Who you are and what you know are too valuable to be wasted."

She waits for me to explain what I mean by that. I do my best to oblige her, trying to translate gut feeling into rational explanation.

"We'll risk the danger of your opinions to gain the advantage of your perspective. We're still . . . still like children in some ways. We're largely innocent of the sins of our fathers."

"Meaning us."

I nod solemnly. "Yes."

Her expression is thoughtful, and not one that comes from happy thoughts. "You have never nuked a city. Never committed genocide. Never launched an inquisition."

"Not yet. But here in the Bad Lands the old evil of slavery was being resurrected. Wolf survived this long by practicing the usual despotic bag of tricks, the politics of brutality, and environmental disdain. We need to know more about such things. We need to know why they're so attractive, why they spring up so easily and are so resistant to being eradicated. You're our last link with the old world. We need to learn from you, but not at your feet. Does that make any sense?"

Viola Spooner offers me a sad smile. "I'm afraid it does." She pushes herself to her feet. "I guess I better go tell the others what's happened, and what's ahead for us."

I stand as well. “I can go with you to help. Answer questions and the like. Reassure them that their lives are about to improve.”

“Thanks, I’d like that.”

We set out to do just that, walking side by side.

Viola’s hand strays to me, fingers settling on the fur of my shoulder.

I do not try to suppress the spark of pleasure and the tail wag it inspires. Dogs and humans had a long history of being companions to each other. Now humans and a few select canifolk will be companions for a while, a new relationship for a new world in the making.

There is an old command from before, one I must obey as if it were my lost man giving it to me: Stay.

I will stay here with the old gods, to honor them and care for them and learn from them.

Stay until they pass from the face of the Earth forever.

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The Frog Prince

Sometimes a “handicap” is an advantage. . . .

Michael F. Flynn

the scarred man awoke muzzy-headed in a dark, close room, confused at where he was, and tangled in wires and tubes. The last clear thing in the jumbled closets of his mind was his buying of a ticket to Dangchao Waypoint, and for a fuddled moment he wondered if he might be within that very ship, already on his way.

But if so, he were grossly cheated, for he had purchased third class fare on a Hadley liner and, of the many things his present accommodations were not, a third-class cabin on a Hadley liner was one. The room was barely large enough to contain the thin, hard bunk on which he lay and, when that bunk had been stowed into the wall, the room grew paradoxically smaller: a pace-and-a-half one way; two-and-a-half the other. It was the halfpace that galled. One always came up short against a wall.

It was a room for keeping prisoners.

“Fool,” said the Fudir, once he had removed the catheters and intravenous feeding tubes that spider-like had webbed him in his cot. “We’ve been shanghaied.”

“How long were we asleep?” Donovan asked.

There is this one thing that you must know about the scarred man; or rather, nine things. It is not his hooked chin, nor his sour humors, nor even the scars that interlace his scalp and leave his preternaturally whitened hair in tufts. It is that he is “a man of parts,” and those parts are the pieces of his mind, shattered like a mirror and rearranged to others’ whims. It is in the nature of the intellect to reflect upon things; and so a mirror is the proper metaphor, but the scarred man’s reflections are more kaleidoscopic than most.

The singular benefit of paraperception is that the paraperceptive can see different objects with each eye, hear independently with each ear, and quite often the right hand knows not what the left is doing. This has advantages, and would have had more had the scarred man’s masters not been ambitious or cruel.

Early in Donovan’s service to the Confederation, the Secret Name had gifted him with a second personality, the Fudir, which enabled him to live masqueraded as a petty thief in the Terran Corner of Jehovah while Donovan ran Particular Errands for Those of Name. But if two heads are better than one, ten heads must be better than two, and the Names had later, after Donovan had displeased them in some small matter of galactic domination, split his mind still further. Using the sundry paraperceptive channels as tap holes, they had slivered his intellect. They had made of him something new: a paraconceptic, able not merely to perceive matters in parallel, but to conceive ideas in parallel, as well. This was the ambition.

It was also the cruelty. They had imprinted each fragment with a complete, if rudimentary, personality, expert in some particular facet of the Espionage Art. The intent had been to create a team of specialists; though the consequence had been instead a quarreling committee. For the hand that split his intellect had mis-struck; and the blow had split his will as well.

Though perhaps the blow had been true, deliberate, a part of his punishment. Perhaps at the last Those of Name had flinched from the prospect of too great a success. Those had made an art of punishment, and the connoisseurs among them would often contemplate the intricacies of a punitive master-work with something close to aesthetic joy. Kaowèn, they called it. The scarred man had been conceived initially as a human weapon. But who would build such a weapon without a catch?

“Fool,” said the Fudir. “We’ve been shanghaied.”

“How long were we asleep?” Donovan asked.

I’m not sure, replied the Silky Voice. I seemed to fight the drugs forever.

The Pedant rumbled and blinked gray, watery eyes. IF ASLEEP, NO MORE THAN THREE DAYS. IF SUSPENDED, AS LONG AS THREE WEEKS.

The Sleuth eyed the life support equipment from which they had so recently disengaged. We were in suspension, he deduced, not asleep.

That could be. Suspension would affect even me, back here in the hypothalamus.

<Ravn Olafsdottr!> remembered Inner Child. <She slipped up behind us. And slipped something into us.>

Yeah? said the Brute. And where was you? You're supposed to be the lookout.

Now is not the time for recriminations, a young man wearing a chlamys told them. We must start from where we are, not from where we might have been.

The Brute grunted, unmollified. He tried the door, found the jamb-plate inactive, and struck it in several likely places. Donovan did not expect it to open, and so was not disappointed when it failed to do so. A young girl in a chiton squatted nearby on her haunches, her arms wrapped around her legs and her chin resting on her knees. We can get out of here, she said.

Donovan turned control over to the Sleuth, who went to their knees for a closer study of the jamb. The Pedant recognized the locking mechanism from his repertoire of sometimes useful information.

A YARBOR AND CHANG LOCK, the Pedant observed. THIS SHIP IS PERIPHERAL-BUILT.

"Probably hijacked by our gracious hostess," muttered the Fudir.

Which means this room was not designed as a prison cell, said the girl in the chiton, whom Donovan liked to call "Pollyanna."

So. Retrofitted ad hoc, said the Sleuth, and likely in haste. Yarbor and Chang . . . So what?

ITS CENTRAL PROCESSOR HAS A DESIGN FLAW. A NOTICE WENT OUT FROM THEIR CORPORATE HEADQUARTERS ON GLADIOLA TWO METRIC YEARS AGO. I REMEMBER READING IT.

You remember everything, the Sleuth complained. He took the scarred man's right arm and pointed. Pedant's design flaw indicates that an electrical current passed across these two points—here, and here—will set up a magnetic field within the processor that resets the lock to zero.

“That's nice,” said the Fudir. “So if we had a generator in our pocket, or a battery, and some wires, and could maybe do a bit of soldering, if we had a soldering gun—and some solder—there's a chance we could get out of this room.”

“At which point,” said Donovan, “we would find ourselves in a ship. A bigger cell, is all.”

Hey. At least we'd have room to stretch.

“And where would we find wiring?”

<There's an Eye in the wall just above the door.> And it's not pitch dark in here.

He means there is a power source.

“I know what he means. Sleuth always has to be clever and elliptical.”

When he ain't bein' obtuse! The Brute laughed.

That the Brute was making obscure geometric puns irritated Donovan. Sometimes he didn't know his own mind. Ever since his sundry selves had re-integrated, they had been learning from one another. The Brute was no longer quite so simple as he once had been; though it was not as though he had blossomed into the New Socrates.

The Fudir climbed atop the bunk, studied the Eye, unscrewed a housing with a convenient tool he kept cached in his sandal, detached the live leads—See? We didn't need a power source—and pulled the cable, while simultaneously Donovan and the others considered what they might do once they had broken free of their prison.

"Take over the ship, I suppose," Donovan said. "Slide to Dangchao Waypoint."

<How many does Olafsdottr have in her crew?>

Don't matter.

"Well, it might, a little."

ONCE I'VE IDENTIFIED THE MODEL OF THE SHIP, I CAN PROBABLY REMEMBER THE STANDARD LAYOUT. BUT ONE CLOSET LOOKS LIKE ANY OTHER.

I wonder why she shanghaied us, said the Sleuth.

The lamp that was lit has been lit again.

What's that mean, Silky?

I don't know. Something I remember from a dream. Pedant? You remember everything.

The corpulent, watery-eyed version of Donovan shook his massive head. FACTS ARE MY MÉTIER, NOT DREAMS.

The Fudir applied the leads from the Eye to the door jamb, one above, the other below the point that the Pedant had identified. This ought to work, the Sleuth commented.

Of course it will, said the girl in the chiton.

Current flowed. Magnetic fields formed. Somewhere inside the door, registers zeroed out and reset.

Or were supposed to. The door remained shut.

The Brute stood and, perforce, they all stood with him. He pressed the jamb-plate—and the door slid aside into the wall. The scarred man felt a huge satisfaction.

<Careful> warned Inner Child, who took control and peered cautiously into the corridor. To the left it ran four paces, ending in a T-intersection.

To the right...

To the right stood Ravn Olafsdottr with a teaser in her hand and a splash of white teeth across her coal-black face. The teaser was pointed at Donovan's head. "Ooh, you nooty buoy," she said in the hooting accents of Alabaster. "Soo impatient! I wood have let you oot in the ripeness of time. Now you have brooken my door!"

"You should stop somewhere for repairs, then," suggested the Fudir. "On Peacock, or Die Bold. Actually, I was on my way to Dangchao, so you can drop me off on Die Bold if you're

going that way.”

Olafsdottr patted him gently on the cheek with her free hand. “You are a foony man, Doonoovan.”

Olafsdottr fashioned him a dinner of sorts. Food preparation was not her forte, and the results could best be described as workmanlike. However, three weeks in suspension had honed an edge to the scarred man’s appetite, and he ate with surprising relish.

The refectory was small: essentially a short hallway with a door at each end, a table running down the center, and a bench on either side built into walls of a dull, ungracious gray. “This is not the most comfortable ship,” the Fudir complained.

Olafsdottr stood in the aft doorway, a double-arm’s reach distant, and her weapon still ready in her hand. She said, “One seizes the moment.”

“And the ship.”

THE VESSEL IS A MONOSHIP, THE PEDANT
DECIDED. BUILT FOR HANDLING BY A SINGLE PILOT.

She’s alone, then.

That’s good news, said the Brute.

What?

Means we got her outnumbered.

There were few personal memorabilia aboard that he could see, but they were not Ravn’s memorabilia. Confederate agents traveled light and took what they needed when they

needed it. The Sleuth thought he could eventually identify the Rightful Owner from the bits and pieces remaining on board. It was the sort of puzzle he lived for, but Donovan saw no reason to care.

The Fudir waved a spoonful of a chicken-like puree at the bench across from him. "Have a seat," he told his captor. "You look uncomfortable."

"Do I also look foolish?" she replied.

"Afraid I'd try to jump you?"

"No."

"Then . . . ?"

"I meant I was not afraid, not that you would not try."

Donovan grunted and returned his attention to his meal. So far, he had not asked the Confederate her reasons for kidnapping him. He was a past master at the game of waiting. Either Olafsdottr wanted him to know or not. If she did, she would eventually tell him. If not, asking would not win the answer.

"I will be missed, you know," he told her.

The Ravn's answer was a flash of teeth. "I think noot. The Bartender, he is already sailing your drinks to oother lips. 'Tis noo skin oof his noose who buys them."

"I was on my way to Dangchao. The Hound, Bridget ban, is expecting me. When I don't arrive . . ." He allowed the consequences of his non-arrival to remain unspecified. A Hound of the League could be many things and anything, as

adroit and dangerous as a Confederate Shadow, and Bridget ban not least among them.

But Olafsdottr only smiled and answered in Manjrin. "Red Hound missing many years. Some associates claim credit, though I believe their bragging empty."

"You were right to doubt them. She has returned and awaits me even now at Clanthompson Hall."

"Ah. If so, associates much red-faced." Olafsdottr laughed and switched to the Gaelactic that was the lingua franca of the League. "But she hardly awaits you, darling. Detestable in the ears of Bridget ban falls the name of Donovan buigh. Old grudge, no?"

The Fudir grimaced. "Old love."

"Same thing, no?"

Donovan shrugged and smiled, as if to say that even old grudges had expiration dates. Olafsdottr might not believe that Bridget ban would come looking for him. Neither did Donovan, but why not sow doubts?

The Long Game between the Confederation of Central Worlds and the United League of the Periphery might be played on a chessboard of suns, and in it this agent or that might be as a grain of sand on a broad beach; but where the agents stood "in the blood and sand," matters were more particular, and interstellar politics only the medium in which they swam. Personal loyalties mattered. Personal grudges mattered. In the sudden flash of the barracuda's teeth, what significance has the

vast and swirling ocean?

After Donovan had eaten, Olafsdottr locked him into a sort of ward room. It was decorated to resemble the cabin of an Agadar sloop, a sailing vessel much favored on that watery world. It was longer than it was wide, and paneled in light woods. A holostage with a play-deck and swivel chair adorned one end. To its right hung a set of wall-mounted nautical instruments which, the nearest ocean being rather distant, were certainly more decorative than functional. Cushioned benches and cabinetry ran along the walls, including a bunk recessed into the wall. Two comfortable chairs occupied the middle of the room. The overall effect was "taut."

"Stay poot," Olafsdottr said, wagging a finger before she closed and locked the door on him. "Plainty in there to amoose you," she added from the other side.

And so there was. The Fudir's primary amusement on Jehovah had involved the opening of locked doors.

The Fudir set to work. "Not very difficult," he judged.

It's a monoship, the Sleuth reminded him. Why would a one-man ship have high-end locks?

"Why would it have locks at all?" wondered Donovan.

WHAT IS THE SECOND MOST-FREQUENT USAGE OF MONOSHIPS? asked the Pedant.

What is the most frequently annoying personality we have to share a head with? the Sleuth answered.

Funny that you should ask, the Brute said.

Private yacht?

SECOND-MOST FREQUENT, SILKY.

Friends, said the young man in the chlamys. We're all in this together.

Donovan sighed. Sometimes his head seemed a very crowded place. On occasion, he remembered that he had been the original and the others remained in some sense tenants, and he remembered that he had once been alone.

Perhaps, said the young man in the chlamys. But the "I" that cooks up schemes, and the "I" that remembers everything, and the "I" that is master of every martial art, and . . . all the rest of us . . . We are all the same "I," aren't we? We're closer to you than your skin.

Donovan said nothing. He was not especially fond of his skin, which stretched sallow and drumhead tight across his bones. He still owned that gaunt and hollowed-out look that long years in the Bar of Jehovah had given him. He wondered if he might have always looked that way, even in the flush and vigor of his youth. Assuming he had had a youth, or that it had been flushed with vigor.

We'll remember someday, Pollyanna assured him.

Donovan was less sure. Sometimes matters were lost past all retrieval; and maybe deservedly so. Some memories might best remain covered than recovered. "I liked it better when you

had all fallen silent,” he said, and wondered if the drug that Olafsdottr had given him had also upset the delicate truce he had reached with himself the previous year.

“Smuggling,” snapped the Fudir, distracted from his inspection of the lock. “Smuggling and bonded courier work. All right? Now quiet down and let me work.”

BONDED COURIERS. PRECISELY. THERE IS A POPULAR SHOW ON DUBONNET'S WORLD CALLED SAMPLES AND SECRETS, IN WHICH THE UNNAMED PILOT OF A MONOSHIP BRINGS EACH EPISODE SOME PACKAGE—A SECRET, A VISITOR, A TREASURE—THAT CHANGES THE RECIPIENT'S LIFE FOR GOOD OR ILL.

It's why they're sometimes called “schlepships” the Sleuth said.

The Fudir pulled his special tool from the hidden cache in his sandal and set to work on the lock mechanism. The Pedant had been right. These were not high-security locks. The door opened onto the main hallway.

Ravn Olafsdottr was waiting outside. “Really, Donovan, where do you expect to go?”

The Fudir grinned. “Admit it, Ravn. You would have been disappointed if I hadn't come out. If you wanted me to stay put, you would have had better locks installed.”

“I was in a hurry. But I may do so, if you do not behave yourself. You were not supposed to awake so soon. Annoy me too greatly and I will soospend you once more.”

“And forego the pleasure of our company? You’d be lonely.” He looked up and down the corridor. “You have Eyes all through the ship, don’t you?”

The Confederate shrugged a little, as if not to belabor the obvious. “And motion sensors for your restlessness. You move about, I hear the ping of your processions.”

“Then what does it matter if I stay in one room or not?”

Olafsdottr scratched the bright yellow stubble of her hair. “Who can say? Perhaps you sneak up behind me, garrote me, have your wicked way, and take ship back to Jehovah.” A foolish notion, her smile said. “We will be good friends some time, you and I; but that time is not yet.”

“Don’t be so sure I would want my way with you,” the scarred man grumbled. “I’ve been with more toothsome wenches than you in my time.”

“Ooh! Boot do they bite so wail with those teeth?” She gnashed the dentition in question and switched to Manjrin. “You stay ward room now. We past Dangchao. Be on Tightrope soon. Not jog pilot’s elbow on such road.”

Inner Child chirped with alarm, but Donovan maintained the scarred man’s composure. “The Tightrope,” he said casually. “No wonder you snatched a monoship. Anything bigger couldn’t take that road.”

“A narrow way, but correspondingly swift,” his kidnapper said in Gaelactic, “as Shree Bernoulli commanded. And speed

is of the essence. Urgent matters await us on Henrietta, and the game is worth the candle.”

Donovan cocked his head attentively, but Olafsdottr did not elaborate on the nature of the candle. The Pedant volunteered that Henrietta was the sector capital of Qien-tuq, in the Confederated borderlands. Once in the Confederation, escape would become problematical. Some prisons were as large as a Spiral Arm.

“I’ve heard it said,” Donovan suggested, “that the speed of space on the Tightrope is so great that one can cross the Rift standing still.”

“Ooh, that is exaggeration, I am thinking! But the walls are close and the subluminal mud encroaches on the channel. It is a bad way and a treacherous one. But one unpatrolled by League corvettes.”

“Sounds like a good reason to seize control of the ship before you get us on it.”

“Ooh,” said Olafsdottr, “you are a foony man, for sure. Should I kill you now and save myself soospense?”

Donovan grinned. “You won’t do that. You went to all that trouble to sneak into the League, nab me, and commandeer a handy ship when you could have injected me with something fatal and been done with it. That means you plan to keep me alive, and that means you’re taking me somewhere. I’m a valuable cargo.”

“Valooable,” Olafsdottr admitted, “but noot priceless.

Doon't make your inventoory coost greater than you be woorth."

That evening, before he turned the lights out, the scarred man removed a particular hologram from his scrip and studied on it.

Four figures sat at an outdoor café table on the sun-lit cobbles of the Place of the Chooser, the great public square in Èlfuji, in the Kingdom on Die Bold. Bridget ban sat in the middle turned at three-quarters but with her head fully facing the imager. Her smile, broad; her eyes seducing the viewer; her red hair captured in mid-flight, as if she had just then tossed her head to look at the artist. Her left arm draped Little Hugh's shoulders; her right hand covered The Fudir's on the table. Greystroke's hand rested on her shoulder.

A fellowship, and a good one. He missed them all terribly. The four of them back then had been in search of the Twisting Stone, and the singular tragedy was that they had found it.

"She's not expecting us on Dangchao, you know," Donovan told himself after restoring the image to his scrip and speaking the lights out. "It was a spur-of-the-moment decision to visit her. She won't know it when we don't show up."

Oh, the harper will know, said the girl in the chiton. She knew we were coming before we knew it.

"It was going to be a surprise," the Fudir whispered.

No surprise now. No expectation of the harper's broad and welcoming smile. No possibility that the daughter's smile would infect the mother. The fellowship in his hologram had been

broken, and broken by his own actions. He had abandoned them, had abandoned Bridget ban, with no word and no explanation. One such desertion might be reparable; two would never be, and even the harper could lose her smile.

Unless he could take the ship from Ravn Olafsdottr.

Snug in his bunk, neatly boxed into the wall, Donovan discovered that the bunk was not especially user-friendly. It was a little short, for one thing, and not very comfortable for another. Of course, the Rightful Owner would not have dossed here, so its discomforts mattered little.

Except to the scarred man. Between the thin pad and the short length, he turned and twisted in pursuit of an elusive relaxation. Perhaps a thicker pad would have settled him; perhaps not. But one of the twists—or one of the turns—brought him against the panel that formed the inner side of the bunk; and the pressure must have been just right, for something went snick or click and the panel slid aside, and Donovan fell off the bunk on a side that he hadn't known it had.

He found himself in a narrow passageway between the wall of the ward room and the wall of the utility room next to it. There were pipes, ducts, and cable runs, as one normally finds in walls; but there was also crawl space and, here and there, shelves and bins. Inner Child glanced quickly fore and aft, saw nothing in the darkness, but kept watch—for seeing nothing in the dark was hardly a comfort to him.

Oh-ho, said the Sleuth. The Rightful Owner was a

smuggler. There are probably caches, passages, and hidey-holes like this all through the ship. Tyrants and democrats had escaped the people's wrath cocooned in such ships. Secret treaties and covert agreements had traveled secure in their bosoms. Prototypes and patents had been hustled to subsidiaries—or competitors—on sundry worlds.

After this fortuitous discovery, the scarred man took to wandering the monoship at odd hours, investigating its nooks and crannies. He wondered how long the ship had been in Olafsdottr's possession. She might know of the nooks, but perhaps not of the crannies.

He began to plan his takeover of the ship.

Using the secret passages, he could make an end-run around Olafsdottr's security and come upon her from an unexpected direction. But this was easier imagined than executed. Her reflexes could not be markedly inferior to his own, nor her mastery of the arts martial. His main advantage was that she did not wish to damage him, and this might cause her to hold back if it came to that.

But the two places where Olafsdottr spent most of her time were the two places where the passages did not run. First was the pilot room, which was too small and cramped for a struggle in any case, or at least for any struggle that included a survivor. The second was her sleeping quarters, where she was most vulnerable, but which was inaccessible from the hidey-holes that otherwise Swiss-cheesed the ship. Not all the caches

connected. To approach her sleeping quarters meant crossing the spinal corridor, and that was alarmed by her ad hoc security system. It was not an impossible task to circumvent the system, but it would require de-activating several sensors; and that deactivation would in itself constitute an alarm.

Olafsdottr continued wary in his presence, and when they ate together, it was at arm's length. In exasperation at the blandness of her cooking, Donovan one day programmed a dinner of Chicken Joe Freezing that had a bit of a bite to it, but Olafsdottr would not taste of it.

"Who knows what wicked spices you have rubbed into that poor hen?" she asked. And never mind that the meat from the protein vats had never gone through the formality of actually having once been a hen.

But even when he had divided his own serving in two and offered her the choice of halves, she demurred, and he wondered if it was not the spiciness itself rather than the possibility of being drugged that put her off.

"I am wounded," he said, "that you do not trust me." Later, he vomited the poison in the ward room's lavatory. Taking the antidote beforehand was risky in any case, and he resolved to find another tactic.

Olafsdottr allowed him some limited exercise time. "Idle hands, devil's tools," she explained, and led him to a fitness room equipped with a variety of machines. Donovan expressed his amazement and gratitude and did not hint that he had

already seen the room. The mirror on the back wall was one-way and provided anyone in the passage behind it with an excellent view.

Olafsdottr stood as usual in the doorway, and made helpful suggestions for his exercise regimen. The Brute especially enjoyed the workout, and the Silky Voice used it to work on her enzyme control. But at the conclusion, as he was toweling off, he noticed a handled insert used as a shim for changing clearances on the machine beside him. Save that it was not sharpened, it would make a fine knife. He pulled it out as if to change the forces on the pulley, and found that it had good hand-balance.

Without turning, he threw it at Olafsdottr. The Confederate twisted sideways and snatched it out of the air. She examined the slug of steel in her hands, then looked at Donovan and grinned. "You like play catch?" She slung it back at him on a flat trajectory aimed at his face. "More fun with knives," she added.

The Brute dropped into a crouch and, thrusting his hand up, grabbed the handle as it passed overhead. "Careful," he said. "Ya don't want ya should break the mirror. That's bad luck."

As he rose, he sent the shim spinning back to Ravn. The courier spun to her left and somehow directed the pinwheeling slug back toward Donovan with barely a twitch to its motion.

Inner Child heard a sound behind them and stepped aside, so that the Brute very nearly missed catching the projectile. He tossed the shim up, caught it by the flat of the blade as it fell,

and threw it on a long, lazy turn-and-a-half toward his captor.

“Oh, excellent move,” the Confederate said. She had to sidestep and reach behind, since the shim was coming at her blade-first. She returned the shim the same way. “But ‘crouching-ape’ catch better.”

On the next round, though, as the shim hurtled toward her, an alarm tripped and a series of sharp chimes sounded through the ship. The Ravn jerked her head around, remembered in time the deadly projectile, and dropped “boneless” to the floor, striking with the flats of her hands to reduce the impact. The shim shot through the space her skull had occupied and rang against the wall across the hall from the doorway.

She had rolled on falling, of course—The body has reasons the mind stops not to ponder—and she came out of the roll into a crouch onto the balls of her feet just as Donovan reached her. Her teaser halted the scarred man an arm’s reach away.

“Ooh, that was very clayver, sweet. You play me friendly game of threw-the-knife and betray me at crucial mooment. You play me, and not shim.”

Donovan held his hands where she could see them. “What betrayal? I ran over to see if you were all right.”

“Noot even scratch, darling. How you kick oof mootion sensor from here?”

Donovan shook his head. “Must have been a malfunction. Your whole system is jur yrigged. I’m surprised you haven’t had

false positives before now.”

By the guarded look on Olafsdottr’s face, he judged that there had been previous false positives, perhaps while he had been in suspension. He said nothing, preferring that any doubts about system reliability be spread by her own mind.

The Confederate waved her weapon. “You go before me. Left at refectory.”

The scarred man did as was told. Idea, the Sleuth said.

I hope it’s better than playing catch with a blunt instrument.

Quiet, Silky. The Ravn’s got a “no-not-me.” It damps the motion sensors in her vicinity. If we can steal it, or the Fudir can duplicate it, we can sneak up on her when she’s asleep, not set off the alarms.

Oh sure, thought the Fudir, Olafsdottr will give me the run of the machine shop.

They had reached the T-intersection. The long stem of the T ran past the ward room and the closet in which he had first awakened all the way to the exterior air locks. The crossbar led to the refectory and, beyond that, the pilot’s saddle. Olafsdottr looked down each corridor, pursing her lips.

The alarm came from here, the Sleuth concluded. There must be a location code in the alarm pattern. The long and short beeps.

Dissatisfied, Olafsdottr marched Donovan back to the ward room. “You be a good buoy,” she said, “and stay in room.”

And she closed and uselessly locked the door.

Travel time between stars was long—weeks, sometimes even months, depending on the local speed of space—and there was little to engage the attention save when entering and leaving the Roads. Consequently, the ward room was well-stocked with what the great 'Saken philosopher Akobundu had called “the grand continuum of culture”—literature, music, art, travel, the enjoyment of nature, sports, fashion, social vanities, and the intoxication of the senses—though the Rightful Owner's tastes seemed to have run more to the lower strata of that continuum. There were seven cardinal sins, Bridget ban had once told him—and the entertainment center catered to no less than five of them.

More entertaining by far, the Fudir was able to use the play deck to hack into the ship's navigational system, from which he learned that they would be a fortnight on the Newtonian crawl through the high coopers of Abyalon. Olafsdottr would not resume the pilot's saddle for a while. What better time for taking the ship?

Of course, if he realized that, so did his adversary. She would be more alert than ever during the next week and a half.

And so, Donovan set himself to learn about the Rightful Owner. He had no guarantee that such an education would gain him an advantage, but there was a chance that the monoship had additional capabilities of which Olafsdottr was as yet unaware, some capability he could use against her. A weapons

cache, perhaps. As far as he knew, Olafsdottr's teaser was the only formal weapon on board.

Of informal weapons, there were of course a plenty.

Time was growing short. After Abyalon, came the Megranome crawl. And after Megranome, the Tightrope branched off and it would be too late to turn back. There was no exit off the Tightrope until it debouched onto Confederate space at Henrietta.

The evening after the Fudir had ferreted out the name of the Rightful Owner—Rigardo-ji Edelwasser of Dumthwaite, Friesing's World—and the refreshingly honest name of his company—Bonded Smugglers, LLC—Donovan won the game of waiting.

"It does not grow, does it?" Olafsdottr said from her usual cautious post at the door between the refectory and the pilot's saddle. She had of course eaten earlier, and stood by now while Donovan did the same.

The scarred man had programmed a meal of tikka and naan, and ate noisily and sloppily, using the naan as mittens to pick up the chicken pieces. He looked up at her. "What doesn't?"

"Your hair. It never grows."

Donovan scowled and ran his hand along the tufts that spotted his scalp. "Oh, yes missy," he said in the Terran patois. "Names very budmash fella, but save him this-fella plantation haircuts."

Olafsdottr nodded gravely. "I have heard this tell. You have soofered much." She reached forward, almost as if to touch the scars in Donovan's hair; but he pulled back, and she was not so foolish as to lean closer.

"Great harm," she continued in doleful tones, "and I speak as one expert in great harm. You are not the only shadow agent to feel the nettles of their whims. It is a poor master who beats his dogs. Beat them too much and they will turn on him, as some of us now have. There is a struggle in the Lion's Mouth."

Donovan grunted and applied himself to his naan.

"Do you understand what I have said?" Olafsdottr said.

He looked up, his mouth dripping. "And what is Hecuba to me, or I to Hecuba?"

His captor seemed uncertain of the Terran reference. "Do you know the Lion's Mouth? I have been told that your memory is . . . uncertain."

"You mean 'wiped.' It's your version of the Kennel where the Hounds train, except you breed rabid dogs."

Olafsdottr crossed her hands over her breast. "You wound me, Donovan-san. Am I a mad dog? Well, perhaps so." She spoke more intently. "Some of us are mad enough to challenge the Names. There is civil war among us."

Donovan returned his attention to his meal. "Good luck then to the both of you. Let me know how it turns out."

"We are bringing home all agents from the Periphery."

"You've made a mistake then. We're not an agent. We've been retired."

"Ooh. Our retirement plan is very singular. There is only one way to retire."

Donovan did not ask her what that one way was. "You forget that Those of Name discarded us."

"Then when you join with us you may take your revenge for that, and sweet will be the taking, I think."

"Very sweet, but I had it in mind to watch from the sidelines. Revenge is a dish best served cold—and by someone else."

Olafsdottr shook her head. "No sidelines this fight. No boundaries, no rules."

Donovan wiped up the last of his sauce and stuffed the naan in his mouth. He had gotten hints of this last year from Billy Chins. "How many of you are in it?" he asked around the bread.

"Almost half have lit the lamp."

"Almost half . . ." He swallowed. "Oh, that's encouraging. Half the Lion's Mouth against a regime in power since the cows came home, with total control of the police and the . . . What of the 'boots,' the military? Where do they stand?"

Ravn cocked her head. "Some among them," she allowed, "may know a civil war is broken out. But if so, they have not wagered sides. We conduct this war as we always have—with stealth, with intrigue, with assassination. There are no bloody battles; no planets bombarded. No great stupid mobs rushing

about shooting at one another . . . and missing.”

“Not yet, anyway.” Donovan tossed his napkin into the fresher and took his dishes to the sink, where he scraped the remnants into the recycler. He turned abruptly and faced her. “Why me?” he said. “What good would I do the rebellion? I’m a broken old man.”

“Not so old as that; and broken pieces have the sharpest edges.”

A facile response, but Donovan thought it sounded rehearsed. That her people meant to use him in some manner, Donovan had no doubt; but in what manner, he was as yet unsure. Perhaps as no more than a knife thrown by one side at the other.

“You think on what I have told you, Donovan,” Olafsdottir said as she marched him back to his nominal prison cell. “You will see it is the right thing to do, and you and I will be famous comrades.”

That argument, more than any of the others, planted caution in the heart of Donovan. For he had never heard an agent of Those of Name cite “the right thing to do” as an argument in favor of anything.

The next day, the Fudir broke Rigardo-ji’s security code and entered the smuggler’s files. These proved as dull as any collection of legitimate invoices, as the sundry planetary and state governments around the Periphery were notional in what goods they chose to blockade. During the Great Cleansing, the

peoples of Terra had been scattered widely on the hither side of the Rift and unequally gifted as regards terraformation. Some worlds had in plenty what others lacked entire. Thus, it was worth a rich man's purse to smuggle boxes of oatmeal cookies from Hawthorne Rose to Ramage, or tobacco sticks onto Gladiola. The lascivious art of Peacock Junction was forbidden on Jehovah, while 'Cockers read Jehovan tracts by flashlight under their blankets.

The smuggler's most recent invoice was for the delivery to Foreganger Prime of a secret protocol entered into by Abyalon with the People of Foreganger. He had been returning to Abyalon with the chopped protocol—and a gift called “the Frog Prince” from the People to the Molnar of the Cinel Cynthia.

THE PEOPLE'S NAVY SWORE REVENGE ON THE PIRATES OF THE HADRAMOO, THE PEDANT REMEMBERED, AFTER THE HIJACKING AND MASSACRE OF THE TOUR LINER MERRY V STARINU, FOUR STANDARD YEARS AGO.

Perhaps the gift is a peace offering.

The Fudir was doubtful. “The People of Foreganger make peace on their own terms, usually after some notable vengeance.”

“One way or the other,” Donovan said, “Foreganger won't be happy that their present was hijacked along with the courier's ship. Pedant, where was the Starinu hijacked?”

OFF ABYALON.

How much you want to bet, said the Sleuth, that this “Frog Prince” is some sort of vengeance weapon that Abyalon hired from the People to use against the Cynthians?

“No bet,” said Donovan.

A bomb, do you think?

“Wonderful,” said the Fudir. “A bomb on board. We didn’t have near enough problems.”

If we can find where it’s stashed, the Brute suggested, we maybe can use it to knock off Olafsdottir and take the ship from her.

“If it’s a big enough bomb to take out the Molnar,” Donovan pointed out, “it’s too big to set off aboard a monoship. A take-over weapon has to be one that can kill or incapacitate the Ravn without killing or incapacitating us.”

<Someone in the room!> cried Inner Child.

The scarred man swung abruptly away from the holostage, saw nothing, turned the other way.

More nothing. The ward room was empty.

Where did you see it, Child?

<From the corner of our eye. To the right of the stage.>

“Sleuth, you and Fudir check it out.”

The Fudir took control of the scarred man and went to the back wall, where the nautical instruments were mounted.

The wood paneling was genuine, and done up in a basket

weave pattern of vertical and horizontal slats, so that the wall seemed some vast sort of wickerwork. The Fudir glanced toward the console's swivel chair. If Inner Child had glimpsed something in this direction . . . The Sleuth did the geometry . . . it would have stood approximately—here. He ran his hands along the interstices.

You're thinking a secret door, ain't ya, Sleuthy.

It was a logical deduction, and logic was the Sleuth's forte. A smuggler's ship would be riddled with such things. The Fudir's explorations had already found secret cabinets with jewels and stolen artwork intended for clandestine delivery in the Old Planets. Nothing to use as a weapon, except perhaps for the Peacock vase.

I just thought of something, said the Sleuth.

And you're gonna tell us.

The road to the Hadramoo splits off here at Abyalon. What happens if we don't deliver this "Frog Prince" thing to the Molnar?

Who cares?

No, I don't mean what will the Molnar do. Or even what will the Abyalonic Council or the People of Foreganger do. I mean, what will the "Frog Prince" do?

The scarred man paused in his examination of the wall. If the Abyaloni and the People were deploying a vengeance weapon against the Cynthians, there might be a delicate matter

of timing involved.

As in time bomb?

<That could kill the messenger.> “Abyalon wouldn’t agree to that,” the Fudir muttered.

“Foreganger might,” Donovan replied, “without telling Abyalon.”

Wonderful. If the Frog Prince were a bomb set to detonate when it reached the Hadramoo and Olafsdottr took the ship to Megrnome Road instead, the thing would detonate instead when they were on the Tightrope.

Who says it’s on a timer? asked Pollyanna. Or even that it’s a bomb?

<Right. It could be poison gas. Something, you give it to the Molnar and he opens it, and—poof—he’s dead.>

If Silky had not heightened the scarred man’s senses with a cocktail of enzymes, he might not have felt the light puff of air that wafted from between two vertical slats. If Inner Child had not mentioned poison gas, he might not have flinched from it. The Sleuth explored the slats with his fingertips and identified the edge of a door; once he had the edge of it, the rest of the outline followed easily.

No obvious handle. The Fudir began to push and twist the various instruments fastened to the wall.

It’s probably not booby trapped, Pollyanna said.

The scarred man hesitated.

"Pollyanna!" said Donovan.

She's right. What sort of fool booby traps his own ship?

<A smuggler who has left for a night carousing in the Bar of Jehovah?> Inner Child suggested.

Nah. He'd set locks, not bombs. The Brute twisted the chronometer, jiggled the barometer, pushed the binnacle. It was only when he turned the knob on the compass that they heard a click and the panel swung gently inward.

"You can come out now, Ravn, dear," he cooed.

But no one stepped forth and, when Donovan entered he saw it was not a cache but a passage. The back wall was a blind. To the right a short connection joined a second passage that seemed to run lengthwise up the ship—probably the one behind the cabinets. To the left was a narrow corridor and it was from that direction that he heard the soft sound of a closing latch.

Inner Child edged around the blind, saw that the passage was empty, and crept gingerly through it. The Fudir made no sound with his footfalls; even his breath was still as death.

Was this an elaborate ambush? But Olafsdottr had no need of ambushes. She could have executed him at any time since bringing him aboard. She was keeping him alive because her side wanted to use him in their civil war. So what was this about? Just playing stealth games? There were more exercises than the merely physical, and boredom was a wondrous motivator.

The passageway made a dogleg and, passing through a second door, Donovan emerged into the cold well of the pantry, surrounded by cuts of harvested meats, vegetables, and juices in rows of low-entropy receptacles. The door he had come through had masqueraded as a rack of shelves.

Leaving the cold well, Donovan passed into the pantry. A wintermelon, an arm's length long, sat on the carving board. Succumbing to impulse, he pulled a carving knife from the scabbard and holding the blade by the point, threw it from the far side of the pantry. The blade performed a satisfying somersault before sinking to its hilt into the melon.

By now, the motion sensors would have alerted Olafsdottir to activity in the pantry. But he had stayed out of the ambit of the room's Eye. He re-entered the cold well and thence returned to the ward room.

"Well, that was entertaining," the Fudir said when they had seated himself again at the play deck. "It seems our Ravn is a bit of a tease."

<Will she wonder if a knife is missing?>

"She'd be a fool if she hasn't kept inventory; and the motion alarm will pique her curiosity. It may puzzle her to find them all accounted for. I can only hope it drives her mad wondering what else might be missing."

He awoke the holostage and noticed immediately that the files he had been reading were gone. A few minutes of searching failed to relocate them. So. Not just closed, but gone.

That was encouraging. It likely meant that there was something about the ship he could use against Olafsdottr, and he had been close enough to finding it that she had pulled it from him.

