

STROBOSCOPIC

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Alastair Reynolds is a frequent contributor to *Interzone*, and has also sold to *Asimov's Science Fiction*, *Spectrum SF*, and elsewhere. His first novel, *Revelation Space*, was widely hailed as one of the major SF books of the year; it was quickly followed by *Chasm City*, *Redemption Ark*, *Absolution Gap*, and *Century Rain*, all big books that were big sellers as well, establishing Reynolds as one of the best and most popular new SF writers to enter the field in many years. His other books include a novella collection, *Diamond Dogs*, *Turquoise Days*. His most recent book is a new novel, *Pushing Ice*. Coming up are two new collections, *Galactic North* and *Zima Blue and Other Stories*. A professional scientist with a PhD in astronomy, he comes from Wales, but lives in the Netherlands, where he works for the European Space Agency.

Here's a taut, inventive, and fast-paced story that speculates that the newish realm of computer game design will eventually merge with the field of daredevil exhibitions of the jump-over-a-canyon-on-a-rocket sled sort, to produce a sport where everything can change in the blink of an eye—sometimes with fatal results.

"OPEN THE BOX."

I wasn't making a suggestion. Just in case the tone of my voice didn't make that clear, I backed up my words with an antique but functional blunderbuss; something won in a gaming tournament half a lifetime earlier. We stood in the airlock of my yacht, currently orbiting Venus: me, my wife, and two employees of Icehammer Games.

Between us was a gray box the size of a child's coffin.

"After all this time," said the closest man, his face hidden behind a mirrored gold visor on a rococo white helmet. "Still don't trust us?"

"First rule of complex systems," I said. "You can't tell friends from enemies."

"Thanks for the vote of confidence, Nozomi."

But even as he spoke, White knelt down and fiddled with the latches on the lid of the box. It opened with a gasp of air, revealing a mass of translucent protective sheeting wadded around something very cold. After passing the blunderbuss to Risa, I reached in and lifted out the package, feeling its bulk.

"What is it?"

"An element of a new game," said the other man, Black. "Something called Stroboscopic."

I carried the package to a workbench. "Never heard of it."

"It's hush-hush," Black said. "Company hopes to have it up and running in a few months. Rumor is it's unlike anything else in Tycho."

I pulled back the last layer of wadding.

It was an animal packed in ice; some kind of hardshelled arthropod; like a cross between a scorpion and a crab—all segmented exoskeletal plates and multijointed limbs terminating in various specialized and nasty-looking appendages. The dark carapace was mottled with patches of dirty white, sparkling with tiny reflections. Elsewhere it shone like polished turtleshell. There were ferocious mouth parts but nothing I recognized as an eye, or any kind of sensory organ at all.

"Looks delicious," I said. "What do I cook it with?"

"You don't eat it, Nozomi. You play it." Black shifted nervously as if wary of how much he could safely disclose. "The game will feature a whole ecology of these things—dozens of other species; all kinds of predator-prey relationships."

"Someone manufactures them?"

"Nah." It was White speaking now. "Icehammer found 'em somewhere outside the system, using the snatcher."

"Might help if I knew where."

"Tough titty. They never told us; we're just one of dozens of teams working on the game."

I couldn't help but laugh. "So you're saying, all I have to go on is one dead animal, which might have come from anywhere in the galaxy?"

"Yeah," White said, his helmet nodding. "Except it isn't dead."

THE mere fact that I'd seen the creature, of course, meant that I'd have an unfair advantage when it came to playing the game. It meant that I, Nozomi, one of the dozen or so best-known gamers in the system, would be cheating. But I could live with that. Though my initial rise to fame had been driven mainly by skill, it was years since I'd played a game without having already gained an unfair edge over the other competitors.

There were reasons.

I could remember a time in my childhood when the playing of games was not the highest pinnacle of our culture; simply one means by which rich immortals fought boredom. But that was before the IWP commenced the first in a long series of wars against the Halo Ideologues, those scattered communities waging dissent from the system's edge. The Inner Worlds Prefecture had turned steadily more totalitarian, as governments generally do in times of crisis. Stealthily, the games had been pushed toward greater prominence, and shady alliances had been forged between the IWP and the principal gaming houses. The games enthralled the public and diverted their attentions from the Halo wars. And—unlike the arts—they could not be used as vehicles for subversion. For gamers like myself it was a near-utopian state of affairs. We were pampered and courted by the houses and made immensely rich.

But—maybe because we'd been elevated to such loftiness—we also saw

what was going on. And turning a blind eye was one of the few things I'd never been good at.

