

art: Hank Jankus

by Gregory Benford

TIME'S RUB

Gregory Benford's best known work is probably the novel, *Timescape* (1980), which won the Nebula award, the British Science Fiction award, the John W. Campbell Memorial Award, and the Australian Ditmar award for International Novel. His latest novels include *Across the Sea of Suns* (1984) and *Against Infinity* (1983).

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At Earth's winter ebb, two crabbed figures slouched across a dry, cracked plain.

Running before a victor who was himself slow-dying, the dead stench of certain destiny cloyed to them. They knew it. Yet kept on, grinding over plum-colored shales.

They shambled into a pitwallow for shelter, groaning, carapaces grimed and discolored. The smaller of them, Xen, turned toward the minimal speck of burnt-yellow sun, but gained little aid through its battered external panels. It grasped Faz's extended pincer—useless now, mauled in battle—and murmured of fatigue.

"We can't go on."

Faz, grimly: "We must."

Xen was a functionary, an analytical sort. It had chanced to flee the battle down the same gully as Faz, the massive, lumbering leader. Xen yearned to see again its mate, Pymr, but knew this for the forlorn dream it was.

They crouched down. Their enemies rumbled in nearby ruined hills. A brown murk rose from those distant movements. The sun's pale eye stretched long shadows across the plain, inky hiding places for the encroaching others.

Thus when the shimmering curtains of ivory luminescence began to fog the hollow, Xen thought the end was here—that energy drain blurred its brain, and now brought swift, cutting death.

Fresh in from the darkling plain? the voice said. Not acoustically—this was a Vac Zone, airless for millennia.

"What? Who's that?" Faz answered.

Your ignorant armies clashed last night?

"Yes," Xen acknowledged ruefully, "and were defeated. Both sides lost."

Often the case.

"Are the Laggenmorphs far behind us?" Faz asked, faint tracers of hope skating crimson in its spiky voice.

No. They approach. They have tracked your confused alarms of struggle and flight.

"We had hoped to steal silent."

Your rear guard made a melancholy, long, withdrawing roar.

Xen: "They escaped?"

Into the next world, yes.

"Oh."

"Who *is* that?" Faz insisted, clattering its treads.

A wraith. Glittering skeins danced around them. A patchy acrid tang

laced the curling vacuum. **In this place having neither brass, nor earth, nor boundless sea.**

"Come out!" Faz called at three gigaHertz. "We can't see you."

Need you?

"Are you Laggenmorphs?" Panic laded Faz's carrier wave a bright, fervid orange. "We'll fight, I warn you!"

"Quiet," Xen said, suspecting.

The descending dazzle thickened, struck a bass note. **Laggenmorphs? I do not even know your terms.**

"Your name, then," Xen said.

Sam.

"What's that? That's no name!" Faz declared, its voice a shifting brew of fear and anger.

Sam it was and Sam it is. Not marble, nor the gilded monuments of princes, shall outlive it.

Xen murmured at a hundred kiloHertz, "Traditional archaic name. I dimly remember something of the sort. I doubt it's a trap."

The words not yet free of its antenna, Xen ducked—for a relativistic beam passed not a kilometer away, snapping with random rage. It forked to a ruined scree of limestone and erupted into a self-satisfied yellow geyser. Stones pelted the two hunkering forms, clanging.

A mere stochastic volley. Your sort do expend energies wildly. That is what first attracted me.

Surly, Faz snapped, "You'll get no surge from us."

I did not come to sup. I came to proffer.

A saffron umbra surrounded the still-gathering whorls of crackling, clotted iridescence.

"Where're you hiding?" Faz demanded. It brandished blades, snouts, cutters, spikes, double-bore nostrils that could spit lurid beams.

In the cupped air.

"There *is* no air," Xen said. "This channel is open to the planetary currents."

Xen gestured upward with half-shattered claw. There, standing in space, the playing tides of blue-white, gauzy light showed that they were at the base of a great translucent cylinder. Its geometric perfection held back the moist air of Earth, now an ocean tamed by skewed forces. On the horizon, at the glimmering boundary, purpling clouds nudged futilely at their constraint like hungry cattle. This cylinder led the eye up to a vastness, the stars a stilled snowfall. Here the thin but persistent wind from the sun could have free run, gliding along the orange-slice sections of the Earth's dipolar magnetic fields. The winds crashed down, sputtering, delivering kiloVolt glories where the cylinder cut them. Crackling yellow sparks grew there, a forest with all trunks ablaze and branches

of lightning, beckoning far aloft like a brilliantly lit casino in a gray dark desert.