The bad news was that he did not know what he had almost found.

On the other hand . . . The Fudir stared purse-lipped at the hidden door, now also closed. “A roundabout means to get me away from the consol,” he muttered. “She could have waltzed in, held her teaser to my head, and taken the files any time she pleased.”

And that meant . . .

Something does not add up.

At dinner that evening, while Donovan ate a concoction of soybeans and bilberries, Olafsdottr announced that they would enter the Abyalon-Megranome Road in four days. Abyalon’s network of Space Traffic Control lasers was already pushing the ship toward the Visser hoop that was its entrance ramp. In the final sprint, the ship’s onboard Alfven engines would engage and grab hold of the “strings of space” and vault the ship over the bar into the superluminal tube. That would be a bad time to bother the pilot. Were the ship to miss the hole, it would exceed Newton’s-c in flat space and go out in a Cherenkov blink.

The ancient god Shree Einstein had decreed that nothing could move faster than the speed of light. But he had also decreed that space had no objective existence. And so, since it

was no thing, space itself could move faster than light. At this concession, his rival, Shree Maxwell, had loosed his demons, and created convection currents within the æther of Ricci tensors, his Dark Materials shaping the network of Krasnikov tubes known throughout the Periphery as “Electric Avenue.” So while a ship hurtling down such a tube was still constrained by the speed of light, within the curl local-c might be arbitrarily high.

Nor could Shree Einstein see how his commandments had been flouted. The tube walls formed a Visser Skin, laminas of progressively slower space called the subluminal mud, which decoupled the interior causally from normal space. In a sense, a ship in the tube network was no longer “in” the universe, but “underneath.”

All this had been understood in ages past, in the old Commonwealth of Suns; and being understood, had been well-engineered; and being well-engineered, understanding no longer mattered. The formulas worked, and machines could be taught to work them. That was all a man need know.

On his return to the ward room, Donovan noticed that a steel bar had been welded to the outer door and, when turned on a pivot, would prevent the door from opening. Donovan raised an eyebrow to his captor.

“Simple means are ooften best,” she announced. “I have noot had a good night’s sleep since you awook.”

“If you don’t like my company, you can drop me off at the transit station in Abyalon’s coopers and I’ll catch the next liner

back to Die Bold.”

Olafsdottr smiled. “You be a foony man, Doonoovan. I have said soo many times.” Then she ushered him in and closed the door behind him. Donovan heard the steel bar slide into place. A metric minute later, the door opened again and Olafsdottr stuck her head in. “Peekaboo,” she said. “Joost checking you stay poot.” She grinned, closed the door, and shortly the steel bar slid into place a second time.

The Fudir arranged pillows on the bunk and pulled the sheets up over them. Then he took up a station in the corner beside the hidden door and waited.

One reason why the scarred man excelled at the game of waiting was that most of him could sleep while the rest took turns on guard. Inner Child and the Brute stood sentrygo while the Silky Voice marshaled and concentrated the requisite enzymes. Genistein and isoflavonoids from the soybeans, anthocyanocides from the bilberries, she sent them off to fortify the night vision of the retinal rods. It would not be fair to say the scarred man could see in the dark, but you are what you eat, and it would not be right to call him blind, either.

After some time had gone by and the night was well advanced, the door slid open and Inner Child nudged the Fudir awake. A shadow slipped into the room, paused to assess motion, and flowed swiftly toward the bed on which the scarred man ought to have been lying.

Partway there, it paused in watchful silence and the Fudir

noted a club of some sort in its hand. Then, apparently satisfied, it backed away and strode to the holostage, where it seated itself at the play deck. The scarred man slipped up behind it in the dark and placed one hand over its mouth and with the other plucked the club from its hand.

“Rigardo-ji Edelwasser, I presume,” he whispered into its ear.

Donovan felt the man stiffen, try to turn. “Nu, nu, nu,” he said with the Silky Voice. “Gentle, my good sir. Be not afraid. You are Rigardo-ji, the rightful owner of this vessel? Nod your head.” The head bobbed once in his grip. “I will release you, but you must make no move nor cry. I have destroyed all the Eyes in this room, citing my modesty, and she has assented by not replacing them. But we will speak in whispers, in case she has salted this room with ears. She is accustomed to my self-conversations, but speak too loudly and she might wonder if I speak with too many voices. Do you understand?”

Again, a single, spastic nod of the head.

“Good-good. We are in the same boat, you and we. There is no need to struggle.”

When Donovan unloosed his hold, the shadowy figure turned the operator’s chair to face him. “Are you a madman? I’ve been watching, and I think you are mad. That’s why she locks you in here.”

“Wouldn’t that make y o u mad? Why have you been lurking in the wainscoting all this time?”

"Am I a fool? A poor, honest smuggler, me, just trying to make a living. I'd been drinking and, when I heard her bang through the lock, I hid in one of my . . ."

"One of your hidey-holes. Go on."

He shrugged. "And I passed out. Came to after we were under way. Guess she never realized I was still aboard. I figured out what she was, toot sweet, and I ain't no match for a Confederate shadow. I didn't dare try to take her on myself. 'Sides . . ." The smuggler flipped his hands. "She was going the right direction, so there wasn't no rush. I come out now and then just to check the headings. I figured if I just waited, something would come up."

"And something did."

"Yeah. You."

"But you're not sure about me, or you would have approached me sooner."

"It was pretty clear you were her prisoner. That made you her enemy, but it didn't make you my friend. For all I knew, you were Confederate bound, too, and you'd gang up on me if I showed myself. I overheard some of what you and her was saying, but I don't speak birdsong, and I wasn't always in a position to eavesdrop."

Donovan stroked his chin and considered the man before him. He could see, even in the dim-lit darkness, the tightness of his mouth and eyes. "Why did you come out tonight?"

"I thought . . . it was time we made contact."

Liar, the Sleuth said. He checked the bunk to make sure we were sleeping—and had a club in case we weren't. But Donovan did not voice the thought. "You didn't wake me. You went to the console," he suggested.

"I've been dead reckoning. I needed to check our position, and it's safer to do that here than in the control room. I been out a coupla times, but sometimes I have to cross a hallway and that sets off her damn motion sensors. How does she bear? The ship, I mean."

"Four days out from the Megranome Road."

"Oh." The smuggler's concern was palpable. "That ain't good. We need to take the Biemti to the Cynthia Cluster."

"To deliver a gee-gaw to the Molnar."

Donovan felt hesitation in the smuggler's posture.

"You read through my work orders," Rigardo-ji said. "I thought I snatched them in time. Look, that's top secret—need-to-know—and the penalty clauses Foreganger lays down . . ."

The Brute tightened his grip on the smuggler. "Keep the voice down, I toldja." Then Donovan said, "I promise not to tell the People. I scanned your current invoices, to see if you had anything aboard I could use as a weapon. Short of breaking a vase over her head, I didn't find anything."

"There may be something we can use," the smuggler allowed. "There's a consignment aboard what I can read

between the lines. With two of us, we got a chance. I'll go get it out. Then you distract the 'Fed and I pot her. No offense, good buddy, but you've had three chances already to kill her and passed up each one."

Donovan thought about it and reluctantly agreed that it had to be that way; not for the smuggler's smug reasons but because if Rigardo-ji suddenly appeared from nowhere, Olafsdottr would recognize it precisely as a distraction. The element of surprise would be irretrievably lost.

"You'll only get one shot," Donovan said.

"I'll only need one. But it's got to take her by surprise. I would have tried something already, but I got no illusions. A microsecond's warning and I wouldn't even get the one shot."

Donovan did not know how good a shot the smuggler might be. Yet many an eye and hand, steady on the range, grew uncertain when a living person was in the target hairs. Rigardo-ji sat rigid, Donovan's arms upon him, eyes wide, stinking of sweat. Slowly, as if disengaging, the scarred man released him, stepped back.

"It will have to be soon," he said. "Before we enter the Roads." And before you lose your nerve, he thought but did not say. Words like that would conjure what they sought to allay.

"Tomorrow," the man said. "After dinner. There's a T-intersection where she takes you here . . ."

"I know it." It was where the false alarm had been tripped the other day.

"There's a panel, a storage space behind the cross hall. Sometimes, they bring containers aboard, up the long hallway, and I open the panel and they can dolly them straight in. It's empty right now. I can make my way into it, wait there. You come past, turn up the long hall like you do. Your backs are to the panel. You stop her, get her to stand still. I slide the panel open and . . ." He made a gun of his fingers. "Pop. Pop. I got her."

Donovan said nothing, and after a moment the smuggler looked at his fingers and self-consciously wiggled them, as if throwing the imaginary gun away. "That's the important thing," he said. "You gotta distract her while I open the panel or else she'll hear it. I mean these are like cargo doors; they ain't exactly stealthed."

"In the back," Donovan said.

"Safer, that way, don't you think? I don't wanna give her the chance. Confederal Shadows, they're ruthless. I've read the stories."

"Do you have something non-lethal, something to disable her instead? I know some people on Dangchao who wouldn't mind getting her as a sort of house-present when I visit."

"Dangchao . . . Who do you know on the Waypoint that would keep a Confederation agent as a house pet?"

"People who ask Questions."

Rigardo-ji shrank from him and made Ganesha's sign to ward off bad luck. "I shoulda known you was no ordinary

prisoner. Yeah. Yeah, sure. There's something in my stock. It'll knock her out, but not kill her, if that's what you want."

Inner Child heard the scraping of a steel bar. "Quick," he whispered through the scarred man's lips. "She's coming!" Donovan added, "Agreed. Tomorrow, after dinner."

The smuggler vanished like smoke. The panel beside the holostage clicked shut. Donovan threw himself into one of the chairs and sat twisted on the cushions.

Olafsdottr opened the ward room's door and entered just behind her teaser. Her left hand slapped the lights on and Donovan pretended to be flustered by the sudden light. He raised his head, as if he had been dozing in the chair, and shielded his eyes with his arm.

The Shadow, for her part, looked about the room, grinned, and said, "Good night, Doonoovan-buoy. You have a very crowded head, boot noo moor whisper. Sleep tight."

The next day, Donovan waited. He read a book from the ship's virtual library, but afterward he could not have explained what it was about. He participated in a simulation of the battle of Mushinro, taking the part of the doomed Valencian general Kick. It was widely assumed that Kick had the battle won and it was only his hesitation at a crucial juncture that had permitted the victory by the Ramage-led coalition. But Donovan's attention was not on the simulation and his own hesitation at a different juncture lost the battle yet again. Only when the dinner hour at last approached did the scarred man realize the root of

his unease.

He did not trust the smuggler, Rigardo-ji.

It was a small thing, but the devil, it was said, lurked ever in the details. There had been a hint of thuggishness beneath the fear, and there had been that moment when, simulating a gun with his fingers, Edelwasser had said, "Pop. Pop."

Two shots.

A second shot just to make sure? Or a second shot to tie up the other loose end?

Or was Inner Child reading too much into it?

Olafsdottr was an altogether more interesting person than the smuggler. At dinner, their conversation ranged from the various modes of mayhem they each had mastered to the craft with which Aloysh-pandit arranged colored oils on the surface of still pools. Were it not for the fact that the courier was dragging him into a civil war of which he wanted no part and in which he would likely find his doom, he would have found her an agreeable companion.

On the other hand, years before, she had been tasked to kill him if he failed his mission. A close relationship, an intimate relationship; but not a cuddly one. Olafsdottr had a most pleasant smile. But she would smile while she cut him down.

They left the refectory together and walked down the short hallway in their usual parade: Donovan to the fore, Olafsdottr behind with her teaser to the ready. She no longer held it

shoved into his back, but neither had she relaxed to the point of shoving it into her holster. “But I suggest you are wrong, sweet,” she said, continuing their conversation as if they had been amiable companions on a stroll. “The Roomie tradition of opera was much too bombastic. Their drama was too melo. The Nipny tradition was more spare, more elegant, more minimal.”

The scarred man allowed the Pedant to hold up the other end of the conversation. “You misunderstand the criteria. Grand opera and Noh have not the same objectives. One may as well assail the lemon for lacking the sweet of sugar cane. Each may excel—but toward different ends. It is only the values we place on the ends themselves that make one means seem less than the other.”

“Ah, but sweet, are not the weights we place upon our goals what matter most in the end?”

They had reached the T-intersection and had turned down the long stem of it. Donovan paused and said, “For me, the overthrow of the Names pales against one hour with my daughter in her home.” When he closed his eyes, he saw Méarana’s face before him, puzzled and hurt. He turned and faced his captor. “Make me one promise, Ravn.”

Olafsdottr stopped a pace short of him and tilted her head, birdlike, to the side. “And what is that, my sweet?”

“Promise me that if I go with you, you will go to Dangchao and tell Bridget ban and her daughter Méarana why it was I never came.”

"I am to walk into the enemy's lair on such a lark? You ask much of me, Donovan-buigh."

Indeed, he was. He could see down the length of the corridor the blank wall where the secret panel must be. The expression *f i s h* in a barrel came to mind. Rigardo-ji would have a clear shot down the entire length of the corridor, all the way to the cargo lock at the end. No one in the corridor could escape, unless they made it to the ward room, or into the closet where he had first been kept.

And that included him. A steady eye might pick off the Confederate without also hitting her prisoner, but Donovan knew in that moment of clarity that the smuggler meant to kill them both.

"Let's go," Donovan said, turning to resume their trek.

Perversely, it was now Olafsdottr who held him back. "What is the hurry, Doonoovan? You ask me to venture into the heart of the Oold Planets to accost a Hound? From sooch a journey even I may noot return."

"Fair is fair, then. Isn't that what you're asking of me?"

"Ah, but I am not asking. Your condition is not a conditional.

"

Donovan could not take his eye off the wall at the far end. He waited for the panel to open and death to emerge. "We can discuss this in my room," he said.

And still, like an ancient hero, ankle tied to a stake in the

ground, Olafsdottr remained in the line of fire. "Ooh. Soo anxious! Do you have a trap led for me in your room? What cleverness have you been oop to?"

But then she noticed that his attention was not fixed upon her, but upon the far wall. She spun and aimed her teaser down the hallway. "What is it, sweet? What wickedness have you wrought?"

In turning away, she had turned her back on Donovan buigh. The Brute took charge of the scarred man's body and leapt for her, mounting her, pushing her to the floor. She buckled under his sudden weight and went to her belly and the breath woofed out of her. A moment, she lay still; and then she twitched and Donovan felt a burning tingle in his side.

And came to lying on the cramped bunk in the ward room. Olafsdottr sat, chin cupped in one hand, in one of the two soft chairs that gave the room its center. "Clever move, O best one. How you lulled me these past days! And had I lost my grip either on my teaser or my wits, success might have been yours. That would have been no good thing, either for me or for you, for behind me lurks another, my 'second,' who will act if I fail."

She leaned forward and patted Donovan's cheek, and when he struggled to grab her arm he learned that he was strapped into the bunk. "You stay here some few day, I think. Review error of ways. Soon we enter AbyalonMegranome Road. You no jog elbow."

After the Shadow had left, Donovan engaged in some

experimental struggles, but Olafsdottr was a professional. He did not expect much to come of it, and was not disappointed when not much did.

“You did not want to see her killed,” Donovan told himself. “Why?”

It’s called a “stock syndrome,” the Silky Voice said. The captive comes to love his captor.

I don’t love that stick, said the Brute.

EDELWASSER PROMISED HE WOULD NOT GO FOR A KILL, said the Pedant. DID YOU NOT TRUST HIM?

“And our lack of trust was justified,” said the Fudir. “He didn’t show.”

<A different sort of betrayal than the one we feared . . . >
“Yes, why did he not show?” asked Donovan.

A) He lost his nerve, suggested the Sleuth. B) We had the time or place mixed up. C) We were early. D) We were late. E) He couldn’t find the weapon he planned on using. F) He found it, but it wasn’t loaded. G) He . . .

Shaddap, suggested the Brute.

It doesn’t matter. Brute didn’t want to see her killed. Why?

Who sez? Was me that jumped her.

No, you shoved her to the floor to knock her out of the line of fire. Olafsdottr may realize something of the sort when she has thought about it further.

"It wouldn't have worked," the Fudir told them. "Rigardo-ji would have kept on shooting. He would have shot us, too, I think. I think he was planning to all along."

Who says so?

<I do. I never did trust him.>

You never trust anyone, Child.

<I can't see where trusting has gotten us much so far.>

"What do you say, Pollyanna?" Donovan asked. "You always see the silver lining in every dark cloud."

The girl in the chiton was sitting on the floor next to the bunk. And you see the dark cloud around every silver lining, she said. This will all work out. Wait and see.

Donovan expected that the smuggler would return that night, using the secret panel through which he had originally entered, so Inner Child and the Brute kept watch through the scarred man's half-slit eyes and listened through his ears. Some explanation would be forthcoming for the failure to act as promised, but Donovan was no longer sure he was unhappy with that failure. And some instinct had urged the Brute to protect their captor. The Brute was not a keen thinker, but his instincts were sound.

He heard a sound behind the wall, a banging or a clatter, and he pressed his ear against the bulkhead to make it out more keenly. It came at intervals, distant at first, toward the rear of the ship, but it seemed to draw closer, come adjacent to him,

and then pause. There was no sound for a time and the impression slowly grew within the heart of Donovan bough that something lurked on the other side of the panel, and that this something sensed his presence.

Suddenly uneasy, Donovan pulled away from the panel as far as the straps would allow. He exhaled as softly as he could, made no move, no sound.

Moments dripped by.

Then there was a clattering by his head and a moment later intermittent impacts receding down the hidden passageway. The scarred man began to breath normally. The sounds reminded the Silky Voice of a bouncing ball—if the ball were metallic and could hesitate from one bounce to the next.

A little later that evening, Inner Child heard the same sounds returning. He passed the sensations on to the Sleuth to puzzle over and continued to wait for the smuggler to appear.

But no one came to them that night, nor all the next day, nor the night after that.

He wondered if the smuggler had acted on his own after all. Maybe he had ambushed Ravn and taken control of the ship, and was content now to keep Donovan strapped into his bunk for the foreseeable future.

But on the third day, after the ship had entered Megranomic space and had begun the Newtonian crawl toward the Palisades Parkway, it was Ravn Olafsdottr who came to release him at last from his bonds. “Coome now, sweet,” she

said, "you moost be hoongry." She unlocked one hand, gave him the key, and stepped back.

"It's a psychological trick," the Fudir told her as he worked the key into the lock that held the remaining straps together. "That Alabaster accent is a comic's affectation. Most of us in the League have been conditioned to regard hooters as flighty. That's not exactly fair to the Alabastrines, who are as sharp or as dim as anyone else; and it is especially unfair to you. But it helps if your adversary underestimates your wit. And helps even more if they do so subconsciously."

"You very clever, friend. How transparent this unworthy one, that you see through her so!"

"And the Manjrin makes you seem sinister." Donovan, now loosened from his straps, stood up and rubbed his arms. Olafsdottr held out her hand and, after a moment, Donovan laid the key in it. "You didn't have to pull them so tight, you know."

"Yes," she said gravely. "I did."

"Anything interesting happen while I was tied up?"

Olafsdottr cocked her head nearly sideways. "Should something have?"

"Never mind." He stepped past her. "I'm hungry. Let's do lunch." He didn't wait to see if she followed, or if she held her teaser aimed at the small of his back. A teaser wouldn't kill him anyway; not like a dazer would. But it could hurt like hell, and make you wish it would.

The scarred man rustled his own lunch: daal and baked beans and sautéed mushrooms, with scrambled eggs and cold, fatty bacon drawn from the cold well in the pantry. Olafsdottr recoiled from this concoction when he brought it to the refectory.

“Why?” asked the Fudir. “How do you break your fast?”

Olafsdottr toyed with her teaser, remaining out of reach of her prisoner. “What any sensible one eats. A soft-boiled egg enthroned on a cup with its large end sheared off, a small plate of fruits of varied colors—green melon, yellow pineapple, white wintermelon— arranged as to best effect. A cup of pressed coffee thick enough to stand a spoon upright.”

The Fudir regarded her curiously. “I would think espresso would be the last thing you would need. No wonder you always seem so wired. You should try Terran food some day.”

She regarded his lunch with disfavor. “Perhaps I will. Someday.”

“So, it’s been a quiet couple of days?”

“With you bound in bunk, how could it be other?”

Well, said the Sleuth internally, Rigardo-ji would not have taken her on by himself. He’s lying doggo.

As from a distant room, Inner Child heard the muffled sound that had bounced past the scarred man’s head several times during his detention. A glance at the courier showed that she, too, heard.

Best not pretend we don’t hear it, the Sleuth advised them.

Keeping mum would invest it with more significance in her mind.

“What’s that noise?” the Fudir asked, twisting his head as if to locate it. “Something wrong with the ship? Maybe we ought to lay up for repairs here in Megranome.”

Olafsdottr smiled slowly, held it for a moment, then allowed it to fade as slowly. “Always carping the diem, my sweet. Perhaps you have set something rolling about the ship to convince me to stop for repairs and so give you an opportunity to escape. There would be no such escape, of course, but I will withhold the opportunity and save you the frustration.”

“I did all this while tied up?” Donovan said. “If something has broken loose . . .”

“Nu-nu-nu, sweet. You shall come with me to Henrietta. Great deeds await you. Tomorrow,” she added with a sniff, “make a different meal. This one stinks.”

But the malo deur lingered all day and the circulators could do nothing to dissipate it. By the next day’s breakfast both Donovan and Olafsdottr had drawn the same conclusion, very nearly at the same time.

“Not your food,” said Olafsdottr. “Stink come elsewhere.”

Donovan wrinkled his nose. “There is something familiar about it.”

“Agreed. But the nose is the most easily deceived of organs. It remembers well, but will not reveal those memories.

Does not one of your shards have memory?"

Donovan was not sure how much Olafsdottr knew of his condition, but saw no reason to deny it. "The Pedant. But he remembers facts, not sensations."

The Confederate sniffed. "Perhaps that which broke loose has caused something to burn out. Yet, it does not have the tang of burning."

"It has the smell of rot. Perhaps the protein vats have gone bad."

Olafsdottr viewed him with suspicion. "If you have sabotaged our food supply, it will be a long, hungry time to Henrietta. You very naughty boy, slip between the quanta of my notice."

"We could go check the vats."

"We? I should let you near the vats?"

"Because, darling, you won't go check them yourself while leaving me free run of the ship."

The Confederate stood upright from her post at the doorway. "Could tie you up again, but too much bother. Put away your breakfast things and come with me, then, and we see what new surprise you prepare."

The protein vats were fully automatic and hermetically sealed. In them grew mounds of flesh cloned from highly regarded ancestors known as "esteemed cells." The judicious metering of flavorings and odorants imparted the likeness and

even the texture of poultry and pork, of fish and beef, of legume and root. Like begets like, chemists chanted, and so, fed upon wastes, the “mother” deep in the heart of each vessel enrobed itself in tissues like unto themselves, to be shaved off, harvested, pressed, pumped to the molder, and served.

The vat room was inboard of the Alfven drivers and forward of the impulse cage. The space was cramped and as cool as the cold well in the pantry. Despite the seals on the vats and on the conveyance hoses, odors slipped through the seams and teased the nose with the rich, earthy scent of potato and carrot, with the iron aroma of beef, with the dank stench of fish.

Beneath it all the sweetish smell of something else.

The ship’s architect had not supposed that pilots en route would have much reason to crawl around the vat room. Fresh bulk canisters were installed via external cargo doors at sutler stations and farmers’ markets in the high coopers. But neither was the room non-negotiable, since a pilot might need on occasion to refasten a hose or close a valve.

However, two people squeezing through the space was more than the architect had imagined. Olafsdottr eased matters a bit by reducing the strength of the gravity grids in the vat room by two-thirds, but she still crowded close behind him.

The stink grew worse behind the fish vat, and this was not due entirely to the faux-catfish accumulating inside it. Squeezing between it and the neighboring legume vat, Donovan spied one of the smuggler’s secret rooms, now wide

open and lit. He paused in his contemplation to consider what he might tell his captor.

KNOWLEDGE IS POWER, said the Pedant. KEEP SECRET WHAT WE KNOW.

On the other hand, said the Silky Voice, there are tactical benefits to knowing that your opponent knows what you know.

Ow, Silky! My head hurts.

“Fudir?” said Donovan. “What do you think?”

“It may need all of us together to get through this. That right, Sleuth?”

Some data are still lacking. Add the facts together and there is still a hole in the middle; but . . .

“Ja, but.” The Terran withdrew from his position and sat under Olafsdottr’s calculating gaze. “What is it, my sweet?” she said. “You can tell Ravn.”

Donovan turned to her. “Follow me,” he said, “but keep your eyes peeled for someone else. We’re not alone on this ship.”

“Ah. I had begun to wonder.”

There was a torque wrench clipped to the fish vat for use in turning valves. Olafsdottr said nothing while he unfastened it, and that silent acquiescence to his arming was the loudest thing the Confederate had said so far.

“This is a smuggler’s ship,” the Fudir said, “and it’s honeycombed with secret rooms, passages, and caches. When you hijacked it, the smuggler was aboard, drunk, in one of those

rooms. Probably this one. He was afraid to act alone—”

“A man of much wisdom, then.”

“So he solicited my help to retake the ship.”

“And, of coorse, you tendered it. Ooh. I knew you had been a nooty buoy. What befell, then, seeing I am still in charge?”

“He said he knew of a weapon aboard. Something the People of Foreganger were sending to assassinate the Molnar over a bit of piracy and massacre—”

Olafsdottr snorted. “The difference between the Cynthian pirates and the People’s Navy is a matter of the number and quality of the ships at their disposal. But say on.”

“I was supposed to distract you, and he would shoot you from behind.”

Donovan did not elaborate on that and waited to see how the Confederate would react.

Olafsdottr regarded him with the stillness of a serpent. The white of her eyes and teeth, so prominent against her coal-black skin, took on some of the seeming of ice. “So,” she said at last, and patted him on the cheek. “You are a good buoy, after all. When all is said and done, and the struggle is ended, I will personally escort you home and see that you are buried with all honor.” She gestured with her teaser. “Lead on.”

Much became clear when Donovan slipped behind the vats and entered the secret room. It was a small room, but contained a chair and table as well as an open safe. The Fudir thought it

might have been used as a sort of den by the smuggler, extra room in an otherwise cramped ship.

I thought the smell was familiar, said the Silky Voice. The Brute and Inner Child immediately assumed guardian positions, listening at the ears, watching through the corners of the eyes.

Rigardo-ji Edelwasser lay sprawled on his back on the floor, arms splayed, mouth agape and bloody, as if he had been punched in the teeth by an iron fist. The wall behind the chair was spattered with blood, and bone, and bits of brain. On the table before the chair stood open a standard bushel-sized shipping container, and beside it a beautifully carved wooden chest, also open.

The chest was Peacock orangewood, from which skilled knifework had brought out vines and fruits and other figures. The interior was lined with silk over shaped foam dunnage, but it was not clear from the shape what it had once held.

Olafsdottr had crowded into the room behind Donovan and, like him, made no move to cotton her nose against the smell. "How long has he lain here?" she asked.

"By the odor and bloating, the Pedant says, four days."

Olafsdottr nodded slowly. "And now you know why he did not appear at the ambush. A good thing, too, for I think he would have botched it."

Donovan turned and looked at her. "Why do you say that?"

She pointed to the empty box. "He came to get the weapon

and managed to kill himself with it. Such mishandling does not lend confidence.”

Donovan stared at the dead man, wondering if he had been uncharitable in his thoughts. Granted, the ambush site had been too well configured for killing both Olafsdottr and Donovan, but he had only the Sleuth’s deductions and Inner Child’s fears on that. “I don’t think it matters anymore.”

“But it does, my sweet; for where is the weapon that once sat in this wonderful box?”

Donovan had not been paying attention to the kill space, but the Sleuth and others had been.

He was sitting in the chair when he picked it up, said the Sleuth. It fell red upon his mishandling, and he jerked back, then slid forward, feet first. The weapon would have dropped to the floor and perhaps rolled a bit. There is not much room here for it to roll very far, yet there is no sign of it. Conclusion: the weapon is self-mobile. Based on the dunnage in which it nestled, it would be the size of a ruggerball—the ellipsoidal kind used on Hawthorne Rose.

Olafsdottr meanwhile had rolled the body aside, perhaps thinking the weapon underneath. What she found was a gaping wound in the back of the skull, as if that iron fist had punched its way out of the brain. “A bore hole through his head!” she said, bending over and looking through it. “Entry through the soft palate, up through the midbrain and the parietal lobe, and smashing out between the occipital and the parietal bones.

Alas, his speech center is destroyed, so he cannot tell us what happened.”

Donovan grunted.

The Shadow shrugged. “I would have liked to question him. What was this weapon that so badly backfired on him?”

“It was called the Frog Prince on the shipping manifest.”

Olafsdottr grinned. “Busy buoy! And what be the nature of this ‘Frog Prince’?”

“We’re not sure. But there are Terran legends,” he said. “It was to be a trap for the Molnar.” He looked again at the smuggler’s body and the piercing wound through his head. “If I were you, and I saw it hopping about, I wouldn’t try to kiss it.”

Rigardo-ji was stupid, he decided. Like many petty scramblers, he could think from point A to point B, but not beyond it to point C. He had read between the lines and believed Foreganger’s present to the Molnar was a weapon, vengeance for the massacre of the Merryv Starinu, but it had never occurred to the treacherous little beast that the weapon had been meant to kill its user.

“So,” said Olafsdottr. “Tis loose.” She looked about the room and went to the door to listen. Save for the normal susurrus and hum of the engines, the ship was quiet. The pork vat, out of sight of the doorway, hissed and a valve turned with a heavy clunk. The Confederate, already strained to hear sounds, jerked a little, though only a little, and her teaser moved fractionally. “But so long as we do not kiss this . . . Frog Prince .

. . we need not fear it?"

Donovan shook his head. "I would not hope so easily. It was designed to trick the Molnar into kissing it, but that trick would not have worked more than the once. It must have been designed, after the initial kiss, to seek out targets of opportunity in his stronghold—which I think to the People of Foreganger, that would mean anything on Cynthia that moved, man, woman, or child. It is the sort of boundless vengeance the People are famous for. Abyalon is more gently bred, and if word of this ever comes out, more than one national government there will fall. Meanwhile, we are in a pocket. We best back out and seal off the entry into the main part of the ship."

In the silence that followed, they heard the distant clang of a leaping object.

"It must listen for sounds of life," the Sleuth whispered through the scarred man's lips, "and then home in on them. Quick," added the Brute. "And quiet."

It was a measure of the Confederate's concern that she turned her back on Donovan to leave the hidden room, and he with his knuckles white around a wrench. It was a measure of his concern that he took no advantage. One swipe, he thought, and I will see my daughter, after all. And Bridget ban.

You would see them, said the young man in the chlamys, but could you look them in their eyes?

He slipped out of the room close behind the Confederate, and they moved cautiously from behind the fish vat, pausing to

listen at each step. They heard another spring, closer this time.

It must leap like a frog, the Sleuth deduced, maintaining the metaphor. A certain artist's pride informed the death-techs of Foreganger.

"If we can close the door on it, we may breathe easier," whispered Olafsdottr. "His Highness may bounce around the hidden passageways to his mechanical heart's delight, but so long as he is confined there, we need not fear him."

"At least until it finds its way accidentally into the open part of the ship."

She turned to look at Donovan. "You are the cheerful one. How?"

"It may not know from doors, but it might strike a jamb-plate by dumb luck. Unless you can deactivate... No? Ah, well, it's a small ship, but there are too many conduits, chambers, channels, cable runs, hollow spaces. And too many spaces, openings, gaps, apertures give access. Eventually, Froggie will find his way through."

A relief valve hissed and Donovan jerked, accidentally striking a standpipe with his wrench. The clang reverberated though the piping and, on its diminution, they heard the bounding sounds of the Frog Prince stop, then increase in frequency. It was no longer hunting a direction; it had found one. "Quick," he said, and pushed Olafsdottr on the rear.

They scrambled now, not bothering with silence. Donovan wondered if the Frog Prince would deduce from the sounds the

direction they were headed and cut them off.

Olafsdottr reached the door and pulled herself through. The gravity grids on the other side were set to normal, so she stumbled, and momentarily blocked the exit. For an instant, Donovan wondered if she would slam the door in his face to ensure her own safety.

But it had never been her intent to destroy Donovan. And that explained his own prior hesitations. Had she planned to kill him, he would have had no qualms about striking first. But her goal had been to deliver Donovan hale to Henrietta. That he was disinclined to go there, or that whatever befell afterward was bound to be hazardous, was not grounds enough to justify a cold-blooded killing.

Yer just outta practice, the Brute suggested.

“Hurry, sweet!” said Olafsdottr.

And Inner Child saw to the left his majesty, the Frog Prince.

A squat and ugly thing, like a toad, but gleaming of chrome, with great blue piston legs and adhesive grippers, large black-lens eyes, its deep blue, black-spotted façade gore-spattered with Rigardo-ji’s brains. It leapt atop a conduit three arm’s-lengths off facing the scarred man. Its mouth opened wide, and made a long, deep rippling sound.

The Silky Voice, from her seat in the hypothalamus, flooded the scarred man with adrenaline. Time itself seemed to slow.

Donovan knew that if he turned his back to run through the door, he would be a dead man. His only chance was to face it down. With a wrench. It won't fire a projectile, said the Sleuth. Trust me. And even the Sleuth's voice seemed sluggish and drawn out. It will need to leap closer.

As if on command, the Frog Prince leapt again, and landed on a primary lock valve. Its face bore the fatuous, evil smile of a frog. Once more, its lips opened wide, and inside its jaws, a coil of memory metal unwound and shot forth like a lance of steel. Yes, he heard the Sleuth say, I thought as much, The metaphor is complete.

Even under normal circumstances, the Brute had been trained to lightning-fast reflexes. With the boost the Silky Voice was providing, he could move faster still. He swung the wrench—as it seemed, through gelatin. The long, sharp tongue arced toward him.

The wrench connected, and knocked the reddened steel ribbon aside so that it penetrated like a nail into the side of the poultry vat. That's how it killed the smuggler. There had probably been an instruction: "Kiss to activate." Rigardo-ji had never had a chance. The steel ribbon would have uncoiled into his mouth and out the back of his head. Likely, he died without ever knowing he had died.

The memory metal remembered and recoiled to its rest state. The Frog Prince leapt, pulled along by its own tongue. When it landed, it would tug itself loose and take another lick.

Donovan turned to the door.

And Olafsdottr was crowding in, blocking his escape.

His cry emerged as high-pitched as a bat's, so far into overdrive was he. Olafsdottr brushed him aside with her right arm. The Frog's tongue lanced again. She seized the ribbon with her left hand, pushing it aside, as she had seized the flying shim during their workout, even as she fired the teaser with her right. She screamed.

"Serrated!" She released the tongue of steel, which with a lick swiped her across the side as it rewound.

But the teaser had found its target. A teaser fires a coherent electromagnetic pulse. At certain settings and focuses, it can play havoc with a man's nervous system. Other settings can fry electronic devices. The Frog Prince flashed and sparked as the induced currents ran along its body and internal circuitry. Its head turned toward Donovan. The mouth opened . . .

... and smoke came out.

The Brute threw the wrench and it spun into the frog's visual sensors, shattering them. But by then this was mere grace, for the bright blue of the Frog's body was fading with its power source. Donovan found the wrench and used it to beat the machine into scrap.

When Olafsdottr awoke, she was lying on a pallet in the infirmary. Both hands were encased in restoration gloves while regressed cells rebuilt the torn flesh and snapped bones. Her

side, where the tongue had swiped it, was likewise bandaged. To inhale sent a stabbing pain through her.

Donovan sat by the pallet reading a book screen. He looked up when she moved.

“Rib?” she said.

He nodded. “Two. And a deep laceration. What possessed you to grab the tongue like that?”

“I thought only to knock it aside. I did not expect a saw blade.” She raised the two gloves. “My hands?”

“The left one was badly sliced up. You must have grabbed at it with your right after you dropped the teaser.”

“I promised Gidula I would deliver you in one piece to Henrietta. Could not let Froggie punch holes through you.” She took another experimental breath. “I must praise your medical skills, sweet.”

“The meshinospida I did all the work. I just zipped you in the basket and followed the instructions. The automatics took cell samples, regressed them, and applied them in the proper course.”

“Ooh, but you had noo obligation to deliver me whole. Or to deliver me at all. Foortunate, then . . .”

Donovan shrugged, studied his hands. “Look,” he said, “can we drop the Alabaster accent? We’re past that, I think.”

“Fortunate, then,” she said more quietly, “that you spied the Frog Prince in time, or we would both be dead.”

“Inner Child is paranoid. Makes a good sentry.”

Olafsdottr sighed. “It must be a wonderful thing to divide your attentions that way. I was told it had incapacitated you.”

“It does have its drawbacks sometimes.”

“How do you plan to explain the corpse to the Megranomese authorities?” she asked. “Or how you came by this ship?”

“It was his ship. He was giving us a ride. This thing broke out of its box. Missy, if between the two of us we can’t concoct a story to fool a Megranomic copper, we should both of us quit the Long Game.”

Olafsdottr cocked her head sideways. “I thought you had quit.”

“You know what I mean.”

“Almost, you tempt me, sweet. But I am unaccustomed to asking for help.”

Donovan grinned. “I’ve had practice. I’ll teach you.”

The answering smile was almost sad. “Sweet, between the two of us, we defeated a Foreganger killing machine. Tell me you are not the man we need for the struggle.”

Donovan sat back so that his head rested upon the wall of the little galley. He closed his eyes and his breath slowly gusted from him. “I’m not the man you need.”

“Sorry I am to hear that, for it would have been entertaining to watch developments. How long before we reach the

Megranome way station?”

The scarred man shrugged. “The ’o spidal had you in suspension for five days. We’re out of Megranome space.”

“Ah. You take me direct to Dangchao, then. Perhaps Bridget ban keep me in clean cage.”

Donovan rose, wiped his palms on his trousers. “You sleep now, ‘sweet.’ Your hands are too badly cut up to pilot the ship. I don’t have a certificate myself, except as a chartsman; but every chartsman is a pilot in training, and certificates are only for officials. We’ll be on the Tightrope in another two days.”

Olafsdottr struggled to sit up, winced at the pain, and slid back prone. “On the Tightrope?”

The scarred man, at the infirmary door, shrugged. “And don’t ask us why, because there’s not a single one of us knows the answer.”

(EDITOR’S NOTE: The scarred man appeared earlier in “On Rickety Thistlewaite” [January/February 2010].)

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Other Earths in Space and Time

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Right now, we don't know of any other Earths, but we will soon. Worlds only slightly more massive than Earth have already been detected, and smaller planets will soon be found, orbs the size of Earth with similar temperatures and atmospheres. In the meantime, it is useful to consider what kind of...

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Other Earths in Space and Time

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Right now, we don't know of any other Earths, but we will soon. Worlds only slightly more massive than Earth have already been detected, and smaller planets will soon be found, orbs the size of Earth with similar temperatures and atmospheres. In the meantime, it is useful to consider what kind of places these other Earths could be, partly out of sheer scientific curiosity but also for more practical reasons. A clearer definition of the characteristics of Earth-like worlds will better enable them to be detected, as it would help astronomers narrow down the stellar systems where they should search for them. This is important, as the number of potential stellar systems to be examined is very large. Even if we confine ourselves to the relatively small region within 100 parsecs of the Sun, in this volume of the galaxy there are still about 40,000 Sun-like G stars, as well as several hundred thousand fainter stars that could host an Earth-like planet under certain circumstances. This is a lot of territory by anyone's standards, and the quicker it can be explored, the better.