One day, five years ago, I was approached by the same individuals who'd brought the box to my yacht. Although they were officially working for Icehammer, they were also members of an underground movement with cells in all the gaming houses. Its lines of communication stretched out to the Ideologues themselves.

The movement was using the games against the IWP. They'd approach players like myself and offer to disclose material relating to games under development by Icehammer or other houses; material that would give the player an edge over their rivals. The player in turn would siphon a percentage of their profit into the movement.

The creature in the box was merely the latest tip-off.

But I didn't know what to make of it, except that it had been snatched from somewhere in the galaxy. Wormhole manipulation offered instantaneous travel to the stars, but nothing larger than a beachball could make the trip. The snatcher was an automated probe that had retrieved biological specimens from thousands of planets. Icehammer operated its own snatcher, for obtaining material that could be incorporated into products.

This time, it seemed to have brought back a dud.

"IT just sits there and does nothing," Risa said when the Icehammer employees had left, the thing resting on a chilled pallet in the sick bay.

"What kind of game can they possibly build around it?"

"Last player to die of boredom wins?"

"Possible. Or maybe you throw it? It's heavy enough, as though the damn thing is half-fossilized. Those white patches look like quartz, don't they?"

Maybe the beast wouldn't do anything until it was placed into the proper environment—perhaps because it needed olfactory or tactile cues to switch from dormancy.

"Black said the game was based on an ecology?" I said.

"Yeah, but how do you think such a game would work?" Risa said. "An ecology's much too chaotic to build into a game." Before she married me she'd been a prominent games designer for one of the other houses, so she knew what she was talking about. "Do you know how disequilibrate your average ecology is?"

"Not even sure I can pronounce it."

"Ecologies aren't kids's stuff. They're immensely complex—food webs, spectra of hierarchical connected-ness. . . . Screw up any one level, and the whole thing can collapse—unless you've evolved the system into some kind of Gaian self-stabilizing regime, which is hard enough when you're not trying to re-create an alien ecology, where there might be all sorts of unexpected emergent phenomena."

"Maybe that's the point, though? A game of dexterity, like balancing spinning plates?"

Risa made the noise that told she was half acknowledging the probable truthfulness of my statement. "They must constrain it in some way. Strip it down to the essentials, and then build in some mechanism whereby players can influence things."

I nodded. I'd been unwilling to probe the creature too deeply until now, perhaps still suspicious of a trap—but I knew that if I didn't, the little arthropod would drive me quietly insane. At the very least, I had to know whether it had anything resembling a brain—and if I got that far, I could begin to guess at the kinds of behavioral routines scripted into its synapses, especially if I could trace pathways to sensory organs. Maybe I was being optimistic, though. The thing didn't even have recognizable eyes, so it was anyone's guess as to how it assembled a mental model of its surroundings. And of course that told me something, though it wasn't particularly useful.

The creature had evolved somewhere dark.

A MONTH later, Icehammer began a teaser campaign for Stroboscopic. The premiere was to take place two months later in Tycho, but a handful of selected players would be invited to an exclusive preview a few weeks earlier, me among them.

I began to warm up to competition fitness.

Even with insider knowledge, no game was ever a walkover, and my contacts in the resistance movement would be disappointed if I didn't turn in a tidy profit. The trouble was I didn't know enough about the game to finesse the required skills; whether they were mental or physical or some combination of the two. Hedging my bets, I played as many different types of games as possible in the time frame, culminating in a race through the atmosphere of Jupiter piloting frail cloudjammers. The game was one that demanded an acute grasp of aerodynamic physics, coupled with sharp reflexes and a willingness to indulge in extreme personal risk.

It was during the last of the races that Angela Valdez misjudged a thermal and collapsed her foil. Valdez had been a friend of mine years ago, and though we'd since fallen into rivalry, we'd never lost our mutual respect. I attended her funeral on Europa with an acute sense of my own mortality. There, I met most of the other gamers in the system, including a youngish man called Zubek whose star was in the ascendant. He and Valdez had been lovers, I knew—just as I'd loved her years before I met Risa.

"I suppose you've heard of Stroboscopic?" he asked, sidling up to me after Valdez's ashes had been scattered on Europa's ice.

"Of course."

"I presume you won't be playing, in that case." Zubek smiled. "I gather the game's going to be more than slightly challenging."

"You think I'm not up to it?"

"Oh, you were good once, Nozomi—nobody'd dispute that." He nodded to the smear of ash on the frost. "But so was Angela. She was good enough to beat the hardest of games—until the day when she wasn't."

I wanted to punch him. What stopped me was the thought that maybe he was right.

I WAS on my way back from the funeral when White called, using the secure channel to the yacht.

"What have you learnt about the package, Nozomi? I'm curious."

