DUST

By Greg Egan

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Born in 1961, Greg Egan lives in Australia, and is certainly in the running for the title of "Hottest New Writer" of the nineties to date, along with other newcomers such as Ian R. MacLeod, Maureen F. McHugh, Mary Rosenblum, Stephen Baxter, and Tony Daniel. Egan has been very impressive and very prolific in the early '90s, seeming to turn up almost everywhere with high-quality stories. He is a frequent contributor to Interzone and Isaac Asimov's Science Fiction Magazine, and has made sales to Pulphouse, Analog, Aurealis, Eidolon, and elsewhere. Several of his stories have appeared in various "Best of the Year" series, including this one; in fact, he placed two stories in both our Eighth and Ninth Annual Collections, the first author ever to do that back-to-back in consecutive volumes. His first novel, Quarantine, has just appeared, and it was sold as part of a package deal that includes a second novel and a collection of his short fiction—a pretty high-powered deal for such a new writer. He may well turn out to be one of the Big Names of the next decade.

Here he gives us an unsettling and brilliantly original study of just what it is that makes us human …

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I open my eyes, blinking at the room's unexpected brightness, then lazily reach out to place one hand in a patch of sunlight spilling onto the bed from a gap between the curtains. Dust motes drift across the shaft of light, appearing for all the world to be conjured into, and out of, existence—evoking a childhood memory of the last time I found this illusion so compelling, so hypnotic. I feel utterly refreshed—and utterly disinclined to give up my present state of comfort. I don't know why I've slept so late, and I don't care. I spread my fingers on the sun-warmed sheet, and think about drifting back to sleep.

Something's troubling me, though. A dream? I pause and try to dredge up some trace of it, without much hope; unless I'm catapulted awake by a nightmare, my dreams tend to be evanescent. And yet—

I leap out of bed, crouch down on the carpet, fists to my eyes, face against my knees, lips moving soundlessly. The shock of realization is a palpable thing: a red lesion behind my eyes, pulsing with blood. Like … the aftermath of a hammer blow to the thumb—and tinged with the very same mixture of surprise, anger, humiliation, and idiot bewilderment. Another childhood memory: I held a nail to the wood, yes

—but only to camouflage my true intention. I was curious about everything, including pain. I'd seen my father injure himself this way—but I knew that I needed firsthand experience to understand what he'd been through. And I was sure that it would be worth it, right up to the very last moment—

I rock back and forth, on the verge of laughter, trying to keep my mind blank, waiting for the panic

to subside. And eventually, it does—laced by one simple, perfectly coherent thought: I don't want to be here.

For a moment, this conclusion seems unassailable, but then a countervail-ing voice rises up in me: I'm not going to quit. Not again. I swore to myself that I wouldn't … and there are a hundred good reasons not to—

Such as?

For a start, I can't afford it—

No? Who can't afford it?

I whisper, "I know exactly how much this cost, you bastard. And I honestly don't give a shit. I'm not going through with it."

There's no reply. I clench my teeth, uncover my eyes, look around the room. Away from the few dazzling patches of direct sunshine, everything glows softly in the diffuse light: the matte-white brick walls, the imitation (imitation) mahogany desk; even the Dali and Giger posters look harmless, domesticated. The simulation is perfect—or rather, finer-grained than my "visual" acuity, and hence indistinguishable from reality—as no doubt it was the other four times. Certainly, none of the other Copies complained about a lack of verisimilitude in their environments. In fact, they never said anything very coherent; they just ranted abuse, whined about their plight, and then terminated themselves—all within fifteen (subjective) minutes of gain-ing consciousness.

And me? What ever made me—him—think that I won't do the same? How am I different from Copy number four? Three years older. More stubborn? More determined? More desperate for success? I was, for sure … back when I was still thinking of myself as the one who'd stay real, the one who'd sit outside and watch the whole experiment from a safe distance.

Suddenly I wonder: What makes me so sure that I'm not outside? I laugh weakly. I don't remember anything after the scan, which is a bad sign, but I was overwrought, and I'd spent so long psyching myself up for "this" …

Get it over with.

I mutter the password, "Bremsstrahlung"—and my last faint hope vanishes,

as a black-on-white square about a meter wide, covered in icons, appears in midair in front of me.

I give the interface window an angry thump; it resists me as if it were solid, and firmly anchored. As if I were solid, too. I don't really need any more convincing, but I grip the top edge and lift myself right off the floor. I regret this; the realistic cluster of effects of exertion—down to the plausible twinge in my right elbow—pin me to this "body," anchor me to this "place," in exactly the way I should be doing everything I can to avoid.