How well I know. I stem from fossiled days.

"Then why—"

This is my destiny and my sentence.

"To live here?" Faz was beginning to suspect as well.

For a wink or two of eternity.

"Can you . . ." Faz poked the sky with a horned, fused launcher.

" . . . reach up there? Get us a jec?"

I do not know the term.

Xen said, "An injection. A megaVolt, say, at a hundred kiloAmps. A mere microsecond would boost me again. I could get my crawlers working."

I would have to extend my field lines.

"So it *is* true," Xen said triumphantly. "There still dwell Ims on the Earth. And you're one."

Again, the term—

"An Immortal. You have the fieldcraft."

Yes.

Xen knew of this, but had thought it mere legend. All material things were mortal. Cells were subject to intruding impurities, cancerous insults, a thousand coarse alleyways of accident. Machines, too, knew rust and wear, could suffer the ruthless scrubbing of their memories by a random bolt of electromagnetic violence. Hybrids, such as Xen and Faz, shared both half-worlds of erosion.

But there was a Principle which evaded time's rub. Order could be imposed on electrical currents—much as words rode on radio waves—and then the currents could curve into self-involved equilibria. If spun just so, the mouth of a given stream eating its own tail, then a spinning ring generated its own magnetic fields. Such work was simple. Little children made these loops, juggled them into humming fireworks.

Only genius could knit these current whorls into a fully-contorted globe. The fundamental physics sprang from ancient Man's bottling of thermonuclear fusion in magnetic strands. That was a simple craft, using brute magnets and artful metallic vessels. Far harder, to apply such learning to wisps of plasma alone.

The Principle stated that if, from the calm center of such a weave, the magnetic field always increased, in all directions, then it was stable to all manner of magnetohydrodynamic pinches and shoves.

The Principle was clear, but stitching the loops—history had swallowed that secret. A few had made the leap, been translated into surges of magnetic field. They dwelled in the Vac Zones, where the rude bump of air molecules could not stir their calm currents. Such were the Ims.

"You . . . live forever?" Xen asked wonderingly.

Aye, a holy spinning toroid—when I rest. Otherwise, distorted, as you see me now. Phantom shoots of burnt yellow. What once was Man, is now aurora—where winds don't sing, the sun's a tarnished nickel, the sky's a blank rebuke.

Abruptly, a dun-colored javelin shot from nearby ruined hills, vectoring on them.

"Laggenmorphs!" Faz sent. "I have no defense."

Halfway to them, the lance burst into scarlet plumes. The flames guttered out.

A cacaphony of eruptions spat from their left. Grey forms leapt forward, sending scarlet beams and bursts. Sharp metal cut the smoking stones.

"Pymr, sleek and soft, I loved you," Xen murmured, thinking this was the end.

But from the space around the Laggenmorphs condensed a chalky stuff—smothering, consuming. The forms fell dead.

I saved you.

Xen bowed, not knowing how to thank a wisp. But the blur of nearing oblivion weighed like stone.

"Help us!" Faz's despair lanced like pain through the dead vacuum. "We need energy."

You would have me tick over the tilt of Earth, run through solstice, bring ringing summer in an hour?

Xen caught in the phosphorescent stipple a green underlay of irony.

"No, no!" Faz spurted. "Just a jec. We'll go on then."

I can make you go on forever.

The flatness of it, accompanied by phantom shoots of scorched orange, gave Xen pause. "You mean . . . the fieldcraft? Even I know such lore. is not lightly passed on. Too many Ims, and the Earth's magnetic zones will be congested."

I grow bored, encased in this glassy electromagnetic shaft. I have not conferred the fieldcraft in a long while. Seeing you come crawling from your mad white chaos, I desired company. I propose a Game.

"Game?" Faz was instantly suspicious. "Just a jec, Im, that's all we want."

You may have that as well.

"What're you spilling about?" Faz asked.

Xen said warily, "It's offering the secret."

"What?" Faz laughed dryly, a flat cynical burst that rattled down the frequencies.

Faz churned an extruded leg against the grainy soil, wasting energy in its own consuming bitterness. It had sought fame, dominion, a sliver

of history. Its divisions had been chewed and spat out again by the Laggenmorphs, its feints ignored, bold strokes adroitly turned aside. Now it had to fly vanquished beside the lesser Xen, dignity gathered like tattered dress about its fleeing ankles.