"Not much," I said, nibbling a fingernail. With my other hand I was toying with Risa's dreadlocks, her head resting on my chest. "Other than the fact that the animal responds to light. The mottled patches on its carapace are a matrix of light-sensitive organs; silicon and quartz deposits. Silicon and silicon oxides, doped with a few other metals. I think they work as organic semiconductors, converting light into electrical nerve impulses."

I couldn't see White's face—it was obscured by a golden blur that more or less approximated the visor of his suit—but he tapped a finger against the blur, knowingly. "That's all? A response to light? That's hardly going to give you a winning edge."

"There's nothing simple about it. The light has to reach a certain threshold intensity before there's any activity at all."

"And then it wakes up?"

"No. It moves for a few seconds, like a clockwork toy given a few turns of the key. Then it freezes up again, even if the light level remains constant. It needs a period of darkness before it shows another response to light."

"How long?"

"Seventy seconds, more or less. I think it gets all the energy it needs during that one burst of light, then goes into hibernation until the next burst. Its chemistry must be optimized so highly that it simply can't process more rapid bursts."

The gold ovoid of his face nodded. "Maybe that ties in with the title of the game," he said. "Stroboscopic."

"You wouldn't care to hazard a guess as to what kind of evolutionary adaptation this might be?"

"I wish there was time for it, Nozomi. But I'm afraid that isn't why I called. There's trouble."

"What sort?" Though I didn't really need to ask.

He paused, looking to one side, as if nervous of being interrupted. "Black's vanished. My guess is the goons got to him. They'll have unpicked his memory by now."

"I'm sorry."

"It may be hazardous for you to risk competition now that you're implicated."

I let the words sink in, then shook my head. "It's too late," I said. "I've already given them my word that I'll be there."

Risa stirred. "Too pigheaded to back down?"

"No," I said. "But on the other hand, I do have a reputation to uphold."

AS the premiere approached we learned what we could of the creature. It was happier in vacuum than air, although the latter did not seem to harm it provided it was kept cold. Maybe that had something to do with its silicon biochemistry. Silicon had never seemed like a likely rival to carbon as a basis for life, largely because silicon's higher valency denied its compounds the same long-term stability. But under extreme cold, silicon biochemistry might have the edge, or at least be an equally probable pathway for evolution. And with silicon came the possibility of exploiting light itself as an energy source, with no clumsy intermediate molecular machinery like the rhodopsin molecule in the human retina.

But the creature lived in darkness.

I couldn't resolve this paradox. It needed light to energize itself—a flash of intense blue light, shading into the UV—and yet it hadn't evolved an organ as simple as the eye. The eye, I knew, had been invented at least 40 times during the evolution of life on Earth. Nature came up with the eye whenever there was the slightest use for it.

It got stranger.

There was something I called the secondary response—also triggered by exposure to light. Normally, shown a flash every 70-odd seconds, the animal would execute a few seemingly purposeful movements, each burst of locomotion coordinated with the previous one, implying that the creature kept some record of what it had been doing previously. But if we allowed it to settle into a stable pattern of movement bursts, the creature began to show richer behavior. The probability of eliciting the secondary response rose to a maximum midway through the gap between normal bursts, roughly half a minute after the last, before smoothly diminishing. But at its peak, the creature was hypersensitized to any kind of ambient light at all, even if it was well below the threshold energy of the normal flash. If no light appeared during the time of hypersensitivity, nothing happened; the creature simply waited out the remaining half a minute until the next scheduled flash. But if even a few hundred photons fell on its carapace, it would always do the same thing; thrashing its limbs violently for a few seconds, evidently drawing on some final reserve of energy that it saved for just this response.

I didn't have a clue why.

And I wasn't going to get one, either—at least not by studying the creature. One day we'd set it up in the autodoc analysis chamber as usual, and we'd locked it into the burst cycle, working in complete darkness apart from the regular pulses of light every minute and ten seconds. But we

forgot to lash the animal down properly. A status light flashed on the autodoc console, signifying some routine health-monitoring function. It wasn't bright at all, but it happened just when the creature was hypersensitized. It thrashed its limbs wildly, making a noise like a box of chopsticks.

And hurled itself from the chamber, falling to the floor.

Even though it was dark, I saw something of its shattering, as it cleaved into a million pieces. It sparkled as it died.

"Oops," Risa said.

THE premiere soon arrived. Games took place all over the system, but the real epicenter was Tycho. The lunar crater had been domed, pressurized, and infused with a luminous mass of habitats and biomes, all dedicated to the pursuit of pleasure through game. I'd visited the place dozens of times, of course—but even then, I'd experienced only a tiny fraction of what it had to offer. Now all I wanted to do was get in and out—and if Stroboscopic was the last game I ever played there, I didn't mind.