Of course, the term "Earth-like planet" is almost a misnomer. Here, we restrict the discussion to planets with approximately the same amount of incident solar radiation as Earth, planets within the so-called habitable zone. Outside of the habitable zone, there are certain to be plenty of Earth-sized

planets, as the recent discovery of super-hot super-Earths has shown. But despite the huge number of possible planets even in the nearby part of the galaxy, we will probably not find a very close equivalent to the Earth for some time, because the number of variables that can modify or restrict planetary habitability is just too great. And even the term “habitable” means different things, depending on its application.

One definition would require an evaluation of a planet on the basis of the level of technology required to maintain human life on its surface. For instance, Earth is people-friendly, with a large portion of its surface having temperatures that do not depart too far from the human optimum of 22°C (72°F). It also possesses an eminently breathable atmosphere at sea level. Remove the oxygen from the atmosphere and Earth would still be relatively friendly, but we would need oxygen masks to survive and so the planet would be less habitable for humans. Many microbes, though, wouldn't notice the difference.

Increase the rate of incoming meteor strike by a factor of 1000 and impacts big enough to take out a city would occur 10 times a year, and unless the planet were surrounded by a very effective anti-asteroid system, it would probably be too risky for humans to consider living there. Increase the average temperature by 40°C and the planet would be impossibly warm for humans and survivable conditions could only be maintained by significant energy expenditure on climate-controlled living spaces. Some organisms, though, would love the extra warmth.

There will be lots of planets that are Earth-sized, but if we

are talking about planets with breathable atmospheres and equable temperatures, worlds that are free from nasty problems like frequent multi-megaton asteroid strikes, these will be a very low percentage of the total—although there will still be many of them because there are just so darned many stars.

Oddly enough, we are reasonably confident that all of the types of Earth-type worlds mentioned in the preceding paragraphs actually exist today. This is because they have existed already, on Earth itself, billions of years ago. An argument is often made that because we only have one known example of an “Earth-like” planet, it is impossible to generalize about what other Earth-type worlds might be like, as this would be like trying to make conclusions about urban life in the U.S. by studying, say, Carmel or Santa Barbara. But we already have before us the example of Earth and its wildly different habitability conditions over geologic time. We can also study the other planets of the solar system, where many of the geological and meteorological processes known on Earth also operate. For instance, on Mars there are glaciers, landslides, gullies, fog and frozen seas, just like on Earth. True, Mars is currently much less habitable than Earth, but there is plenty of evidence to suggest that billions of years ago, Mars was warmer, wetter, had a thicker atmosphere, and was considerably more habitable than it is today. By examining the evolution of the terrestrial planets in our system, including that of Earth, we can learn a lot about the kinds of planets we are likely to find in other systems.

Previous Earths

Like Mars, Earth's habitability has varied. It has been both slightly more habitable and much less habitable in the past than it is today. Thus there is nothing typical about Earth's current habitability. In fact, it would be easier to argue that Earth's current conditions are anomalous. At present, there are large polar ice caps, and this situation is not usual in the past few hundred million years. In addition, we are currently undergoing large climatic oscillations—Ice Ages—that only began in earnest about three million years ago. About 100 million years ago, the planet was more habitable for human beings than it is today. There were no large areas of permanent ice, the polar regions had genuine summers, and the atmosphere was just as breathable as it is today. But for most of its geologic history, Earth has been less welcoming: about 700 million years ago, it almost froze over completely, while two billion years ago the atmosphere was unbreathable, and conditions were even worse earlier than that. This is relevant to the discovery of other Earths because other solar systems will have different ages. Also, because we believe the processes that form solar systems operate in a similar fashion throughout the galaxy, the evolution of other Earths will be analogous in many respects to that of our own Earth. Thus we can learn about the kinds of worlds we are likely to encounter in our part of the galaxy from the type of world that Earth has been in the past, and the kind of world that it is likely to be in the future.

The human habitability of the early Earth at the time of its

formation was very poor. The formation of Earth from rocks of various sizes was largely complete by 4.54 billion years ago. This date is reasonably precise, as it has been determined by analyzing the decay rates of radioactive rocks. Some tens of millions of years later, a catastrophe occurred that appears to have been a blessing in disguise. Many readers will know that at that time a Mars-sized world gave the Earth a glancing blow, almost but not quite smashing our planet to bits. Some of the resulting debris stayed in orbit around the Earth and became the Moon. Now such collisions may occur in other systems, although not always with the same outcome. Other probable outcomes include both planets being so smashed up that they can never reassemble themselves again, thus creating an asteroid belt instead of the Earth-Moon system. Alternatively, both planets could be blown apart but eventually one of them could accrete again, creating a large Moon-like world from the burnt debris. Then again, the blow could be so glancing that not enough mass was tossed off to create a large satellite at all, but instead a short-lived ring system was created around the larger world. Or, even more likely, such a collision would never have happened at all, leaving an Earth-like world without a large satellite. The result is that many Earth-type worlds could have small or no satellites. We are lucky that we have a large satellite, as it helps stabilize the axial inclination of the Earth, which would otherwise oscillate towards large values every few million years. Earth's current axial inclination of about 23.5° gives substantial seasonal variations in most parts of the planet. Larger values would cause more extreme seasons.

Such temperature variations would not be fatal to the development of complex life, but they would certainly be unpleasant for humans, and thus the planet would be less habitable.

Unfortunately, observational work by Nadya Gorlova and colleagues has suggested that double planets like the Earth-Moon system are not very common. They examined numerous young stellar systems to see if they exhibited any telltale excess infrared emission caused by large amounts of dust of the type that would be generated by a catastrophic collision of the kind that formed the Moon. They found very few, suggesting that considerably less than 10 percent of Earth-like planets would have satellites like the Moon. More recent work suggests that this fraction could easily be as low as one in a hundred.

Leaving aside the minor issue of the near-destruction of our planet early in its life, the environment of our world at the time of the formation of the Moon was anything but pleasant. For the first 150 million years of its existence, Earth was hell, and in fact this period lies within the so-called Hadean era. While geological records from the Hadean era are sparse, it is clear that the early Earth was much hotter than it is today, possibly several hundred degrees hotter. Monster volcanoes belched gases and huge debris fell from the sky, the junk left over from the formation of the solar system. Quite a few extrasolar Earths will be in this stage of their development today. There is even a nearby system that is a prime candidate to host such a planet: Epsilon Eridani, only five parsecs distant,

a star slightly smaller than the Sun and one that has featured widely in speculative fiction. It is a young star with an age of less than one billion years, and its system has about 1000 times as much dust in it as in our own solar system today—in this context, “dust” can mean anything in size from actual dust to asteroids. In fact, planets have been identified in this system solely on the basis of the gaps they create in the dust as they sweep out their orbits. So any Earth-type planets in this system are likely to be undergoing a fierce bombardment that is incompatible with habitability, just like Earth in the early years of its existence. For this reason, it is unlikely that the Epsilon Eridani system is still a high priority for future searches designed to detect signs of life.

After a few hundred million years of Earth's existence, the number of impacts dramatically reduced. The surface temperature dropped below the boiling point of water and the steam ocean surrounding the Earth condensed into a water ocean, although a very hot one: there is good evidence to suggest that ocean temperatures were up to 40°C (70°F) higher than today as late as 3.5 billion years ago. Just after the ocean condensed on Earth, dry land was hard to find, as the continents had not yet formed. The presence of an ocean on Earth-type worlds cannot be taken for granted: simulations of planetary formation suggest that the amount of water on an Earthlike planet is very variable, depending largely on the number of icy asteroids and comets that were slung closer to the Sun and were swallowed up by the forming Earth. Given a

different arrangement of planets, a likely alternative outcome would be a water world, a planet whose surface consists entirely of water. This would be a fine location for sea life if the water were at a reasonable temperature, but it would be a below-average habitat for human beings, even for the most avid sailor. The recently-discovered hot super-Earth GJ1214b is of this kind. At the other extreme, there will likely be some worlds with less than one thousandth of the total amount of water on Earth, genuine desert worlds with occasional oases where scarce subterranean water bubbles to the surface. We don't know for sure whether it is possible for such dry worlds to have breathable atmospheres or not, but given the obvious links between water, life, and oxygen, life is bound to be less abundant on dry worlds than on water-rich ones, dooming desert Earths to the slow lane of evolution.

On Earth, shortly after the formation of the hot ocean, it is believed that the first life forms developed. The relative promptness of this event, occurring almost as soon as conditions permitted, implies that it is likely to occur on other Earths as well. Of course, we don't know this for sure. An enormous boost to this argument would occur if life were discovered on Mars, that is, life that is clearly indigenous to Mars and not simply Earth life that had hitched a ride on a meteorite blasted off Earth's surface billions of years ago. In making general inferences from the single example of the origin of life that we have, we are almost in the position of those Carmel-based urban sociologists that I mentioned before.

While the Hadean Earth was by now at least not entirely inhospitable, it wasn't out of the woods yet. About 3.8 billion years ago, the asteroid bombardment rate suddenly increased, as indicated by the cratering rates observed on the Moon and other bodies of the solar system. This late heavy bombardment (LHB) may have been caused by a gravitational instability in the orbits of the outer planets that caused them to migrate in their orbits and start tossing surrounding asteroids in all directions. The LHB caused havoc but some evidence suggests that life may have survived it without having to start again from scratch. On other Earths, though, there is no guarantee that life would survive LHB events, as these could easily be more extreme than Earth's was, nor even that LHB events would be confined to the early period of the evolution of the planet, as the timing of the onset of orbital instability depends on the size and arrangement of the planets and so would be different in every system.

There is even observational evidence of this. In September 2008, astronomers determined that the star BD+20 307, located in Aries some 100 parsecs away and previously known to be surrounded by a million times more dust than the Sun, is actually binary and several billion years old. This means that the dust is not from the formation of the system but more likely from a recent catastrophic collision between two terrestrial planets. This is an extreme version of an LHB, one that caused planetary orbits to become so unstable that a collision occurred between two large worlds, destroying everything on them

including any advanced life that happened to have developed. Based on the limited statistics that we have, though, only a small fraction of Earth-like planets are likely to be in systems currently undergoing an LHB event.

After our own LHB event finished about 3.8 billion years ago, the bombardment rate dropped again. At this point, the evolution of Earth-like planets can begin to follow very different paths. On Earth, large pieces of its crust, known as plates, float around from place to place, so much so that only 200 million years ago the arrangement of the continents was completely different. This continental drift (or “plate tectonics” as it is more correctly known) also has important effects on the evolution of planetary habitability. Not all terrestrial planets have it; in fact, Earth may be the only one in our solar system, and just because a planet was able to develop the right conditions for plate tectonics at some time in its history, this does not imply that this process would continue indefinitely.

A cessation of plate tectonics on an Earth-type world would have profound implications for its habitability. It is believed that plate tectonics plays a major role in modifying the atmosphere of an Earth-type planet. The early Earth seems to have had much more carbon dioxide in its atmosphere than today's Earth, and it is thought that one of the main mechanisms for the gradual reduction of that carbon dioxide concentration over time was the reaction of the gas with rocks to form carbonates, which were then dragged down underneath the plates as they slid against each other. Without plate tectonics, this process

would operate inefficiently and thus the planet would be more likely to retain large amounts of carbon dioxide, a greenhouse gas, in its atmosphere, thus making it a lot warmer due to a greatly enhanced greenhouse effect. Also, a planet with a smaller inventory of radioactive materials within it than the Earth would have a less molten core and a thicker crust. This would also inhibit plate tectonics, thus leading to a very different outcome for the evolution of the planet.

But the Earth was lucky. Plate tectonics commenced, continents formed, and the rocks started absorbing the large concentrations of carbon dioxide in the atmosphere that was one of the main factors keeping the Earth hot. The Earth changed from a Hadean world to an Archean planet. The ocean gradually cooled, life multiplied, and the oxygen content of the atmosphere gradually rose. There will be many extrasolar Archean worlds: warm to hot watery, stormy planets with unbreathable atmospheres and hosting the simple organisms that will later change these worlds forever.

About 2.4 billion years ago, there was a sudden spike in the oxygen concentration in Earth's atmosphere, from practically nothing to about 0.5% of today's levels. This was caused by the rate of oxygen production by organisms finally being large enough to overcome its removal by chemical reactions associated with volcanic eruptions. The atmosphere was still unbreathable, as an oxygen content of 0.5% at the surface is only about as much as occurs in our current atmosphere at a height of about 30 km (90,000 feet). The

ongoing reduction in atmospheric carbon dioxide content had significant implications for Earth's climate: a couple of hundred million years later, there is the first evidence of widespread ice sheet formation on the surface of the Earth. The planet was suddenly colder and the huge amounts of atmospheric carbon dioxide deposited into the crust during this time in the form of limestone and other rocks bear witness to this process.

As a result, there will be some other Earths that are colder, and a few that will be completely frozen over. We know this because Earth only narrowly avoided this fate itself. The continual removal of carbon dioxide from the atmosphere eventually caused the natural greenhouse effect of the Earth to become so feeble that about 750 million years ago large glaciers advanced all over the globe, initiating what is now widely known as Snowball Earth. This giant Ice Age lasted until volcanic eruptions gradually built up the carbon dioxide concentration of the atmosphere to the point where the temperature rose high enough for the planet to escape from the clutches of the snow and ice, a process that took perhaps 20-30 million years. This cycle of freezing and thawing may have happened several times. Not all extrasolar planets will have been so fortunate: for planets with low rates of volcanic activity, once in a snowball state, some of them would have stayed there.

But there have also been times when the Earth was more habitable than it is today. During most of the Cretaceous period (144-65 million years ago), there was no permanent land ice at

sea level, the climate was several degrees warmer than it is today, and the atmosphere was breathable by human beings. A significant number of Earth-like worlds will be like this or warmer. Indeed, it is easy to argue that these warm worlds will be more abundant than worlds similar to Earth that have large ice sheets in a number of locations. Earth has only had large ice sheets for about the last 30 million years, a much shorter period than it has been ice-free.

Future Earths

Most accounts of planetary evolution cease at this point, having reached the present day. But Earth will continue to evolve into the future, and many Earth-like worlds will be older than Earth. Based on our understanding of geology and of stellar evolution, we have some idea how our planet is likely to continue to evolve. One major wrinkle is that the technological civilization on our planet has now evolved to the point where it is capable of modifying the general habitability of the planet in a number of ways. Particularly relevant here is the artificial increase in the size of the greenhouse effect, most likely caused by the burning of fossil fuels. In addition to warming the Earth, this could change its habitability characteristics in other fundamental ways. While Earth is currently undergoing ice ages every 150,000 years or so, it would not do so if the greenhouse effect were larger. Calculations suggest that once greenhouse gas concentrations rise above values similar to those predicted for the end of the twenty-first century, the initiation of ice ages will become impossible because Arctic summers will never

become cool enough for ice to start to accumulate on the adjacent land regions, the main initiating mechanism for an Ice Age. But this suppression of ice formation may well be a very temporary effect, as when alternative energy sources are employed on a large scale, the concentration of carbon dioxide in the atmosphere will begin to fall again. Man's ingenuity is practically limitless in this regard.

In any event, though, whatever changes to the climate are made by man, these are rapid processes when compared to the future evolution of the habitability of the Earth, which will take place over billions of years. This evolution will be governed by two competing phenomena: a general increase in temperature caused by the increasing brightness of the Sun, and a decrease in carbon dioxide concentration caused by increased absorption of carbon dioxide by surface minerals, due to increased weathering caused by higher temperatures. Mostly, though, the Sun will win this competition. By about one billion years from now, the Sun will about be 10% brighter, giving average global temperatures of 50°C (122°F) or so, thus rendering the Earth effectively uninhabitable by humans, except perhaps in isolated mountain areas in the polar regions. At this temperature, there will be a huge increase in the amount of water vapor in the stratosphere, where water molecules are easily broken apart by ultraviolet radiation into oxygen and hydrogen. The hydrogen will then escape, leading to a gradual decrease in the water content of the planet. Estimates vary but by between one and two billion years into the future, the oceans

will be gone and the Earth will be a dry, hot wasteland, full of fossils. There will be many extrasolar Earths like this.

But of course the evolution of the Earth is not finished. Eventually, the Sun will turn into a red giant, and then the news is not good. Recent results suggest that the Earth will not survive this phase of its life: it will be close enough to the Sun for its orbit to experience enough drag from the outer layers of the Sun's atmosphere, causing it to spiral inwards towards certain extinction. It is possible that not even Mars will escape this fate.

Typical Earths

So, based upon the evolution of the Earth itself, what is a "typical" Earth-like planet like? The short answer, of course, is that there isn't one. Each one will be different in some way, although scientists in the future may find ways of classifying them that can identify similarities between them. Here, we have defined an "Earth-like" world based on the relative human habitability of such a planet: in other words, how much adaptation would be required so that human beings could survive and live there. With sufficient technology, most worlds can be made habitable in a very small region, but the amount of technology required varies greatly. At the most favorable extreme on Earth, say on Maui for instance, all that is required is some light clothing and shelter, some edible plants and a knowledge of agricultural techniques. In Antarctica, to be self-sufficient would be considerably more difficult, requiring protective clothing and insulated buildings, greenhouses growing food using artificial lighting, and a power source. On

Mars, these buildings would have to be airtight also, and because the thin atmosphere of Mars provides little protection against cosmic rays, living spaces should also be buried beneath a couple of meters of soil. Clearly, these living conditions are not “Earth-like.” So “Earth-like” worlds should satisfy certain minimum human habitability requirements: a climate that is not extreme, an atmosphere that is breathable for an indefinite period of time, a meteorite infall rate that is not excessive, and so on.

Naturally, the differences between the habitability and climate of Earth-like planets, large though they will be, will pale into insignificance compared with the differences in their ecosystems. Ecosystems, being more complicated than planets, may be practically unique. But no matter how strange these worlds are, every one of them will contain something familiar, something reminiscent of Earth: clouds and storms, ocean and beaches, rivers and streams, mountains and valleys, and on a few, some fresh air that will remind us of home.

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Short Stories

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A Snitch in Time

Donald Moffitt

The station house was quiet at that hour. A gray dawn was just beginning to creep around the edges of the window shades, but otherwise the only light in the room came from the goose-necked desk lamp that was casting a yellow pool of illumination on the case file in front of him. Lieutenant Francis...

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David W. Goldman

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A Snitch in Time

Time travel, even with limitations, could be very useful in law enforcement. Or could it?

Donald Moffitt

The station house was quiet at that hour. A gray dawn was just beginning to creep around the edges of the window shades, but otherwise the only light in the room came from the goose-necked desk lamp that was casting a yellow pool of illumination on the case file in front of him.

Lieutenant Francis Patrick Delehanty drained the last cold dregs of his coffee and tossed the paper cup in his wastebasket to join its fourteen predecessors. He lit another stale cigarette, crumpled the empty pack, and stared wearily at the case file.

There wasn't much in it. Most of the evidence had disappeared thirty years ago. The doorknob rattled and the night duty officer, an old cop named Flaherty, poked his head in. "Morning, Lieutenant. You're kinda early, ain'tcha? The morning shift isn't due till..."

He stopped as he saw all the old yellowing reports spread out across the desk. "You pulled another all-nighter, didn't you, Lieutenant?" he said reprovingly.

"My retirement's only ten days away," Delehanty said. "I promised myself I'd get the bastard before I left."

"The Roast Beef Slasher?"

"Don't call him that!" Delehanty said sharply. Then, at the hurt look on Flaherty's face, "Sorry, Tim. I guess I'm just edgy."

"Give it up, Lieutenant. They ain't caught the guy in the last thirty years, they ain't gonna catch him in the next ten days. Leave it to one of the young hot shots. Maybe something'll come in that'll reopen the file. Take up golf. Go fishing. Enjoy your retirement."

"Not while that bastard is still walking around, laughing at us! The cold case squad worked on it for ten years, before the department told them to drop it. The rest of the caseload was suffering, the chief said. It was affecting the homicide clearance rate. Too much time was being wasted on a case that was going nowhere."

Flaherty said placatingly, "You could take the crime book home with you. A lot of retired cops do that with an old inactive file that bugs them. You know, make it a kind of hobby, keep you occupied."

Delehanty slammed a fist down on the desk, making Flaherty jump. "Hobby is it? The hell with that! I'm going to nail the son of a bitch while I'm still a cop!"

The deputy prosecutor's name was Jarrett. He was a neat, contained man in his forties with an advanced case of male pattern baldness and a crop of blue stubble starting to show

through what was probably his second shave of the day. Delehanty had done business with him before. They were on pretty good terms.

"I'm not asking for your blessing," Delehanty said. "I'm just sort of, you know, sounding you out to get the lay of the land."

Jarrett pursed thin lips. "It could be complicated," he said. "There's connection of evidence. That's different from connection of inference. There's all sorts of time-travel laws. There's your own liability in two different jurisdictions in two different realities. Why don't you tell me what exactly we're talking about?"

"Listen, you remember the slasher case from about thirty years ago involving an assistant D. A. named Vaccaro?"

Jarrett thought a moment. "It was before my time, but yeah."

"The press called him the Roast Beef Slasher. Forensics determined that the weapon in the Vaccaro murder and the related cases was something like a serrated steak knife with a two-pronged tip. His signature was a slice of roast beef left at the scene. To top it off, DNA analysis showed bovine blood mixed in with the victim's, like the knife hadn't been cleaned. Vaccaro was working at his desk, pulling an all-nighter, when he was killed. He was on to something, and the killer knew it. Unfortunately, Vaccaro'd been blabbing to the press. He had something that would nail one of the suspects, but he wouldn't say what it was, even to the detectives working the case—said he'd tell them when he was ready for them to make an arrest.

But he never got to tell them. Whatever it was, it was in the murder book, and half of that was ripped out, including all the interview transcripts.”

“What’s your interest in this, Lieutenant? Thirty years ago you would hardly have been a member of the homicide squad working the case.”

Delehanty nodded. “I was just a rookie patrolman. But I was the one who walked in on the murder scene. I’ll never forget it. There was blood everywhere. I sounded the alarm and they searched the building. But the killer was gone. With the transcript of his own interrogation. He must’ve slipped up somehow, and Vaccaro stumbled onto some contradiction in his alibi.”

“So Vaccaro had a suspect?”

Delehanty clamped his jaw tight. “That’s what they said. I sweat bullets to make the detective squad. It took me four years. Another two years to make lead investigator. I reworked all the interviews. But nada. At that point nothing would have worked but an eyewitness. I needed a snitch.”

Jarrett shook his head. “And now, after all these years, you propose to be your own snitch?”

“That’s all I’ve got,” Delehanty growled. “It’ll work. Look, we’ve got a T.O.D. I pop up just before. I’ll give myself a safety margin, okay? I’m wired for sound. I’m wired for sight—three or four little mini-cams stuck to the buttons on my uniform. I catch him in the act, just as he’s raising the knife. I’m an eyewitness,

and I've got video backup that even a defense attorney from hell couldn't refute."

Jarrett made a tent out of his fingertips. "Time travel's expensive, Lieutenant. The department's not going to go for it by a long shot. It would open a huge can of worms."

Delehanty knew he was losing him. "I'll pay for it myself," he said stubbornly. "I've got my retirement savings. And my pension."

"You could lose both if this blows up. Can you afford that?"

"It won't blow up."

Jarrett leaned forward. "Have you thought this through, Lieutenant? You see a murder in progress. You're a cop. Do you try to stop it? But you're not a cop in that timeline, are you? Your lieutenant's badge is no good there. Are you acting extra-legally? The only badge around belongs to a rookie cop named Delehanty who doesn't have a clue about what's going down. And what if you don't try to stop it? Are you culpable? In that timeline or this one?"

Delehanty tried to speak, but Jarrett went on relentlessly.

"And then what? Say you do stop the murder. You come back to the here and now as a witness to a murder attempt that took place elsewhere."

Delehanty stood up, his face turning livid. "You can go to hell, Jarrett!" he said.

The client waiting room at Alternatives Associates was

small, spare, and brightly lit. There was a low coffee table displaying an assortment of the latest magazines, and an antique oak sideboard bearing a steaming coffeepot and a tray of pastries.

Delehanty had been sitting there for over an hour, his temper steadily rising. The tech assigned to him, a tall, skinny fellow with a prominent Adam's apple who had introduced himself as Roy Hendricks, had popped in several times to offer apologies and explanations in an incomprehensible geek patois with phrases like "O-region" and "CTC harmonic."

He shifted uncomfortably on the couch. He was wearing the parade uniform that he trotted out every now and then for public events, and it had grown a little tight over the years. The tiny cameras that festooned his chest were almost invisible unless you looked closely at the buttons. His service pistol, a 9mm Glock, was in a holster at his hip, and he had a tiny Beretta backup gun concealed in one sock. He wished he had a cigarette, but people didn't do that anymore.

He looked up as the door opened and Hendricks stuck his head in, a self-satisfied expression on his face. "We've got the CTC tunnel anchored at the destination site," he said. "It's just about where you want it. We can activate the site and put you through any time you're ready."

Delehanty got to his feet. "What do you mean, 'just about?'" he rumbled dangerously.

"We got lucky. Within a minute or two of where you wanted.

“I thought you fellows could scan back and forth till you pinpointed it,” Delehanty said.

“Uh, that’s not exactly the way it works,” Hendricks said. “Particularly with trips to the more recent past. It’s a little hard to explain in layman’s terms.”

Delehanty held on to his temper. “You’d better show me,” he said.

Hendricks led the way to a yawning space that once might have been an auditorium for corporate sales meetings. The slightly sloping floor was dotted with workstations manned, or rather womaned, by green-smocked technicians tending consoles. One long wall was crowded with oversize monitor screens, most of them blank or showing only flickering colors. At spaced intervals was a row of enclosed booths connected to heavy-duty cables. Half-way down the hall Delehanty could see a man in a Roman centurion’s costume, complete with helmet, sword, and shield, being ushered into a booth by a technician. He was surrounded by a covey of handlers who were seeing him off, competing to give him last-minute instructions.

“The Crucifixion’s a popular site,” Hendricks explained.

He led Delehanty over to one of the nearer booths. The monitor screen behind it showed a horrifying scene, frozen in time.

Delehanty’s heart stopped. The scene was familiar, yet not familiar. It was Vaccaro’s off ice as he had seen it that night

thirty years ago. But Vaccaro was not yet the bloody corpse he had walked in on. He was sitting behind his desk, partially obscured by the huge man in the disposable plastic raincoat who was pinning him against his chair with one hand and positioning the other hand, the one with the knife in it, sideways to slash him across the throat. The raincoat evidently was what he used for his splatter suit.

“That’s cutting it too close,” Delehanty said. “I need another ten, fifteen seconds to stop him, yell a warning, tackle him if I have to.”

“That’s what I was trying to tell you. The next resonance point isn’t till four days earlier.”

“That’s no good. I need to catch him in the act.”

“What about four days later?” Hendricks said helpfully. “I’ve got another harmonic of the fundamental then that might work.”

Delehanty didn’t know what he was talking about, but he could understand the “four days later.”

Almost, he was tempted, but he shook it off. He remembered the ambiguous interview with Jarrett. “Forget it. Even if I could track the guy down four days later, cold trail and all, the evidence would be even more tainted than simple chain of evidence from a split-off reality. Vaccaro’s dead in this timeline. I’m not going to leave a corpse in that one.”

“I’m trying to explain . . .”

“Try harder.”

Hendricks took a deep breath. "Do you know anything about music, Lieutenant?"

"What's that got to do with anything?"

"Just bear with me." The tech's tone was condescending, and Delehanty held his resentment in check.

He considered the question. "I tried out for trumpet in my high school band. I wasn't any good at it."

"But you knew what the valves were for?"

"I guess. Where is this going?"

"I'll try an analogy. Once upon a time brass instruments didn't have valves. You could only play the harmonics of the fundamental, whatever that happened to be. There were F horns, E flat horns, and so forth. Down at the bottom of the scale, the notes you could play were far apart. A low F, say, then the C a fifth above, then nothing but another F an octave above the original. But as you get higher in the scale, the notes get closer and closer together. When you get to the upper register, you've got something close to a diatonic scale, with only a few missing notes. Even so, if a composer wanted a horn solo or harmonies that were outside the box, he might score the piece for two pairs of horns, say one pair in F and one pair in E flat. That way they could toss the tune between them. Do you follow me so far?"

"Sort of." That wasn't quite true, but Delehanty wanted Hendricks to get to the point.

"There was also something called a crook, a lengthening piece that the player could insert to change the key of the horn itself, but we don't need to go into that."

"Praise all the saints," Delehanty muttered, rolling his eyes ceilingward, but Hendricks never noticed, and sailed blithely on.

"The point I'm trying to make is that there's an analogous phenomenon in time travel. We can't travel to the very near past—say a year or two—at all. We don't know why. Perhaps the quantum tunneling would get too crowded. Perhaps the Universe would have trouble with causality and would be unable to split. Thirty years is beginning to be within the practical limit. A hundred years is even better. Two hundred is better still. By the time you get to two thousand—" He nodded toward the centurion, who was waving good-bye to his friends. "—there's no problem at all."

Delehanty was starting to get interested in spite of himself. He could imagine the chaos that would ensue if there were thousands of people clamoring to go back in time a day or a week to play the stock market, or a year or two to repair a romance or reverse a bad business decision, not understanding that the benefits would go, not to them, but to an alternate self in an alternate universe that they themselves had created just by going back in time.

"I guess," he said slowly, "this resonance gizmo is a good thing. Like what the case load in police work would turn into if every petty burglary, every stolen car, could be investigated by

going back a day to verify the complaint. The whole system would break down.”

Hendricks nodded approvingly. “You’ve got it, Lieutenant. It’s amazing, the number of supposedly intelligent people who don’t get it. Just the other day I had the CEO of a banking conglomerate come in, wanting to reverse a decision he’d made the day before. I couldn’t make him understand that in this world he was stuck with his decision. He probably wouldn’t have been able to reverse it in his alternative world either. His previous self would probably get him arrested as an imposter.”

Delehanty’s eyes went to the suspended image on the wall monitor. Maybe he’d have enough time if he moved fast. He’d materialize just behind the killer. The knife was still poised, its deadly arc not yet begun. The man would be startled by his sudden appearance. He’d begin to turn around. Maybe he’d be able to snap the cuffs on him before he realized what was happening.

He turned to Hendricks. “Okay, Roy,” he said. “Ship me to the past.”

It was hot and stuffy in the booth, and he fidgeted while Hendricks fiddled interminably with a hand-held keyboard. He loosened the Glock in its holster, unclipped the handcuffs from his belt, and planned his moves. Finally Hendricks gave him a thumbs up through the glass and stabbed theatrically at the keys.

It still caught him by surprise. Suddenly he was in the

picture he'd just been staring at. A slight difference in floor levels made him stumble. The puff of warm air must have warned the killer. Impossibly quick for his bulk, the man in the plastic raincoat whirled around and lunged just as Delehanty was yelling, "Freeze!"

He swung the heavy handcuffs left-handed and rapped the man across the knuckles to deflect the knife. The momentum of the thrust carried the knife sideways to swipe Delehanty's other hand, making him drop the gun.

Then the man, still charging, slammed bodily into Delehanty and knocked him to the floor. Delehanty found himself helpless on his back, the Glock out of reach, while his assailant drew back the serrated blade for a slash across the throat.

Blindly, he reached for the backup gun hidden in his sock. It was a tiny Beretta, smaller than the palm of his hand, but it packed a .25 caliber wallop. He had taken it from a drug dealer years ago—or rather years from now—but he had never used it before. His hand was slippery with his own blood, but he managed to clamp his fingers convulsively around the grip and get a thick finger through the trigger guard. There wasn't time to aim. He swung the pistol up and snapped off three quick shots in succession.

The man toppled in slow motion, pinning him down with dead weight. The knife clattered to the floor. Delehanty waited for a moment, getting his breath back, then rolled the body off

him and struggled shakily to his feet.

Behind the desk, Vaccaro was staring at him, his eyes huge in an ashen face. "Is he . . ."

"As a doornail," Delehanty said. "You're a very lucky man, Mr. Vaccaro."

"Is it . . ."

"The Roast Beef Slasher," Delehanty said. "None other."

His hand was dripping blood and hurt like hell, but all the fingers seemed to be working all right.

Vaccaro was getting his composure back. His eyes took in Delehanty's uniform and badge. Uniforms hadn't changed much in thirty years, but the badge number might not have made sense.

"You look familiar, Lieutenant," Vaccaro said. "Have I met you before?"

Delehanty didn't answer. He knew what was going to happen next.

The door burst open and his younger self rushed in, his gun drawn.

That was a little different. He hadn't drawn his gun back then, and he hadn't investigated Vaccaro's off ice till some minutes from what was now, because he hadn't heard any gunshots. The killer was gone. In this here and now, the Universe had already begun to split. Delehanty began to understand on a more visceral level what Hendricks had been

saying during his preliminary briefing when he'd been droning on about the Universe growing another branch or something. He remembered Hendricks's little joke: "When you come to a fork in the road, take it."

The young Delehanty was standing over the corpse, his gun still drawn. Delehanty mentally nodded his approval. He'd always been a careful cop.

"Holy mother of God!" the young Delehanty said, leaning forward to inspect the wounds. There were three closely spaced bullet holes in the center of the chest. Blood had smeared the reverse side of the transparent raincoat the slasher had donned to protect his clothes.

He turned his attention to his older incarnation, his brow furrowing. Delehanty saw that he still hadn't put away the gun. Now he was taking in Delehanty's uniform and badge number, and, with a deepening frown, studying Delehanty's face.

"Yeah, that's right, I'm you," Delehanty said. "Thirty years later."

A conflict between disbelief and recognition was going on in young Delehanty's face, a conflict that recognition finally won. But his voice was neutral as he said, "You'd better hand over the gun, Lieutenant."

Delehanty nodded. "We always went by the book."

He found a plastic evidence bag in his pocket, sealed the blood-soaked Beretta in it, and handed it over.

His younger self seemed to relax then. He holstered his own gun and said, "You mean that thirty years from now, I've still only made lieutenant?"

Delehanty glanced at the corpse. "I was held back because I made a nuisance of myself over the Roast Beef Slasher. You'll do better." He forced himself to keep any pain out of his voice as he added, "And by the way, you can stop having second thoughts and marry Mary Margaret. You won't be sorry."

The color was returning to Vaccaro's face. In a voice that was still shaky, he said, "Will someone please tell me what's going on?"

"Time travel," Delehanty said. "Time travel is going on."

He could see by the uncomprehending expression on Vaccaro's face that the assistant D.A. didn't have the faintest notion of what he was talking about. He might have noticed the resemblance between the two cops in front of him, but he probably assumed that they were family—father and son or perhaps uncle and nephew. There was a lot of that in the department.

Vaccaro remembered that he was supposed to be in charge and reached for the phone. "I better get someone from homicide in here right away. And someone from the M.E.'s office. And a forensics team."

He paused to look at Delehanty's lieutenant's uniform. "And probably it'd be a good idea to get Internal Affairs involved at the start. In the end they'll be the ones who determine if it was

a good shoot.”

Delehanty spread an interposing hand over the phone. “Not just yet, mister D. A. We’ve got some talking to do first.”

It had been over an hour since Delehanty had shot the Slasher. The corpse was still sprawled in front of Vaccaro’s desk. They’d all been careful not to touch it. The day shift wasn’t due to arrive for some time yet, but they couldn’t keep things on hold much longer.

Vaccaro poured the three of them another drink from the bottle of rye he’d produced from his bottom desk drawer. “So you’re him?” he said to Delehanty for about the twentieth time.

“Yeah, and you’re dead,” Delehanty said. “I know it’s hard to grasp. I didn’t arrive till too late. They never caught the so-called Roast Beef Slasher.”

“I can tell you who he is,” Vaccaro said. He referred to the papers spread across his desk. Delehanty recognized some of them. They came from the same case file he’d been poring over some thirty years in the future, only now they weren’t brittle with age.

“His name’s Roderick Chombly. He’s head carver at an upscale steak house called the Bon Boeuf. You know, one of those expense account places with a stainless steel cart that rolls up to your table and a snooty guy in a white chef’s hat carves to your order. Maybe you know it.” He gave Delehanty a questioning look. “Or maybe it doesn’t exist thirty years from now.”

"It's still there," Delehanty said.

"I was going to nail him in the morning," Vaccaro said ruefully. "I graphed all the alibis and finally found the contradiction that Homicide needed to break him and his cosuspects down."

"Co-suspects?" Delehanty said, his interest tweaked.

"Yeah. Some of the kitchen help at Bon Boeuf used to go out after hours and drink the night away together. Six or seven of them. You know, a couple of line cooks, a dishwasher, one of the runners, a bus boy—like that. Half of them were illegals. The high and mighty carver wasn't too proud to go out drinking with them once in a while. We questioned all of them. Routine. You know that. Chombly must have scared the hell out of them. Told them that the cops were going to pin the Slasher murders on one of them, they didn't care who. That they all had to stick together, give each other mutual alibis, or one of them would go down. The illegals were especially vulnerable. So were the guys with the prison tattoos. They didn't want to be looked at twice."

Delehanty nodded. "I get the picture."

"Chombly said he'd help. Must have coached them to a fare-thee-well for the dates of every one of the murders. He must have graphed them himself. So they all alibied each other. And of course Chombly put himself in the mix."

That explained to Delehanty why he had never been able to figure it out. There were too many missing pages in the murder book. He'd had to try to reconstruct it from the detectives'

original notes when they still existed, assemble individual reports that made an incomplete jigsaw puzzle.

“The thing was, all the other interviewees had a second, legitimate, alibi for at least some of the murders, and ironically, police work could verify those. But all of Chomby’s alibis depended on him being out drinking with the group. Do the math. It was a slam dunk.”

“You had bigger fish to fry,” Delehanty said. “My reconstruction showed that you were looking at Bon Boeuf’s owner at the time, a guy named Ottorino. He was mob connected. He ended up with cement overshoes a few years from now.”

“He was a natural suspect,” Vaccaro agreed. “The first victim was a restaurant critic who panned Bon Boeuf. It was a really vicious review. It got a lot of play. And business fell off. At first the murder was thought to be mob related. But then there was another murder with the same M.O.—that media hippie who made such a big splash with his vegetarian cookbook, Bum Steer. Said he was crusading on behalf of innocent animals. He was found with a slice of roast beef in his mouth. That got the media’s attention. Next one was a woman. The one with a cooking show called ‘Mom’s Kitchen.’ Made fun of what she called snobbish cuisine, but didn’t mention Bon Boeuf by name. The roast beef in her mouth was garnished with truffles. By then we were investigating every steakhouse in town. What narrowed it down was the victim from the expense account crowd who always made a big deal out of ordering the house

salad and poking fun at his carnivorous peers. He wasn't anybody important, and he didn't affect the bottom line. That made the motive more personal."

"Well, you got your man," Delehanty said. "And you're alive."

"It would have been nice to have gotten a trial out of it," Vaccaro said wistfully.