"Im's never share *that*. A dollop, a jec, sure—but not the turns of field-craft." To show it would not be fooled, Faz spat chalky ejecta at a nearby streamer of zinc-laden light.

I offer you my Game.

The sour despair in Faz spoke first. "Even if we believe that, how do we know you don't cheat?"

No answer. But from the high hard vault there came descending a huge ribbon of ruby light—snaking, flexing, writing in strange tongues on the emptiness as it approached, fleeting messages of times gone—auguries of innocence lost, missions forgot, dim songs of the wide world and all its fading sweets. The ruby snake split, rumbled, turned eggshell blue, split and spread and forked down, blooming into a hemisphere around them. It struck and ripped the rock, spitting fragments over their swiveling heads, booming. Then prickly silence.

"I see," Xen said.

Thunder impresses, but it's lightning does the work.

"Why should the Im cheat, when it could short us to ground, fry us to slag?" Xen sent to Faz on tightband.

"Why anything?" Faz answered, but there was nodding in the tone.

2.

The Im twisted the local fields and caused to appear, hovering in fried light, two cubes—one red, one blue.

You may choose to open either the Blue cube alone, or both.

Though brightened by a borrowed kiloAmp jolt from Xen, Faz had expended many Joules in irritation and now flagged. "What's . . . in . . . them?"

Their contents are determined by what I have already predicted. I have already placed your rewards inside. You can choose Red and Blue both, if you want. In that case, following my prediction, I have placed in the Red cube the bottled-up injection you wanted.

Faz unfurled a metallic tentacle for the Red cube.

Wait. If you will open both boxes, then I have placed in the Blue nothing—nothing at all.

Faz said, "Then I get the jec in the Red cube, and when I open the Blue—nothing."

Correct.

Xen asked, "What if Faz *doesn't* open both cubes?"

The only other option is to open the Blue alone.

"And I get nothing?" Faz asked.

No. In that case, I have placed the, ah, "jec" in the Red cube. But in the Blue I have put the key to my own fieldcraft—the designs for immortality.

"I don't get it. I open Red, I get my jec—right?" Faz said, sudden interest giving it a spike of scarlet brilliance at three gigaHertz. "Then I open Blue, I get immortality. That's what I want."

True. But in that case, I have predicted that you will pick both cubes. Therefore, I have left the Blue cube empty.

Faz clattered its treads. "I get immortality if I choose the Blue cube *alone*? But you have to have *predicted* that. Otherwise I get nothing."

Yes.

Xen added, "If you have predicted things perfectly."

But I always do.

"Always?"

Nearly always. I am immortal, ageless—but not God. Not . . . yet.

"What if I pick Blue and you're wrong?" Faz asked. "Then I get nothing."

True. But highly improbable.

Xen saw it. "All this is done *now*? You've already made your prediction? Placed the jec or the secret—or both—in the cubes?"

Yes. I made my predictions before I even offered the Game.

Faz asked, "What'd you predict?"

Merry pink laughter chimed across the slumbering megaHertz. **I will not say. Except that I predicted correctly that you both would play, and that you particularly would ask that question. Witness.**

A sucking jolt lifted Faz from the stones and deposited it nearby. Etched in the rock beneath where Faz had crouched was *What did you predict?* in a rounded, careful hand.

"It had to have been done during the overhead display, before the game began," Xen said wonderingly.

"The Im *can* predict," Faz said respectfully.

Xen said, "Then the smart move is to open both cubes."

Why?

"Because you've already made your choice. If you predicted that Faz would choose both, and he opens only the Blue, then he gets nothing."

True, and as I said before, very improbable.

"So," Xen went on, thinking quickly under its pocked sheen of titanium, "if you predicted that Faz would choose *only* the Blue, then Faz might as well open both. Faz will get both the jec and the secret."

Faz said, "Right. And that jec will be useful in getting away from here."

Except that there is every possibility that I already predicted

his choice of both cubes. In that case I have left only the jec in the Red Cube, and nothing in Blue.

"But you've already chosen!" Faz blurted. "There isn't any probable-this or possible-that at all."

True.

Xen said, "The only uncertainty is, how good a predictor are you."

Quite.

Faz slowed, flexing a crane arm in agonized frustration. "I . . . dunno . . . I got . . . to think . . ."

There's world enough, and time.