"Something's bothering you, Noz," Risa said, as we took a monorail over the Icehammer zone. "Ever since you came back from Valdez's funeral."

"I spoke to Zubek."

"Him?" She laughed. "You've got more talent in your dick."

"He suggested I should consider giving this one a miss."

"He's just trying to rile you. Means you still scare him." Then she leaned toward the window of our private cabin. "There. The Arena."

It was a matt-black geodesic ball about half a kilometer wide, carbunched by ancillary buildings. Searchlights scissored the air above it, neon letters spelling out the name of the game, running around the ball's circumference.

Stroboscopic.

Thirty years ago the eponymous CEO of Icehammer Games had been a top-class player in his own right—until neutral feedback incinerated most of his higher motor functions. Now Icehammer's frame was cradled within a powered exoskeleton, stenciled with luminous Chinese dragons. He greeted myself, the players, and assorted hangers-on as we assembled in an atrium adjoining the Arena. After a short preliminary speech a huge screen was unveiled behind him. He stood aside and let the presentation roll.

A drab, wrinkled planet hove into view on the screen, lightly sprinkled with craters; one ice cap poking into view.

"PSR-J2034+454A," Icehammer said. "The decidedly unpoetic name for a planet nearly 500 light-years from here. Utterly airless and barely larger than our moon, it shouldn't really be there at all. Less than ten million years ago its sun reached the end of its nuclear-burning life cycle and went supernova." He clapped his hands together in emphasis; some trick of acoustics magnifying the clap concussively. "Apart from a few comets,

nothing else remains. The planet moves in total darkness, even starlight attenuated by the nebula of dust that embeds the system. Even the star it once drew life from has become a corpse."

The star rose above one limb of the planet: a searing point of light, pulsing on and off like a beacon.

"A pulsar," Icehammer said. "A 15-kilometer ball of nuclear matter, sending out an intense beam of light as it rotates, four flashes a second; each no more than 13 hundredths of a second long. The pulsar has a wobble in its rotational axis, however, which means that the beam only crosses our line of sight once every 72 seconds, and then only for a few seconds at a time." Then he showed us how the pulsar beam swept across the surface of the planet, dousing it in intense, flickering light for a few instants, outlining every nuance of the planet's topography in eye-wrenching violet. Followed by utter darkness on the face of the world, for another 72 seconds.

"Now the really astonishing thing," Icehammer said, "is that something evolved to live on the planet, although only on the one face, which it always turns to the star. A whole order of creatures, in fact, their biology tuned to exploit that regular flash of light. Now we believe that life on Earth originated in self-replicating structures in pyritic minerals, or certain kinds of clay. Eventually, this mineralogic life formed the scaffolding for the first form of carbon-based life, which—being more efficient and flexible—quickly usurped its predecessor. But perhaps that genetic takeover never happened here, stymied by the cold and the vacuum and the radiative effects of the star." Now he showed us holoimages of the creatures themselves, rendered in the style of watercolors from a naturalist's fieldbook, annotated in handwritten Latin. Dozens of forms—including several radically different bodyplans and modes of locomotion—but everything was hardshelled and a clear cousin to the animal we'd examined on the yacht. Some of the more obvious predators looked incredibly fearsome. "They do all their living in bursts lasting a dozen seconds, punctuated by nearly a minute of total inactivity. Evidently some selection mechanism determined that a concentrated burst of activity is more useful than long, drawn-out mobility."

Jumping, I thought. You couldn't jump in slow motion. Predators must have been the first creatures to evolve toward the burst strategy—and then grazers had been forced to follow suit.

"We've given them the collective term Strobeliflife—and their planet we've called Strobeworld, for obvious reasons." Icehammer rubbed his palms together with a whine of actuating motors. "Which, ladies and gentlemen, brings us rather neatly to the game itself. Shall we continue?"

"Get on with it, you bastard," I murmured. Next to me, Risa squeezed my hand and whispered something calming.

WE were escorted up a sapphire staircase into a busy room packed with consoles and viewing stands. There was no direct view of the Arena itself, but screens hanging from the ceiling showed angles in various wavebands.

The Arena was a mockup of part of the surface of Strobeworld, simulated

with astonishing precision: the correct rocky terrain alleviated only by tufts of colorless vacuum-tolerant “vegetation,” gravity that was only a few percent from Strobeworld’s own, and a magnetic field that simulated in strength and vector the ambient field at the point on Strobeworld from which the animals had been snatched. The roof of the dome was studded with lamps that would blaze for less than 13 hundredths of a second, once every 72 seconds, precisely mimicking the passage of the star’s mercilessly bright beam.