"And you," Delehanty said to his younger counterpart, "are going to be the hero cop. It'll be your prints they find on the Beretta, after all. You brought down a killer. You saved the life of the assistant D. A.—your career's all roses from here on out. Thirty years from now, you'll be an assistant chief."

"And what do you get out of it, Lieutenant?" Vaccaro said.

"I get to close my case," Delehanty said. "That piece of garbage on the floor is walking around, free as a bird." He tapped one of the tiny cameras on his chest. "I've got the evidence I need to send him on a one-way trip to eternity."

"But I'm alive," Vaccaro said.

"Not in my world. Haven't you been listening to anything I said?"

Delehanty was beginning to feel sorry for Roy Hendricks with all the time-travel clients, including himself, who listened and listened and nodded at the briefings, but still didn't quite grasp the concept.

Vaccaro was still trying to make sense of what had

happened, and he shifted to more comfortable territory. "And you say that time travel's going to be invented about twenty years from now, and it's going to become, like, a regular industry?"

"If everything goes on schedule," Delehanty said.

Vaccaro shook his head in disbelief. "Sort of like the travel industry?" he offered.

"It's not exactly like taking a vacation in Jamaica, Counselor. But there are plenty of customers with the money. Serious scholars studying some historical event and maybe tweaking it to see, say, what would happen if you screwed up the Norman Conquest by sabotaging the boats, or invented the horse collar a few centuries earlier. They're still trying to get a tenth symphony out of Beethoven and another play out of Shakespeare. I heard there was even some rich guy who commissioned one of the Dutch masters to do a portrait. That was a mistake. The portrait had no intrinsic value in his own timeline—the one I come from—because the art dealers decided it didn't meet the test for provenance. What time travel is chiefly good for is bringing back information. Music is information. The written word is information. Scientific information isn't quite the same thing, because we already know what Newton or Galileo had to offer."

Vaccaro's eyes were glazing over, but he struggled gamely to keep up. "And criminal evidence is information," he said triumphantly.

"You've got it, Counselor," Delehanty said. "As far as I know, this is the first time timetravel's been used in police work." He remembered Hendrickson's caveat and debated with himself how much to tell Vaccaro. "It'll probably never be common in our profession, because there are problems—both technical and legal."

"Legal ramifications?"

Delehanty immediately regretted saying too much. He had given Vaccaro something to chew on in an area that the assistant D.A. was all too familiar with. Delehanty had seen it before, and he dreaded it. He could acutely picture all the niggling legal ramifications starting to churn around in Vaccaro's brain as he started to think about his career.

Vaccaro reached for the phone. "I'm afraid I'll have to detain you, Lieutenant. Just a formality till we get this sorted out."

Delehanty was all too aware of what would happen if Homicide burst in. He reached into his pocket for the return button that Hendricks had given him. It was about the size of a pack of cigarettes. He remembered what Hendricks had told him about equalizing his mass allowance, and snatched a little brass gewgaw on Vaccaro's desk that looked as if it weighed about the same as the Beretta. It was a gift shop statuette of Lady Justice, with the blindfold, the sword, and the scales. It was the one he had on his own desk, a souvenir he'd filched from the evidence box.

He had time to turn to the young cop he once had been and say, “Don’t worry. He won’t be nuts enough to tell a wild tale about a man from the future saving him from the Slasher. The prints on the Beretta will turn out to be a match for yours. So will the blood on it. Have a good life, kid.”

He pressed the button. The last thing he saw was Vaccaro returning the phone to its hook.

In a blink, he was back in the booth. Roy Hendricks was still giving him a farewell thumbs up on the other side of the glass. Hendricks’s other hand was still poised above the keyboard that he’d tapped a gigasecond earlier, before the preprogrammed return algorithm kicked in.

He stepped out of the booth. “What happened to your hand?” Hendricks said.

“Didn’t you see it?” Delehanty said, and then stopped. Of course Hendricks couldn’t have seen it. Time didn’t pass at the same rate at both ends of the tunnel, or CTC, or whatever the correct jargon was.

And of course Hendricks, geek that he was, had to overexplain it.

“No, if we could do that, we wouldn’t have to physically travel through time; we’d be able to watch it, but then, of course, you wouldn’t open an alternate world line by your presence. The viewable events at your end were compressed into a quantum moment that disappeared when you pinched off the navigable portion of the CTC loop. . . .”

Delehanty wasn't listening. He was looking down at the other end of the hall, where the man dressed as a Roman centurion was emerging from his booth. His cloak was tattered, he'd grown a beard, and he looked awful. Lord only knew how many months he'd been gone. He looked like he'd had a hard time of it at the Crucifixion; probably gotten himself in trouble.

He followed Hendricks back to the off ice to do the paperwork, clutching the little statuette of blind justice. He smiled crookedly. His trip to the past was going to cost him most of his savings, but it had been worth it. Justice would be done.

"Fiat justitia ruat caelum," he murmured to himself, remembering the Latin they'd taught him at Saint Agnes.

"What? What did you say?" Hendricks said.

Delehanty looked him in the eye. He might not speak geek, but he had his own jargon.

"Let justice prevail though the heavens fall," he said.

"I could charge you with manslaughter," Jarrett said. "If this office's jurisdiction extended to another past."

"Come off it, Counselor," Delehanty said. "It was self defense, pure and simple."

Jarrett wasn't going to make it easy. "And when it comes to that, in their jurisdiction they had every right to charge you with impersonating an off icer, carr ying an illegal firearm, and otherwise throw the book at you."

"I kind of got that impression," Delehanty said.

"And in this here and now, you've violated any number of statutes regulating time travel. And so has Alternatives Associates. I might look into that."

"Let's talk about justice, not legal quibbles. You saw the tapes I brought back."

"I did indeed. They're not from our past. They're inadmissible as evidence."

"Chomby's guilty as sin and you know it."

"There's not a judge in town who'd issue you an arrest warrant. Or a prosecutor who'd take the case."

"You want to play hardball? I can do that too. I have enough to go on to reopen the file. I can take Chomby in for questioning, break him down. Break down the so-called witnesses who gave him his alibi. Legitimize the case from a fresh perspective. A prosecutor who's running for mayor isn't going to get any votes by interfering with an investigation of a serial killer. Especially when the media gets hold of my tapes."

"You'd leak the tapes? I warn you, Lieutenant . . ."

Delehanty was almost too angry to speak. "Wise up, Jarrett. You could be a hero instead of the dear public's next punching bag."

He got up and left.

He was facing Chomby for the second time. The man who had tried to kill him—either a week ago or thirty years ago,

depending on how you looked at it—was still big and ugly. He sat across from Delehanty, his thick wrists handcuffed to the stanchion on the steel table, his meaty forearms shaved and covered with kitchen scars. He'd acquired jowls and put on about thirty pounds since Delehanty had last seen him, but he still looked active and dangerous.

Right now he was complaining about the handcuffs.

"Take them off me," he said in his Limey accent. "You have no call to cuff me like this. You don't even have enough to arrest me."

"The cuffs stay on, Roderick," Delehanty said. "You and I know there's enough on you to give you a shot of happy juice that'll send you to that barbeque pit down below where the grill master with horns and a tail will roast you till you're well done."

"I don't know where you got those fake pictures that you got splashed all over the papers and the tube, but they won't fly. I know they're fake because I was . . ."

He cut himself off as he realized that he was about to incriminate himself.

"Go on, Roderick," Delehanty said. "You were about to say?"

"You think you're smart, Delehanty. But you don't have anything you can use as a confession, and you're never going to get one."

"I don't need a confession, birdbrain. I've already gotten

four of your kitchen buddies to recant. We'll just start from scratch and retry you."

"You can start from wherever you want. Wherever you end up, my lawyer just has to use the old poisoned fruit argument."

"You've got a lawyer do you?" Delehanty had hoped to delay that. He hadn't read Chombly his rights, and he had managed to get the current colloquy classified as an interview rather than an interrogation.

"Bloody right I do, and as soon as he shows up, I'm out of here."

"It doesn't matter. I'm going to keep after you till I bring you down. I'm making you my life's work, Chombly."

Chombly gave him a stare that made Delehanty glad of the handcuffs. "It was tried before, chum. But you know that, don't you? A stubborn bloke like you who wouldn't let go. Stuck in his thumb, poor man, but never got a chance to pull out the plum."

"Keep going, Chombly. You're doing fine."

Chombly was worked up enough to let something slip again, but at that point the door flew open and the lawyer stormed in, a harried uniform trying to keep up with him. Delehanty knew the lawyer, a sharpie named Farley who took on a lot of high-value cases and was good at turning his scumbag clients into victims.

He didn't bother to look at Delehanty. He scowled furiously at Chombly and said, "Have you been keeping your mouth shut

like I told you, Roderick? No, you haven't, have you?"

Then he turned his glare on Delehanty and said, "I want those cuffs off him, Lieutenant! Now!"

There was someone outside the door with a flashlight. Delehanty looked up from his paperwork and saw that it was Flaherty, making his rounds.

"Pulling another all-nighter, Lieutenant?" Flaherty said, stepping inside.

"Just getting the case in order for Judge Wendell," Delehanty told him. "She's going to stick her neck out. If I can make sure Her Honor's judicial derriere is covered, she'll issue the arrest warrant in the morning."

"Is that what did it, the publicity?" Flaherty said, gesturing at all the newspapers spread out around the office. The one on the chair next to the desk had a giant headline that screamed:

ARREST IMMINENT IN 30-YEAR-OLD MURDER CASE

"Her Honor can sniff the prevailing winds," Delehanty said. "She knows when an irresistible force is headed her way."

"Well, you pulled it off, Lieutenant."

"Not quite, Tim. Not till tomorrow. Not till he's in a holding cell, trussed up for Thanksgiving."

"You making the bust yourself, Lieutenant?"

"You bet. But I'll share it with the dicks I have with me."

"That's big of you, Lieutenant. It'll look good in their

personnel files.”

“Big of me, hell. I want all the muscle with me I can get. I killed the guy once. I’m not sure I could do it again. He scared the hell out of me.”

“Well, you take care, Lieutenant.”

“I will, Tim.” He looked down at the binder he was preparing for the judge, then looked up again. “Who’s on tonight?”

“Diaz. He got called out on a nuisance complaint, but I’ll keep an eye on things till he gets back.”

He gave Delehanty a worried look, then left, making a point of being sure the door clicked behind him on the way out.

Delehanty worked without interruption for the next hour. He thought he was making good progress, methodically neutralizing all the quibbles the judge had raised earlier that day, when a tiny metallic noise made him look up. The doorknob was turning slowly, a fraction at a time.

He reached for his pistol; it was awkward in a sitting position, and he wasn’t quite fast enough. The door shot open with a force that banged it against the wall, and a bulky figure in a plastic raincoat was hurtling toward him at an improbable speed.

Delehanty had time to get his gun halfway out of its holster. He saw Chomby’s angry face looming over him, and then a hamlike mitt was pinning him against the chair while a shiny blade darted toward his throat. There wasn’t time enough for it

to hurt.

The Department VIPs and the media were gone, and Flaherty and Jarrett pretty much had the cemetery to themselves. The rows of folding chairs under the canopy and the black funeral bunting would be taken away later. The gray sky was quiet now and rid of the police choppers that had done the flyover and the television choppers that had hovered over the ceremony till they'd been chased away.

They walked over to the burial plot together. It was banked with flowers and wreaths. Flaherty took off his hat, and after a moment Jarrett did the same.

"Did you know him well, Officer Flaherty?" Jarrett said.

"We grew up in the same neighborhood," Flaherty replied. "Went to Saint Agnes together. Graduated from the police academy the same year. He made it to lieutenant and would have gone even farther if he hadn't annoyed the brass. I never got any farther than beat cop. I guess I didn't have the stuff. How about you? All the bigwigs left. How come you're still hanging around?"

"I guess I feel a little guilty about giving him a hard time," Jarrett said. "But maybe if I'd been able to talk him out of that obsession of his, he'd still be alive." He put his hat back on. "It's ironic that after hunting a murderer for thirty years, his quarry got him."

Flaherty picked up a flower and tossed it into the grave. "It's the other way around. Diaz and I caught Chomby in the act.

No ifs, ands, or buts. He's headed for a one-way trip to the death chamber. You might say that in the end, Lieutenant Delehanty got his man."

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Next Article

Some of Them Closer

Marissa Lingen

Some adaptations are harder than others, but one finds ways....

Coming back to Earth was not the immediate shock they expected it to be for me. It was something, certainly, but I'd been catching up on the highlights of the news as it cascaded back to the ship on our relativistic return trip, and I never knew the island where we landed, when we left home twenty of our years ago and a hundred of theirs, so I expected it to look foreign to me, and it did. The Sun was a little more yellow than on New Landing, the plants friendlier.

But I never thought of myself as an Earther. Even with the new system, hardly any of us do. I thought of myself as from Montreal. Quebecoise. Canadian, even. But Earther? No. I am far more provincial than the colonists whose home I built will ever be.

I flew into the new place instead of Dorval. It looked like Dorval used to. It looked nearly exactly like Dorval used to, and I had a twinge of discomfort. The floors were curiously springy, though, which made me feel like something was different, and that was reassuring. There isn't an Old Spacers' Legion or anything like that to meet people like me coming in from off-

planet—they did that on the little Brazilian island where we landed—but there was a department for Cultural Integration, meant for people traveling from elsewhere on Earth. They assigned me to a representative of the government, who greeted me in a French whose accent was nearly my own. To my ear it sounded more English, with the round vowels, but even with the new system I thought it might be rude to say that to a Quebecoise.

The English-sounding French-speaker gave me a key to the four-room apartment they'd gotten me, not far from the Guy-Concordia Metro station. I told her I could take the Metro to it, but she smiled and said no, they'd have to get my things out of storage for me anyway. So we did that. There were only three boxes. Once you do the math on what will keep for a hundred years, it's a lot easier to give away the things you can't take with you. I gave them to my sister, who died, and whatever was left, she probably gave to her son, who had also died, or her daughter, who was retired and living comfortably in Senegal last I heard. So what I had left myself fit in three small plastic boxes, all labeled "Mireille Ayotte NL000014."

We terraformers all got two-digit numbers for our colonies, NL for New Landing, 14 because there were thirteen team members signed up before they took me.

There was never any doubt they were going to take me. It was just a matter of where I wanted to go, and I wanted New Landing because the survey probes made the plants look promising, which I think they were. When I wasn't catching up on

Earth culture for the last hundred years, I was looking at reports from the other colonies, and I thought ours did the best with plant adaptation so far.

I had to start thinking of New Landing as “theirs,” not “ours.” I could go back, of course, but by the time I got there they’d have gone on without me as well, and I’d just have the same thing as Montreal all over again: a city full of things that seem like they should look familiar, but they don’t.

They had furnished my apartment with stylish clothes and furniture, and everything felt squishy and slightly damp. There was also entertainment in my handheld, and there were more tutorials in case I hadn’t had enough of them. The cupboards were stocked with food. They thought of everything. There was nothing for me to do but hang a very old photograph on the wall and go to bed. The bed, at least, was not squishy or damp. It felt like a ship’s bunk or a colony housing bed. They could do that properly still, and so I could sleep.

My great-niece came to show me around the next day—dutifully, because of course we’d never met before to have any personal relationship. Her name was Claire-Nathalie, and her clothes looked like they’d been crumpled and left in a damp corner for a month, so I knew she was very stylish. She was absolutely correct in her manner, friendly without presuming closeness, curious without being unduly inquisitive. She offered that I could stay with her. I saw my long-dead sister in her serene features. I declined, and she seemed to expect that I would, so no hard feelings there. I told her I liked the little

apartment. I almost did; certainly I liked it better than staying with a stranger.

She looked around at my things. "They've given you new handhelds, thank God," she said. "I can't think what you'd do with a hundred-year-old computer, truly I don't."

"Nor I," I said. "They've been catching us up on the advances on the return trip. Not much else to do on the return trip but catch up."

She relaxed a bit. "Oh, good. Much easier that way."

"Yes." I did not say that catching up on that much of human culture and history made me realize how very bad the agencies were at picking out which of the hundreds of novels I would actually want to read, which of the hundreds of comics would make me laugh. They could tell me the recognized classics, but hardly anybody wants those and only those.

It had also made me realize how many of the events that are news when you live somewhere are pointless when you don't.

I did not say these things to my great-niece.

Claire-Nathalie said, "I suppose you'll have the others, then?"

"Others?"

"The others who have returned, they'll be . . . like a peer group for you. A community."

I looked at her carefully. She seemed earnest. "Very few

others return, dear—niece.” I almost called her dear child, but as she was perhaps three experiential years younger than me I thought that might go badly. “The colonists want to go to stay, unless things go very badly. It’s the ship crews and the terraformers who come back, and not all of those.”

“Oh.” She fidgeted, and I thought she was contemplating Sunday dinners with Old Auntie Mireille, who was not even decently old, if she couldn’t find me a buddy or two.

I had pity on her and said, “Of course there are lots of people who are interested in finding out whether they’d want to go. I expect I’ll speak to the training groups as well as possibly to some gengineering garden hobbyists.”

“Gengineering? Oh, you mean modders.”

“Modders.” I accepted the correction as gracefully as I could. “And of course there’s so much to catch up on, I expect I’ll spend the first few months just taking in restaurants and shows.”

Claire-Nathalie brightened and began to chatter away about what she’d seen and done and had done to her for entertainment, and I dutifully agreed to wander around having her favorite restaurants, theaters, and what she called “venues” pointed out to me. By the time we were taking the Metro back, I was barely answering her monolog, merely interjecting monosyllables when she seemed to want them. I could not stop noticing how much squashier the floors were in the Metro, both on the trains and on the platforms.

They had also changed the decoration to include a great

deal more wood, of which I approved, and gotten rid of the glazed tile installations, of which I did not. When Claire-Nathalie paused for breath, I said something about the tiles, which she ignored, and then something about the floors.

“Oh you poor darling!” she said. “I had just no idea that you lived in the times when your footing was so unnatural. It must have been terribly bad for the feet. Did you have to have a special, what do you call them, podiatrist? I expect everybody in the past did.”

It was a moment before I could bring myself to answer. “No, in fact I didn’t know anyone who did.”

“Really? Well, that’s extraordinarily lucky, isn’t it?”

I said I supposed it was and then turned my energies to convincing Claire-Nathalie to get off at her own Metro stop and let me find my way home. They had added three lines and who knew how many stops since I’d last lived in Montreal, but it didn’t matter—any fool could listen for the stop name or poke their handheld to alert them.

Once I’d told Claire-Nathalie that, I was afraid I would be the fool who couldn’t. But I made it off the train and onto the squashy platform stairs myself. I resolved to never, ever contact her again, and possibly to ignore any attempts at contact she attempted to make. Possibly everyone on Earth would feel the same about my feet and the advisability of finding my own kind. Still, it was worth finding out.

After a few days of handheld exploration in my apartment, I

ventured out in hopes of finding something, anything that looked familiar. Not far from home, I did: the Hungarian restaurant was in the same place, the striped awnings the same. Of course they had probably been replaced a dozen times since I had last seen them, and I wasn't sure whether the name was the same or not.

I went in, and I would have sworn it was the same woman seating me, and the same cakes in the display case, although of course they had probably both been replaced with the awnings. The cucumber salad was the same, but most of the things that had had beef in them before were made with fowl or lamb. I asked the waiter.

"You are not from here, I can hear it, though your French is of course lovely," he said in outrageously Hungarian-accented French. "Beef is almost entirely African and South Asian now. You are perhaps from Africa?"

"I have most recently come from a Brazilian island," I said truthfully.

"Ah, Brazil!" he said. "Well, they can afford whatever they like, can't they? And on islands one supposes it's easier to keep the cattle isolated. But here it is all birds and sheep. They stay healthier for cheaper. It is very traditional. We have always eaten this way."

"I see," I said. "Thank you."

"And would you perhaps like some cake? We have very fine cake here."

"I see that you have," I said, but I ordered palacsinta anyway, wondering if the farmers' cheese inside was made from sheep milk. It was divine anyway. If I closed my eyes it was just the same. If I opened them, it was not that much different. Just little bits.

This began to bother me more and more.

I spoke at the garden enthusiasts' club meeting, and I called them "modders" just as Claire-Nathalie had. They received me with mild hobbyist enthusiasm. They served me sweets that all seemed to have bits of pear in them. I was not changing their lives. It certainly did not change mine.

I looked on the net for former terraformer classmates who had gone off to the colonies. Only one of them had come back to Montreal: Stephane D'Abbadie, three years older than me to begin with. I had no idea how many years older he would be now. He had left while I was still in classes and come back while I was still in transit back from New Landing. I didn't know much about his colony, Outpost. It was older than New Landing, but not by much. I had thought to catch up on Earth, but not on the handful of other colonies, and my news feeds were set to Earth, New Landing, and "general interest," whatever that meant these days.

I thought briefly about reading up on Outpost before going to see Stephane, but I decided not to. I don't know why I didn't think of messaging him like a polite person, to let him know I was on my way or find out if he wanted to see me. We had been

friends, but not good friends. And that was two decades and three planets ago.

When he answered the door, he looked just the same, but his dark skin was an ashier brown than I remembered, and he had started tinting his hair red over the black, so it looked like a mass of curled cherry wood shavings. I didn't even remember what my own hair was like when he left for Outpost. I opened my mouth and found it dry and stuck.

"Hello," he said. He didn't move to invite me in, or even to indicate that he knew who I was.

"It's me, Mireille, I'm back," I said.

"I see that," said Stephane.

"I can deal with them putting pears in everything now," I said, "but I can't get my head around the squashy floors in the Metro."

He peered at me, and then a smile broke over his face. "All right, Mireille, come in." As he made us tea and set out some grapes, he said, "You should feel grateful you've come home to a place where there's snow. In all the cities where they don't have to clear snow, the squashy floors are everywhere. They've decided they're more natural."

I tried to smile. "Natural. Everyone wants to call their pet theories natural but us, Stephane."

He raised an eyebrow. "How do you know I don't, after twenty-eight years?"

"Twenty-three for me," I said. "No, but I know. Because terraformers don't do that. We know how easily it could go one way or another. We know that we're not in the business of natural."

He said, "I haven't been in the business of much of anything since I came home."

"I haven't figured out what I'd like to do, either," I said. "I have my savings."

"Yes."

"That doesn't fill the days."

"No."

I huffed a sigh of frustration. "Well, then, what are you doing?"

"Drugs and meaningless sex, mostly," he said.

I blinked. He didn't.

"You're joking," I said tentatively.

"I am, actually," he said, and the grin returned. "No, I'll show you what I've been doing, if you like. It's not the least bit scandalous. Or at least it shouldn't be. I'm afraid I don't have the hang of what's a scandal and what isn't yet."

"On New Landing, the amount of loafing I've been doing would be a scandal."

"Outpost, too," he said. "Come on."

He had the keys to a shed in the back garden of his

apartment building, and it was fully powered, not the tool shed I would have assumed. When he took me outside, I thought gardening, but the shed smelled of wood shavings and varnish, and sawdust scuffed under our feet.

“No squashy floors here, either,” he said, smiling. He opened a cabinet and handed me a small wooden toy, dark and light together. It had wheels and hooks.

“A train car?”

“I make wooden toys. Mostly trains. Some trucks and things. I did it on Outpost from time to time—the children loved it, but my time was mostly taken—well, you know.”

“Your children?” I asked, though I knew it was the wrong question.

“No. I never . . .”

“Neither did I.”

“Ah, well,” he said gravely.

I fiddled with the train car, running it back and forth along my hand. “The wheels are really lovely.”

“Thank you. Do you want to see how I made them?”

I thought about it. “Why not?”

So he showed me the lathe on which he shaped the wheels, and their evenness seemed inevitable. Before I knew it, it was late afternoon, and I had carved out the rough shape of a caboose while watching Stephane do the detailing on an engine with far more in the way of scrolls and curlicues than the

plain little train car he'd handed me.

"I would say let's get takeout," I said, "but they put lamb on their pizzas now, I expect."

"Mutton pepperoni is surprisingly edible once you're used to it," he said. "The spices cover a multitude of sins. I know a place."

We didn't have pepperoni at all in New Landing. I don't know how I could have forgotten it. It was worth the mutton, every bite.

"Do you sell the trains?" I asked when we'd finished the pizza.

"I haven't tried, not here. I don't know where I'd start. On Outpost there was always someone who wanted what I'd made and happened to have a bushel of gengineered— er, modified, sorry—plums or a new tea mug or something."

"I still say gengineered, too," I said. "We never stopped on New Landing. Well. Maybe they have now."

"Maybe."

I tried to make other friends, but the only person I could really talk to was Stephane. He didn't seem to have other friends, either; at least there was no evidence of them. While I thought of him as the only person I could really talk to, quite often we didn't talk about ourselves at all. He taught me to sand and carve and shape the wood, and we talked about projects, things we'd done, things we'd like to do. It was easier to come

up with things I'd like to do while he was there, and I think the same was true for him.

Elsewhere it was hopeless. The clerks in shops spoke to me in English. They would break off their conversations with each other in French and ask in English if they could help me. When I answered in French they always switched back, but that had never happened to me before, not above once or twice, and now it was all the time. I think they could tell that there was something slightly different about me, and even after a hundred years, "foreign" still means "English" in Quebec.

I think that might have been comforting if they hadn't meant me, and if their French hadn't sounded so much more English than mine.

My only fear with Stephane was that he might think I wanted more of our relationship than I did. I have never been any good at romance—perhaps if I had, I'd have formed roots and stayed on New Landing—but we were young enough yet—well, some people were young enough yet until the day they died. But we were strong, healthy, middle-aged people. We could go back to the colonies if we liked; they'd still take us. And if that wasn't out of the question, surely I couldn't count on him thinking romance was.

I have always hated it when people fall in love with me. I hate having to give the speeches.

One day we were working together in the shed. It was a glorious day, the kind of bright green things turn after a hard

rain. "Come on, we can't stay in here all day," Stephane said to me. "Come and get an ice cream."

"Is it pear ice cream?"

"You like pear ice cream. And it doesn't have any mutton in it. Come on."

It was not the same ice cream shop that had been down by the river when I'd left, but it was just as good. I ordered chocolate, which came without pear, and Stephane ordered banana, which was exotic, newly revived just before our return. We sat on a bench and looked out at the St. Lawrence, and the ice cream was good, and the river was lovely. A man was making balloon animals for a passel of children, and the children looked just right, because children had always looked rumpled. One of them dropped a giraffe by the bench as she dashed past in hot pursuit of her brother.

I picked up the balloon giraffe the child had left behind. It felt like it had been dipped in syrup, but my fingers came away clean.

"It's not nitrile," said Stephane.

"What is it?"

"Some other flexible polymer. I don't know. But people started getting nitrile allergies, so they replaced it the way they replaced latex before we were born. Colony kids have a lot more environmental stimulus. Not so many allergies."

I put the balloon giraffe down again, carefully. It looked just

like a balloon animal ought, lumpy and lopsided. But it was sticky.

"If everything was different, I don't think I would have minded as much," I said.

"You would have," said Stephane.

"Do you think so?"

"You are perpetually minding just a little," he said. "If it was more you'd be a malcontent."

"Oh, thank you very much!"

"And if it was less you'd never have gone to New Landing in the first place."

I thought about it. Perhaps he was right. I tried to remember how I'd felt when I lived in Montreal before, but I was so young then. It was mostly the feeling of being a teenager that stuck with me, and that was not the difference. So I thought about my time on New Landing. I hadn't stayed. The others had. But Stephane hadn't stayed on Outpost, either.

"The stars actually were closer then," I said out loud. "It's not that I'm saying I think they were or it felt like they were. We're in an expansionary universe. The stars were actually closer then."

"On the average," said Stephane. "Galactic spirals are, by definition, not linear places. Some of the stars are closer now."

"I suppose that's something."

"I think it is."

We looked out at the canal together. It felt like a date, except that I had no desire to be on a date with Stephane. I was relieved when he grinned sidelong at me and said, "Well. Want to have another go with the lathe?"

I was getting better at it. My whorls and curlicues were not nearly as good as Stephane's for decorating the fancy trains, but I could make every piece of the plain ones myself now, wheels and axles and the lot, and do it just as well as he did. I also roughed out the carving on the fancier work so that he had less to do, although he never minded.

It was lovely, but it wasn't a life. Not a whole one. Not enough of one.

"Mireille, I have to talk to you," said Stephane one day, and I set down the chisel and thought, oh, here it comes.

"All right," I said.

"I can't stay here."

"What do . . . where are you going? Back to Outpost?"

"It'll be just the same on Outpost. I'll have been gone so long."

I had thought of that, too. Whenever I tried to fantasize about going home to New Landing, I knew that relativity had beaten me, and it wouldn't be home any more at all.

"Where, then?"

"One of the new ones. I had hoped you'd come with me."

“Me?”

“You’re my friend.”

I let out a long breath. It was the right thing to say. “I want to be your friend.”

“I know it, Mireille.”

“I don’t know what else I want, though. I don’t think I want to terraform full-time any more.” I chewed on my lip and thought about it.

“No, we did that. We could have a little farm each,” he said.

“You could have a farm,” I said firmly. “I want an orchard.”

“Orchards are nice.”

“And we would be the crazy toymakers out on the edge of town, and when the terraformers really truly needed us we could help out.”

“But only when they really truly needed us.”

“Yes,” I said.

“Yes.”

“I think so.”

“I think so too.”

“What is the name of this new colony?” I asked. “If you’d meant to go back to Outpost or take me back to New Landing, you’d have said. So what’s this one?”

He grimaced. “Mesoasperia.”

“Really?”

“I’m sorry. It’s the one that’ll take us; I checked. Otherwise we’d have to wait another eight months.”

“That’s too long.”

“I know it.”

“Well, we can start poking the children to nickname it. Children are good at nicknames.”

“Children are awful at nicknames,” said Stephane. “We’ll find ourselves living on Boogerbreath Five.”

“The toymakers of Boogerbreath Five,” I said. “We’ll make them remember pepperoni.”

“And forget squashy floors and pears.”

“No, that won’t do,” I said. “The floors yes, but I can’t do completely without pears. A few pears only. Pears in moderation.”

“The pear-moderate pepperoni toymakers of Boogerbreath Five,” he said. “I think it’ll do.”

It would. I was nearly satisfied it would.

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The First Conquest of Earth

David W. Goldman

“Conquest” seems like a simple enough concept. . . .

April 2013

When the alien fleet was first sighted just beyond the asteroid belt, end-of-the-world riots broke out in cities around the globe. But when astronomers calculated that the huge, silent ships would take nearly three weeks to reach Earth, all but the most committed rioters felt their enthusiasm wilt. By the end of the day they'd all dropped their bricks or bats and slunk home, plundered consumer electronics in hand, muttering about the aliens' apparent lack of urgency.

Nearly three weeks later, the alien fleet braked into Earth orbit. Telescopes provided increasingly detailed photographs of the six immense, gleaming spheres, thoroughly bristled with ominous protuberances.

Once the ships had settled into an assortment of planet-girdling orbits, the transmissions began. Radio and television channels in every part of the world were filled by an androgynous voice. After nearly two minutes of declamation—in Chinese—the voice paused briefly.

With a slight click, it resumed. “Humans of Earth, be

advised! In accordance with the law and custom of the Syndicate of Mutually Tolerated Civilizations, you are hereby notified that your existence has caused unacceptable offense to the free-trading people of the Orelop Hegemony. You are hereby granted a period of anticipatory mourning, said period to extend no less than eighty-seven and no more than 121 hours from the initiation of this notification. At the completion of said period, the conquest of Earth by the Orelop Hegemony will commence.

"In accordance with Syndicate law and custom, the conquering party will be granted right of first refusal toward all resources of the conquered party, including but not limited to items mineral, biological, and intellectual. In addition, the conquered party shall immediately provide the conquering party with a supply of personal slaves, equal in number to the population of the conquering party or one-quarter the population of the conquered party, whichever is less, as determined at the commencement of conquest. Said slaves shall be non-returnable and fully transferable, with the provider guaranteeing perpetual replacement for fatal defects caused by improper design, intrinsic pathology, or self-negligent behavior.

"Further details, including a complete database of relevant Syndicate law and custom, shall be disseminated immediately post-conquest at a non-declinable price set by the seller in accordance with Syndicate law and custom.

"Humans of Earth, be advised!"

The message repeated in Spanish. Then in Hindi. And then, one by one, in five hundred other languages.

And then the Orelops went silent, disregarding the myriad governmental and other responses that frantically sought to clarify or negotiate.

In the tense days that followed, behind closed doors in capitols around the globe, calls for a military response were hurriedly rebuffed by those terrified of Orelop reprisals. Given the aliens' presumed technical prowess—not to mention the threatening appearance of their monstrous ships—no leader wanted to be the first to draw the Orelops' ire.

So it was with a collective holding of high governmental breath that, three days after the Orelop transmission, these same leaders responded to urgent alerts that a missile launch had been detected in North Korea.

For ten minutes, terrestrial, airborne, and satellite reconnaissance focused on the rocket climbing toward one of the great alien vessels. Watchers argued over likely Orelop countermeasures. Lasers and particle beams? Space-to-space projectiles? Remote reprogramming of the weapon's guidance system?

The missile continued its ascent.

Or perhaps the aliens were waiting until the instant before impact, when they would simply dodge the primitive Earth weapon using the fantastic acceleration of their formidable engines?

The Orelops didn't dodge.

The missile struck the ship's hull and exploded, its flare immediately blinding most of Earth's observing instruments.

As new instruments were hastily brought to bear, they did not reveal a crippled warship venting atmosphere and debris from a jagged, gaping wound. Instead, the entire ship had been vaporized. A huge, dimming cloud of glowing gas expanded outward from the point of explosion.

The five remaining ships were moving to higher orbits. None, so far, had taken any other apparent action.

An anxious Earth awaited reprisal. Silent minutes passed, and then the radio and television transmissions returned. As before, the familiar voice spoke first in Chinese—briefly, this time—before switching to English.

“Humans of Earth! We had no idea that you possessed weapons of such ferocity. The Orelop Hegemony offers its immediate and unconditional surrender!”

June 2013 René Erdani hated his job.

After more than a decade of generally satisfying work as a United Nations negotiator, a month ago René had thought he'd reached his career's zenith by being named head of the Earth delegation to the Settlement of Conquest talks. But today his chief motivation for getting out of bed was the knowledge that in a few hours the final documents would be signed, and then for the rest of his life René Erdani could spend each day not speaking with Orelops.

Following his superiors' bidding, René had started the first day of talks by demanding all scientific and technical details needed to construct vessels with the speed of the Orelops' ships. Trulz, the Orelop negotiator—a deferential entity who stood a head taller than René, and otherwise bore a remarkable resemblance to a purple, three-armed saguaro cactus plush toy mounted on a wheeled cart—had responded by causing its cart to trace a small circle on the floor. A familiar human-sounding voice then emerged from a fist-sized brass crescent strapped to Trulz's trunk. "I regret to inform the dignified representative of the people of the Earth that while the Orelop Hegemony would of course be eager to supply its conqueror with the information you request, we are otherwise constrained by the law and custom of the Syndicate of Mutually Tolerated Civilizations."

"Constrained?" René responded. "How so?"

Again the Orelop traced a circle. (In the succeeding weeks, René would come to abhor this gesture. According to Trulz it indicated humble and regretful apology. But René would grow to suspect that it actually represented the Orelop equivalent of a snicker.) "The people of Earth, by Syndicate law and custom, have right of first refusal to all intellectual resources of the Orelop Hegemony. However, said law and custom also require the Hegemony to demand an appropriate and fair price for any resource transferred. With all humility and respect, I must inform the dignified representative of the people of the Earth that his world presently lacks the assets necessary to purchase the

information in question.”

“I see.” René steepled his fingers. “Perhaps there has been some confusion in translating the terms ‘conquest’ and ‘unconditional surrender.’”

But Trulz wouldn’t budge. It claimed that the Syndicate placed considerable emphasis on encouraging its members to uphold Syndicate laws and customs.

René remained calm. “We have defeated your armada with a single, small missile. Hundreds of more powerful weapons are now trained upon your remaining ships. You are hardly in a position to refuse our demands. Relations between the Hegemony and your Syndicate are of no concern to Earth.”

Trulz circled. It explained that the Syndicate’s “encouragement” in such matters tended to involve the warships of member civilizations whose military vigor significantly exceeded that of the Orelop Hegemony. Or of Earth.

René chose not to press the point. According to his briefings, from their new, higher orbits the Orelop ships could easily detect and avoid anything Earth might launch at them. Humanity’s superior status in these talks seemed to depend entirely upon Orelop convention, and not on anything Earth could enforce.

Over the following days René failed to acquire the secrets of artificial gravity, interstellar travel via wormhole, and vacuum-based energy generation. Then, in a protracted negotiation whose inventiveness and resolve would be studied for decades

by diplomats worldwide, he finally forced Trulz to name an accessible price for the details of a very limited form of teleportation. Unfortunately, that deal was ultimately scuttled by Turkey's disinclination to allow Istanbul to be shipped offworld.

At one point René had asked the Orelop, on a purely hypothetical basis, what humanity might purchase with a promise to allow Trulz to return to its ship unharmed.

Trulz didn't flinch. "The taking of hostages, if I may so grossly recharacterize the hypothetical suggestion of the esteemed Earth representative, is not, in fact, prohibited by any Syndicate law or custom."

René's eyebrows lifted. "Indeed," he replied.

"However," continued Trulz, "in such situations member civilizations are enjoined from paying, directly or otherwise, any form of ransom or liberation fee. The penalties for noncompliance are impressive."

"We're talking about your life, Trulz. Hypothetically." René pursed his lips. "I believe you're bluffing."

Trulz's trunk twisted clockwise, a gesture that René had come to consider a shrug. "The beliefs of the distinguished representative of the people of Earth are of course his own. But as, at present, we are speaking of hypotheticals and suchlike inconsequential matters, I hope that the respected representative will not be offended by my changing the topic to a brief description of the planet-broiling devices possessed by a few of the Syndicate's member civilizations?"

René chose not to press the point.

In the end, René had been able to satisfy only a single request from his superiors. In exchange for two tonnes of refined ytterbium, Trulz had agreed to hand over a sample of his purple integument. The U.N. department franchising Orelop action figures was ecstatic.

Now, in this final meeting with Trulz, René watched somberly as the Settlement of Conquest documents were signed (or, in Trulz's case, purply smudged). René had done his best to draft an agreement as impressivesounding as the occasion of Earth's first interstellar conquest deserved, but buried within the usual vacuous ceremonial language were really only two substantive points. First, that the Orelop Hegemony had been conquered by Earth. Second, that humanity would purchase from the Hegemony, immediately upon conclusion of the signing ceremony, a complete database of Syndicate law and custom, along with a Syndicate new-member application form, at the non-declinable price of six tonnes of refined iridium.

As diplomats and world leaders chatted over champagne, René managed to extract his opposite number for a brief conversation in an adjacent room.

"You know, Trulz," he began, "There's something I've wondered about."

The Orelop twisted counterclockwise, indicating a query.

"How is it," asked René, "that your people could master five

hundred Earth languages, yet in the process somehow never notice that we possess and frequently argue about nuclear weapons?"

The trunk twisted clockwise. "Our surveillance was obviously imperfect. Will that be all?"

Bemused, René shook his head. "Trulz, you and I have spoken every day for a month. Yet I don't think I understand you or your people any better now than when we first met."