"Let me draw a diagram," said Xen, who had always favored the orderly over the dramatic. This was what condemned it to a minor role in roiling battle, but perhaps that was a blessing. It drew upon the gritty soil some boxes: "There," Xen wheezed. "This is the payoff matrix."

		THE IM	
		Predicts you will take only what's in Blue	Predicts you will take what's in both
YOU {	Take only what is in Blue	immortality	nothing
	Take what is in both Red and Blue	immortality and jec	jec

As solemn and formal as Job's argument with God.

Enraptured with his own creation, Xen said, "Clearly, taking only the Blue cube is the best choice. The chances that the Im are wrong are very small. So you have a great chance of gaining immortality."

"That's crazy," Faz mumbled. "If I take both cubes, I at least get a jec, even if the Im *knew* I'd choose that way. And with a jec, I can make a run for it from the Laggenmorphs."

"Yes. Yet it rests on faith," Xen said. "Faith that the Im's predicting is near-perfect."

"Ha!" Faz snorted. "Nothing's perfect."

A black thing scorched over the rim of the pitwallow and exploded into fragments. Each bit dove for Xen and Faz, like shrieking, elongated eagles baring teeth.

And each struck something invisible but solid. Each smacked like an insect striking the windshield of a speeding car. And was gone.

"They're all around us!" Faz cried.

"Even with a jec, we might not make it out," Xen said.

True. But translated into currents, like me, with a subtle knowledge of conductivities and diffusion rates, you can live forever.

"Translated . . ." Xen mused.

Free of entropy's swamp.

"Look," Faz said, "I may be tired, drained, but I know logic. You've already *made* your choice, Im—the cubes are filled with whatever you put in. What I choose to do now can't change that. So I'll take *both* cubes."

Very well.

Faz sprang to the cubes. They burst open with a popping ivory radiance. From the red came a blinding bolt of a jec. It surrounded Faz's antennae and cascaded into the creature.

Drifting lightly from the blue cube came a tight-wound thing, a shifting ball of neon-lit string. Luminous, writhing rainbow worms. They described the complex web of magnetic field geometries that were immortality's craft. Faz seized it.

You won both. I predicted you would take only the blue. I was wrong.

"Ha!" Faz whirled with renewed energy.

Take the model of the forcecraft. From it you can deduce the methods.

"Come on, Xen!" Faz cried with sudden ferocity. It surged over the lip of the pitwallow, firing at the distant, moving shapes of the Laggenmorphs, full once more of spit and dash. Leaving Xen.

"With that jec, Faz will make it."

I predict so, yes. You could follow Faz. Under cover of its armory, you would find escape—that way.

The shimmer vectored quick a green arrow to westward, where clouds billowed white. There the elements still governed and mortality walked.

"My path lies homeward, to the south."

Bound for Pymr.

"She is the one true rest I have."

You could rest forever.

"Like you? Or Faz, when it masters the . . . translation?"

Yes. Then I will have company here.

"Aha! That is your motivation."

In part.

"What else, then?"

There are rules for immortals. Ones you cannot understand . . . yet.

"If you can predict so well, with Godlike power, then I should choose only the Blue cube."

True. Or as true as true gets.

"But if you predict so well, my 'choice' is mere illusion. It was fore-ordained."

That old saw? I can see you are . . . determined . . . to have free will.

"Or free won't."

Your turn.

"There are issues here . . ." Xen transmitted only ruby ruminations, murmuring like surf on a distant shore.

Distant boomings from Faz's retreat. The Red and Blue cubes spun, sparkling, surfaces rippled by ion-acoustic modes. The game had been reset by the Im, whose curtains of gauzy green shimmered in anticipation.

There must be a Game, you see.

"Otherwise there is no free will?"

That is indeed one of our rules. Observant, you are. I believe I will enjoy the company of you, Xen, more than that of Faz.

"To be . . . an immortal . . ."

A crystalline paradise, better than blind Milton's scribbled vision.

A cluster of dirty-brown explosions ripped the sky, rocked the land.

I cannot expend my voltages much longer. Would that we had wit enough, and time, to continue this parrying.

"All right." Xen raised itself up and clawed away the phosphorescent layers of both cubes.

The Red held a shimmering jec.

The Blue held nothing.

Xen said slowly, "So you predicted correctly."

Yes. Sadly, I knew you too well.

Xen radiated a strange sensation of joy, unlaced by regret. It surged to the lip of the crumbling pitwallow.

"Ah . . ." Xen sent a lofting note. "I am like a book, old Im. No doubt I would suffer in translation."