The game itself—Level One, at least—would be played in rounds: single player against single player, or team against team. Each competitor would be allocated a fraction of the thousand-odd individual animals released into the Arena at the start—fifty/fifty in the absence of any handicapping. The sample would include animals from every ecological level, from grazers that fed on the flora, right up to the relatively scarce top predators, of which there were only a dozen basic variants. They had to eat, of course: light could provide their daily energy needs, but they’d still need to consume each other for growth and replication. Each competitor’s animals would be labeled with infrared markers, capable of being picked up by Arena cams. It was the competitor’s goal to ensure that their population of Strobeworld creatures outperformed the rival’s, simply by staying alive longest. Computers would assess the fitness of each population after a round and the winner would be announced.

I watched a few initial heats before my turn.

Most of the animals were sufficiently far from each other—or huddled in herds—that during each movement burst they did little except shuffle around or move slightly more in one direction than another. But the animals that were near each other exhibited more interesting behavior. Prey creatures—small, flat-bodied grazers or midlevel predators—would try and get away from the higher-level predators, which in turn would advance toward the grazers and subordinate predators. But then they’d come to a stop, perfectly motionless, their locations revealed only by the cams, since it was completely dark in the Arena.

Waiting.

It was harder than it looked—the dynamics of the ecosystem far subtler than I’d expected. Interfering at any level could have wildly unexpected consequences.

Risa would have loved it.

Soon it was my turn. I took my console after nodding briefly at my opponent; a rising player of moderate renown, but no real match for myself, even though neither of us had played Stroboscopic before.

We commenced play.

The Arena—initially empty—was populated by Strobeflife via robot drones that dashed out from concealed hatches. The Strobeflife was in stasis; no light flashes from the dome to trigger the life cycle; as stiff and sculptural as the animal we’d studied in the yacht. My console displayed a schematic overlay of the Arena, with “my” animals designated by marker symbols. The

screens showed the same relationships from different angles. Initial placement was pseudo-random; animals placed in lifelike groupings, but with distances between predator and prey, determined by algorithms compiled from real Strobeworld populations.

We were given five minutes to study the grouping and evolve a strategy before the first flash. Thereafter, the flashes would follow at 72-second intervals until the game's conclusion.

The five minutes slammed past before I'd examined less than a dozen possible opening gambits.

For a few flash cycles nothing much happened; too much distance between potential enemies. But after the fifth cycle some of the animals were within striking range of each other. Little local hot spots of carnage began to ensue; animals being dismembered or eaten in episodic bursts.

We began to influence the game. After each movement burst—during the minute or so of near-immobility—we were able to selectively reposition or withdraw our own or our opponent's animals from the Arena, according to a complex shifting value scheme. The immobile animals would be spirited away, or relocated, by the same robots that had placed them initially. When the next flash came, play would continue seamlessly.

All sorts of unanticipated things could happen.

Wipe out one predator and you might think that the animals it was preying on would thrive, or at least not be decimated so rapidly. But what often happened was that a second rival predator—until then contained in number—would invade the now unoccupied niche and become more successful than the animal that had been wiped out. If that new predator also pursued the prey animals of the other, then they might actually be worse off.

I began to grasp some of Stroboscopic's latent complexity. Maybe it was going to be a challenge after all.

I played and won four rounds out of five. No point deluding myself: at least two of my victories had been sheer luck, or had evolved from dynamics of the ecology that were just too labyrinthine to guess at. But I was impressed, and for the first time in years, I didn't feel as if I'd already exhausted every aspect of a game.

I was enjoying myself.

I waited for the other heats to cycle through, my own name only displaced from the top of the leader board when the last player had completed his series.

Zubek had beaten me.

"Bad luck," he said, in the immediate aftermath, after we'd delivered our sound bites. He slung an arm around my shoulder, matishly. "I'm sorry what I said about you before, Nozomi."

"Would you be apologizing now if I'd won?"

"But you didn't, did you? Put up a good fight, I'll admit. Were you playing to your limit?" Zubek stopped a passing waiter and snatched two drinks from his tray, something fizzy, passing one to me. "Listen, Nozomi. Either way, we won in style and trashed the rest."

"Good. Can I go now? I'd like to speak to my wife." And get the hell away from Tycho, I thought.

"Not so fast. I've got a proposition. Will you hear me out?"

I LISTENED to what Zubek had to say. Then caught up with Risa a few minutes later and told her what he had outlined.

"You're not serious," she said. "He's playing a game with you, don't you realize?"

"Isn't that the point?"

Risa shook her head exasperatedly. "Angela Valdez is dead. She died a good death, doing what she loved. Nothing the two of you can do now can make the slightest difference."