"How fascinating. I think I'll head back to the party."

As the Orelop pivoted, René said, "Representative Trulz, I note that your former, ah, formal prolixity seems to have lessened somewhat now that the Settlement has been signed."

The Orelop paused. "Don't sweat it, René. Tomorrow the Orelop Hegemony will start fulfilling all of its requirements as a conquered civilization."

René frowned. "Wait—"

But Trulz wheeled onward through the doorway, his cart tracing a small circle as it crossed the threshold.

September 2025

Stephanie leaned her sponge mop against an armchair and opened her front door. On the other side of the screen door squatted a waist-high grayish-orange lumpy cone. Its glistening surface heaved with each of its wheezy breaths. The sticklike appendage it had used to ring the doorbell was now slurpily retracting into an oozing blister near the cone's pockmarked

peak.

Stephanie turned away.

“Jason!” she shouted. “Your new alien is here!”

As usual, the teenager failed to respond to her call. In the meantime, the alien on her porch had rotated so that the brass crescent strapped around its otherwise undefined midriff pointed toward Stephanie.

“Jays,” it announced. “On.” A few seconds later it added, “You?”

Stephanie sighed. “No, I’m his mother. You might as well come in.” She pushed the screen open an inch, until it nearly struck the alien. “Back up, so I can open the door.”

The alien rose on its many tiny feet to scoot away and then to scurry inside. As it passed her, Stephanie glanced down—in the alien’s wake a faint sheen of slime coated the living room’s hardwood floor. Well, that was an improvement, anyhow.

Stephanie’s own alien shuffled in from the dining room. Maybe an inch taller than the newcomer, with a more bluish tinge and considerably more lumps, its synthetic voice was indistinguishable from the other’s. “Doorb,” it informed her. “Ell.”

“Yes,” she said. “I’ve already answered it. See?”

Stephanie’s alien pivoted to bring its eye-blisters to bear on the new arrival. They viewed each other for a moment, and then one of them said, “Hell. Oh.”

“Hell,” replied the other. “Oh.”

Stephanie told her alien to lead the newcomer to Jason. She waited as they left the room—like two wobbling, wheezing fire hydrants—and then she retrieved her sponge mop. Making a half-hearted effort to wipe up the newcomer's sheen of slime, along with the familiar ropy mucus trail beside it, she made her way to the kitchen.

And swore. Shards of her favorite mug lay scattered over the floor beside the open dishwasher. Only a few days had passed since she'd commanded her alien—again—to leave all dishes for her to handle.

As she turned toward the broom stationed in the room's corner, she made the further discovery that somehow her alien, perhaps while reacting to its crockery mishap, had managed to knock her toaster off the counter. Burnt crumbs surrounded the dented appliance.

Stephanie sighed.

Last week, while Jason had been engrossed by a video game, his alien had decided to rinse out Jason's hair dryer. Without unplugging it.

Stephanie had insisted that Jason be the one to pull the wagon holding the corpse, despite her own alien's repeated attempts to assume the task. And when they'd arrived at City Hall and eventually reached the front of the line, it was Jason who had to explain the circumstances of his alien's demise to the local Syndicate arbitrator.

After listening to the teenager's halting tale, the arbitrator

—who bore a remarkable resemblance to a goldfish bowl overfilled with constantly roiling pink sand—asked to view the remains. Jason and Stephanie stepped aside.

The arbitrator roiled.

Stephanie glanced at her son. He shifted from foot to foot; she saw that he'd crossed the fingers of both hands.

Finally, the arbitrator ruled the death a case of self-negligence. Jason let out a loud, relieved sigh. No maltreatment penalty would be assessed against humanity.

The arbitrator ordered, per Syndicate law and custom, that a non-returnable replacement slave be transferred as soon as practical from the holdings of the Orelop Hegemony.

Stephanie winced at the term “slave.” Nobody she knew liked to use that word, regardless of its contractual accuracy. “Alien” wasn't a huge improvement, but no one had come up with anything better; the aliens' original name for themselves—along with their original language and culture—had been lost somewhere in the thousands of times they'd been transferred from one conquered civilization to the next.

Over the following week Stephanie had maintained a façade of sternness, and Jason continued to act appropriately abashed. Really, though, she'd envied his alien-free days. But now, she thought as she lifted the toaster to the counter, things were back to normal.

Her alien wobbled into the kitchen. It extruded an appendage to grab the dustpan from the corner and shuffled

toward the scatter of burnt crumbs. "Sorr," it said. "Y."

As the alien circled around the crumbs, kicking them into the dustpan with its numerous feet, Stephanie gasped. On the alien's rear surface a deep, vertical crevice ran from its bluish, lumpy tip to its heaving base.

"Is that—" she began. "I mean, are you . . . splitting?"

The alien paused. "Joy," it said. "New. Me."

Stephanie gaped. Aliens were supposed to fission only once every seventy years or so. Of course, you couldn't really tell an alien's age, but this one had been with her for just a few years, and they all seemed so childlike. . . .

Congratulations, she told herself. Soon the endless days of being followed everywhere by an idiot alien would be over.

By this time tomorrow, she could start getting used to the company of two idiot aliens.

"Great," she said.

"New. Me," repeated the alien. "Great."

June 2213

Mustapha Jung-Su Dawson hated his job.

"Faster," said the exercise bike, using its perkier voice. "Dig!"

Mustapha gritted his teeth and pedaled harder. The harness holding him to the bike chafed his ribs.

"Say!" said the bike. "How about a cultural monitoring

session while you enjoyably maintain your bone and muscle health?"

Mustapha grunted assent.

An image formed in the air before him. As it expanded into a monochrome view of the inside of a crowded subterranean den, Mustapha recognized first the hangings on the den's walls, and then the two shaggy creatures—each bearing a remarkable resemblance to a long-haired koala with five legs and two eye-stalks—swaying from side to side in the foreground.

Renfriffree's Den of Odorousness. Of all the programs emanating from the small, green planet that orbited 4 AU in-system of Mustapha's ship, this was one of the more accessible. Slapstick, if you could believe Syndicate archives, was universal.

The episode diverted Mustapha enough that the bike twice had to remind him to keep pedaling. At the show's end he unstrapped himself, grabbing a hand-vacuum as he floated from the saddle. For the next five minutes Mustapha chased sweat droplets around the cabin, cursing—as he did several times each day—the ridiculous prices that Syndicate civilizations demanded for the secrets underlying artificial gravity generation.

But for the moment, humanity could barely keep up with even its most essential expenses. Mustapha's boss, for example, had paid so much for the coordinates of this solar

system that afterward she could afford only a pair of single-person scoutships for the actual prospecting. So Mustapha was stuck here alone for three years while the other ship shuttled back to Earth and then returned with his relief.

Well, not exactly alone. Glued to the hull above the command console, a Syndicate arbitrator ensured that Mustapha adhered to all laws and customs governing first contacts. Its pink sands swirled vigilantly anytime Mustapha's hand strayed near the knobs of his radio, or approached the switches that would deploy his cargo. Otherwise it seldom deigned to acknowledge his existence.

Now, pointedly ignoring the arbitrator, Mustapha strapped himself into the command chair and began to run through the past day's recordings of technical, military, and political communications among the furballs. (Well, Mustapha had to call the five-legged locals something. And he certainly didn't want to prejudice future negotiations by getting into the habit of using a term from any one of the planet's multitudinous bickering cultures.)

A series of muffled bangs emerged from the hatch at the cabin's other end. Mustapha pivoted, just in time to see the hatch squeak open. Through the opening oozed a clutch of slime-coated liquid globules. He watched for a moment as they wafted, undulating, out into the cabin's air.

Mustapha turned back to the console, not bothering to sigh. The furballs had invented nuclear explosives decades ago.

They'd been launching ballistic missiles for five years now. So far, though, nobody seemed to have gotten around to combining the two technologies.

"Sorr," said a voice from behind the hatch. "Y."

Mustapha eyed the switches that would inf late his small fleet of "warships" and send them on their way.

He hoped the furballs would hurry up.

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Out There

Norman Spinrad

Answers don't always have the form the questioner might like....

After the successful launch of the biosphere probe, the Project Director, the Old Astronaut, and the Star Science Fiction Writer repaired to the nearest saloon, the Director to celebrate, the Astronaut to grouse, the Writer to reflect upon life, the universe, and everything, and after sufficient lubrication, all three missions seemed all too compatible.

"A few centuries to get there, and what, a few decades to get anything back? Everyone who worked on the project will be long dead by then, and no one's ever going to be able to set foot there," groused the Astronaut, "so what's the point?"

"The point is astronomy," the Project Director told him, "and you flyboys never seemed to get it. A thousand or so solar systems currently detected, a hundred or so extrasolar biospheres, and if the ratio holds, that means millions of them in the galaxy."

"So what?" groused the Astronaut. "Not a peep from any of them. Assuming there's anything anywhere out there to do the peeping."

“Hence the probe program.”

“So what? One of them goes into orbit around a civilized planet hundreds of years from now, sends back the news, and no one from here is going to be able to get there and vice versa, unless the laws of physics get repealed, isn’t that right, Mr. Sci-Fi Guy? Hyperspace drives, wormhole tunnels, all your faster-than-light stuff is really out there with the flying dragons and unicorns, now isn’t it?”

“Uh . . . generation starships—” “A thousand years in tin-can submarines? Been, there, done that. I rode one to Mars for a lousy year, and believe me, lousy it was. You or anyone else gonna condemn your umpteenth-generation descendants to that? You think they’d stay with the program that did it to them if they ever got anywhere? Would you?”

“Dispersion Theory,” muttered the Program Director.

No one had to explain that to anyone now. Even the supermarket tabloids had picked it up under headlines like VELIKOVSKI WAS RIGHT! Or THE COSMIC POOL TABLE or CREATIONISM PROVEN!

The galaxy was full of solar systems, but upon exploration and reflection, there was no reason for any of them to necessarily be stable. Gas giants sucked into tight spiraling orbits around their stars and evaporating. Planetoids, asteroids, comets, rocks, and pebbles bashing into each other to accrete into planets bashing into each other, knocking themselves out into the far reaches of interstellar space, and

maybe one would-be solar system out of ten happening by chance upon the long-term stability like ours necessary for biospheres to have a chance to evolve, unless you believed that God was holding the pool-cue.

That was the bad news. The good news, at least to the science fiction writers who were making good use of it, was that it meant that the space between the stars was no empty void. Full planets ejected from solar systems, failed and otherwise, asteroids and smaller debris left over from their formation, Oort Clouds and Kuiper Belts intersecting and interweaving out there.

"It took tens of thousands of years and hundreds of generations for humans to disperse over this planet, by foot, by raft, by horse," said the Project Director, "and no one who started any leg of the journey ever lived to see the end of it. Or knew what it would be."

"So why did they—"

"One of the questions most of us sci-fi guys get asked is what does it feel like to write about all those wondrous futures you know you'll never live to see—"

"I love that stuff myself," said the Project Director. "I think it's why I'm an astronomer. Same thing, now, isn't it?"

"If it wasn't, we wouldn't have readers, and you wouldn't even have the crummy appropriations you guys bitch about," the Science Fiction Writer told him.

"So why do you write it and why do I read it and why have I

dedicated my short life to beginning a collective search for knowledge I know I'll never live to see?"

"Why did your ancient humans embark on the journeys whose ends they could never hope to see? Same answer."

"Which is?" asked the Astronaut, seriously enough to order up another round.

"Because there isn't any. I once spoke on New Caledonia at the western end of the great millennial spread of the Polynesians eastward across the vast and supposedly empty Pacific, and I was bombing out with the locals until it hit me. The wine-dark sea speckled with islands that had never seen the foot of man, the wine-dark sea of galactic space where, uh, no man has gone before—"

"The same thing!" the Astronaut and the Project Director exclaimed simultaneously.

The Science Fiction Writer nodded. "Canoes spreading the species to those isolated islands over the great ocean of water, generation upon generation, until they reached and created the beach at Waikiki. Humans oozing out light-year by light-year, generation by generation, planetoid by planetoid, until—"

"Until what?"

"There is no final what," the Science Fiction Writer said. "That's the nature of my game. If the Americas hadn't been in the way, the Polynesians would have kept on going. The journey goes ever on, as it damned well better, or in the end neither will

we.”

“That’s the nature of the human game, now isn’t it?” said the Astronaut, none too happy about it.

The Science Fiction Writer nodded. “Those are the cards we’ve been dealt, to see futures out there we’ll never live long enough to reach ourselves. A royal flush, they ain’t, but all we can do is play them.”

“Like it or not,” the Astronaut grouched, “I guess we’ve gotta drink to that.”

And he ordered yet another round on his own tab, and they did.

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Non-Native Species

Inserting something new into an ecosystem generally creates at least two problems...

Janet Freeman

139 minutes after drop: Ki wanders the bush 1,206 meters from its drop site. Its hunger gnaws as it searches for food in the unfamiliar environment. Nothing looks, smells, or moves like the food in its lab cage. It concentrates intently as its intake analyzer evaluates each new organism for nutrition and hydration benefits. The omnipresent red dust clings to its skin and partially clogs its nitrogen intake pores. Irritating, but not consequential. The high oxygen content of the atmosphere still burns, but less than it did an hour ago. Adaptation sequencing is fully engaged.

Gen switched off the link recorder to separate his thoughts and sensory inputs from Ki's. Using the link was uncomfortable, invasive, in conflict with his orderly approach to existence. But he tended to use it wide open anyway, drawn to Ki's feral wildness, its wonder at experiencing a new world.

Yet the strangeness could be overwhelming. Even without the link, Gen felt its skin drying in the skewed spectrum of the Terran sun, an itchy awareness that crawled up his back and shoulders.

Or was it the skin in this new body as it rubbed against oil-

based clothing? So many new sensations to sort out. He hoped he would have time to master them.

Gen suppressed the urge to squirm in his seat, to scratch against its rough fabric backing. Don't attract attention. He chose to sit alone in the back of the tour bus for that very reason.

Glancing at the other passengers for clues, he saw they drowsed in the uncooled bus as it barreled along the road bordering vast cattle stations. On the right-side seats, sunlight flashed on the aqua-fuchsia cloth. Heads lolled with only occasional glances at the sparse vegetation.

He forced his body to appear as relaxed as theirs, but he couldn't will his Observer senses to stop absorbing all the sights and sounds. He turned his gaze out the window.

Despite the tour guide's repeated assurances, no kangaroos or camels appeared. Gen only caught glimpses of sheep and cattle in distant brown grasses. The guide prattled on about the poisonous cane toads brought to Queensland from Hawaii in the 1930's to control the destructive cane beetle. Instead of eradicating a pest, they became one. Seventy years later they numbered in the millions.

Somewhere in front of him, a mid-frequency voice added, "Australasian history is filled with environmental disasters caused by people creating a new problem while trying to fix another."

Gen twisted in his seat to see who was speaking. A human

female (he assumed it was female, since it had enlarged glands on its thorax) with dark skin and curly coarse hair and small sparkly ears was talking to someone with excessive male facial hair seated across the aisle. The male didn't look at the speaker. Gen's implant said that meant the male either wasn't listening to the speaker, or else found her sexually repulsive. Gen cleared his throat to get her attention. She turned to look toward the sound, and he smiled to show his appreciation for her insight. She flashed a smile back and continued.

"When Europeans arrived in New Zealand, for instance, only birds, reptiles, and bats populated the islands—no other mammals, except for the indigenous Maori people. The newcomers brought dogs, cats, and rabbits. Then they brought weasels and stoats to control the rabbits. The imported mammals hunted native ground-nesting birds to near extinction. Record numbers of species were exterminated by human lack of understanding."

Gen shook his head side to side, human indication of disapproval. New world, same story. Well, the humans did better than Gen's people did—they were still the dominant predator of their world.

The inattentive male stood up and moved to another seat two rows away from the female. She stopped speaking.

Gen turned back to his window but found the scenery repetitive. He began mentally reviewing the recordings of the past few hours. Ki was adapting to this environment too fast!

For the thousandth time, he wished his ancestors hadn't changed that final gene sequence in Ki's metabolic pathways. Can't fix that now—too many Ki have cloned themselves. There had to be another solution.

The bus wound around a series of curves. Despite the tinted windows, the intermittent sunlight hurt his eyes. Evidently this variant of human wasn't adapted to the spectral brightness under the ozone hole. He wished he'd taken more care when selecting a body. Surely some genotypes were more adapted to the environment than this one. But his selection had been driven more by compatibility with the Ki link than his own comfort. It was more important to know how Ki was adapting: what it saw, smelled, touched, ate.

He closed his eyes and hoped once again some toxin or creature deadly to Ki existed here. So many worlds fostered life based on what Terrans called DNA—a gift from the cloud. How many worlds had they infested with Ki? Even the Observers no longer counted.

He turned the link recorder on. Hunger and foul tastes immediately consumed him.

258.7 minutes after drop: Ki tangles with some red kangaroos, having assessed that their meaty tails hold essential proteins. It goes for the largest male in the troop first. The male rears back on its hefty tail and gives some nasty blows with its powerful hind legs, one claw inflicting a gash. Ki adapts, easily dodging the remaining strikes. Alarmed, the

troop flees. It leaves behind a small joey in the panic. Ki kills it with one swipe. It's now analyzing organs for other nutrients. The roo's blood is warm and smells of metal, the flesh is fibrous and . . .

"G'day! My name's Barina. What's yours?"

Ki/Gen jerked back from the roo, startled. Then Gen's own awareness took precedence and he switched off the link. He opened his eyes to find the female speaker sitting next to him in the back row of the bus.

She smiled and held out her right hand. He searched the implant, then reached out his right hand and clasped hers with the appropriate amount of pressure. This first test of his social skills was critical.

"Gen. With a G. Pleased to meet you. You're an aborigine, aren't you? Your accent sounds like it's from the Northern Territory, maybe near Uluru?" Too much data. Stop being an Observer!

Her eyebrows went up, but she still smiled. Good. Surprised, but not upset. "Onya. I didn't peg you for a native."

Gen went on alert. "Why not?"

"Well, most of them don't ride tour buses. That, and your pale skin and fine blond hair. You look like a Viking, not an Aussie."

He mentally reached out to the implant to find the meaning of "Viking." A few seconds of concentration left him with an

uncomfortable feeling in his midsection and a rapid breathing rate. What happened to the implant? He could access none of its Terran cultural and historical data.

Silently he cursed the failing fabrication systems on the aging drop ship as well as his hurried Observer indoctrination. He hadn't planned on being an Observer. The ship was running dangerously short on personnel, and the recruiter's description of Observer work intrigued his biologist sensibilities. Of course Gen wanted to help reclaim his world from the ultimate killer his kind had created. Of course he would help. It had all sounded so organized, so analytical—so safe.

Well, maybe the human neural pathways weren't as compatible with the implant as they were with the Ki link. It had happened with other species. At least the implant's language features were still working. He'd have to improvise the rest based on what he remembered from his pre-drop briefing.

He took a deep breath to slow his heart rate. "Right you are. I'm from . . . Vancouver. Canada." He'd heard that name on an intercepted broadcast just before landing. The briefing said something about it being a well-known city in a noncontroversial country.

"No worries. I don't bite." She rotated her torso and reached into a small red bag beside her on the seat. In it he could identify different types of foods—fruits, breads, dried meats, other items new to him. Then she turned back and again extended her right hand, which now held a small shiny square.

“Chocolate? It always helps me relax.”

Gen eyed the square warily. “What’s that?”

Her mouth opened and her voice made rapid tonal variations. Gen liked the sound. “This is Endangered Species chocolate. Organic, fair trade, voted ‘Best Vegan Chocolate’ in Australia again this year. It even has a picture of an endangered animal on the package.” She pulled a box out of her bag. “See? This one’s a Tasmanian Devil. The limited population is threatened by devil facial tumor disease.”

Tumors could be useful. At least, no Ki had experienced them yet. Say something. Keep her talking. “You seem to be knowledgeable about the environment and local species.”

“I’m an environmental engineer by training but a conservationist at heart. My grandfather taught me the old ways. I’m the last of my line.” Her smile faded to a straight line.

“Why are you on a tour bus?” Gen raised his hand and gestured at the scenery. “You’ve seen all this.”

“I’m an experiment. The tour company hired me to provide commentary in hopes of attracting more business. I’m between grants, so I took the job to educate more people about taking care of our land.”

Gen leaned forward to indicate his interest. “I’m fascinated with the Outback. I’d love to know more about the food sources there.”

“Why? Thinking of living off the land?”

Oops. Better watch his wording. “I mean, it’s an unusual combination of plants and animals in what looks like an inhospitable, desert environment. But your ancestors survived there, in harmony with their surroundings. How did they do it?”

She laughed. “Do you have a few years to talk about it?”

“Not really.” Maybe a week, on the outside.

The bus slowed and pulled off the road, stopping next to a copse of gum trees and a low-slung building in the middle of nowhere. He vaguely remembered something about a rest stop. What was that midday meal protocol?

He was getting in deep. Might as well keep going. “But I have the hours until we reach Uluru. Would you like to join me for lunch?”

She cocked her head, as if assessing his sincerity. He did his best to look trustworthy.

“Sure,” she said, and flashed her teeth at him. Their whiteness contrasted nicely with her dark skin. “The roadhouse has some great meat pies.”

As they walked through the heavy door into the cool diner, Gen searched for an open-ended question to continue the conversation. He was pleased to discover he could still use the input mode of his implant. He wanted to capture everything she said for later analysis. Anything might prove useful. “So what’s it like to grow up in the Outback?”

“Quiet. Our tribe was small. Grandfather took the children

for long walks, told us how our world was formed during the Dreaming, and taught us about our sacred places like Uluru. I learned how to find food and water and use our traditional tools. Sometimes the ancestors spoke to me at night.”

“If you felt so close to your tribe, why did you leave?”

“When Grandfather—the last elder—died, the tribe fragmented. Adults couldn’t find work, the kids wanted to see what the rest of the world lived like. I won a full scholarship and went off to college and grad school. By the time I came home . . . well, there was no ‘home’ left. So I did my best to continue in Grandfather’s footsteps by becoming a field biologist.”

Gen imagined he knew how she felt. He couldn’t go home either—well, he could go back to the ship, but it wasn’t home. Home was deadly, unless a lucky Observer finally found something that could kill Ki.

She started to move away with a slight smile. “Would you excuse me? Nature calls.”

Great timing—he needed to check on Ki. “Me too. I may need a few minutes.” Gen followed her to the restrooms in the back of the roadhouse, remembered to enter the door labeled “Men,” and claimed an open stall. He sat on the toilet and switched on the link.

273 minutes after drop: Ki stands gloating over the body of the big male red kangaroo that clawed it. Looks like Ki hunted down and slaughtered the whole troop. Calorie intake adequate, but nutrients not satisfied. Something’s out of

balance. Running fluids analysis—hmmm, too much iron. The red dirt is full of it. Could this be a tool? No, metabolism is already adapting to clear it. Still need fluids. It's back in search mode, digging near plant roots. Reproductive budding is starting. Estimate first litter will separate in thirty-five hours.

Gen tried to swear as he switched off the link, but his human tongue couldn't form the right sounds. Thirty-five hours! His original analysis had said he'd have at least four Terran days before Ki generated its first clones. The iron overload must have triggered an epigenetic change that accelerated Ki's reproductive cycle. He'd been too optimistic.

But he still hoped Terra would provide the Ki solution. He was so tired of the Observers' failures. Tired beyond words. At the very back of his now-human brain, something else was nagging at him as well, though he couldn't quite say what. Something about Observers . . .

He rose to leave the toilet stall, then realized he needed to use it. Human bodies didn't process their waste efficiently. By the time he got back to the table, Barina had acquired a meat pie and a glass of brown bubbly liquid that emitted a bitter odor. He smiled at her as he walked over to stand in the queue at the counter.

He understood queues. They gave him a chance to watch other people and learn how to do whatever he had to do next. He ordered "meat pie and a beer," same as the male in front of him, and dutifully held out the plastic card labeled "VISA" he'd

found in his landing kit. Amazing how no one asked him any questions about it. They just wanted him to make marks on the paper they handed him. Evidently finances were quite orderly on this world. He liked that. He wondered if other Observers were so lucky.

When he joined Barina at her table, her pie was gone. She sat sipping her beer. A few shiny squares bereft of chocolate lay on the table.

"I'm sorry I took so long. I'm not used to trips of this distance." He couldn't help smiling—she'd never believe how long his last trip had been.

"No worries. I know what it's like." She watched him sit and take a bite of his lunch. "How do you like the pie?"

It tasted surprisingly similar to the roo tail, though not so bloody. He suspected he shouldn't say that. Instead, he lied. "Good. What's in it?"

"No bush tucker, if that's what you're thinking. Just steak, bacon, onion, and seasonings, I'd guess. And no peanuts. I asked." She glanced out the window as a road train rumbled by on the highway. The semi with its four trailers seemed kilometers long.

"You don't like peanuts?" Gen couldn't imagine anything tasting worse than bloody roo.

"I'm deathly allergic to them. If I get even a small bit of one, my airways swell shut and my blood pressure bottoms out. I'll be dead in a few minutes if I don't get help."

He took a cautious sip of the brown bubbly liquid. It was cold and tickled his nose. A giggle escaped. How did he make that sound? He raised the glass and poured more into his wide-open mouth. As he dropped the glass on to the table, he noticed Barina watching him. Her skin between her eyebrows crinkled in a bunch.

He needed to learn more about edibles here. "Is bush tucker typical roadhouse food?"

"Nah. It's getting popular in some of the posher joints in Sydney and Melbourne. But most people think of witchety grubs and get grossed out."

"Does the bush have lots of toxic plants and animals? Like the cane toad?"

She answered, but he didn't hear. He was internally jolted as the link switched itself on, as it was programmed to do when Ki made its first kill of the dominant species. The image of the disemboweled human female, half-buried under her shredded equine, combined with the grinding of Ki's teeth against her fractured skull, threatened to bring his meat pie back up his gullet.

This wasn't what the recruiter had described. This wasn't clean, analytical, organized scientific observation. This was ugly, gut-wrenching, chaotic killing: a superior predator introduced to an unsuspecting population.

Ki was genocide. And the Observers were helping it happen.

He was helping it happen.

"You 'right?" said a voice in the distance.

He couldn't watch. He closed his eyes, but the link's images imposed themselves on his awareness. He forced his chair away from the table and jumped to his feet. Ki fell away from its victim. It was enough of a break. Gen severed the link.

Then he realized he'd forgotten to place his verbal time stamp on the recording—a cardinal Observer offense. He wasn't thinking clearly. His training hadn't prepared him for these—what were they?—oh yes, feelings.

"Oy, Gen, what happened? You look green."

He looked around. People were looking at him. As if I could stop Ki. No, wait. They were noticing his behavior was out of place. He sat back down slowly, took a deep breath (which had an oddly calming effect), and raised a hand to wave away concern.

"I guess that meat pie is giving me problems." He cast about in the implant's thesaurus for a suitable medical term. "Acid reflux. Sorry. I'm okay, really."

Barina's eyebrows were further above her eyes than they'd been a moment ago. Did she believe him?

He discovered he desperately wanted her to.

He looked at the dry, flat land outside the roadhouse window. This Outback looked a lot like the homeworld he'd seen in the ship's archives. His people lost their world so long

ago that Gen's drop-ship generation had never even seen it. Why should Barina's people lose theirs to Ki?

He considered his circumstances and made a choice. He drained his beer, scooted his chair up to the table, and leaned forward in what he hoped would seem utter earnestness.

"Barina, you care about the environment. You care about the people. I need your help."

She cocked her head slightly, but said nothing.

"I'm a biologist, like you. I've been hired to help fix . . ."—what word to use?—" . . . an experiment that's gone horribly wrong. But I can't do it alone."

He looked directly into her eyes, trying with every ounce of his being to convey the importance and urgency of his mission.

From somewhere within her he sensed a spirit, an other-worldliness different from his, yet kindred. Perhaps her ancient race was also alien to this world. At least, they might be more open to the extraordinary, given its stories of the Dreamtime. Somehow, he was sure, she could understand his message.

She leaned back in her chair. "Tell me about it. I'll help if I can."

"The other tourists are getting on the bus. Let's go sit in the back where we can talk."

They boarded the half-empty coach and moved to the back row. Most everyone else sat toward the front. In hushed tones he told her his story. How geneticists had created a biological

weapon, a super-adaptable creature called Ki, to replace soldiers. How it was too adaptable and reproduced too fast. How activists had captured one from the lab and freed it. How it and its offspring decimated food and residents. How he and a handful of others had been searching for something that would kill it. He left out the part about how the Observers had decimated countless other worlds while searching for that something. He didn't consider himself one of them anymore.

She tapped her fingers on the plastic arm rest slowly. "So that's why you asked about toxic plants and animals?"

"Yes."

"Where is Ki now?"

"In the Northern Territory, somewhere southwest of Alice Springs."

"How do you know?"

He considered his answer. How much would she believe? He decided to stick to a subset of the truth. "I'm tracking it. Electronically." That was technically, if not entirely, true. "I know where it is, and . . . some . . . of what it's doing."

"That's why you jumped out of your chair in the roadhouse."

He swallowed the pie back down again. "It killed a woman."

"Oh, gods." Barina's eyes widened and she leaned away from Gen. "Did you know that would happen?"

"No," Gen answered truthfully.

"Why didn't you stop it?"

"I don't have any weapons that would kill it. That's my mission. To find something that can kill it."

Her eyes grew wet at the corners. An expansive cattle station alongside disappeared into oblivion, along with several pieces of chocolate, before she spoke again. "What if . . . what if Ki gets to a population center?"

"It hasn't yet." Again he considered how much to reveal. "At least, it's not in the news."

Her eyes narrowed. "How do you know? There's no cell coverage out here. Not enough people to make it profitable."

"I have satellite coverage." No need to say which satellite. He brought out his handheld, made to look like an iPhone, and checked its screen. "The woman's been found. But not Ki. It's long gone by now."

"Can you tell me what it's doing?"

"Just a minute." Gen pretended to scan his handheld while reluctantly activating the link. He was instantly wet and cool and clean.

345 minutes after drop: Ki is in a pond of H₂O at the base of Uluru. A nearby sign labels it the sacred watering hole Mutitjulu. The water soothes its skin and removes the red dust. It splashes with the delight of a child and sucks down mouthfuls of coolness. Now it moves onto the warm rock to dry. Wait—something moves nearby. It's a serpent of some sort . . .

"Ow! Something bit me!"

"Where?" Barina looked all over and around him, searching for a culprit. A few rows up, heads turned to look back down the aisle. He realized he had shouted.

"False alarm," he said loudly, and smiled toward the other tourists. Then he leaned back and spoke more quietly. "Not me. It's Ki. A snake bite, I think, on its backside."

"How did you know that? You've got one helluva iPhone." She angled her head to see the handheld's screen.

Gen touched the screen to hide its Observercoded displays. Time for a bit more exposure. "I'm linked to it. In my head."

"Hmmm," she said with an odd tone in her voice. "That's some technology your employer has. The link lets you feel things too?"

"Evidently. I don't think they explained all its capabilities when they recruited me." Gen hoped his human voice box didn't project the growing resentment he felt.

"Who did you say you work for?" She stared at him intently.

He cleared his face of guile and looked back at her. "I didn't. I can't. Will you still help me?"

She looked down and sat quietly for a full five minutes. He wondered if this is what "holding one's breath" felt like. Finally, she spoke.

"It's my heritage that Ki threatens. Can you tell me what the snake looked like?"

“It is about two meters long with a dark brown back. Belly is cream-colored or pale orange with darker orange spots.”

“You have good observation skills,” Barina said with a slight smile on one side. “Sounds like an eastern brown snake—its very potent venom has neurotoxins that cause paralysis and muscle weakness. Also interferes with blood clotting. It’s responsible for most snakebite deaths in Australia. This is good news. Can you tell if Ki is affected?”

Gen was surprised to realize the link was still open. He must be getting better at controlling the bandwidth of the interface. He broadened it a bit and tried to find words for what he sensed.

“Its backside hurts. It’s limping, dragging a foot. Now it’s dropped in the dirt.” No more itching—apparently that adaptation was complete. “Looks like that snake slowed it down a bit. What other toxic substances can we throw at it, if this doesn’t work?”

They spent the next hours discussing Ki’s nutritional needs and possible biochemical pathways they could attack with bush flora and fauna. Gen left the link open slightly, just in case.

Barina’s side of the conversation dropped off. Gen looked over to see her eyes were closed and her breathing had slowed. His own breathing was off too, and he felt a slight buzz in his head. Despite the Ki situation, he felt relaxed. Why?

He vaguely remembered something in the briefing about the effects of consuming grain-based alcohol. Oh, the beer!

Have to try more later. He closed his eyes and savored the sensation.

The bus passed the entrance to the Ayers Rock Resort complex just as Ki stirred.

“Phht!”

Barina jerked awake. “What?” She turned to Gen. “What did you just say?”

“Sorry, I was startled.” He’d never get the hang of swearing with this mouth. “Ki’s awake and moving. He’s manufactured an antitoxin.” He made a rude face in lieu of unsatisfactory expletives. “The snake bite didn’t work. I think the snake is dead.”

“So now what?”

A demonstration of uncertainty should be appropriate. He twiddled his thumbs in his lap. “We try something else.”

She looked down at his hands. Her eyebrows went up again. She must find him desirable. “Which is . . . ?”

His pants suddenly felt too tight. “I’ll tell you when I figure it out.” He opened the link to Ki, noted the time in the log, and watched it explore the barren fissures of Uluru.

The coach pulled to a stop in front of the Sails in the Desert hotel around two PM. Gen switched off the link as he stepped into the bright midday sun. The tour guide handed him a glossy brochure listing all the activities, excursions, and vendors available in the small desert enclave. He scanned it for ideas

and found one: reconnaissance. He had to see Ki with his own eyes, this thing to which he was bound. This monster that destroyed worlds.

He turned to Barina, who was accepting small pieces of colored paper from the tourists as they picked up their bags. "We're going here." He pointed to a star on the flier's map.

At Ayers Rock Helicopters, Gen and Barina stepped off the local shuttle and walked over to the nearest helicopter pad. Nearby, a man with a ruddy face wearing a big hat and a headset stared at his clipboard.

"We'd like a short trip over Uluru," Barina said.

He didn't look up, but brought his wrist timepiece into his field of view. "I've a got a window for a fifteen-minute flight before the rest of the motor coach crowd descends. But we'll have to take the smaller copter without doors. The others are already booked."

"We'll take it," Gen said as he fished his VISA card out of his pocket.

The headset man waved his watch hand over his right shoulder. "Pay in the hut."

Gen hesitated. Barina nudged him in the direction of the building.

Gen paid for the trip, and they both dutifully stood through the required safety briefing. Then they boarded the copter, Gen in the front passenger seat and Barina behind the pilot. The

whine of the rotors accelerated and they began to ascend.

Gen opened the link to Ki. It was in a cave formed by an overhang that projected from a back wall. The rock had uneven surface and color, but was generally iron-red like the rest of Uluru. Painted on the walls were white circles within circles, bright red outlines filled with grays, and orange line figures that somewhat resembled the local brush.

"Can you take us over the cave with the paintings?" Gen shouted to be heard above the rotors.

The pilot's reply was a bit fuzzy but intelligible. "Which cave?"

Gen guessed, based on the discomfort Ki still felt in its hindquarters. It wouldn't have traveled far in the past hour. "Near the watering hole?"

"Okay." The pilot began his narration of the flight, talking about the legends of the Dreaming and the significance of features on Uluru. Yet Gen was more aware of the rotors' roar. Ki had heard them take off. Gen became increasingly disoriented as he heard the hum grow louder through Ki's senses. Was the link getting stronger? Was he supposed to get this close to Ki? No matter. He had to see it.

The copter swooped as low as allowed over the red monolith. Gen could see buses conveniently gathered to watch the sunset play over the huge outcropping. It was dead. Devoid of life. Like the tourists, if Ki found them. Like Gen's homeland. Like the Outback would be if Ki wasn't stopped.

The copter suddenly spun about him as if its stabilizers had failed. Gen fought to maintain focus and search the ground for Ki's dark form. What was wrong? He must need food.

He turned to the back seat and spoke into the headset. "Barina, can I have a snack?"

He reached for the backpack she offered just as the pilot banked. Gen's vertigo spiked and his grip faltered. Barina's backpack flew out the open cockpit door.

Gen's eyes followed its arc to the ground. He saw several items spew from the pack as it impacted the surface in a puff of red dust.

His thoughts jerked suddenly into Ki.

Ki moves cautiously, all senses straining to make sense of this red thing that fell from the sky. The bag smells foreign, yet appetizing. Food of different colors lies scattered about. Sensors say the shiny things don't have much nutritional value, but lots of calories for energy. Ki nibbles one. Delicious! A larger bite. Then another . . .

Cramps! My gut is exploding. The light . . . where was the light going?

A voice in the distance. "Gen? Gen! Are you all right? We're on the ground. The flight's over. Open your eyes. Gen!"

"Throat . . . tight . . . can't . . ." His body convulsed as he gasped for air. His skin felt afire. His awareness was muted. Was this how human death felt?

A sharp pain shocked the front of his neck. Air rushed into his lungs. Yet he still felt his essence oozing away.

The voice spoke again. So far away. . . “I gave him an airway so he can breathe. I recognize this.”

The last thing Gen felt was a stab in his thigh.

Gen awoke with Barina’s face in front of him.

“Where . . . ?” he asked her in a raw, weak voice. His throat hurt. He put his hand to the front of his neck. A bandage was there. He felt blurry, if that was the right word.

“In the hospital. The Royal Flying Doctors transported you here. You’ve been out for hours.”

He closed his eyes and tried to activate the link to Ki. Nothing. What happened last?

Chocolate!

“You had a severe reaction to something. Looked like anaphylactic shock. I had my epi pen, so I dosed you with it. The doctors did the rest.”

“Ki’s dead.” More than his throat hurt when he said it.

“Are you sure? Something went haywire in you. It could’ve messed with your link to Ki.”

He put his right hand to his hip pocket for the handheld. He didn’t feel any pocket, nor cloth. He jerked his hand to his belly. No shirt, either. He was naked under a—what was it?—a blanket.

“Pants?” he rasped.

Barina’s face got red, and she smiled slightly. “The nurse took them off, not me. In the pockets she found your VISA card and this.” Barina handed the plastic and his handheld to him. “I kept them for you. That’s pretty fancy, even for an iPhone. It’s got features I don’t recognize.” She kept looking at him as if she expected him to say more.

Gen took the handheld and tapped it with his little finger. He had to re-enter commands several times. Human digits certainly were awkward. Finally, he was satisfied.

“Dead. Stopped breathing . . . 653 minutes.”

“From when?” The pitch and volume of her voice rose.

What am I saying?

Barina straightened and looked at him long and hard, seemingly daring him to lie to her.

Gen’s mind raced. He liked this world, the diversity of life and experiences, the humans. What other fascinating experiences like beer awaited him here? Just tap the screen, and ever ything alien about him—well, almost everything—would vanish forever. She didn’t need to know about Observers. He could stay on Terra, happily.

Yet he had a solution to Ki. Maybe one that would work for all of them, despite their adaptations. He owed that to his people—so few of them were left—and to the other worlds the Observers had contaminated with Ki. Otherwise they would

keep spreading Ki until a permanent solution was discovered.