A last glance backward at the wraith of glow and darkness, a gesture of salute, then: "On! To sound and fury!" and it was gone forever.

3.

In the stretched silent years there was time for introspection. Faz learned the lacy straits of Earth's magnetic oceans, its tides and times. It sailed the bright magnetosphere and spoke to steel-blue stars.

The deep-etched memories of that encounter persisted. It never saw Xen again, though word did come vibrating through the field lines of

Xen's escape, of zestful adventures out in the raw territory of air and Man. There was even a report that Xen had itself and Pymr decanted into full Manform, to taste the pangs of cell and membrane. Clearly, Xen had lived fully after that solstice day. Fresh verve had driven that blithe new spirit.

Faz was now grown full, could scarcely be distinguished from the Im who gave the fieldcraft. Solemn and wise, its induction, conductivity, and ruby glinting dielectrics a glory to be admired, it hung vast and cold in the sky. Faz spoke seldom and thought much.

Yet the Game still occupied Faz. It understood with the embedded viewpoint of an Immortal now, saw that each side in the game paid a price. The Im could convey the fieldcraft to only a few, and had nearly exhausted itself; those moments cost millennia.

The sacrifice of Faz was less clear.

Faz felt itself the same as before. Its memories were stored in Alfvén waves—stirrings of the field lines, standing waves between Earth's magnetic poles. They would be safe until Earth itself wound down, and the dynamo at the nickel-iron core ceased to replenish the fields. Perhaps, by that time, there would be other field lines threading Earth's, and the Ims could spread outward, blending into the galactic currents.

There were signs that such an end had come to other worlds. The cosmic rays which sleeted down perpetually were random, isotropic, which meant they had to be scattered from magnetic waves between the stars. If such waves were ordered, wise—it meant a vast community of even greater Ims.

But this far future did not concern Faz. For it, the past still sang, gritty and real.

Faz asked the Im about that time, during one of their chance auroral meetings, beside a cascading crimson churn.

The way we would put it in my day, the Im named Sam said, would be that the software never knows what the original hardware was.

And that was it, Faz saw. During the translation, the original husk of Faz had been exactly memorized. This meant determining the exact locations of each atom, every darting electron. By the quantum laws, to locate perfectly implied that the measurement imparted an unknown, but high, momentum to each speck. So to define a thing precisely then destroyed it.

Yet there was no external way to prove this. Both before and after translation, there was an exact Faz.

The copy did not know it was embedded in different . . . hardware . . . than the original.

So immortality was a concept with legitimacy purely seen from the outside. From the inside . . .

Somewhere, a Faz had died that this Faz might live.

... And how did any sentience know it was not a copy of some long-gone original?

One day, near the sheath that held back the atmosphere, Faz saw a man waving. It stood in green and vibrant wealth of life, clothed at the waist, bronzed. Faz attached a plasma transducer at the boundary and heard the figure say, "You're Faz, right?"

Yes, in a way. And you . . . ?

"Wondered how you liked it."

Xen? Is that you?

"In a way."

You knew.

"Yes. So I went in the opposite direction—into this form."

You'll die soon.

"You've died already."

Still, in your last moments, you'll wish for this.

"No. It's not how long something lasts, it's what that something means." With that the human turned, waved gaily, and trotted into a nearby forest.

This encounter bothered Faz.

In its studies and learned colloquy, Faz saw and felt the tales of Men. They seemed curiously convoluted, revolving about Self. What mattered most to those who loved tales was how they concluded.

Yet all Men knew how each individual's story ended. Their little dreams were rounded with a sleep. So the point of a tale was not how it ended, but *what it meant*. The great inspiring epic rage of Man was to find that lesson, buried in a grave.

As each year waned, Faz reflected, and knew that Xen had seen this point. Immortality glimpsed from without, by those who could not know the inner Self—Xen did not want that. So it misled the Im, and got the mere jec that it wanted.

Xen chose life—not to be a monument of unaging intellect, gathered into the artifice of eternity.

In the brittle night Faz wondered if it had chosen well itself. And knew. *Nothing* could be sure it was itself the original. So the only intelligent course lay in enjoying whatever life a being felt—living like a mortal, in the moment. Faz had spent so long, only to reach that same conclusion which was forced on Man from the beginning.

Faz emitted a sprinkling of electromagnetic tones, and spattered red the field lines.

And stirred itself to think again, each time the dim sun waned at the solstice. To remember and, still living, to rejoice. ●