Okay. Swallow it: I'm a Copy. My memories may be those of a human being, but I will never

inhabit a real body "again." Never inhabit the real world again … unless my cheapskate original scrapes up the money for a telepresence robot—in which case I could blunder around like the slowest, clumsiest, most neurologically impaired cripple. My model-of-a-brain runs seventeen times slower than the real thing. Yeah, sure, technology will catch up one day—and seventeen times faster for me than for him. In the mean-time? I rot in this prison, jumping through hoops, carrying out his precious research—while he lives in my apartment, spends my money, sleeps with Elizabeth …

I close my eyes, dizzy and confused; I lean against the cool surface of the interface.

"His" research? I'm just as curious as him, aren't I? I wanted this; I did this to myself. Nobody forced me. I knew exactly what the drawbacks would be, but I thought I'd have the strength of will (this time, at last) to transcend them, to devote myself, monklike, to the purpose for which I'd been brought into being— content in the knowledge that my other self was as unconstrained as ever.

Past tense. Yes, I made the decision—but I never really faced up to the consequences. Arrogant, self-deluding shit. It was only the knowledge that "I" would continue, free, on the outside, that gave me the "courage" to go ahead—but that's no longer true, for me.

Ninety-eight percent of Copies made are of the very old, and the terminally ill. People for whom it's the last resort—most of whom have spent millions beforehand, exhausting all the traditional medical options. And despite the fact that they have no other choice, 15 percent decide upon awakening—usually in a matter of hours—that they just can't hack it.

And of those who are young and healthy, those who are merely curious, those who know they have a perfectly viable, living, breathing body outside?

The bail-out rate has been, so far, one hundred percent.

I stand in the middle of the room, swearing softly for several minutes, trying to

prepare myself—although I know that the longer I leave it, the harder it will become. I stare at the floating interface; its dreamlike, hallucina-tory quality helps, slightly. I rarely remember my dreams, and I won't remember this one—but there's no tragedy in that, is there?

I don't want to be here.

I don't want to be this.

And to think I used to find it so often disappointing, waking up yet again as the real Paul Durham: self-centered dilettante, spoiled by a medium-sized inheritance, too wealthy to gain any sense of purpose from the ordinary human struggle to survive—but insufficiently brain-dead to devote his life to the accumulation of ever more money and power. No status-symbol luxuries for Durham: no yachts, no mansions, no bioenhancements. He indulged other urges; threw his money in another direction entirely.

And I don't know, anymore, what he thinks it's done for him—but I know what it's done to me.

I suddenly realize that I'm still stark naked. Habit—if no conceivable propriety—suggests that I should put on some clothes, but I resist the urge. One or two perfectly innocent, perfectly ordinary actions like that, and I'll find I'm taking myself seriously, thinking of myself as real.

I pace the bedroom, grasp the cool metal of the doorknob a couple of times, but manage to keep myself from turning it. There's no point even starting to explore this world.

I can't resist peeking out the window, though. The view of the city is flawless—every building, every cyclist, every tree, is utterly convincing— and so it should be: it's a recording, not a simulation. Essentially photo-graphic—give or take a little computerized touching up and filling in—and totally predetermined. What's more, only a tiny part of it is "physically" accessible to me; I can see the harbor in the distance, but if I tried to go for a stroll down to the water's edge …

Enough. Just get it over with.

I prod a menu icon labeled UTILITIES; it spawns another window in front of the first. The function I'm seeking is buried several menus deep— but for all that I thought I'd convinced myself that I wouldn't want to use it, I brushed up on the details just a week ago, and I know exactly where to look. For all my self-deception, for all that I tried to relate only to the one who'd stay outside, deep down, I must have understood full well that I had two separate futures to worry about.

I finally reach the EMERGENCIES menu, which includes a cheerful icon of a

cartoon figure suspended from a parachute. Bailing out is what they call it—but I don't find that too cloyingly euphemistic; after all, I can't commit "suicide" when I'm not legally human. In fact, the law requires that a bail-out option be available, without reference to anything so troublesome as the "rights" of the Copy; this stipulation arises solely from the ratification of certain purely technical, international software standards.

I prod the icon; it comes to life, and recites a warning spiel - I scarcely pay attention. Then it says, "Are you absolutely sure that you wish to shut down this Copy of Paul Durham?"

Nothing to it. Program A asks Program B to confirm its request for orderly termination. Packets of data are exchanged.

"Yes, I'm sure."

A metal box, painted red, appears at my feet. I open it, take out the parachute, strap it on.