"Zubek will make the challenge whether I like it or not."

"But you don't have to agree." Her voice was calm but her eyes promised tears. "You know what the rumors said. That the next level was more dangerous than the first."

"That'll make it all the more interesting, then."

But she wasn't really listening to me, perhaps knowing that I'd already made my mind up.

Zubek and I arranged a press conference an hour later, sharing the same podium, microphones radiating out from our faces like the rifles of a firing squad; stroboscopic flashes of cameras prefiguring the game ahead. We explained our proposition: how we'd agreed between ourselves to another game; one that would be dedicated to the memory of Angela Valdez.

But that we'd be playing Level Two.

Icehammer took the podium during the wild applause and cheering that followed our announcement.

"This is extremely unwise," he said, still stiffly clad in his mobility frame. "Level Two is hardly tested yet; there are bound to be bugs in the system. It could be exceedingly dangerous." Then he smiled and a palpable aura of relief swept through the spectators. "On the other hand, my shareholders would never forgive me if I forewent an opportunity for publicity like this."

The cheers rose to a deafening crescendo.

Shortly afterward I was strapped into the console, with neuro-effectors crowning my skull, ready to light up my pain center. The computer overseeing the game would allocate jolts of pain according to the losses suffered by my population of Strobelife. All in the mind, of course. But that

wouldn't make the pain any less agonizing, and it wouldn't reduce the chances of my heart simply stopping at the shock of it all.

Zubek leant in and shook my hand.

"For Angela," I said, and then watched as they strapped Zubek in the adjacent console, applying the neuro-effector.

It was hard. It wasn't just the pain. The game was made more difficult by deliberately limiting our overview of the Arena. I no longer saw my population in its entirety—the best I could do was hop my point of view from creature to creature, my visual field offering a simulation of the electrical-field environment sensed by each Strobelife animal; a snapshot only updated during Strobetime. When there was no movement, there was no electrical-field generation. Most of the time I was blind.

Most of the time I was screaming.

Yet somehow—when the computer assessed the fitness of the two populations—I was declared the winner over Zubek.

Lying in the couch, my body quivered, saliva water-falling from my slack jaw. A moan filled the air, which it took me long moments to realize was my own attempt at vocalization. And then I saw something odd; something that shouldn't have happened at all.

Zubek hauled himself from his couch, not even sweating.

He didn't look like a man who'd just been through agony.

An unfamiliar face blocked my view of him. I knew who it was, just from his posture and the cadences of his speech.

"Yes, you're right. Zubek was never wired into the neuro-effector. He was working for us—persuading you to play Level Two."

"White," I slurred. "You, isn't it?"

"The very man. Now how would you like to see your wife alive?"

I reached for his collar, fingers grasping ineffectually at the fabric. "Where's Risa?"

"In our care, I assure you. Now kindly follow me."

He waited while I heaved myself from the enclosure of the couch, my legs threatening to turn to jelly beneath me.

"Oh, dear," White said, wrinkling his nose. "You've emptied your bladder, haven't you?"

"I'll empty your face if you don't shut up."

My nervous system had just about recovered by the time we reached Icehammer's quarters, elsewhere in the building. But my belief system was still in ruins.

White was working for the IWP.

ICEHAMMER was lounging on a maroon settee, divested of his exoskeletal support system. Just as I was marveling at how pitiable he looked, he jumped up and strode to me, extending a hand.

"Good to meet you, Nozomi."

I nodded at the frame, racked on one wall next to an elaborate suit of armor. "You don't need that thing?"

"Hell, no. Not in years. Good for publicity, though—neural burnout and all that."

"It's a setup, isn't it?"

"How do you think it played?" Icehammer said."

"Black really was working for the movement," I said, aware that I was compromising myself with each word, but also that it didn't matter. "White wasn't. You were in hock to the IWP all along. You were the reason Black vanished."

"Nothing personal Nozomi," White said. "They got to my family, just as we've got to Risa."

Icehammer took over: "She's in our care now, Nozomi—quite unharmed, I assure you. But if you want to see her alive, I advise that you pay meticulous attention to my words." While he talked he brushed a hand over the tabard of the hanging suit of armor, leaving a greasy imprint on the black metal. "You disappointed me. That a man of your talents should be reduced to cheating."

"I didn't do it for myself."

"You don't seriously imagine that the movement could possibly pose a threat to the IWP? Most of its cells have been infiltrated. Face it, man, it was always an empty gesture."

"Then where was the harm?"

Icehammer tried a smile but it looked fake. "Obviously I'm not happy at your exploiting company secrets, even if you were good enough to keep them largely to yourself."

"It's not as if I sold them on."