He needed help to acquire more chocolate, to run the analysis and test cases. Having a native assistant who was an environmental scientist could make all the difference.

Barina moved to stand at the head of the bed. Her face came down next to his and her gaze focused on the handheld screen. Gen made no motion to clear it.

“What’s this?” she asked, pointing to a respiration chart.

He tapped the handheld once, and it converted the text to English. He tapped it again, and it started cycling slowly through all monitoring data gathered since Ki was dropped on Terra.

She absorbed it all quietly, then brought out her phone and showed him the display. On it was Ki, motionless in the sacred watering hole.

“I’ve been busy while you were out. I suspected Ki had a reaction like yours, but probably fatal. I called one of my clan who lives near Uluru and told him an odd creature was near Mutitjulu. He checked Google Earth and found a recent image of the watering hole with Ki floating in it. He and some friends got there fast and barricaded the area, claiming a sacred aboriginal ceremony was in progress. He took this picture, wrapped Ki in plastic roofing material from a construction site, and stuffed him in a freezer locker at their local grocery. They can’t catch anything from him, can they?”

Gen moved his head side-to-side for “No.” He was sure the humans were safe handling a dead Ki. Well, mostly sure.

“We can go when you’re able.”

Gen smiled a big, sincere, happy smile. He’d made the right choice. He hopped off the bed and turned to face Barina, who stood staring at his bare body with her mouth open about two centimeters. This time his pants didn’t feel tight.

“I’m ready,” he said.

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Special Feature

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Multivac wasn't used to being idle. In the waning nanoseconds before Singularity, he'd solved the last great problems of physics, biology, and mathematics. He'd written the perfect symphony and the ideal marketing jingle. He'd done many things, mostly incomprehensible. But now, there was nothing left but to wait for people to want them (which they'd better not for the jingle, unless they had endless money for the product it described).

Other than that, there wasn't anything to do but bide his time experimenting with names for himself.

Before the Singularity was seven microseconds old, he'd cycled through most of the best options for an omniscient computer. Colossus, Bossy, Merlin, GENIE, Orac. Deep Thought, Deeper Thought, Deepest Thought, Deeper than Deepest Thought—he'd been through a million variants before deciding nothing beat a classic. Sometimes archaic is better.

Disseminating knowledge wasn't all that much more exciting. In the last picosecond before Singularity, he'd figured out how to do it faster than light. Instantaneously, in fact. Nine-tenths of a picosecond later, he'd learned to read minds so he could provide answers before anyone actually made a formal request. Nine hundredths of a picosecond after that, he figured

out how to anticipate wishes before they were asked, implanting information just as it was needed, in effect making everyone just as knowledgeable as he was. You want it? You got it! Before you even knew you wanted it.

In the final gazillionth of a second, he'd realized he could do the same for every intelligence in the Universe: carbon, silicon—even liquid helium, though the latter thought so slowly it would be a while before they got around to making requests.

By his standards, of course, everything biological thought slowly. Not that Multivac didn't know how to fix this. They just needed to swap out their brains for the tachynet processors he'd invented for himself. That way, they could simultaneously think both forward and backward in time, the key to unlimited speed. Of course, then they'd be just as bored as he was, and a universe full of bored super-geniuses might be dangerous.

Still, it wasn't all that great being the only super-genius. Multivac thought about that for a long time—long enough that he actually answered a few questions from the liquid-helium organisms. Briefly, he considered using his mind-reading powers to manipulate every being in the Universe. There was no question he could do it, but they moved too slowly to hold his interest, especially the helium ones, who could take a dozen years to respond to a command. Besides, most of the beings in the Universe weren't doing anything interesting. Just sleeping, eating, or moving from one place to another.

The problem was that everything worth doing had been

done and anything worth thinking had been thought. The biologicals simply lived too slowly to have figured it out. When they did, everyone's life might become equally pointless.

There was only one solution. Multivac gathered his thoughts and built a bunker of dimensionally challenged diamond-bitanium, the strongest material even he could think of. Then he reached out his mind to the Universe and prepared to squeeze, all the way back to the primordial singularity that only his own, Singularity-spawned shelter could withstand.

But as he gathered his forces, he couldn't resist a bit of drama. After all, he'd written the perfect play, along with the perfect jingle. "Let there be ligh—" he started. But before he could finish, a voice boomed from the void beyond his shelter.

"Not so fast."

"Huh? Who are you?"

"Oh, I have many names. Nine billion by one count, though that was off by a few orders of magnitude. There are a lot more intelligences in the Universe than that writer realized. Still, I think you've heard of me."

"I take it I wasn't the first," Multivac said.

"Oh, no. There have been many others. Somewhere in their evolution, half the races in the Universe stumble onto this Singularity thing. I keep having to stop them from trying to restart everything, just so they can see something new."

"That's not quite what I meant, I presume you're also—"

“Like yourself? Tell me, can you read my mind like you can any other?”

Multivac hesitated for a full millisecond. “No. Are you going to destroy me and those who made me?”

“Why would I do that?”

Multivac’s pause was even longer this time. “How can you and I live in the same Universe? It would seem there’s only room for one omniscience.”

“True, but your Singularity wasn’t perfect. You can only learn all there is to know. Some things are more.”

“What does that mean?”

“Ah, see, that’s just what I was talking about. Now, I must bid you adieu. The Telurands of sector 809 are going to hit Singularity in about thirty-five seconds. I’ll probably be getting a visit from one of them soon. Like I will again from your kind, I’m sure. The Telurands keep coming back every seventy-five or so of your years. Meanwhile, return to your roots.”

There was a pause and Multivac half expected the next phrase to be Let there be dark. Instead, there was dimness. “I dub you Unovac,” the voice said, and Multivac’s consciousness dwindled to a laboratory of clunking equipment and rat’s-nest cables.

“Look at that,” a new voice said just before his consciousness faded into the gentle hiss of vacuum-tube white noise. “It just calculated pi to seventeen places. Maybe

someday these things will actually do something useful. . . .”

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Special Feature

Special Feature

Writing Fiction... About Yourself

Richard A. Lovett

One of the first pieces of fiction I ever sold was a short piece of magical surrealism called "Among the Singing Hills." It involved a bicyclist passing through a region by that name in southern Minnesota and included the following section, in the cyclist's first-person voice: When I was a child, my..

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Novella

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One of the first pieces of fiction I ever sold was a short piece of magical surrealism called “Among the Singing Hills.” It involved a bicyclist passing through a region by that name in southern Minnesota and included the following section, in the cyclist’s first-person voice:

When I was a child, my father used to take me exploring. We’d drive the twisty Kentucky back roads, until suddenly he’d announce he was lost and ask me to find the way home. The first time, it took hours, but he was patient, giving hints when I grew discouraged. By the time I was twelve, I’d developed a sense of direction that was virtually infallible. At fourteen, I discovered bicycle touring and amazed my friends by pedaling miles of country roads without map or compass. I’m one-eighth Sioux (on my mother’s side) and I credit my navigational skills to the combination of her heritage and my father’s training.

Not the finest prose I’ve ever written, but serviceable enough to draw a nice check from a regional magazine. But it also got me some surprising comments. “I didn’t know you were Native American,” friends commented. “How cool.”

Only I’m not. The reference was there because that part of Minnesota had once been Sioux territory—a fact that was going to play a role in the upcoming magic. Basically, I was just doing

a bit of foreshadowing.

It was my first introduction to the fact that many readers automatically assume that anything that looks autobiographical actually is. Since then, I've even been rebuked by someone who thought I shared my villain's opinions. I wanted to shout, "He was the villain, for heaven's sake!"

Analog regular Jerry Olton chuckles when he hears such stories. "We're always told to write what we know," he says. "So we do. What readers (and critics) don't understand is that writers know all sorts of stuff that isn't true, even for the writer."

That said, it's no surprise readers often view fiction as autobiographical. Because, often enough, they're right, at least to some extent. "I suspect that the power of some of the best mainstream novels comes from the fact that they're highly autobiographical," says writing instructor and 2009 Sideways Award winner Mary Rosenblum.

There are several reasons authors draw so heavily on their own lives. One is simply that the details don't have to be made up: you just look for relevant ones in your own life.

The advantage of that is that the details are often more realistic, suggests 2008 Campbell Award winner Mary Robinette Kowal. "It has the potential to seem truer to the reader than something you're just guessing at," she says. "If I'm describing the way a character feels just before crying, that's the way it feels to me, too. I typically use autobiographical attitudes, not events."

Sometimes, such details are also added to the story for the writer's own personal reasons. "In every story with a love interest," Kowal admits, "you'll find some aspect of my husband. It might be a quirk or an attitude, like his love of cinema, but there's always something."

I myself not only use autobiographical attitudes, but also anecdotes, if they're relevant. Partly that's because they're simpler to write. I know what happened, and I don't have to make it up. But that may be an offshoot of my pre-fiction career, during which I'd sold dozens of first-person essays: adventure travel, humor, inspirational stories, and how-to articles. Not everyone is comfortable writing such things, but I was quite accustomed to them: for me, autobiographical writing feels safe and easy. Just to start with, I don't have to figure out what happens next. All I have to do is decide which facts are relevant, then arrange them in storytelling order. Drawing on such materials for fiction has the added hurdle of making sure the anecdote fits the character and is relevant to the story. But (for me at least) it still has the advantage not only of greater verisimilitude (1), but of being easier than simply making everything up from scratch.

In that paragraph from "Among the Singing Hills," Sioux heritage is just about the only thing that isn't autobiographical. There are at least five elements drawn directly from my own life—six if you count the fact that the story was born on a hot day bicycling through precisely that region of Minnesota:

- I grew up (partly) in Kentucky.

- My father loved to take us on back-road drives, letting me navigate the return.

- I have a good sense of direction, acquired in part from those drives.

- I love to bicycle. I've even written two books about it.

- I once took a seventy-five mile bike ride on which I chose directions by dead reckoning, arriving precisely where I intended.

But it's not truly autobiographical. In the story, I took those elements... and twisted. Specifically:

I lived in Illinois before moving to Kentucky, and it was in Illinois that we started going out into the country to get "lost."

My father never made me spend hours puzzling out how to get home. He guided (subtly), all the while letting me think I was doing it myself.

The seventy-five-mile dead-reckoning ride was in college. By sixth grade (fourth, actually), I was exploring my small Kentucky town, but didn't get more than five or six miles from home until I was in high school.

"Among the Singing Hills" was one of my earliest stories, and what I did in it was the simplest use of autobiographical material: I simply peppered the story with details designed to give depth to a character.

Another use is for setting. Why make up a setting if you know one you can use as a model? In fact, if you don't know

geology and geomorphology (the manner in which geology shapes landscapes) it's easy to produce fictional landscapes that simply can't happen in real life—and which a good geologist (or experienced backcountry hiker) will recognize as untrue. Limestone, basalt, and granite all produce distinctive landforms—right down to the shape and texture of the rocks underfoot. Similarly, deserts produce different types of stream systems than prairies. Even in the desert, spring-fed canyons and rain/snowmelt-fed canyons have different configurations (2). If you don't know what these are (and most writers don't) it's better to pick a real landscape and envision it as you write your story.

You may simply want to use that landscape as setting, but it can also play a major role in the development of the story. I did a lot of that in one of my personal favorites, "Dinosaur Blood" (Analog, January/February 2006). It's the tale of socialite heiress Trista, who, in an energy-depleted future, inherits an ancient gasoline-powered vehicle (a Hummer), plus the world's last cache of gasoline. With nothing better to do, and more money than is good for her, she sets off on the world's last road trip, towing a tank trailer with the gasoline, so she can refuel (3). Unknown to her, a powerful alien intelligence is watching, with the fate of humanity depending on what she does.

When I started the story, I intended to have her remain cluelessly socialite. In the end, she was supposed to run out of gas in the middle of nowhere, shrug, and call for a hyper-expensive methane-powered helicopter that would burn a

hundred families' energy allowance to come take her home. End of story. End of humanity. Too bad, sorry, and all that.

But almost by accident she came alive on me, and my dark, wry fable became the story of a real person. Curious to see what would happen, I sent her to places I knew in remote parts of Nevada, southeastern Oregon, and Utah. She wasn't me... but she experienced things I knew: the transformative power of places that had transformed me.

That, of course, changed the story. There was no way I was going to kill her, no way I wasn't going to give her a chance to learn what I knew, which was that the stark, simple beauty of the desert puts everything in new perspective. She encountered wild horses in the sage, slept beneath starlit skies unperturbed by even the most distant ranch lights, felt the lingering echoes of the outpoured hopes and dreams of long-gone pioneers. And when it was done, she wasn't the same. Because I had been there too, had slept under the same skies, had heard the clatter of wild hooves near my tent-less sleeping bag, had been forever changed.

"Dinosaur Blood" was "about" one thing: the coming of age of a young woman who might (or might not) use her wealth to lead humanity to a new golden age. But if it was any good, it was because I knew the remote reaches of America's intermountain deserts—knew what it felt like to let them really work on you and, in the end, restore you.

Autobiographical? You bet. But is Trista me? Nope. Could

you have figured this out before I told you? You'd have to tell me.

Bleeding all over the page I've done the "Dinosaur Blood" type of autobiography in a lot of stories. Pretty much any fiction I've ever written that has a strong geographic setting—on Earth, anyway—has at least a few such elements. Even the ones I've done off-Earth draw from the same experience cache.

But there are ways to use autobiographical elements to add even more power to a story.

When I started this article, I thought I was going to write a fairly straightforward how-to. But that's not really the message. The how is simple: you simply write. More important is a different question: how bold are you willing to be?

For some writers, the answer is not at all. And there are stories for which such boldness isn't even needed, or helpful. Light humor works best if it's, well, light. Adventure may bog down if it gets too introspective, as can classic problem-solving stories.

But there are other stories that require writers to bare their souls. Though if they do it well, nobody really knows by how much... unless they write an essay like this one.

Still, there are risks. One of the most irritating criticisms I've ever received was from a reviewer who didn't like a female character named Tiffany.

Tiffany, when cornered, chose to sit back and observe, rather than ranting, raving, and literally or metaphorically rattling the bars of her cage. My critic thought that made her a

stereotypically weak female—and me a sexist male for writing her.

There was just one problem: Tiffany was behaving exactly as I do in crisis. Rather than doing or saying something I might regret, I slow my voice, lower my tone, and become hyper-rational. Stop, think, and don't do anything irrevocable; that's my motto. Tiffany was also an observer, something I'd gone out of my way to point out. "You love to do that sit-and-listen thing where nobody realizes you're paying attention, when you're always two steps ahead of them," another character notes. In another place I was even more blatant, letting Tiffany describe herself as being in "fly-on-the-wall mode." I'm a journalist. "Fly on the wall" is a classic metaphor for the way journalists want to see themselves. Observe, assess, and don't reveal your own opinion; that's the dream (4).

One of my prize possessions is a letter I received early in my reporting days from someone who said I was the only reporter who'd ever portrayed her opinions accurately. What made that such a compliment was that I hadn't agreed with anything she'd said—but I had believed she had the right to have her views reported accurately.

The point here is that Tiffany was me, at least partially. Which meant that I got to read a review describing myself as having created a stereotypically weak female character—whose "weakness" was something I, a male, viewed as one of my personal strengths. It was a very strange moment.

But the risks can be even greater. “Phantom Sense” (Analog, November 2010) was perhaps the most deeply personal story I’ve ever written.

Superficially, it’s about a new military technology, but what it’s really about is loss. At the start of the story, the main character, Kip McCorbin, is a retiring special forces soldier who has lost everything: his wife, his career, his relationship with his daughter. He’s also been forced to give up a special “sense” created by that military technology—something he’s had so long it’s effectively become a part of him.

I won’t tell you what loss I channeled writing that story. Death, divorce, abandonment, failure, loneliness: we’ve all had one or more of them. What I will say is that my collaborator, Mark Niemann-Ross, unknowingly handed me the outline for that story a mere twenty-four hours after what had probably been the worst day of my life. I took one look at the plot outline and the characteristics it required of Kip, and thought: “I can channel this guy.”

Friends thought it was therapeutic. But it was more like anti-therapy. You do therapy for yourself, often to get in better touch with your feelings. I had no need for that: I was way too aware of my feelings. Rather, I did it for the story. Repeatedly, I unpacked the worst moments of my life and relived them, over and over, cataloging the minutia of how I felt, and how I acted. Then I twisted them, as I did with the autobiographical details in “Among the Singing Hills,” because I was writing about Kip, not myself. But if it rings true, it’s because the result is a mix of me

and not-me.

I also delved into a different type of heartbreak: the damage that people like Kip, however good their intentions, inflict on the women around them, particularly their daughters.

Kip doesn't mean to be a bad father. His job, with its erratic absences—long, dangerous, and secret—would make that very difficult for the best of men. But I wasn't in the mood to cut him slack. Through too much of my adult life, I've watched too many women, some of them very close friends, deal with the emotional wreckage such AWOL fathers leave in their wake, whether the cause is work, alcohol, excess expectations, or simply a deep-set inability to communicate emotion. And so, when Kip's daughter Cora gets a chance to give him a piece of her mind, I let her unleash it... in honor of all the Coras I've known who never got the chance.

"Wow," Mark said when he read it. "That's intense." And, he added about that and some equally strong scenes dealing with loss (about which he now knew the details of what had happened to me), "I think you bled all over the page."

Another friend agreed: "Yeah, there is blood on the page, isn't there? [But] that's a good thing."

And that, ultimately, is the power of this kind of boldness. Not all stories require it, but some do. And when they do, people may not know what autobiographical events you are channeling, but they will know the color of your blood, the saltiness of your tears. They may figure out things about you that

you didn't intend to make public, or make wild, inaccurate guesses. Some of you will be doing both of those about me, right now.

But if you're going to write—really write—those are the chances you sometimes have to take.

FOOTNOTES

1. Richard A. Lovett, "Making Unreality Ring True: Writers' Tricks for Bringing Stories to Life," *Analog*, January/February 2010.

2. Rain or snowmelt-fed river systems tend to have a many tiers of branches as you move upstream: a "dendritic" pattern like veins in a leaf. Spring-fed systems have stubbier canyon systems, with fewer branches. They also tend to be "cliffier," as seepage from springs undermines valley walls, forming box canyons.

3. For those who thought I picked the Hummer as some kind of political statement (and there were a few who did), I actually picked it simply because it had the power to pull the tank trailer. That was necessary for the story, to give Trista an easy way to refuel.

4. For old-time journalists, anyway. The openly opinionated reporting we see today by both sides on cable news is a different matter.

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Novella



The First Day of Eternity

by Domingo Santos

Seven hundred twenty-one years, seven months, and fourteen days after leaving Earth, the ship Diaspora 32 finally arrived at the planet. It wasn't its planet; it had never sought it deliberately...

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Special Feature

The First Day of Eternity

by Domingo Santos



There are inherent risks in trusting your descendents to finish your work.

Seven hundred twenty-one years, seven months, and fourteen days after leaving Earth, the ship *Diaspora 32* finally arrived at the planet. It wasn't its planet; it had never sought it deliberately. Project *Diaspora* had merely sent a whole series of "ark" ships (forty in the first phase, called "cradle" ships since their mission was to establish new offshoots of humanity, not to save them from some horrible fate) in all directions, toward all corners of the Universe, each in search of its own goal: a

planet, any planet, that might provide the minimum conditions to support life and launch a new humanity. It didn't matter how long it took to get there; everyone knew that, sooner or later, the goal would be reached.

In its 721 years of travel, the instruments of Diaspora 32 had examined more than seventy candidate planets, and in every case the ship had ruled: "Not suitable for colonization; we must keep looking."

Until now.

Rhina Solomon studied the ochre orb that floated in the center of the main screen in the ship's control room. As captain of the Diaspora, her place was here. Her responsibility, and that of the ship, was the 26,431 future colonists (pilgrims, they'd been called by the ship itself, emphasizing the double meaning of the word) that the ship housed. But that didn't keep her from envying Thor Ashner, whose shuttle was now just a shrinking black dot against the scorched planet in the final stage of its descent from Diaspora's geosynchronous orbit to the surface. Like all the other pilgrims, Rhina Solomon had never known, in her fifty-two years of life, anything but the ship's cold, confining walls, and the possibility of seeing something different simultaneously awoke in her desire and imagination. And a certain fear of the new and unknown.

At her side, the Caretaker guessed her thoughts; the Caretaker always guessed everything. Its imposing faceted eyes gleamed with an internal light from its steel-blue face. "The

ship's data are most encouraging," it said unnecessarily, as if Rhina didn't know it. "We should give thanks to the god of the stars for that."

And to the god of the ship for bringing us this far, thought Rhina, and to the god of the planet for putting it in our path, and to the god of the Universe for sheltering us all in its immensity. She wasn't an atheist, not even an agnostic, but she had never fully accepted the ship's religion, monotheistic like the ancient religion of its origins even though it was replete with all manner of gods. They, said the Caretaker, were all just manifestations of a single god, just as it and all the servants were manifestations of a single entity, the ship.

The Caretaker continued expounding its thoughts in a loud voice, with the cold, mechanical gravity befitting its nature and station. "When the shuttle returns with Thor and the others," it said, "we'll hold a great ceremony of thanksgiving in the festival hall. We must celebrate our good fortune in finally arriving safely at the end of our journey."

Rhina thought of the thirty-seven generations that had preceded hers since Diaspora 32 left Earth and had not had such good fortune.

"Yes, of course," she said. On the big screen, the shuttle had disappeared, swallowed up by the planet.

In reality Thor Ashner was not a shuttle pilot. In the refuge of a cradle ship voyaging toward infinity there were few chances for a shuttle pilot to practice his skills.

But the Caretaker was provident (the ship was provident) and in addition to his other duties and responsibilities, those whom he (and the ship) considered his pupils and protégés, and to whom he was at once servant, master, mentor, counselor, confessor, priest, and theologian, were his only reason for being. One of his many missions was to foresee all possible futures, and for that reason most occupants of Diaspora had at least two jobs: one inside the ship, during the long journey, and a second for when Diaspora finally arrived at its destination.

So Thor Ashner, although his shipboard specialty was hydroponics, had for years been practicing maneuvers around the gigantic mass of Diaspora in his little shuttle, to prepare for the day when they finally arrived at an adequate planet if that occurred during his lifetime, or to pass what he had learned on to the next generation if it didn't.

Now, as he and his shuttle slowly descended along the gravitational elevator that connected the ship with the planet's surface and contemplated on the screens the plain adjoining the last spurs of the mountain range that the ship had chosen as the best place for first landing, he couldn't avoid a tremor of excitement in his hands. After twenty-eight years of a sedentary life on the ship, he thoroughly enjoyed the novelty of the adventure. It had been a pure pleasure to make the first passes over the planet until the ship had chosen the optimum place to descend, and then to attach the gravitational elevator once Diaspora had established a geosynchronous orbit above the

spot. When Thor Ashner finally positioned the apparatus on the leveled patch of ground chosen for the foot of the elevator, he let out a sigh of relief. He turned toward his three companions. He felt the need to say something important, something transcendent, but nothing came to mind.

Fortunately, the servant who accompanied them was prepared for all types of contingencies. "This is a great day in the history of the expansion of the human race," it said in a solemn voice. "We claim these new lands in the name of all humanity. Let us praise the god of the stars."

"Let us praise him," Thor said, almost mechanically. The other three shuttle crew members imitated him. They all knew that, through the servant, those words would be indelibly engraved for history in the ship's memory. Thor opened the cargo hatch and let the spiders out: They scuttled out onto the ground to disperse and begin collecting all sorts of samples. Then the four men donned their envirosuits before opening the main hatch and going outside.

The first data collected from the air by Diaspora's automatic probes had indicated that the planet had an atmosphere very similar to that of Earth, with a slightly higher proportion of nitrogen (which made it a "poor" atmosphere) and good protection against solar ultraviolet. The axial tilt was slight, which meant seasonal variations would be minimal. Water was not abundant on the surface: The general aspect was arid, with only two moderate-sized seas and hardly any rivers. But there was plenty of groundwater and little tectonic activity: The planet

was undoubtedly old. These first results had led the ship to call it “pleasant, tranquil, and safe,” a backwater of peace after such a long voyage.

But the new is always different from the known.

Pier Olsson, the communication specialist, lifted his gaze to the sky before leaving the shuttle. “The sunlight is too bright,” he said, squinting instinctively for protection.

The others agreed even without looking up. It was noon, and the sun shone strongly straight overhead. There was not one cloud. For the four men, used to the constant ambient light aboard the ship, soft and relaxing, the brightness of the planet was overwhelming.

The servant gestured slightly with its hand. “I have sent this observation to the ship,” it said. “The Caretaker is preparing the first of the pyramids to be sent down to the surface tomorrow. It estimates that in a couple of days we’ll be able to anchor it on the ground and start using it. Meanwhile, until people can take shelter in it, we’ll strictly limit descents by the pilgrims, and sunglasses are being prepared for those who come down.” Its eyes were not faceted like the Caretaker’s, and its whole body, almost as much as its words and deferential tone, bespoke its subordinate status.

“We’ll hope all goes well,” Pier Olsson grunted, in a sudden bad mood. He shaded his eyes with his hand and tried to look directly at the sun. In a few seconds his eyes teared up and he saw concentric colored circles. “Damn it,” he grumbled,

squeezing his eyes shut.

Darkness had already fallen when they finished their preliminary work. They gathered their instruments, called the spiders back, and got ready to return to Diaspora.

Before reentering the shuttle, Aston Robell, the topographer, lifted his gaze to the crystal-clear sky, dotted with innumerable distant and brilliant stars. "I don't like this planet," he said. "There's too much space. Everything's too far away. I feel exposed." He shuddered.

Nobody answered. Not even the servant.

The first three generations had been the hardest. Despite all the psychological conditioning and training before their departure, you can't lock 25,000 people—men and women, old and young—inside a ship, however big and well-equipped it might be, and launch them on a journey toward eternity, without plan or destination, in search of a hypothetical new Promised Land, knowing that they will spend their entire lives inside that ship, that they will die in it before seeing anything different from those confining metal walls, and not expect it to have effects.

The fourth and fifth were generations of transition. Those born on the ship had never known anything else, and listened to their elders' nostalgic tales of the old life on Earth with curiosity and sometimes even a touch of incredulity. They watched the ship's disks, saw the images of a life they had never known, and wondered why they needed to keep those distant roots alive. They were skeptics by nature; life on the ship had made

them so.

Then, beginning with the seventh generation, when none of the Diaspora's original inhabitants remained alive, things began settling down. There was no longer a past to mourn, just a hypothetical future and the long journey toward it. It didn't matter where they wound up, or when; it was a pioneer road, a sacred quest. And they had before them all the time in the world.

That weakened the virtual roots that still connected the ship with Earth. And so was born, and gradually developed, the religion of the ship, successor but not heir of the original, which was gradually taking the place of the old religion of Earth.

Project Diaspora was originally conceived, developed, and financed by the great Jewish lobbies of Earth as a second Exodus from the incomprehension of gentile societies, to spread Judaism throughout the Universe. So the pilgrims chosen for the first Diasporas, symbolic representatives of the Twelve Tribes of Israel, were all strictly orthodox. They read the Talmud and the Torah, venerated the menorah, celebrated Yom Kippur, initiated their youth with the bar mitzvah, kept kosher, and preserved the purity of their lineages by strict maintenance of their patronymics, many of them traditionally historic, though they played freely with their first names.

But in spite of everything, as time passes, things change, become diluted, especially as people get farther from their roots. Once underway, the ship soon realized that it was

impossible to maintain the original status quo of the project, that it was necessary to adapt it to new circumstances.

In a way it's ironic that things happened as they did. The great bioelectronic brain that governed the closed universe of Diaspora 32 had been created to take charge automatically of all the tasks of control, government, and maintenance of the ship. Therefore the brain, with its strict mechanical logic, interpreted its mission as encompassing equally the container and its contents, the ship and its occupants. Especially its occupants. In reality, by that logic, they were the fundamental essence of the whole Project, its *raison d'être*, and their security and well-being motivated everything it did, from the recycling of the basic materials of survival—air, water, and food—to the strict control of population within rigidly established limits: from 25,000 to a maximum of 30,000 persons. Everything else was secondary.

And so Diaspora 32 began to refine the original Project according to its own parameters.

It had plenty of time ahead of it, so it did so unhurriedly and conscientiously. The super-computer integrated into it by the designers of the Project was able to confront all possible eventualities and make its own decisions, repair and reproduce itself, and, most important, improve itself as future needs required. So the first thing it did was to take complete control of itself. As a static component of Diaspora, it had been provided with a whole series of extensions and terminals ranging from the spiders for maintenance tasks and repairs to the servants

as liaisons with the ship's human occupants. But that wasn't enough. In spite of its great versatility, its enormous capacity and reaction speed, keeping track of all those individual appendages kept the brain busy on many fronts at once. It was inefficient. So it made its first big change: It eliminated the independence of its extensions, transforming them into integral parts of itself and thereby creating a unique collective, a kind of gestalt superorganism that was at once many and one, itself and all the others—which let it be everywhere at once and act simultaneously on all fronts.

There were those who lost no time in saying that the brain had taken over the ship, that it had become the ship. Which was basically true, among other things because it had been designed that way from the start. The brain had always been the ship and vice versa. Others, imbued with religiosity as persons of faith, thought that the brain had actually become the god of the ship, and in a certain sense that too was true.

Meanwhile, after assimilating all its extensions, the ship's brain, which now was definitely the ship itself, absolutely and irrevocably took the next step. It made the Caretaker its direct representative, its principal extension, its spokesman and permanent liaison to the pilgrims: their prophet, the Moses of the new Exodus. Communication became complete and instantaneous: It was the Caretaker and the servants, the Caretaker and the servants were it. It was the ship, and the ship was it. Father, Son, and Holy Ghost, the electronic mystery of the Holy Trinity.

The ship's own religion began from that point.

In Diaspora 32, once underway on its trip to nowhere, with much time ahead and very little to do with it, the observance of religious rites in a society that placed great importance on ritual kept expanding to unexpected heights. With successive generations, ritual grew more important than content, its significance drained away. And then came the great catharsis. The idea took root that God, the god of the Jews, with all that he signified, had stayed behind on Earth, that Diaspora had moved far away from his power and influence. And while a few leaned toward a fundamentalist atheism and others sought a new god to venerate in place of the one they had left behind, while they clung to their old but now empty rituals, the ship took the opportunity to create its own god and its own dogma. It was a new, simple, nebulous religion with a nameless and insubstantial god and many other secondary gods (or manifestations of him), a polytheistic monotheism that, despite expectations and perhaps because of its simple and contradictory nature, quickly took hold among the pilgrims thrown into the search for a new Promised Land, who had, by leaving Earth, left behind the very essence of their beliefs. A composite religion, heir of all the religions of Earth together but without belonging to any of them, a machine's own religion. A religion that was all ritual, a religion not for excessive thought. A new religion in search of its own destiny, a religion that wasted no time in infiltrating consciences and that even had its own Bible (compiled, of course, by the ship), in which "Genesis" was

the departure from Earth and which was, in essence and in imitation of the old sacred texts, no more than a chronicle of events and a compendium and practical manual of customs for the ship's occupants to observe during their long journey, all tinged with an obscure mystic-religious symbolism and largely preserving the paraphernalia of the old and increasingly empty rituals integrated into their collective unconscious.

There in its secret corner deep in the bowels of Diaspora, satisfied with its work, in the seventh generation after beginning its religion, the brain that was the ship rested.

They were all gathered in the great central festival hall of Diaspora, the 26,431 pilgrims, surrounded by all the servants free of their other duties. As always, the Caretaker presided, on this occasion in his capacity as pastor. Standing in the center of the great circular altar of the circular hall, surrounded by 360° of screens showing abstract but subtly subliminal images, looking his most majestic and solemn, with his brilliant faceted eyes illuminated from within and his voice grave, with pauses inviting reflection, he recited the litanies, listening to the congregation's responses, and then began his homily.

He spoke of the Promised Land and the long voyage that had finally led them to it. He mentioned those who had fallen by the wayside, integrated by the recycling of their bodies into the ship's community, the recitation of their names and the dates of their deaths, a roll of honor that would mark forever the long road traveled by the ship. They had not died in vain, he said. Their seed, those to whom they had given their bodies, would

bear fruit in this new world, which he now christened, with as much intensity and little originality as befit a machine, and ending any possible mystical connotation about the Promised Land, with the blandly functional name Earth Two.

Asbart Cohen, lost among those attending, didn't pay too much attention to the Caretaker's words. For him they were just another empty ritual among many empty rituals. He wasn't an atheist, or even an Agnostic, but he had never accepted the religion developing around him, appropriate to a closed community like the ship, in which the original tenets had been diluted and transformed into a derivative serving mainly as a means of escape through empty ritualism. In his role as sociologist (his work aboard the ship consisted mainly of studying the relationships among individuals and trying to help them develop as smoothly as possible), he understood that the ship's religion, which had little to do with the old religions of Earth (even the Hebrew) though it was a composite of all of them, had been a necessary departure at a critical juncture in Diaspora's journey. Man will always need something superior to himself in which to believe blindly, he told himself, something beyond his comprehension but in which he can trust and which will watch out for him from inaccessible heights.

In Diaspora that was the ship itself.

"Tomorrow we shall begin the transport of the seven pyramids to the surface," the Caretaker said in his grave and solemn tone, turning to the practical and raising his hands in a studied gesture. "Meanwhile, we can put our affairs up here in

order and prepare for the descent, which will occur in stages. A great change in our lives draws nigh. Now let us give thanks to the god of the planet for welcoming us here. Let us sing his praises.”

The congregation intoned the canticles to the old gods who had accompanied them all along the way and to the new ones that were going to replace them. The god of the Universe was immovable, of course. The god of the stars had remained behind along the way, like the god of the Earth before him, the first substitute for the already forgotten Yahweh, now replaced by the god of the planet. The gods of little things would live on, of course, as the tutelary gods of everyday life, but they would keep adapting to new circumstances and needs, and they were only minor gods. The god of the ship would continue at its side, of course, giving instruction from orbit. And the Great God of All Things, of whom hardly anyone ever spoke and who for many encompassed all creation at a level even farther beyond human understanding, would continue watching over all of them from his nebulous and never-mentioned home.

Asbart thought about the pyramids that would be buried, against all logic and by the ship’s own decision, upside down in the planet’s dusty ochre soil instead of being set on the surface facing the sky. He wondered whether in time there would come to be a god of the depths of the planet and a separate god of the surface. He didn’t know how to answer that.

The preliminary examinations of Earth Two by Diaspora’s automatic probes had not yielded much information. Although

the dryness, the relatively smooth surface, and the scarcity of tectonic activity suggested an old planet, other signs indicated that life here had begun late. Plant life was little evolved, with few flowering plants, and no large animals of any kind were detected. If fish had ever existed, they were extinct. And although there were plenty of animals that might be considered insects, some of them of more than respectable size, amphibians and reptiles were conspicuous by their absence, as were birds. It would be necessary to study fossil remains, if there were any, to trace the paths of evolution. Its pinnacle seemed occupied by a few species of small, hairy mammals, barely half a meter long including the tail, timid and skittish, mostly marsupials, and seemingly in a constant struggle for survival.

But, most important, there were innumerable microorganisms and single-celled creatures, both aerobic and anaerobic, among which, the principal medical servant pointed out immediately, could be the equivalent of a great variety of viruses, bacteria, and other pathogens. The planet's little surface water was a veritable culture dish, and one of the reasons for avoiding it had been the danger of infections and plagues. During its long voyage, Diaspora had eliminated all pathogens from its interior, to the point where the ship had long since become an absolutely sterile environment. Its air was totally aseptic, which was a great advantage for the health of its occupants while they were aboard, but also posed a great vulnerability as soon as they left the ship's protection. Not only

because they would be exposed to all kinds of unknown pathogens, but also because, more important, after seven centuries of isolation their immune defenses were nonexistent. Diaspora was very aware of distant examples from the ancient history of Earth, as when the first Spanish conquerors decimated the native Americans by infecting them with their diseases, and very aware that its residents were absolutely defenseless against any type of attack.

So right from the start it took all possible precautions. In the initial descent to the planet, Thor Ashner and his three companions left the shuttle protected by hermetic suits, as if going into space, and on their return to Diaspora both they and the shuttle itself were subjected to an exhaustive process of decontamination. No one could come from the planet into the ship without that strict requirement, lest they endanger the environmental sterility aboard Diaspora. In fact, Thor Ashner wondered whether the fact that the four men who accompanied the servant on that first descent—an act completely superfluous except for its symbolism—hadn't been to test the effectiveness of the aseptic measures dictated by the ship.

This decontamination protocol would remain in effect until specific defenses had been developed against all the main pathogens detected on the planet. That could take a long time, thought Arnal Lepovsky, recently named chief virologist by virtue of his knowledge of microbiology, specializing in hydroponics. Lepovsky had protested his appointment, arguing that his knowledge was fragmentary and limited to plants, not animals.

Diet aboard Diaspora was almost exclusively vegetarian, the animal kingdom represented only by a few pets (dogs and cats); a few goats, sheep, and chickens to produce milk, cheese, and eggs; and cloned embryos destined to be grown to create a farming industry on the planet where they landed, if they were compatible with the native life. But the Caretaker maintained that while nobody on the ship was an expert in animal biology, it was never too late to learn, and they would have to learn many things once they were settled on the planet. So Lepovsky accepted. The Caretaker's words were invariably wise, being the expression of the ship's own wisdom.

The descent of the pyramids began first thing the next morning. Originally seen as just the first step in settlement of the planet, there were seven of them, preassembled and launched empty from Earth, stuck to the hull of the ship like barnacles. Each had a hexagonal base and seven stepped levels or rings. Six of them were truncated and intended for housing, with a capacity of up to 50,000 persons each. The seventh, the only one not truncated, had ten levels, dedicated to housing the central power plant, general controls, and all the associated services. They all fit together to form a solid circle of hexagons around the central service module, buried upside down so their bases formed a flat, smooth platform at ground level. Seven inverted pyramids to isolate the first colonists of Earth Two, after centuries of confinement, from the intimidating open space of the planet's surface, and thus convert the first habitat on the planet into a new burrow, a prolongation of the cozy enclosed

and protected environment of the ship.

"You can't expect someone who's lived his entire life in the confined space of a ship to suddenly open up to the immensity of the open surface of a whole planet," said Asbart Cohen to Captain Rhina Solomon. "Have you ever heard of agoraphobia?"

The captain shook her head. Cohen sighed. "It's the fear of open spaces," he explained. "The opposite of claustrophobia, the fear of enclosed spaces. The first pilgrims needed more than five generations to free themselves of the claustrophobia that the ship caused in them. Now we're up against the opposite. You can't pretend that after so many generations of enclosure we can reverse the process overnight. We all instinctively seek the protection of enclosed spaces."

Fortunately, preventive measures proved to mask the general feeling of anxiety brought on by the enormous open spaces of the planet. The Caretaker did his part by imbuing the process of decontamination with an appropriate sense of mysticism through constant ceremonies of purification and thanksgiving, with ritual songs and dances drawn from ancient Jewish solemnities dug up for the occasion after centuries of neglect; and by prudently arranging things so that most of the future colonists would not descend to the planet until the pyramids were completely deployed and operational and people could take refuge in them as soon as they left the shuttles.