Then I close my eyes and say, "Listen, you selfish, conceited, arrogant turd: How many times do you need to be told? I'll skip the personal angst; you've heard it all before—and ignored it all before. But when are you going to stop wasting your time, your money, your energy … when are you going to stop wasting your life…on something which you just don't have the strength to carry through? After all the evidence to the contrary, do you honestly still believe that you're brave enough, or crazy enough, to be your own guinea pig? Well, I've got news for you: You're not."

With my eyes still closed, I grip the release lever.

I'm nothing: a dream, a soon-to-be-forgotten dream.

My fingernails need cutting; they dig painfully into the skin of my palm.

Have I never, in a dream, feared the extinction of waking? Maybe I have— but a dream is not a life. If the only way I can reclaim my body, reclaim my world, is to wake and forget—

I pull the lever.

After a few seconds, I emit a constricted sob—a sound more of confusion than any kind of emotion —and open my eyes.

The lever has come away in my hand.

I stare dumbly at this metaphor for … what? A bug in the termination software? Some kind of hardware glitch?

Feeling—at last—truly dreamlike, I unstrap the parachute, and unfasten the neatly packaged bundle.

Inside, there is no illusion of silk, or Kevlar, or whatever else there might plausibly have been. Just a sheet of paper. A note.

Dear Paul,

The night after the scan was completed, I looked back over the whole

preparatory stage of the project, and did a great deal of soul searching.

And I came to the conclusion that—right up to the very last moment—my

attitude was poisoned with ambivalence.

With hindsight, I very quickly came to realize just how foolish my

qualms were—but that was too late for you. I couldn't afford to ditch you,

and have myself scanned yet again. So, what could I do?

This: I put your awakening on hold for a while, and tracked down

someone who could make a few alterations to the virtual environment

utilities. I know, that wasn't strictly legal … but you know how important it

is to me that you—that we—succeed this time.

I trust you'll understand, and I'm confident that you'll accept the situation with dignity and equanimity.

Best wishes,

Paul

I sink to my knees, still holding the note, staring at it in disbelief. He can't have done this. He can't have been so callous.

No? who am I kidding? Too weak to be so cruel to anyone else—perhaps. Too weak to go through with this in person—certainly. But as for making a copy, and then—once its future was no longer his future, no longer anything for him to fear—taking away its power to escape …

It rings so true that I hang my head in shame.

Then I drop the note, raise my head, and bellow with all the strength in my non-existent lungs:

"DURHAM! YOU PRICK!"

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I think about smashing furniture. Instead, I take a long, hot shower. In part, to calm myself; in part, as an act of petty vengeance: I may not be adding to the cheapskate's water bill, but he can damn well pay for twenty virtual minutes of gratuitous hydrodynamic calculations. I scrutinize the droplets and rivulets of water on my skin, searching for some small but visible anom-aly at the boundary between my body—computed down to subcellular resolution—and the rest of the simulation, which is modeled much more crudely. If there are any discrepancies, though, they're too subtle for me to detect.

I dress—I'm just not comfortable naked—and eat a late breakfast. The muesli tastes exactly like muesli, the toast exactly like toast, but I know there's a certain amount of cheating going on with both taste and aroma. The detailed effects of chewing, and the actions of saliva, are being faked from empirical rules, not generated from first principles; there are no individual molecules being dissolved from the food and torn apart by enzymes—just a rough set of evolving nutrient concentration values, associated with each microscopic "parcel" of saliva. Eventually, these will lead to plausible increases in the concentrations of amino acids, various carbohydrates, and other substances all the way down to humble sodium and chloride ions, in similar "parcels" of gastric juices … which in turn will act as input data to the models of my intestinal villus cells. From there, into the bloodstream.

The coffee makes me feel alert, but also slightly detached—as always. Neurons, of course, are modeled with the greatest care of all, and whatever receptors to caffeine and its metabolites were present on each individual neuron in my original's brain at the time of the scan, my model-of-a-brain should incorporate every one of them—in a simplified, but functionally equivalent, form.

I close my eyes and try to imagine the physical reality behind all this: a cubic meter of silent, motionless optical crystal, configured as a cluster of over a billion individual processors, one of a few hundred identical units in a basement vault… somewhere on the planet. I don't even know what city I'm in; the scan was made in Sydney, but the model's implementation would have been contracted out by the local node to the lowest bidder at the time.

I take a sharp vegetable knife from the kitchen drawer, and drive the point a short way into my forearm. I flick a few drops of blood onto the table—and wonder exactly which software is now responsible for the stuff. Will the blood cells "die off" slowly—or have they already been surrendered to the extrasomatic general-physics model, far too unsophisticated to represent them, let alone keep them "alive"?