"No, I'll credit you with discretion, if nothing else. But even if I thought killing you might be justified, there'd be grave difficulties with such a course of action. You're too well known; I can't just make you disappear without attracting a lot of attention. And I can't expose you as a cheat without revealing the degree to which my organization's security was breached. So I'm forced to another option—one that, on reflection, will serve the both of us rather well."

"Which is?"

"I'll let Risa go, provided you agree to play the next level of the game."

I thought about that for a few moments before answering. "That's all? Why the blackmail?"

"Because no one in their right minds would play Level Three if they knew what was involved." Icehammer toyed with the elegantly flared cuff of his bottle-green smoking jacket. "The third level is exponentially more hazardous than the second. Of course, it will eventually draw competitors—but no one would consent to playing it until they'd attained total mastery of the lower levels. We don't expect that to happen for at least a year. You, on the other hand, flushed with success at beating Zubek, will rashly declare your desire to play Level Three. And in the process of doing so you will probably die, or at the very least be severely maimed."

"I thought you said it would serve me well."

"I meant your posthumous reputation." Icehammer raised a finger. "But don't imagine that the game will be rigged, either. It will be completely fair, by the rules."

Feeling sick to my stomach, I still managed a smile. "I'll just have to cheat, then, won't I?"

A FEW minutes later I stood at the podium again, a full audience before me, and read a short prepared statement. There wasn't much to it, and as I hadn't written a word of it, I can't say that I injected any great enthusiasm into the proceedings.

"I'm retiring," I said, to the hushed silence in the atrium. "This will be my last competition."

Muted cheers. But they quickly died away.

"But I'm not finished yet. Today I played the first two levels of what I believe will be one of the most challenging and successful games in Tycho, for many years to come. I now intend to play the final level."

Cheers followed again—but they were still a little fearful. I didn't blame them. What I was doing was insane.

Icehammer came out—back in his frame again—and made some halfhearted protestations, but the charade was even more theatrical than last time. Nothing could be better for publicity than my failing to complete the level—except possibly my death.

I tried not to think about that part.

"I admire your courage," he said, turning to the audience. "Give it up for Nozomi—he's a brave man!" Then he whispered in my ear: "Maybe we'll auction your body parts."

But I kept on smiling my best shit-eating smile, even as they wheeled in the same suit of armor that I'd seen hanging on Icehammer's wall.

I WALKED into the Arena, the armor's servo-assisted joints whirring with each step. The suit was heated and pressurized, of course—but the tiny air-circulator was almost silent, and the ease of walking meant that my own exertions were slight.

The Arena was empty of Strobelife now, brightly lit; dusty topsoil like lunar regolith, apart from the patches of flora. I walked to the spot that had been randomly assigned me, designated by a livid red circle.

Icehammer's words still rang in my ears. "You don't even know what happens in Level Three, do you?"

"I'm sure you're going to enjoy telling me."

"Level One is abstracted—the Arena is observed, but it might as well be taking place in a computer. Level Two's a little more visceral, as you're now well aware—but there's still no actual physical risk to the competitor. And, of course, even Level Two could be simulated. You must have asked yourself that question, Nozomi. Why create a real ecology of Strobelife creatures at all, if you're never going to enter it?"

That was when he had drawn my attention to the suit of armor. "You'll wear this. It'll offer protection against the vacuum and the effects of the pulse, but don't delude yourself that the armor itself is much more than cosmetic."

"I'm going into the Arena?"

"Where else? It's the logical progression. Now your viewpoint will be entirely limited to one participant in the game—yourself."

"Get it over with."

"You'll still have the ability to intervene in the ecology, just as before—the commands will be interpreted by your suit and transmitted to the controlling computer. The added complexity, of course, is that you'll have to structure your game around your own survival at each step."

"And if—when—I win?"

"You'll be reunited with Risa, I promise. Free to go. All the rest. You can even sell your story, if you can find anyone who'll believe you."

"Know a good ghostwriter?"

He'd winked at me then. "Enjoy the game, Nozomi. I know I will."

Now I stood on my designated spot and waited.

The lights went out.

I had a sense of rapid subliminal motion all around me. The drones were whisking out and positioning the inert Strobelife creatures in their initial formations. The process lasted a few seconds, performed in total silence. I could move, but only within the confines of the suit, which had now become rigid apart from my fingers.

Unguessable minutes passed.

Then the first stammering pulse came, bright as a nuclear explosion, even with the visor's shielding. My suit lost its rigidity, but for a moment I didn't dare move. On the faceplate's head-up display I could see that I was surrounded by Strobeflife creatures, rendered according to their electrical field properties. There were grazers and predators and all the intermediates, and they all seemed to be moving in my direction.