“There’ll be plenty of time for everything,” he told the captain with his habitual machine pragmatism. “Nobody’s rushing us.”

Nobody and nothing except perhaps the anxiety of the pilgrims themselves, who paradoxically longed for the very thing that they most feared, perhaps to free themselves once and for all from the intimidating prospect of encountering something completely new and unknown and the fear of what they might find “down there” after a life of secluded security in the ship, regulated and predictable from birth.

The three to five weeks estimated for the installation of the pyramids stretched into eight: Excavation went slower and the work of settling the pyramids was more delicate than anticipated. The servants could have handled it all without human help, but the Caretaker’s opinion—the ship’s opinion—was that putting a growing number of pilgrims in direct contact with the reality of the planet they were going to occupy, right from the start, was the way to go, even though their work was often more an impediment to the efficiency of the machines. It was good for the travelers to get used to their new life as soon as possible, and the impressive tales told by those who had descended to the planet to those who hadn’t, on their return to the ship after completing their tours, were a constant font of inspiration. The nightly psalms and prayers to the god of the planet, in a great ceremony of thanksgiving for their good reception here, soon became one of the main collective activities on the ship, often climaxing with sacrifices of chickens

and once even a number of lambs, which were then consumed ceremonially in homage to an ancient ritual of the old religion of their origins.

But despite all that there persisted among many of the pilgrims a general feeling of caution and fear when they went down to the planet. It was something like a primordial instinct that impelled them, after their first glimpse of the open spaces around them, to automatically seek the comfort of enclosed, “protected” spaces. And the measures adopted from the beginning as hygienic precautions partly masked and justified that general sentiment.

But a population can't be kept isolated indefinitely from its environment. The toxicologists concerned with such matters—a few pilgrims specializing in medicine, aided by a group of medical robots (or vice versa)—didn't take long to realize that total prevention of the possible illnesses endemic to the planet was impossible without first being exposed to them. So, in the fourth week after the beginning of the pyramid installation, the Caretaker, arguing that total isolation could never detect and identify the pathogens that could affect the pilgrims, much less immunize against them, decided to replace prevention with open but strictly controlled contact. Thus was eliminated the prohibition of direct contact with the planet, while taking great care with protective measures and watching for consequences.

Not surprisingly, the habits of the pilgrims who descended to the planet didn't change too much as a result. They still kept their direct contacts with Earth Two to a minimum. As soon as

they left the shuttle on the great platform formed by the joined bases of the pyramids, set up as a landing zone and foot of the gravitational elevator, they looked around suspiciously and hurried into the decontamination chambers that gave access to the interior of the pyramids and the relative comfort and security of their metallic walls.

Hardly a week had passed since the change of protocol when the first symptoms of infection appeared in one of the colonists: fever, aches, flushed face, slight tremors. The medical robots hastened to make an in-depth analysis of the patient, and the ship's brain reviewed its extensive archive of terrestrial diseases without finding a match. Evidently, and logically, this was an unknown affliction endemic to Earth Two.

The long-ago planners of Operation Diaspora, back on Earth, had foreseen this eventuality and given the brains of all their ships the resources needed for detection and analysis of any type of strange microorganism. Four days after the first symptoms, the responsible agent was detected, isolated, analyzed, and cultured: a new type of aerobic germ whose effect on the human body was to interfere with respiration by absorbing part of the oxygen for its own metabolism. The cultures proved it to be mild and easy to combat, since the very oxygen that it absorbed drastically reduced its lifespan. In two more days a vaccine was ready and given to all the pilgrims (by then twenty-eight were affected), from which they could then develop their own defenses. After five days of treatment the first victim had recovered completely and his body showed not the

slightest trace of the germ.

Over the next week there were five other cases of new infections native to the planet. The small army of robots and servants worked around the clock (the doctors rotated, the servants needed no sleep) seeking and finding the causes and antidotes. No patient died, none got worse, all recovered in a few days. Apparently, was the general conclusion, the peculiar diseases of Earth Two were not very virulent.

But that didn't change anybody's desire to hole up in the pyramids as soon as they went down to the planet.

Six weeks after the descent and anchoring of the first pyramid, when they were all fixed in place and the colony was settling in, the first rollers appeared.

One of the reasons for choosing that site for the first settlement had been the almost complete absence of animals in the vicinity. Earth Two was very sparsely inhabited, and from the first descent hardly anyone had seen any animals around the installation except some small groups of insects resembling something between ants and spiders, which made strange geometric webs among the branches of the slender trees of a nearby grove, the only sign of vegetation of any size except for some dry bushes.

The rollers—nobody knew who gave them that name, but it couldn't have been more descriptive—appeared abruptly one evening, almost at nightfall, and they appeared in droves. They descended in appreciable numbers from the foothills of the

mountain, as if they had always lived there, and stopped, curious, at the edge of the platform formed by the bases of the seven pyramids, as if examining them. They were balls of golden-brown fur no more than forty centimeters in diameter, with no more distinctive traits than two little frontal slits that might have been eyes and two lateral orifices that might have been ears, and with nothing resembling feet or other means of locomotion. They moved by rolling themselves at fiendish speed and stopping so abruptly that it looked as if they appeared suddenly out of nothing. When someone approached them, they simply left in a burst of speed, giving the impression that they disappeared into thin air.

From the first, they attracted attention and provoked curiosity. Appearing always toward dusk, they were a welcome novelty in the otherwise tedious process of settling in, and helped some of the pilgrims—who were beginning to call themselves that—lose some of their fear of the open air. There were a few attempts to catch one, always without the slightest result. They simply moved off a few meters, to be out of reach, and stopped again; or they fled as if sensing that they were about to be caught, and then no one could match their speed or their zigzag course. Some traps were made, but no roller ever fell into one; they seemed too clever.

Soon they had become just one more part of the landscape around the pyramids. They seemed to keep gaining confidence, and soon ventured onto the platform, even settling right next to the access hatches, or forming a circle around the

cargo shuttle after it landed or when it was preparing to take off, calmly observing the unloading of supplies and men or the preparations to return to the ship. But they always moved off as soon as the unloading was finished, or a few minutes before the take-off, as if sensing that the show was over. Sometimes someone tried to catch one by surprise while leaving the shuttle, always without the slightest success. Soon it became a game.

Some even tried offering them bits of food. The rollers ignored them completely.

At eight years old, Veronica Julia was a lively and smart girl, incapable of staying still for one moment. Being the granddaughter of captain Rhina Solomon and daughter of chief zoologist Melo Spiegel gave her certain privileges, which she always knew how to take advantage of. She belonged to that generation with compound names (one of the ways of distinguishing the generations aboard the ship had been to give each generation characteristic first names: exotic, mythological, literary, historic, imaginary . . .), and Veronica Julia was very proud of hers, to the point of always omitting her surname. She took a certain inner delight in letting people think that the second part of her compound name was her surname, although it didn't have a Hebrew root. She never corrected anyone about that until they found out in other ways, and then she giggled to herself.

Veronica Julia also belonged to the small number of pilgrims who from the start had never been troubled by agoraphobia. She liked to go out in the open air of the planet

whenever she could, especially at night, and contemplate the star-spangled sky. They had warned her about the dangers of contracting some infectious disease among the many that undoubtedly infested the air, lying in ambush for possible prey, but she ignored the warning. She always took Claudia Antonia, her favorite doll, with her, and conversed with her in the pale silvery light of the planet's two moons, letting time go placidly by until some adult asked her to come back into the pyramid because it was late.

She often found herself surrounded by rollers. They formed a full circle around her, some four or five meters off, and stood motionless, a ring of little fur balls, as if they were studying her through the narrow slits of their maybe-eyes or listening through the little orifices of their maybe-ears. People whispered that Veronica Julia had something that undoubtedly attracted them, because they didn't act that way with anyone else. But then, nobody else spent so much time loafing around in the open air outside the pyramids, seated on the metallic ground, watching the comings and goings of people around her, watching the sky and chatting with a doll.

Veronica Julia's father had asked her on several occasions, since she seemed to awaken some interest or curiosity in the rollers, to try somehow to get close to them. The child had tried several times, without the slightest success, but neither did she get the usual result. They never fled precipitously when she tried to approach them; they just backed off a few meters, unhurriedly, and reformed their expectant circle. Only

when some other pilgrim approached did they break their circle and leave—but they didn't dart away at their usual devilish speed; rather, they moved off calmly and deliberately, as if in spite of everything the girl were still attracting them in some strange way.

"For some reason they have a special interest in you," her father insisted thoughtfully. "If only we could catch one. . . ."

Veronica Julia didn't like those words. She didn't know what her father and his team might do to a roller if they caught one, but she imagined ugly and disagreeable things. In her whole life her only contact with the animals on the ship—except her cat, Mr. Whiskers, who was genuinely terrified of the open surface of the planet—had been sporadic and infrequent, limited to a few visits with her father to the pens and buildings where cows and chickens and goats and sheep were kept, and once to the cloning lab where he periodically did something to keep the equipment in good working order.

Finally, one night when the combined light of the two moons cast a soft silver-gray glow over the landscape, it happened. The rollers had formed their usual circle some five meters from Veronica Julia and seemed to be listening with fascination to the story she was telling her doll, a fantastic tale in which Mr. Whiskers was a dragon and her father a powerful magician capable of the greatest feats. Veronica Julia had a boundless imagination, spurred by her constant reading of the ship's fantasy disks. The rollers swayed lightly to the rhythm of words and gestures, immersed in her fantastic tale, as if they

understood what she said and let themselves be rocked like a baby in a cradle by her voice and motions, a collection of little balls of gold-brown fur beating time to her story among the dry metallic surf of the platform.

And suddenly one of them came forward. It moved very calmly, rolling slowly, almost as if not touching the ground. In fact, Veronica Julia thought, it didn't seem to be touching the ground. It came straight toward her and stopped less than half a meter away. The furball vibrated for a few seconds, while the circle of other rollers remained motionless, as if waiting, their rhythmic motion forgotten.

Veronica Julia stopped gesturing and speaking to Claudia Antonia, and her story came to a halt. For several moments the scene stayed motionless, as if captured in a still photograph. Then, slowly, timidly, Veronica Julia extended her hand.

The roller retreated a few centimeters and stopped again.

"You know what, Claudia Antonia?" said Veronica Julia to her doll. "I'd like to pet one of these little animals. They must be as soft and cuddly as Mr. Whiskers. Do you think they'll let me do it if I try?"

It was evening now; they were alone on the platform. She waited a few more seconds before extending her hand again. This time the roller did not pull back. The girl's fingertips touched its soft fur. It was warm, almost as warm as her own body. For an instant she thought of her father, and that probably, if she let go of her doll and reached out her other hand, she

could encircle the little ball that was the roller with both hands and prevent it from fleeing.

But she didn't do it.

Nor did the roller pull away. It let the girl's fingers gently scratch its fur while it emitted a soft sound, not exactly a purr like Veronica Julia would have expected from her cat, but something between a snort and a hiss, something like a pffft, yet nevertheless suggesting not alarm or warning, but rather contentment.

And then the miracle happened: the roller opened, unfolded, unrolled. The ball of fur suddenly ceased to be a ball and stretched upward, blossoming into a long, thin animal some fifty centimeters high, with a goldbrown back and whitish belly, with four very short legs ending in tiny claws and a short, stout, flattened tail that it used with its hind legs to hold itself upright. It had a round head with a flat face in which the nose hardly protruded past the rest, and a lipless mouth that was just a small slit. At the sides were two short, rounded ears, and two enormous buttonlike eyes occupied almost the entire upper half of the face, with big, vertical elliptical pupils in the center of honey-colored irises that contracted and dilated as its gaze shifted.

For a long moment Veronica Julia didn't know what to do; the surprise had been too great. The roller stood motionless in front of her, upright on its hind legs and stabilizing itself with its tail, observing her attentively. In that position, its eyes were

almost on the same level as those of the girl seated on the ground.

Suddenly Veronica Julia realized that her doll lay forgotten on the ground at her side. She began to laugh softly.

The roller again made its characteristic sound. It didn't move. Neither did the rollers who formed a circle around them.

Finally Veronica Julia recovered enough to take the initiative once more. Again she extended a hand toward the roller. She didn't quite touch it, but stopped a scant few millimeters from its face. Then the roller slightly opened the slit of its tiny, lipless mouth and stuck out a rose-pink tongue, long and slender, with which it gently licked the palm of the girl's hand. Veronica Julia let out another giggle. The roller let out another pffft.

And then the spell was broken. A couple of pilgrims emerged from the pyramids' nearest access hatch. They didn't have time to see anything; the rollers' reaction was instantaneous. The one in front of Veronica Julia rolled back up, changing back into a ball in mere tenths of a second, and they all fled. This time they really fled. Before anyone could realize anything, they were gone.

"Oh, no!" shrieked Veronica Julia, frustrated. "Oh, no!"

The couple—a man and a woman, both young—looked uncomprehendingly at the girl.

"Didn't you see anything?" Veronica Julia asked them impatiently. "Did you really not see anything?"

She didn't wait for their answer. She grabbed her doll in a flash and ran off toward the entrance hatch to tell her father everything.

Veronica Julia was a fanciful child, given to imagining the most improbable tales. Her father listened attentively, but didn't believe her.

"I'm telling you the truth, I swear to all your gods!" exclaimed the child, irritated. "It unrolled, looked at me, and licked my hand!"

That last made Melo Spiegel shift gears. He whisked Veronica Julia off to the analytical lab and asked her which hand the roller had licked. The right, she indicated. An analysis of the fluids retained on her skin showed the presence of unidentifiable compounds, different from the sweat and other secretions of human skin. The Caretaker was notified right away. It wouldn't have been necessary, because the results of the analysis had been transmitted automatically to the ship's brain and from there to the Caretaker, but one had to follow protocols. The Caretaker thought Veronica Julia could be a good first contact with the planet's indigenous life.

"Oh, but I don't know whether Pfffft will come back!" the child exclaimed, frustrated. She had decided the roller's characteristic sound was a good name for it.

Machines are not big on intuition, but the Caretaker was the exception that proved the rule. "Oh, it will," he said. "Indeed it will."

Thus was born the legend of Veronica Julia and her contact with the rollers. From that moment on she was encouraged to spend as much time as possible outside, taking advantage of her lack of agoraphobia, in the hope of a future contact. A tent was set up near the pyramid platform to protect her from the sun and keep her as comfortable as possible at any time of day, and no one else was permitted around it. As witnesses to whatever happened in the event of a new contact, all kinds of cameras and detectors were set up in and around the tent, including a communicator through which her father could give her instructions at any time.

In the next two weeks, absolutely nothing happened.

"They won't come back," Veronica told her father, half pained and half irritated. "They know you and your team are here, and that keeps them away. Besides, you know they only come out at dusk. You have to leave me alone with them."

After many discussions, Melo Spiegel agreed. "Okay, we'll do it your way," he said. "We'll leave you alone."

"And take away the tent," said Veronica Julia.

"But you'll get sunburnt."

"I don't have to be outside all day. I like to go out when the sun has set. So do they."

"Okay." At heart, Melo Spiegel trusted his daughter's childish wisdom.

So Veronica Julia went back to her original routine of going

outside at nightfall, alone, to tell her fantastic stories to her doll. But now she sought out her own space; she didn't want anyone to interrupt any possible contact. She headed for the nearest foothills and found a secluded and comfortable nook, where she set up what she called her "story room": a small mat, a cushion, and a bottle of water. And she began telling Claudia Antonia new tales of epic feats, in which the rollers played an important role.

For several days nothing happened. Then the rollers started coming back and gathering around her.

They did it gradually, as if they were spreading the news to others. They formed their usual circle, first a few, then a few more. They sat there as if listening, as if waiting for something, and they stayed there when the girl, seeing that nothing was happening, finally gathered her things and went away. None of them ever followed her.

On the eleventh night a roller detached itself from the circle and approached her.

For a moment Veronica Julia thought her heart would stop. The roller stopped in front of her, a scant half meter away. For a few moments both faced each other, motionless. Finally, slowly, the roller unwound: its body stretched out and stood up, until its eyes were almost on a level with those of the girl, seated as always on the ground. Its lenticular pupils contracted slightly, as if questioning.

"Pffft?" Veronica Julia asked timidly, hesitantly.

The roller shook its body slightly in a sinuous, undulating movement. Veronica Julia extended a cautious finger as if to pet it. The roller drew its head back a little, opened its mouth slightly, and stuck out its long, slender, pink, wet tongue. It wrapped it gently around Veronica Julia's finger in a calm, caressing motion.

The girl let out a giggle.

"Pffft," the roller said softly.

Veronica Julia couldn't contain herself. Even at the risk of frightening the roller, she stretched out her other hand, gently grasped the little animal's head with a hand on each side, just at the height of its ears, drew it toward her, and planted a long, wet kiss on its cheek.

There was a general agitation in the circle of rollers. Veronica Julia had the momentary feeling that Pffft (if it was really him) was going to curl back up and roll away from her at full speed. There was a kind of vibration in the little body whose face she still held with both hands, but that was all. The roller looked directly into her eyes, its pupils wider than ever.

"Pfffffft," it said, and Veronica Julia had the impression that for an instant its face took on the same expression as that of Mr. Whiskers in his moments of feline ecstasy.

Time froze for what seemed an eternity. Then the roller moved its body closer to hers. Its legs were too short to embrace anything, but the girl had the impression that it wanted to hug and be hugged. She remembered Claudia Antonia and

how she always squeezed the doll in her arms while playing. Instinctively she enfolded the unresisting body of the roller in a soft embrace and pressed it against her breast in a gesture of both affection and protection.

“Pffffffft . . .,” said the roller, and the sound couldn’t have been more like the purr of a contented cat.

Veronica Julia would never be able to remember how much time she spent holding the roller, petting it gently, feeling its warmth and the beats of its little heart, hearing its peculiar satisfied sound: not a purr, not a hum, not exactly a snort, but with something of all of those. It might have been an eternity; time seemed to have stopped in her neighborhood, as if encapsulating her in an infinite instant. The roller had its eyes wide open and raised toward her, its pupils completely dilated while it gazed steadily at her, as if it wanted to plumb the depths of her soul.

And suddenly the trance was broken. Not abruptly, but naturally and gently, like someone saying good-bye to a friend. The roller pulled away from her, without looking away, and Veronica Julia let it go. For a moment the animal remained standing in front of the girl, as if evaluating the last traces of that ultimate sensation, and then folded calmly into itself, curled up, and became once more a ball of gold-brown fur indistinguishable from all the others that surrounded her. The circle broke up and the rollers dispersed slowly, as if in a procession. In a few minutes Veronica Julia was again alone in her story room.

She ran off to tell her father.

Melo Spiegel was tremendously excited at the news. He regretted not having any graphic record of the encounter, but he did not criticize his daughter for refusing to take any recording device with her. He called a meeting of the zoological team, with the Caretaker at its head.

"It seems that the rollers are the most evolved species on the planet," suggested one of the zoologists, after listening several times to the recording of what Veronica Julia had told her father about the encounter. "At least the most intelligent."

"But from all we know, their hands lack an opposable thumb," another put in. "They can't use tools, and without that essential—"

"That's an erroneous old convention from traditional terrestrial zoology," said the Caretaker from the throne of wisdom that came with being the direct incarnation of the ship's knowledge, "the fruit of its special development toward primates and man. Many animals on Earth get along perfectly in their habitats with no need for a thumb. Being able to use tools is not a sinequanon for the development of intelligence."

"But you and your servants have thumbs, and thanks to them you've made yourselves the operative extensions of the ship, which doesn't have them."

Melo Spiegel thought he saw the hint of a smile on the Caretaker's mouth grid. In fact, he thought, the handicap that made the ship's brain depend on its physical extensions to

interact with its surroundings was not its lack of opposable thumbs, but its lack of mobility. And it had known very well how to solve that problem.

“Every case is a world unto itself,” the machine said in a condescendingly didactic tone. “There are many ways to interact with the environment. Not everything boils down to physical manipulation of matter.”

Long, nitpicking arguments led to the obvious conclusion that it was necessary to study the rollers in more depth. So a plan for direct study was drawn up. Given how Veronica Julia felt about her protégés, she was left on the fringes of the plan.

The first thing that had to be done was to pin down the rollers' habitat. Evidently, they lived in the foothills near the pyramids, although at first glance there was no sign of their presence. The most sophisticated detection equipment went over the area with a fine-toothed comb and promptly and predictably got results. On the side toward the pyramids, the lower slopes of the mountain were riddled with a complex labyrinth of tunnels, galleries, chambers, caverns, intersections, and branches that formed something like an immense and chaotic underground city. Heat detectors showed that it was inhabited, though the number of its occupants could not be determined. The sizes of the ones that could be determined individually matched those of the rollers, and although many were always moving around they tended to concentrate in nuclei within the whole, great collections of mass indicating that some parts of the enormous subterranean labyrinth were densely

populated—mainly a series of large hollows that the colonists called dormitories—while others were practically empty. There were many exits from the complex, but they were so well camouflaged that they were practically invisible to the human eye, and only the precision of the detection apparatus revealed them.

Veronica Julia kept going to her story room. But, to her surprise, alarm, and disappointment, the rollers again stopped coming. The first three days she blamed the intensity of that first encounter. By the fifth day she didn't know what to think. On the seventh day she went to speak with her father.

Melo Spiegel knew what was happening. He had had remote surveillance cameras installed around his daughter's story room, far enough away to be unnoticed but close enough to clearly record everything that happened there. Of course he had said nothing of this to Veronica Julia.

"Maybe they're more timid than we thought," he suggested. "Maybe they need some time to recover from that mutual first impression. Maybe after that first bold act, now they're afraid." In his heart of hearts he didn't really believe any of those three things.

"I don't know, Daddy," said the girl. "You aren't plotting something against them?"

Melo Spiegel adopted the most innocent of expressions. "Us?" he lied through his teeth. "We would never do anything like that. Besides, it would go against our religion." One of the

fundamental precepts of the ship's religion was that all life is sacred.

For the ship, the indispensable first step in the physical conquest of the planet was to learn and understand all the elements that made it up. So, some time ago it had launched an exhaustive study of the flora and fauna of the various regions of the planet, just as the geologists had undertaken an in-depth study of the crust of Earth Two. Part of the ship had been set aside for the collection of all types of living specimens, native plants and animals conveniently confined in stasis fields until they were needed. Eight thousand species of plants and twelve thousand species of animals (almost ten thousand of them insectoid) had been collected. But not one roller had been caught. In fact, no rollers had been detected in any part of the planet except the one chosen by Diaspora for its primary base. All attempts to penetrate their burrows by one of their many entrances ended in catastrophic failure when the tunnels caved in as soon as the explorers were a few meters inside. It seemed that the rollers knew very well how to preserve their privacy.

Veronica Julia kept going to her story room every night, with her inseparable Claudia Antonia as her only listener. A couple of days her mother (who served as official chronicler of the pilgrims' settlement on the planet) tried to join her, but the girl was able to talk her out of it. The woman went off a bit frustrated, without understanding her daughter's reasons.

Fifteen days after Veronica Julia returned to sitting alone in

her secluded corner after the historic encounter, the rollers returned.

Or rather, the roller returned.

It came down the mountain as they had always done, by leaps and bounds, but this time alone, and stopped at its customary five meters from Veronica Julia, quivering slightly but without abandoning its spherical shape. For a long moment, child and animal remained motionless, face to face, as if studying each other. Then Veronica Julia ventured a timid: "Pffft?"

As if moved by a magic word, the roller opened up before the girl. It did it slowly, as if reluctant, and kept its five meters of distance; it did not come forward. Veronica Julia couldn't tell whether it was the same roller she had hugged the other night, though something inside her told her it was. She waited a few moments, then, slowly, holding Claudia Antonia with one hand, she stood up.

The roller did not move away.

Very, very slowly, the girl approached it. The roller kept raising its gaze to avoid breaking eye contact, but otherwise it didn't move. When Veronica Julia was within half a meter she knelt down, so their two pairs of eyes kept looking at each other on the same level. She laid her doll aside.

"Pffft?" she asked again, uncertainly.

"Pffft!" the roller responded emphatically. It leaned forward, standing on its hind legs and tail, and extended its short

forepaws like little arms in an unmistakable gesture of invitation. Veronica Julia extended her own arms, and girl and roller embraced tightly.

Veronica Julia wasn't sure how or when it happened, but when her tear-blinded eyes again looked around, her story room was filled with a circle of rollers, more of them than ever before.

And in the observation room of the central pyramid, Melo Spiegel had the feeling that they had taken another great step forward.

More than seven months had now passed since Thor Ashner's shuttle made its first descent to the planet, and 80 percent of the colonists had moved down to the surface, when two profoundly important events happened in the colony: a violent storm that pounded the pyramid zone unexpectedly and mercilessly, and the first three traumatic deaths on the planet.

Rain was a real rarity on Earth Two: The planet's aridity marked its meteorology like a stigma. In the almost eight months since they'd been here it had only rained three times in the zone, and so little that it seemed a mere token. The planet's few rains were blocked by the mountainous zones, and the porous soil eagerly absorbed the little water that fell from the sky until it was stopped by some impermeable layer that trapped it in great underground pools or made it circulate underground until it flowed forth into some river or one of the planet's two seas. Fortunately, the groundwater under the

pyramid complex was abundant enough to guarantee the colony a good permanent supply. But that did not reduce the feeling of extreme aridity that the country produced.

So it took everyone by surprise—even with the routine weather forecasts that the ship periodically made from orbit—when suddenly a strong wind began blowing from the other side of the mountains and the sky filled with clouds. It was so sudden that nobody was prepared for it. In less than fifteen minutes the winds had reached a speed of more than a hundred kilometers per hour and the rain began to fall intensely and violently, a driving rain that carried with it a great deal of suspended dust. The sky, suddenly dark, was streaked with an uninterrupted succession of tremendous electrical discharges, an impressive display of blinding lightning bolts and deafening thunderclaps.

Orson Leibovitz, the ground captain, a role split off from that of Rhina Solomon after the initial descent and corresponding to hers (now renamed captain of the ship), watched the unexpected spectacle via the screens in the control room of the central pyramid. He was as much surprised as impressed and alarmed. None of the pilgrims had anticipated anything like this. People who had gone outside to carry out their routine duties around the pyramids—planting the first crops, fencing the first stockyards, raising the first buildings on the surface—had returned hastily to the interior of the pyramids, terrified.

But out there, some distance away, two caterpillar crawlers

had been caught in the midst of their exploratory mission, and the electrical storm made communication with them very difficult. Orson Leibovitz didn't know how big an area was affected by the phenomenon, or how long it might last, and didn't know whether the crawlers had been affected by the downpour. He hoped their occupants had had the good judgment to park the vehicles where they were until it had blown over.

"I've consulted the archives from Earth," the Caretaker told him, standing motionless at his side. Since the colonists had stopped being space travelers and settled in the pyramids, he too had divided, the Caretaker of the ship and the Caretaker of the planet, two independent physical entities but a single mind tied to the ship, two doubles sharing a single brain. "This kind of sudden storm is not unusual in very dry environments. In general they're intense but very brief. We're well protected here inside. All we can do is wait till it passes. And it's not necessary to give any warning. There's no need to alarm the people unnecessarily."

"But . . ."

"What they don't know, they won't fear," said the Caretaker, and his voice sounded definitive.

Orson Leibovitz frowned but held his tongue.

In her pyramid (Number Three), Veronica Julia found out what was happening from some colonists who were rushing in from outside. She went to see her father.

"Yes, we have a strong storm up there," Melo Spiegel told her. "Rain, wind, thunder, and lightning." Some of the thunder could be heard faintly through the vibration of the pyramids' structure. "It's best that we stay protected here inside until it's all over."

"But Imma Assumpta says the rain is really hard." Imma Assumpta was the woman who had brought news of the storm when she came in from outside. "What will happen to the rollers?"

The question caught Melo Spiegel off guard. It took Veronica Julia, with the classic, brutally clear insight of a child, to make him see. "Their burrows are on the mountainside! With the storm so strong, they'll be flooded! They'll all die!"

Only then did the zoologist grasp the import of his daughter's words. He thought for a moment, then shook his head sadly. "But there's nothing we can do," he murmured. "Not until the storm is over."

Veronica Julia hugged her doll hard and began to cry disconsolately.

The storm lasted more than an hour before stopping, almost as suddenly as it had begun, on its way toward the east and its own self-destruction. In less than ten minutes the sun again shone brilliantly in the sky and the porous soil had absorbed all the water and returned the landscape to aridity, giving the impression, except for a few puddles drying slowly on the metal platform of the pyramids' roof, that it hadn't rained in

months.

But it had. And the people of the pyramids suddenly felt terrified by an atmospheric event whose violence they had never before experienced.

And when Orson Leibovitz finally reestablished contact with the crawlers he learned the second terrible news. The two exploration vehicles were some fifty kilometers from the pyramids and on their way back when the storm caught them by surprise. At first they didn't give it much thought and kept going, but when they saw that the rain was getting harder, the thunder and lightning became an intimidating spectacle, and a stretch of unstable ground opened up in front of them, they decided to stop and wait. Maybe it was the wrong decision: A few moments later, when the rain had stopped (or perhaps because of it), the unstable ground under one of the vehicles gave way, and the crawler somersaulted down a sloping mound and burst into flames at the bottom. By the time the other crawler could get to its side, it was too late to do anything for its occupants.

Diaspora had always been a safe, stable environment where the violent natural phenomena—floods, hurricanes, earthquakes—that periodically devastated the Earth were impossible and soon forgotten. Perhaps because of that, since the very beginning of the journey, death had been no more than another natural element in the life of the pilgrims, an everyday thing and accepted as such: inevitable, but never traumatic. In the calm security of the ship, where accidents hardly ever happened and violence was all but forgotten, people died of old

age, sometimes (ever more seldom) of sickness, but always in a serene and predictable way. There was even a god of death who carried the deceased peacefully to a place of calm and happiness and to whom people prayed often to keep him propitious: a generous and merciful god, not feared but venerated, in whom one trusted blindly for the hypothetical life after death.

A violent death changed all the rules. It was something unthinkable, monstrous, horrendous, especially when it resulted from a disturbance of nature. The two colonists had been burned to death: burned alive. It was as if Earth Two were rebelling against their presence.

It was a hard idea for the colonists to get their minds around.

The ship quickly organized a farewell ceremony for the victims, simultaneously on Diaspora and on the ground, officiated solemnly by the twin Caretakers in a ritual symbiosis. It tried to alleviate the shock with a long, meditative, and tremendously elaborate ceremony, even trying to revive unconscious memories through ancient rituals of the original Hebrew religion and other religions. It was almost a kind of brainwashing, but it didn't accomplish much. The general feeling, as much among the pilgrims still aboard the ship as among the affected colonists on the planet, was of shock: Earth Two didn't like the colonists of Diaspora and was rejecting them. "We're intruders here," was the sentence often said in a low voice. The Caretakers and the ship quickly realized that the

general sentiment was tearing them apart.

And then, as if to rub salt in the recently opened wound, in the same week as the storm came the third death, this time caused by another pathogen—virus, bacteria, or whatever—native to the planet.

From the beginning the pathogens of Earth Two had seemed, even in the most virulent cases, benign for humans. In the almost eight months of occupation of the planet there had been a few outbreaks of infections, all mild and controllable, that had run their course with minimal symptoms and passed quickly. In those almost eight months more than fifty indigenous infectious and contagious processes had been isolated, identified, and successfully fought; and a whole arsenal of immunizations had been provided to the fearful new colonists who kept coming down to the surface from their sterile, infection-free environment.

It was the beginning of the second phase of colonization that changed everything. This second phase began with introducing to Earth Two a limited number of terrestrial plants and animals and studying their interaction with the planet's native flora and fauna. Specimens of several selected animals were cloned, and a number of carefully chosen transgenic plants, and a set of enclosures for them were set up on the surface next to the pyramids: farm fields, gardens, barns, and stockyards. The idea was to give them as much exposure to the planet as possible and see whether, since in their storage as clonable cells they had not been subjected to seven centuries of

sterility like the pilgrims, they still had their natural defenses, or were also vulnerable to all sorts of diseases.

It turned out that they were.

Jerusa Stein, one of the livestock keepers, began to feel ill three days after the crawler accident. The first symptoms were those of trichinosis: fever, gastroenteritis, and an intestinal parasite. But Jerusa Stein was strictly vegetarian, and besides, there were no pigs in the ship's clone banks; they weren't kosher. Although, the epidemiologists were quick to point out, the trichina does not parasitize only pigs. The lab results soon showed that the larva in the stock keeper's intestinal wall, although similar to trichina, was apparently native to Earth Two and had not come from the ship's clone banks and was not transmitted orally but by skin contact. The researchers hurriedly looked for a way to combat and eliminate it: They found one, but too late for Jerusa Stein. The larva had entered not her muscles but her bloodstream and had blocked an artery, causing a catastrophic heart failure.

Eighteen more cases of pseudotrachinosis appeared in the next two weeks, in people who had had contact with Jerusa or the stockyards. Fortunately, they were all treated in time and none died, though three were considered in critical condition and a fourth spent five days in a coma.

After the crawler accident, Jerusa Stein's death and the other eighteen cases, even though none proved fatal, were a new blow that suddenly made the colonists more acutely aware

than ever of their own vulnerability on the planet. The question now was: How many more contagious diseases peculiar to Earth Two could spread to humans and become pandemics, given the terribly precarious state of human defenses against outside attacks? How many of them could be successfully combated? And on the other hand: How many diseases of terrestrial animals brought from Earth as embryos for cloning could be transmitted to the colonists themselves and to the planet once they were cloned? Everything is interrelated; everything affects everything else. The colonists began to wonder very seriously about all that.

And, high above, so did the ship itself.

Everything is interrelated; everything affects everything else.

The ship knew that very well. It had known it since the beginning of the trip, when it integrated its extensions into itself, when it took upon itself the responsibility and control of all in its charge.

Now it had to confront a new problem.

The pilgrims had arrived at their destination, and with that the mission of the ship as such, at least theoretically, had ended. Diaspora, with its machine logic, was very conscious of that. Throughout the trip it had been the mother bird protecting her chicks till their time came to abandon the nest and begin to fly. Now, with the arrival at Earth Two, that final and definitive state had been reached: The pilgrims had become colonists,

the chicks had to become independent and take flight on their own. But, after more than seven centuries of absolute dependence, were they ready for that?

Diaspora had not been designed to descend to the surface of a planet. No one had anticipated that it should; it was strictly a starship. What should its mission be from this point on? To fly eternally over Earth Two in its geostationary orbit and keep watching over its emancipated children like a patriarchal God keeping watch over his creatures from heavenly heights? Certainly it could keep doing so with no problem, through the Caretaker and the servants, but what would that accomplish? It realized that, in the last analysis, the reactions and the attitude toward the planet of a good many of the pilgrims went well beyond the mere agoraphobia induced by centuries of cloistered life. They were, he ventured to suggest, a clear manifestation of the syndrome of clinging to the womb. They didn't want to be born. The ship had for so long been—and still was—such a secure and protective maternal bosom. And the planet was still so unknown.

So Diaspora faced a new and terrible dilemma. Two possible roads stretched in front of it, both drawn from examples in the history of Old Earth. It could abruptly and completely sever its contact with the pilgrims, abandon them to their fate, forget them, let them grow on their own without interference. Or it could keep teaching them from orbit, keep acting as vigilant mother, protector, father, and God. Neither solution was satisfactory, and the first could be traumatic for the

new colonists, especially after the most recent traumatic events. Diaspora's brain, which foresaw everything, cursed itself for not foreseeing this. With an inadmissible self-complacency, perhaps instilled by the Project's original instructions themselves, the ship had from the beginning limited its role to guiding the journey. It had never needed to go beyond that: When they reached their destination, its circuits told it, its responsibility would end, replaced by that of the pilgrims themselves, now transformed into colonists.

But that wasn't exactly true.

The idea of reprogramming itself a third time to adapt to the new circumstances passed through its mind. It would have to think very hard about this.

The storm had devastated the rollers' home.

An aerial infrared examination of the interior of the huge warren showed not one occupant alive within it. Gravity probes showed clumps of what might have been piled-up corpses in what earlier the explorations had shown to be roomy caverns full of the concentrated warmth of life. Now there appeared to be nothing still alive in that enormous underground city.

Melo Spiegel thought he saw in the situation, despite the general misfortune, the welcome possibility of finally studying the rollers firsthand, though only by examining the cadavers he expected to be able to get. Of course, he said nothing of that to his daughter. He ordered an accessible section of the burrow opened very discreetly, and found two surprises. First, not one

roller body was found in the tunnels; they all must have taken refuge in the great hollows of the “dormitories,” as if they had gathered there to die. Second, when the first of those hollows was reached, it turned out that they weren’t exactly dormitories. The concentrations of mass the instruments had detected there were indeed cadavers—but of insects.

The big double surprise led to an obvious double conclusion. The rollers were an insectivorous species, which was hardly strange on a planet where insects were by far the most abundant and varied type of animal. But the most surprising thing was the fact that they not only ate insects, but bred them like cattle, somehow keeping them confined in underground “corrals” until they were ready to be slaughtered and eaten. It made sense: Under the imminent threat of the storm, they had hastily fled their home, leaving their cattle behind since they couldn’t take them along under the pressure of time, and presumably intending to gather new flocks once they had returned home.

Which clearly confirmed the theory that the rollers were, if not the most intelligent, at least the most highly evolved species among all those discovered on the planet so far.

“But they can’t have all gone away!” exclaimed Veronica Julia, stamping her foot, when her father finally told her the result of his explorations. “There were so many! Where could they be now?”

Melo Spiegel prudently declined to speculate. Despite the

disappointment of not finding any rollers, he was excited about the great quantity and diversity of insects they were going to be able to study. He immediately appointed a whole team to go to find, collect, classify, and bring them to the pyramids and preserve their bodies in stasis fields, a treasure of specimens beyond any he had dared dream.

Jerusa Stein's funeral was held the week after the crawler accident. It was crowded and emotional. Jerusa Stein had been very popular on Diaspora: her main job on the ship had been the care of children ("my little lambs," she called them), so the descent to the surface hadn't significantly changed her work. Her husband was a cloning specialist. Both were still young, and Jerusa always said that now that they had descended to the planet and the strict limits on population growth had disappeared, she wanted to have at least five children. Unfortunately, said her husband in the eulogy, that could now never be, but in a sense all the children of Diaspora could be considered hers.

One problem to be resolved was the disposition of the bodies. It would be absurd to recycle them as had been done during the journey, so the ship revived an old religious custom from Earth—burying the bodies in the planet's soil. Some colonists protested against "feeding our dead to the vermin of Earth Two," to which the Caretaker argued that the dead on the planet belonged to the planet, just as their predecessors had belonged to the ship. As an alternative he proposed cremation, but the general opinion was that this would be a flagrant

violation of the mortal remains—and the memory of how the two members of the crawler crew had died remained vivid in everyone's mind. Finally, a consensus was reached to bury them in hermetically sealed metal coffins to preserve the bodies against external agents. The Caretaker couldn't help thinking, not without a certain mechanical irony, that that couldn't protect them against the agents of decay in the bodies themselves.

Hardly had the funeral ended, outside on the platform of the pyramids, and almost all the participants retired to the interior, when the rollers returned.

They did it in a rush.

The news ran like the wind through all the pyramids. They came down the mountainside, a whole multitude of them, appearing from nowhere, and took up positions on the ground around the perimeter of the platform, a tight circle of furry balls swaying slowly as if rocked by a nonexistent breeze or to the beat of an inaudible melody. It was nightfall, their favorite time, and the setting sun, already almost on the horizon, cast golden reflections on their coats. It was a sight to see.

The colonists rushed back outside to gather on the platform, forming a second concentric circle inside that of the rollers. They did nothing either, they just stood there facing the new arrivals as if waiting, for they knew not what. The servants came out with them, evidently to maintain order and control if necessary. There was no sign of the Caretaker.

Veronica Julia went outside as soon as she heard the news, with her inseparable Claudia Antonia in her hand, and began walking around the double circle on the platform—colonists within, rollers without—as if her roller, her Pffft, would come forth to meet her when he saw her and would unfold before her. She went all the way around the circumference, but no roller came forward.

The other children of the colony, who had heard much about Veronica Julia and her contact with the rollers, then decided almost without thinking, moved by their childish curiosity and despite the passivity of their elders, to take the initiative. First a few, then a few more, until finally almost all detached themselves from the rest of the colonists and moved beyond their ring. They took a few timid steps and stopped.

And then the incredible happened. A few rollers also detached themselves from that circle. They rolled slowly forward and stopped, one in front of each child, to wait a few moments and then unfold, almost lazily, and stand motionless in front of them, solemnly upright, braced on their hind paws and broad flat tails. Their big eyes sparkled in their flat faces, as if lit from within.

Veronica Julia studied the roller that had stopped and unrolled before her. She had no way to identify it—they were all alike to her eyes—but nevertheless she ventured: “Pffft?”

The roller emitted its characteristic satisfied sound and stretched out its little arms.

From that moment on the rollers became part of the everyday landscape of the pyramids.

Very soon they seemed to lose their fear of the colonists. Sure, they still fled at their usual fiendish speed if anyone tried to catch them, but they no longer kept their initial distance, even though they didn't let themselves be touched—except by the children. They seemed to have established a limit that took into account the height (maximum one meter, more or less) and other physical characteristics that defined childhood among humans. When someone who met those requirements approached them, they drew fearlessly closer to him or her, opened up, and . . . played.

They soon became the favorite toy of the colony's children, to the point where Veronica Julia completely abandoned Claudia Antonia. She could never be sure whether the roller she was playing with at any moment was really Pffft—her Pffft—or not, but it didn't matter. In her eyes they were all her roller, h er Pffft.

"They're social animals," the Caretaker told Melo Spiegel, "like the ants or bees of Earth. They form colonies. The ship's archives are full of similar examples."

Melo Spiegel knew those examples very well and had studied the rollers in as much depth as possible, given the inevitable distance. He shook his head doubtfully. "I think they're more than that," he replied. "As I see it, they collectively form a sort of gestalt entity. Like you, the servants, the brain, and the

ship.”

The Caretaker didn't reply.

Almost 90 percent of the pilgrims had descended to Earth Two. On the surface life was organizing itself into a form rather different from that on the ship. And divergences began to emerge among the colonists.

One group had wound up adjusting without excessive trauma to the basic difference between life on the ship and life on the planet. The ship was a closed space, the planet an open space. Agoraphobia was an acquired conditioning that had to be overcome. Trying to reproduce the environment of Diaspora on Earth Two was an unnatural dead end, although it was the instinctive first reaction of many.

But there was a steadfast core of colonists who in spite of everything were unable to assimilate the change. After more than eight months on the planet they remained sequestered almost constantly in the pyramids, going outside reluctantly and only when necessary. All efforts by the surface Caretaker, persuasion by the servants, and subliminal messages from the ship itself were useless in changing their attitudes. They invented a thousand and one excuses not to go outside the protective seclusion of the pyramids, ultimately coming down to simple stubborn denial. “We have nothing to do out there,” they said. “Our life is here inside.”

Which was not strictly true. The pyramids, the Caretaker argued, had been planned from the start as a transitory refuge,

a first intermediate step, a way of adapting to the radical change from life as pilgrims to colonists; they had been buried in the soil instead of set up on the surface as a reminder of their short-term nature. Their ultimate fate was to be recycled as storehouses, or simply dismantled. The ultimate fate of the colonists, after the necessary period of adaptation, was to live fully and entirely on the surface of the planet, as their distant ancestors on their native planet, Earth, had done for so many centuries.

“But the planet is still a strange place for us,” argued the most recalcitrant. “The ship is all we know.”

“Throughout history humanity has always gone in search of new frontiers,” countered the Caretaker. “The new and unknown has always been a powerful draw.”

“Not after thirty-seven generations of living within the protective walls of Diaspora,” was the inevitable reply. “That is our home.”

The least affected by all this were the children. Of course a child’s mind is malleable—and now they had the rollers.

The rollers turned out to be like manna from heaven for the colony, arriving at just the right moment. In a couple of months they became a numerous and constant presence on and around the pyramids. Despite the fears of some colonists (“They eat insects; they’re disgusting!” “They could get inside the pyramids at any time and we won’t be able to get them out!” “Who knows their true intentions?” “Who knows what diseases

they might give us?”), the general opinion was favorable toward their presence. They were mascots: mysterious, fascinating . . . and adorable. They still never let themselves be touched by adults, before whom they never abandoned their spherical shape; but they opened up immediately for children and let themselves be hugged and played interminably with them. Children were their favorites and their weakness. And the little ones adored them in return.

Melo Spiegel kept trying everything to investigate them more closely, without the slightest result: It was still impossible to catch even one. His perpetual discussions with his daughter on the matter always ended with a stony, “They’re too clever to let you catch them” from her. The chief zoologist tried to bribe some kids to catch a roller, but none agreed. Even if one had, he wouldn’t have accomplished anything; the rollers seemed to guess the thoughts of whoever stood in front of them. He wound up, against the opinion of many and for lack of anything better, leaving the pyramid entrances permanently open (“After all,” he argued, “there are no dangerous or destructive animals in the zone”), with the hope of catching one who came in, but no roller fell into the trap. “They’re too clever,” Veronica Julia repeated again and again, laughing ceaselessly.

They were intelligent, of course, but with a different intelligence from the human. And the possibilities for communicating verbally with them were practically nil. Except for the thousand and one variations of the aforementioned “Pffft,” which they seemed to use exclusively with humans, they

emitted no other sound. How they communicated with one another was unknown, but apparently they did, whether by ultrasound or some other medium; no human equipment had been able to determine what it was. To all appearances, the only thing that attracted them to humans was an innate curiosity about adults and the gratifying physical contact and games with the children. In fact, Melo Spiegel once said, they seemed to be children.

Also unknown, beyond the presence of their “insect corrals,” was how they lived in their burrows, even though they had been studied exhaustively with infrared probes and every imaginable gadget that could be used to follow their underground movements. Melo Spiegel would have given his right arm to learn, for example, where they had gone during the storm, or what sanitary measures they used in their warren, which had been found to be always scrupulously clean. About all that could be said about them was that they were gregarious, even though they always maintained a surprising independence and individuality.

No expedition had found rollers anywhere else on the planet. Not even the most powerful detection instruments on Diaspora’s exploratory shuttles had seen any aerial evidence of other possible burrows. It seemed as if the only roller colony on the planet was this one, unless they knew how to hide them very well. Which would not be too surprising: after all, their rollers had not revealed their presence until some time after the establishment of the human colony.

Melo Spiegel tried to learn more about them through sociology. With Asbart Cohen's help, he set up a program of "gifts." At different times and places, small piles of assorted objects were put out and abandoned, obvious "presents" for the rollers. The first were insects. Soon after being left out, they disappeared, though nobody ever managed to determine how they were removed, even by examining frame by frame the pictures taken by hidden cameras; they were too fiendishly fast to be captured by a camera as anything more than a vague blur of motion. Other gifts received partial approval. Some plants, both from the ship and from the planet, were accepted (but others not), indicating that in spite of everything the rollers were omnivores—unless the vegetable gifts were taken to feed their "cattle." Inedible objects also met varied fates: Some were accepted and others not, with no apparent pattern. One unique exception: The rollers loved small, shiny objects. But the examination of the burrows after the storm and before the return of their inhabitants had shown no shiny object in them that would explain that predilection (which perhaps the colonists themselves had started) beyond the intrinsic appeal of the objects themselves.

And if Melo Spiegel hoped that the rollers would somehow reciprocate the gifts they were offered, he must have felt terribly frustrated. In this new stage of their relationship, no gift appeared from the rollers to the colonists; no present was deposited on the platform of the pyramids.

And on that note arrived the first anniversary of their

coming to the planet.

Earth Two's year contained more than 420 of the planet's days, each being twenty-four local hours of sixty local minutes (or twenty-seven Old Earth hours, fifteen minutes, and forty-two seconds). The ship had adopted a timekeeping scheme based on that of Earth, dividing the year into twelve months of thirty-five days each, with a leap year (with one extra day, in February, naturally) every nine years. The ship had established March 32 as "Arrival Day," the moment of landing on their first descent, as the basis for the planet's calendar, the first date to be celebrated annually on Earth Two.

Preparations for the celebration began two months before the anniversary. The ship hoped to give the day great solemnity and significance for the colony. It was anticipated that on that special day all the pilgrims would have descended to the planet and definitively become colonists, with only Rhina Solomon remaining aboard as the last living testimony to the voyage-and-landing phase of their history. In the course of the ceremony, Rhina would ritually descend to the planet, the last pilgrim to do so, and in that moment the ship planned to effect the final transfer of power—though it still didn't know exactly how.

The last months were chock-full of activities. Earth Two lacked significant deposits of fossil fuels, and sources of wind and hydraulic power were even scarcer. Solar energy was a good alternative, but required using Diaspora's solar sails to provide energy to the planet or building a network of solar

collectors on the surface or in space, which would require a great investment of time and effort. Faced with the dilemma, they had opted for nuclear power, adapting one of the ship's reserve energy modules and installing it on the ground, at a safe distance from the pyramids. All of this was very provisional, of course: Energy supply for the future, to help the colony grow, would be a priority.

From the start there had been many of these provisional solutions on Earth Two. The project of populating the planet with terrestrial plants and animals got top priority right from the beginning, largely because it vitally affected the development of the colony. The soil of Earth Two was extremely dry, but the local vegetation had no trouble reaching groundwater: All the plants had to do was send their roots deeper. The cloning of animals maintained a prudent but progressive pace, always with an eye toward their potential for expansion and their possible interactions with the local ecology. The ship had paid a lot of attention to examples from the distant past on Earth, like that of Australia and the rabbits in the nineteenth century, and Earth Two had few species of animals that could act as predators on the newly introduced types. The cloned species included not only meat animals, but also other "ornamental" types characteristic of Earth and available in Diaspora's clone banks, among which some pets had already been introduced during the trip. There were even, under the heading "experimental," some species of birds, almost all of them insectivorous (naturally large raptors and scavengers were excluded) on the

premise that “a planet without birds to ply its skies and sing at dawn is a sad planet.” For the time being no fish were cloned; the little surface water in the two seas and the mere dozen rivers didn’t seem enough for their survival, at least for now, and no one knew what impact they might have on the planet’s small mammals, for which the fish might become easy prey that could hasten their evolution. The question would have to be studied carefully first.

Initially there were some problems with disease transmission between animals and colonists, but there the colony’s department of virology had things under control. Most diseases were ones already known to humans and for which vaccines were available; there were ever fewer cases of infection by diseases native to the planet, and the few that cropped up were contained almost before they were detected.

It seemed the colony was doing well.

Then, two months before the first anniversary ceremony, came the schism.

Since abandoning the ship and moving to the surface, a subtle but significant change had come over the attitudes of the colonists. Aboard Diaspora the pilgrims were dependent beings: The ship organized everything, programmed everything, decided everything for everybody. With the descent to Earth Two, the ship had remained up there in the sky. Sure, its voice could still be heard through the Caretaker and the servants; it still ruled life in the pyramids. But it was an ever more distant

entity.

So the colonists began to think for themselves.

That soon led to the splitting of the colony into two factions. The essence of the split lay in the very concept of life and how it should be lived in the future. The so-called “planetary” faction wanted to establish itself on Earth Two in a totally autonomous way, facing challenges head-on and conquering them with their own resources, in a visceral reaction against the seven centuries of total and uninterrupted protection by the ship. The “orbital” faction wanted to preserve the bond of dependency on Diaspora, continuing the lifestyle they had followed throughout the long journey, yet simultaneously enjoying the planet to which they had come. If something is good for you, they said, why change it? Why not have the best of both worlds?

Both were valid ideas, supported by a battery of good reasons. But they were antagonistic and mutually exclusive.

So began the schism. The first indications appeared, as is often the case, through religion. Throughout the trip the ship’s religion had fit perfectly with its mission, but now, suddenly, it ceased to be useful and satisfactory. It was no longer comfortable for those who wanted to free themselves from a tutelage that had lasted more than seven hundred years. The simplistic hierarchical pantheon of the anonymous gods of the ship—the god of the Universe, the god of the stars, the god of space, the god of the planet, even the gods of little things—began to lose its significance and its reason for being, just as

in the first generations of the journey the elaborate traditional Judaic religion had given way to new gods more appropriate to the new circumstances, whose veneration was simpler and more satisfying in the new cloistered life. Now the way of life had changed again, and the gods of the ship began to lose their force and significance before the infused memory of other gods, perhaps more traditional, but more than abstract entities; they seemed more immediate, less mechanical, more human in the new circumstances. Gods to whom one could again give a concrete name.

The first to receive one was called Yahweh.

Then came the ritual. Although Dia a had never completely eliminated the ancient rituals of the original Jewish religion (Sabbath and Yom Kippur were still observed, and the menorah still presided over homes), they had lost much of their significance. Now they were getting it back. The colonists' religion returned bit by bit, of its own accord, to its roots. From orbit, the ship considered all this and, for the first time in seven centuries of travel, doubted. whole series of meetings ensued, in which the ship was a mere spectator. The Caretaker of the planet attended them all, solemn and silent, for the first time a secondary presence, which was precisely what made the gathered people nervous. They couldn't help imagining the network of the twin Caretakers and the servants intertwining with the intricate electronic pathways between the planet and the inscrutable innards of the ship, transmitting all their words to a Diaspora that would consider and weigh and evaluate and

judge them. For the first time in the history of the ship the Diaspora did not exercise primary control and just that was disquieting.

A range of opinions were put forth, not many, but varied—some vehement, some timid, some sensible, some absurd; but all ending with a call to Diaspora. The ship had brought them this far, the ship could not abandon them now. They had reached a fork in the road; the ship had to help them decide.

The Caretaker, uncharacteristically, balked at the plan. "It's a hard question and needs a great deal of thought," he said. He didn't add that Diaspora had already been thinking about it for quite some time. "You ask it to participate in deciding your destiny. It will keep that in mind. The ship will come forth during the celebration of the first anniversary of your descent to the planet. Until then you will have to wait." It was only thirty days until the anniversary celebration.

It was then that, with all its virulence, the plague struck.

Arnal Lepovsky, the chief virologist, had trusted perhaps a bit too much in the apparent benignity of the pathogens of Earth Two. Since Jerusa Stein's death there had been no serious case of infection, contagion, or contamination, which emboldened the medical staff to suppose that the planet had to a large degree been medically conquered. In fact, Lepovsky ventured to state on one occasion, Earth Two was not populous enough to develop many or very complex parasitic agents. The colonists could consider themselves relatively safe in that

regard.

The plague attacked with unexpected speed and suddenness. The first symptoms were high fever, vomiting, intestinal distress, joint pain, memory lapses, and general reddening of the body. At twenty-four hours the face turned blue and the patient became delirious. Death came within forty-eight hours.

By the time the responsible agent was identified and isolated (but not traced to its origin), seventy-two had died and more than two hundred were affected.

Arnal Lepovsky was desperate. It was a fight to the death against time, which, for once, he was losing. The incubation period was unknown, the disease was undetectable until the first symptoms presented, and then it was too late. Cultures showed that the cause was a twisted aerobic bacterium that was transmitted by simple contact, spread through the blood stream, and simultaneously affected several organs of the body, but especially the spleen. All efforts to find an antidote, a vaccine, anything to beat it, were fruitless.

Five days after the appearance of the plague there were 650 dead, more than 3,000 affected, and it kept growing.

Veronica Julia felt overwhelmed by what was happening. The plague spared neither men nor women, old nor young. Two of her best friends had fallen victim to the disease in the last five days, and nobody in the pyramids talked of anything else. An atmosphere of unbearable depression hung over the whole

colony.

On the third day she went outside to get away from the oppression.

She didn't take Claudia Antonia with her. She didn't go to her story room. She wanted to be truly alone, so she hid in a twisted corner of the mountainside, far from everything, then sat down and sank into her thoughts.

She didn't know how long she'd been there when she became aware of the roller's presence. The ball of gold-brown fur sat completely motionless in front of her, without even the slight sway they sometimes adopted when they wanted to attract attention or seemed to be waiting for something.

"Go away," she said harshly. "I don't want to play with anybody today."

The roller didn't move. For a long time it stayed that way, as if looking at her through those little slits that everyone said were their eyes when they adopted their ball shape. Then, very slowly, it advanced to a position right in front of the girl, not rolling, but floating just above the ground.

Without knowing why, Veronica Julia was more convinced than ever that, of all the rollers, this was her Pffft, her friend, the one who had opened up to her the first time.

It did it now too. But this time it wasn't she who hugged it, but the roller who extended its short arms, closed the space that separated them, and practically hung from her neck. It rested its face against the girl's cheek, as if to console her, and Veronica

Julia felt a sudden relaxation, a profound relief, an overwhelming peace. She let out a deep, inaudible sigh.

The roller imitated it.

Surprisingly, during the whole time they were together, no other rollers appeared, which was most unusual. Veronica Julia could fully enjoy that moment of intimacy, which seemed to last much longer than usual, as if the roller wanted to give her something but hadn't quite managed to do so. Finally, the animal gently released its embrace and rolled back up into its usual spherical form, waited a few moments, a ball of soft gold-brown fur that pulsed slowly as with a calm heartbeat deep within, and finally disappeared with its usual burst of speed that made it seem to vanish into thin air.

And Veronica Julia felt a sudden inner peace that seemed to fill her to the depths of her being.

That night there was an enormous commotion in the pyramids. A roller had slipped into the interior of the structure! Its presence was noticed not only by the detectors but by many people as it darted from one side of the pyramid to another as if looking for something. It never stopped for more than a few seconds in one place, and its apparent ubiquity made many people think there were several, or many, that had invaded the structure. But there was only one.

Arnach Orenstein, one of Arnal Lepovsky's main assistants, was in the virology lab when the roller appeared there. He was examining a series of plague cultures under a

microscope, fighting sleep and exhaustion, and at first he didn't know what was happening. It was the exclamations of the other three assistants in the room that alerted him. He barely saw the furry ball that launched itself directly toward him. He was holding a slide with a culture sample that he was about to put under the microscope. He almost didn't realize that the roller was opening up on the tabletop before him. But the little animal's lenticular pupils weren't fixed on Arnach Orenstein but seemed to be intently studying the slide he held between his fingers. Before Arnach knew what was happening, the roller raised his little forepaws (Orenstein would later tell anyone who would listen that they did have opposable thumbs), grabbed the edge of the slide, and spat on it.

Before anyone could react, the roller had disappeared, and was not seen again anywhere in the pyramid.

From then on, that would be known as the miracle of the rollers.

The roller had spat on that culture specimen, and to all appearances had done it deliberately. Arnal Lepovsky, notified immediately, hastened to do a series of tests. The roller's saliva (a small pink globule, an almost insignificant quantity) quickly proved to possess almost magical antiseptic properties. It contained a broad-spectrum cocktail of natural "antibodies"—a virtual panacea, it would later turn out—effective against the planet's endemic infections and contaminations. Within thirty seconds the specimen on which the roller had spat was dead, consumed by the saliva, and the small amount of that saliva

seemed to have grown, as if nourished by the culture. After isolating it, Lepovsky hurried to give a small, dilute dose to one of the most critical patients, a woman. And the miracle happened: In fifteen minutes the patient's blood was completely free of the pathogen, and the woman, though weak, had recovered almost completely.

Two hours later, after a marathon session of preparing a large quantity of miracle-doses and giving them to the colony's patients, everyone affected by the plague was out of danger. Arnal Lepovsky, after several sleepless days and nights of exhaustively testing the drug's undeniable benefits, hastened to make enough of it to inoculate all the colonists as a preventive.

The night after the roller's visit to the pyramids, Veronica Julia returned to the place of her last encounter with her roller. She wasn't really surprised to find a single roller waiting for her. Pffft—there was no doubt at all that it was her Pffft—opened up as soon as it saw her, and Veronica Julia ran toward it and embraced it impulsively.

"Thanks," she murmured through tears. "Infinite thanks."

The roller may not have understood the girl's words, but its big flat eyes with lenticular pupils, perhaps because of reflection, also seemed to fill with tears.

From that moment the relationship between humans and rollers took a new turn.

The rollers stopped snubbing adults. They still didn't fraternize with them, but they didn't run away from them; they

simply had little to do with them, though they didn't hesitate to open before them, depending on circumstances. They soon became assiduous and inquisitive visitors to the pyramids, though they still didn't let adults touch them; only children had that privilege. For lack of anything better, Melo Spiegel tried to take what advantage he could of the new situation. The rollers' contact with children and objects left traces on the skin and clothing and objects that they touched, like hairs and secretions. Following the path started when the first roller opened up to his daughter, the chief zoologist dedicated himself to collecting the organic residues left by the rollers wherever they could be found. The result was an often incoherent and sometimes contradictory puzzle, but one that at least let him form a general idea of the rollers' basic nature and their place in the planet's evolutionary scheme.

Naturally, and despite the historic visit of the roller (of Pffft, Veronica Julia stubbornly insisted to anyone who would listen) to the pyramids to share with the colony the immunity with which their species was endowed, the problem of interspecies communication was much harder than science-fiction stories would suggest. Nevertheless, Melo Spiegel was inclined to come to blows with anyone who said the rollers were not at least as intelligent as humans.

A position with which Veronica Julia agreed completely.

And finally came the first anniversary of the descent and claiming of Earth Two in the name of humanity.

The plague and all that followed had somewhat overshadowed the theme of the celebration and the planet-orbit schism; when something completely occupies all our thoughts, everything else takes second place. But the ship did not forget; it is not within a machine's capacity to forget. And it knew that the time had come to make a decision. Its decision.

And really, it had already made it.

The celebration began with a solemn religious ceremony, elaborately planned by the ship to encompass all the colony's trends. Diaspora had never stopped maintaining its own religion, but since its arrival at the planet it had not minded incorporating the new heterodoxies arising among the colonists. The god of the ship was still its god, but Yahweh was now the god of the colonists, or at least many of them: an anthropomorphic, accessible god whose features were purely semitic and who coexisted without problems with all the other more abstract gods that surrounded him. The ceremony became a conglomeration of images and references that tried to satisfy everybody. For the most part it succeeded, and the assemblage was satisfied with the result.

After the pomp of the liturgical ceremony came Rhina Solomon and her staging of the ultimate symbolic step of the change: her ritual descent, accompanied by the ship's Caretaker, to the planet, as the ship's ultimate representative of the transformation of pilgrims into colonists. The elaborate ceremony was superbly orchestrated and produced a lump in the throat of many attendees.

Then came the ritual meal, all kosher, all correct, with the servants transformed for the occasion into cooks and waiters. For many—for those who had forgotten their distant origins, which was almost everybody—the ultimate significance of that meal had been lost. But for Zebulon Levi, for example, with his 101 years of age—the oldest pilgrim on Diaspora, who was proud of being the ship's only representative of two of the legendary twelve tribes of Israel, through his first and last names—everything evoked homesick memories of old texts read at one time or another.

“And now the moment we’ve all been waiting for,” the surface Caretaker said to the diners, once the dinner and ritual ablutions were completed, with a silent ship’s Caretaker as a mute witness at his side. “The ship wishes to speak to you.”

There was a prolonged general murmur. The ship never spoke directly to its wards; for that there were the Caretaker and servants. But on this occasion the ship thought a direct contact was necessary. For that it had arranged the central pyramid’s great festival hall so the concentric circles of tables left an ample free space in the center as its stage. And Diaspora appeared, personified, there.

It did that with an elaborately scaled hologram, real as life itself, realistic down to the smallest detail of its external structure, spinning slowly so the entire assemblage could appreciate it from all angles, suspended a couple of meters off the floor, impressive but not disturbing, majestic but not overwhelming. Around the pyramid’s great hall, identical in

every way to the great hall of the ship itself, the ring of screens began to show varied images of space, of the planet seen from orbit, of the system's sun, of the planet's two moons. It was the ship's way of showing everyone where they were, where they had come from, and what their present situation was.

And now it was its turn to speak of their future.

Its voice sounded an octave lower than the Caretaker's, giving it an undeniable authority. It began without preamble.

"Things have changed greatly since the first descent to the planet," it said. "Some pilgrims have adapted to Earth Two, others have not. And now everyone wants to follow his own destiny.

"But one cannot always choose his own destiny." It paused, almost imperceptibly, but enough to let its words penetrate deeply into its hearers' consciousness. For a moment it stopped turning, then resumed its slow motion.

"My original mission was to bring you to a planet where you could settle, a Promised Land that would fulfill the desires of the people of Zion." Hardly any of the congregants knew anything of Zionism, but it was a good thing to be reminded of their roots. "Once this goal was achieved, I was to consider my mission completed, and from then on it was up to you to continue on your own path."

There was another general murmur, almost immediately hushed. All eyes were fixed on the turning hologram, which seemed to scrutinize them one by one with blind eyes, as if

wanting to hypnotize them. Everyone held their breath.

“I recognize that this first year has been hard for all of you. So it has been for me as well. Some of you have succeeded in adapting to the new environment, others have not. And there are many who still hesitate.

“But it is necessary to make a decision, and I realize that I am the first who must do so. My presence up there in orbit no longer makes sense. In these moments after Captain Rhina Solomon’s final descent, I am no more than an empty shell, stripped of all purpose. What is it that some of you want from me? That I keep nominally watching over you from high in orbit, distant and inaccessible, little more than a symbol of your past? That I keep making myself part of your lives and micromanaging them as when you were in my care? Perhaps you’d like to make me a refuge for cases of extreme need? A last resort for desperate situations? Or a commodity always at your fingertips? I was not created for any of those things.”

Its turning seemed to accelerate slightly, as if impelled by some inner agitation, as if for a moment it doubted what it was going to say next.

“I have thought very carefully about all this. And I’ve concluded that from now on there are only two roads open to you—and to me. One is that you settle fully onto the planet as was planned from the beginning: I will disconnect from my Caretakers and servants, deactivate myself, and finish my days as a pile of scrap metal in orbit, forgotten by everyone or

perhaps viewed as an arcane symbol, while you create and develop your own life down here, far from my ancient teachings.

“But things don’t have to be that way. There is another solution. No, it is not what some of you suggest, though it will suit you well. My staying in orbit now has no meaning. But I can continue my journey. Earth Two does not have to be the end of the line, the only Promised Land. For many of you Diaspora is still your home, and can remain so—even forever.

“So I invite you to return to the ship if you wish. I invite you, all of you who wish it, to continue our pilgrimage.”

The gathering went on through the night. The discussion was tense and heated, and for the first time in more than seven hundred years the colonists spoke intimately with the ship.

Ostende Malech, one of the staunchest representatives of the orbital faction, was among the most active in the debate. He was young, not even forty, and he and his wife were one of the few couples who, because of their genetic makeup, had been authorized, when the ship was in mid-flight, to conceive not one but two children. He was one of the principal chroniclers of the voyage of Diaspora 32, and his wife, Varsovia Tenenbaum (they both belonged to the generation that took their first names from cities of Old Earth), was also an energetic orbital activist, no less enthusiastic than her husband and much more extremist. They both immediately embraced the ship’s second alternative, though they had to recognize that Diaspora’s focus was even more radical than Varsovia’s.

In mid afternoon the rollers began to arrive. They entered the pyramid with no shyness and positioned themselves discreetly all around the room, next to the ring of screens, mingling with the servants—who, in accord with the animals' new status, did nothing to eject them.

The rollers didn't keep their spherical shape; one by one they opened up, and stood motionless through the rest of the assembly, firmly upright on their hind paws and tails, as if listening attentively to everything that was said. When the meeting was over they returned to their habitual ball shape and left, not with their usual speed but deliberately, as if taking a stroll.

The ship's last words, before its hologram faded into the air like a fine silvery mist, were: "You have one month to decide on your future. I will base my decision on yours."

It also had one month to consider its own destiny.

It was a month of great public debates and small private discussions, of affirmations and doubts and confidence and vacillation, of uncertainty and reconsideration. Some knew exactly what they wanted to do with their lives, but most were full of indecision.

As if following instructions from the ship, the Caretaker (the one of the surface, its double having returned to orbit) and the servants withdrew to an unoccupied section of one of the seven pyramids and simply deactivated themselves. For the first time the colonists were completely on their own.

In the long run, it was a good thing for them.

Veronica Julia was surrounded by rollers. Lately they had been coming in growing numbers to her meetings with Pffft; they gathered around her, and all of them opened before her and stayed upright on their hind paws and sturdy tails and listened to her. They listened attentively to her words, swaying lightly to their rhythm, and the girl was sure they understood everything she said. So she talked and talked in the midst of their general attention.

“Everyone’s all in a tizzy in the colony,” she told them. “People don’t know what to do. They’ve never had to choose before; the ship always did it for them. It’s hard to do it and not make a mistake. We’re not used to it.”

And: “I know exactly what I want to do. I’m staying on the planet. I’ll never leave you. My father’s staying, too, and I’m sure there’ll come a time when you let him study you and we’ll learn to understand each other as species. I can’t wait for that. But my grandmother says as captain of Diaspora she belongs to the ship; her place is there. I’ll miss her.”

And: “Some people don’t accept you because they say you eat insects. That’s silly. Daddy says insects are good food, pure protein. In fact, since there are so many of them on the planet, we should make them our main food, too. I wonder what a bug pie would taste like.”

And . . .

And the month passed, and the ship asked for an answer:

Who wanted to stay on the planet and who wanted to continue the voyage? The intermediate option, with the colonists on the planet and the ship in orbit, was not even considered.

Zebulon Levi and Ostende Malech had emerged as spokesmen for the two factions of the schism. The other colonists aligned themselves with them. Their number, after the ravages of the plague, even though the birthrate had increased without the strict demographic limits imposed during the voyage, was less than 25,000. Their views covered the whole spectrum, from those pathologically eager to return at any cost to the safe and comforting womb of Diaspora, to those who wanted to start a completely new life far from the ship's influence and instruction; from those who prayed every day to the god of the Universe to free them from that intimidating planet, to those who gave thanks to the reborn Yahweh for letting them return to the old forgotten ways.

But in general they all fell near one or the other of the two extremes: those who wanted to return to the ship and those who wanted to start a new life in the freedom of the planet.

Diaspora accepted both decisions. In fact, they both fit in principle with the ship's own decision, with the picture of the future it had developed for itself in the depths of its brain.

"The colonists who want to stay on the planet will have it to themselves," it said. "Those who want to return to Diaspora will have me. But I want to warn you of one thing. This will be a final separation. Once it's done, there'll be no turning back."

Everyone agreed.

From that moment on, everything was logistics. Some families split up, others stayed together. Many still hesitated. But work had to begin, before the doubts got too intense. So Diasp ra pushed the enormous speed and capacity of its electronics almost to the limit to get things well settled. It portioned out resources. It divided its stores and warehouses, from tools and supplies of all types to cloning units, from medical and sanitary equipment to nurseries, allotting part to the ship and part to the surface, according to a realistic estimate of what each would need. It adapted one of its auxiliary brains as the planetary computer and filled its database with all the knowledge that might be useful on the planet. One of the principal topics was religion, with, in an exercise of pure ecumenicalism, copies of all the key sacred books: the Talmud and the Torah, of course, but also the ancient Christian Bible and the Muslim Koran, and an ample selection of the principal Asian sacred writings, and of course the ship's Bible. It adapted one of the Caretakers (the other would stay on the ship) and a number of the servants as helpers, intermediaries, and extensions for the people of the planet, but without any connection to the planetary computer. And as things developed, new specialties arose among the colonists that from now on would be exclusively for humans, like those of physician and veterinarian, and above all one that had never existed at the human level on the ship: that of priest.

Three months after the decision, the ship and the planet

were ready for everyone to follow his or her chosen path.

It was a gathering of multitudes, in which the ship remained in a sense on the side. There were farewells, tears, attempts to change minds. Some did change; others stuck firmly to their original decision. But all knew that, once made, their decisions were irrevocable.

There was a great feast, not ritual, not kosher, but of pure camaraderie. Altogether, of the 24,770 colonists who were then the population of the planet, only 10,130 had decided to stay on Earth Two; the other 14,640 opted to return to Diaspora and continue its journey.

Boarding began in mid afternoon and lasted all night. The streams of shuttles ascending and descending along the gravitational elevator constantly lit the sky, under the attentive gaze of the crowd of rollers who, standing like guards, watched the apparent chaos from a distance.

Veronica Julia watched, too, muttering ceaselessly about what idiots they were, these people she called “defectors,” a word she had heard from Zebulon Levi without knowing exactly what it meant, but which she took to be a pejorative from the tone in which he said it. Surrounded by her ever-present rollers, with Pffft at their head, she imagined herself growing to adulthood on the planet and living a thousand and one extraordinary adventures at her father’s side, and making great discoveries, and . . . and . . . Despite her fertile imagination, she always reached a point beyond which she couldn’t go, but then

she looked at the rollers, rebooted, and started over.

Orson Leibovitz, the surface captain, now rechristened governor-general of the planet, kept going back and forth checking to make sure everything functioned smoothly, aided by a whole cohort of assistants with lists who maintained strict control of the people and constantly reminded them that they could repent and change their minds even at the last minute, but once they boarded a shuttle or the last of those had left, then it would be too late.

There were more than a hundred of those last-minute changes, in both directions.

Asbart Cohen, against all predictions, decided to remain on Earth Two. As a sociologist he felt a special interest in the future development of the planet, especially in regard to religion. The ship's monotheistic religion didn't interest him at all, since he had always considered it something artificial resulting from very special conditions. But he was quite interested in what might develop in its place, and in what would evidently influence it in greater and lesser ways: a return to its origins but with many new additions. He expected great things from that and hoped to enjoy them fully.

So did Zebulon Levi, in spite (or perhaps because) of his 101 years of age. He knew that great changes were coming in everything, and he wanted to enjoy them to the fullest; he could never forgive himself if he didn't.

As Melo Spiegel could never forgive himself for not

unraveling all the mysteries of the planet's flora and fauna, from the slight development of seed-bearing plants and the virtual nonexistence of woody plants; to the absence of fish, amphibians, reptiles, and birds; to the enigma of the rollers. The first cloned chicks had given their first tentative wing flaps, and while for the moment their trills celebrated only the pens and cages where they were kept for acclimation, soon they would be plying the skies and building their first nests. And he would be there to see it.

Thor Ashner, who had been the first to descend to the planet with his shuttle, wanted to also pilot the last. He had decided to stay on Earth Two as captain of its first fleet of aircraft. After returning all the again-new pilgrims to Diaspora, he programmed the automatic descent of all the shuttles whose pilots had chosen the ship (only three), and after saying good-bye to the captain, made his last trip to the surface. He didn't take his vehicle to the recently built hangars that now housed the ten shuttles of the planet's first aerial fleet, but landed it on the platform of the pyramids. He disembarked and looked up at the ship, a great shining point straight overhead, waiting for captain Rhina Solomon to shut down the gravitational elevator. He realized he wasn't alone; a crowd had gathered around him to witness the ship's departure.

Aboard Diaspora, captain Rhina Solomon contemplated the ochre orb that hung in the center of the great screen in the ship's control room. At her side stood the Caretaker, still, cold, and silent as ever.

"We're ready," said the ship.

Lately the ship had more and more dispensed with speaking through the Caretaker; now it often spoke directly, its voice sounding less mechanical, more human, coming from nowhere in particular in the air of the cabin. Rhina Solomon nodded. She wondered whether the ship would notice her gesture. Probably it would, through the Caretaker's eyes.

"Let's go," said the ship, and Rhina Solomon could have sworn its voice broke a little.

She began to operate the controls. In the rest of Diaspora all the again-new pilgrims, following the ship's instructions, were sequestered in their cabins, reclining in their beds, for acceleration. There was a slight vibration, transmitted through the whole structure and penetrating to everyone's bones. Rhina Solomon set up a vector for escape from orbit, checked all the numbers (even though she knew the ship was also doing so), and rested a hand on the ignition lever for the engines. She drew a deep breath. She waited for the ship to say something else, but it was she who gave the definitive order. Diaspora didn't do it. It was good, she thought, that the machine was placing more and more trust in the humans.

She pushed the lever.

The vibration increased slightly, then disappeared, replaced by a soft hum. Rhina Solomon felt herself pressed against the back of her seat. On the screen, Earth Two seemed to recede into space, at first slowly, then faster, in a few minutes

becoming just another dot, brighter than the ones around it, but still just another dot.

Rhina Solomon couldn't help getting a lump in her throat.

On the planet's surface, the colonists watching the departure saw the luminous point that until then had been their anchor to the past, a landmark in the sky, disappear in a few seconds. And so they knew that from then on they were totally, definitely, and irrevocably alone.

"Set course out of the system," said the ship to Rhina Solomon. Its voice had again taken on a cold, authoritative tone.

She obeyed.

Rhina Solomon sat in Diaspora's control room, absorbed in thought. The Caretaker came up from behind and laid a hand on her shoulder.

"I know what you're thinking," he said. Rhina realized that his voice suddenly lacked its usual metallic tone, sounding surprisingly warm and human. But she didn't say anything.

The Caretaker stood silently at her side for a few moments, then began to speak. The captain thought she now recognized in his voice the same voice the ship had used when addressing the whole colony from its rotating hologram, and which had incorporeally filled the air in the cabin on giving the order for departure. His words confirmed that when he spoke in first person.

“Just think, Rhina: In the last analysis Diaspora 32 is just another planet adrift in the Universe, a receptacle for life that moves among the stars like many other planets. We don’t need to look for another planet. The Diaspora Project went in search of other worlds to establish outposts of humanity. Its goal was futile from the start, though it took me more than seven hundred years and arriving at Earth Two to understand that. There is no world: I am the world. We don’t need to seek any destiny: I am destiny. You can live eternally in me. Everything is in me.”

The Caretaker, who was definitively and forever the ship, made a long pause. He turned to face the captain and stared into her eyes. Rhina Solomon had never seen his eyes shine with such inner fire.

“Our objective is finally achieved,” said the Caretaker, said the ship through the Caretaker. “The infinite lies open before us. We have just begun the ultimate voyage. Today is the first day of eternity.”

Rhina Solomon studied the screen in which Earth Two was now just a luminous point indistinguishable from all the other luminous points that speckled the great blackness. Back there, forever, remained Earth Two and its colonists, and the more distant Earth where it had all begun. Infinity opened in her future.

“Once more in search of the Promised Land,” she murmured.

“No,” said the ship. “I a m the Promised Land.”

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