And something was dreadfully wrong. They were too big.

I'd never asked myself whether the creature we'd examined on the yacht was an adult. Now I knew it wasn't.

The afterflash of the flash died from my vision, and as the seconds crawled by, the creatures' movements became steadily more sluggish, until only the smallest of them were moving at all.

Then they, too, locked into immobility.

As did my suit, its own motors deactivating until triggered by the next flash.

I tried to hold the scene in my memory, recalling the large predator whose foreclaw might scythe within range of my suit, if he was able to lurch three or four steps closer to me during the next pulse. I'd have to move fast, when it came—and on the pulse after that, I'd have another two to contend with, nearing me on my left flank.

The flash came—intense and eye-hurting.

No shadows; almost everything washed out in the brilliance. Maybe that was why Strobeflife had never evolved the eye: it was too bright for contrast, offering no advantage over electrical field sensitivity.

The big predator—a cross among a tank, armadillo, and lobster—came three steps closer and slammed his foreclaw into a wide arc that grazed my chest. The impact hit me like a bullet.

I fell backward, into the dirt, knowing that I'd broken a rib or two.

The electrical field overlay dwindled to darkness. My suit seized into rigidity.

Think, Noz. Think.

My hand grasped something. I could still move my fingers, if nothing else. The gloves were the only articulated parts of the suit that weren't slaved to the pulse cycle.

I was holding something hard, rocklike. But it wasn't a rock. My fingers traced the line of a carapace; the pielike fluting around the legs. It was a small grazer.

An idea formed in my mind. I thought of what Icehammer had said about the Strobeworld system; how there was nothing apart from the planet, the

pulsar, and a few comets.

Sooner or later, one of those comets would crash into the star. It might not happen very often, maybe only once every few years, but when it did it would be very bad indeed: a massive flare of X rays as the comet was shredded by the gravitational field of the pulsar. It would be a pulse of energy far more intense than the normal flash of light; too energetic for the creatures to absorb.

Strobeliflife must have evolved a protection mechanism.

The onset of a major flare would be signaled by visible light, as the comet began to break up. A tiny glint at first, but harbinger of far worse to come. The creatures would be sensitized to burrow into the topdirt at the first sign of light, which did not come at the expected time. . . .

I'd already seen the reaction in action. It was what had driven the thrashing behavior of our specimen before it dropped to its death on the cabin floor. It had been trying to burrow; to bury itself in topdirt before the storm came.

The Arena wasn't Strobeworld, just a clever facsimile of it—and there was no longer any threat from an X-ray burst. But the evolved reflex would remain, hardwired into every animal in the ecology.

All I had to do was trigger it.

The next flash came, like the brightest, quickest dawn imaginable. Ignoring the pain in my chest, I stood up—still holding the little grazer in my gloved hand.

But how could I trigger it? I'd need a source of light, albeit small, but I'd need to have it go off when I was completely immobile.

There was a way.

The predator lashed at me again, gouging into my leg. I began to topple, but forced myself to stay upright, if nothing else. Another gouge, painful this time, as if the leg armor was almost lost.

The electrical overlay faded again, and my suit froze into immobility. I began to count aloud in my head.

I'd remembered something. It had seemed completely insignificant at the time; a detail so trivial that I was barely conscious of committing it to memory. When the specimen had shattered, it had done so in complete darkness. And yet I'd seen it happen. I'd seen glints of light as it smashed into a million fragments.

And now I understood. The creature's quartz deposits were highly crystalline. And sometimes—when crystals are stressed—they release light; something called piezoluminescence. Not much; only the amount corresponding to the energy levels of electrons trapped deep within lattices—but I didn't need much, either. Not if I waited until the proper time, when the animals would be hypersensitized to that warning glint. I counted to 35, what I judged to be halfway between the flash intervals.

And then let my fingers relax.

The grazer dropped in silence toward the floor.

I didn't hear it shatter, not in vacuum. But in the total darkness in which I was immersed, I couldn't miss the sparkle of light.

I felt the ground rumble all around me. Half a minute later, when the next flash came from the ceiling, I looked around.

I was alone.

No creatures remained, apart from the corpses of those that had already died. Instead, there were a lot of rocky mounds, where even the largest of them had buried themselves under topdirt. Nothing moved, except for a few pathetic avalanches of disturbed dirt. And there they'd wait, I knew—for however long it was evolution had programmed them to sit out the X-ray flare.

Thanks to the specimens on the yacht, I happened to know exactly how long that time was. Slightly more than four and a half hours.

Grinning to myself, knowing that Nozomi had done it again—cheated and made it look like winner's luck—I began to stroll to safety, and to Risa.