If I tried to slit my wrists, when exactly would he intervene? I gaze at my distorted reflection in the blade. Maybe he'd let me die, and then run the whole model again from scratch, simply leaving out the knife. After all, I re-ran all the earlier Copies hundreds of times, tampering with various aspects of their surroundings, trying in vain to find some cheap trick that would keep them from wanting to bail

out. It must be a measure of sheer stubbornness that it took me—him—so long to admit defeat and rewrite the rules. I put down the knife. I don't want to perform that experiment. Not yet.

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I go exploring, although I don't know what I'm hoping to find. Outside my own apartment, everything is slightly less than convincing; the architecture of the building is reproduced faithfully enough, down to the ugly plastic pot-plants, but every corridor is deserted, and every door to every other apartment is sealed shut—concealing, literally, nothing. I kick one door, as hard as I can; the wood seems to give slightly, but when I examine the surface, the paint isn't even marked. The model will admit to no damage here, and the laws of physics can screw themselves.

There are people and cyclists on the street—all purely recorded. They're solid rather than ghostly, but it's an eerie kind of solidity; unstoppable, unswayable, they're like infinitely strong, infinitely disinterested robots. I hitch a ride on one frail old woman's back for a while; she carries me down the street, heedlessly. Her clothes, her skin, even her hair, all feel the same to me: hard as steel. Not cold, though. Neutral.

This street isn't meant to serve as anything but three-dimensional wallpa-per; when Copies interact with each other, they often use cheap, recorded environments full of purely decorative crowds. Plazas, parks, open-air cafés; all very reassuring, no doubt, when you're fighting off a sense of isolation and claustrophobia. There are only about three thousand Copies in existence—a small population, split into even smaller, mutually antagonistic, cliques—and they can only receive realistic external visitors if they have friends or relatives willing to slow down their mental processes by a factor of seventeen. Most dutiful next-of-kin, I gather, prefer to exchange video recordings. Who wants to spend an afternoon with great-grandfather, when it burns up half a week of your life? Durham, of course, has removed all of my communications facilities; he can't have me blowing the whistle on him and ruining everything.

When I reach the corner of the block, the visual illusion of the city continues, far into the distance, but when I try to step forward onto the road, the concrete pavement under my feet starts acting like a treadmill, sliding backward at precisely the rate needed to keep me motionless, whatever pace I adopt. I back off and try leaping over this region, but my horizontal velocity dissipates—without the slightest pretense of any "physical" justification—and I land squarely in the middle of the treadmill.

The people of the recording, of course, cross the border with ease. One man walks straight at me; I stand my ground, and find myself pushed into a zone of increasing viscosity, the air around me becoming painfully unyielding before I slip

free to one side. The software impeding me is, clearly, a set of clumsy patches which aims to cover every contingency—but which might not in fact be complete. The sense that discovering a way to breach this barrier would somehow "liberate" me is compelling—but completely irrational. Even if I did find a flaw in the program which enabled me to break through, I doubt I'd gain anything but decreasingly realistic surroundings. The recording can only contain complete information for points of view within a certain, finite zone; all there is to "escape to" is a range of coordinates where my view of the city would be full of distortions and omissions, and would eventually fade to black.

I step back from the corner, half dispirited, half amused. What did I expect to find? A big door at the edge of the model, marked EXIT, through which I could walk out into reality? Stairs leading metaphorically down to some boiler room representation of the underpinnings of this world, where I could throw a few switches and blow it all apart? Hardly. I have no right to be dissatisfied with my surroundings; they're precisely what I ordered.

It's early afternoon on a perfect spring day; I close my eyes and lift my face to the sun. Whatever I believe intellectually, there's no denying that I'm beginning to feel a purely physical sense of integrity, of identity. My skin soaks up the warmth of the sunlight. I stretch the muscles in my arms, my shoulders, my back; the sensation is perfectly ordinary, perfectly familiar—and yet I feel that I'm reaching out from the self "in my skull" to the rest of me, binding it all together, staking some kind of claim. I feel the stirrings of an erection. Existence is beginning to seduce me. This body doesn't want to evaporate. This body doesn't want to bail out. It doesn't much care that there's another—"more real"—version of itself elsewhere. It wants to retain its wholeness. It wants to endure.

And this may be a travesty of life, now—but there's always the chance of improvement. Maybe I can persuade Durham to restore my communications facilities; that would be a start. And when I get bored with holovision libraries; news systems; databases; and, if any of them deign to meet me, the ghosts of the senile rich? I could have myself suspended until processor speeds catch up with reality—when people will be able to visit without slow-down, and telepresence robots might actually be worth inhabiting.

I open my eyes, and shiver. I don't know what I want anymore—the chance to bail out, to declare this bad dream over…or the chance of virtual immortality—but I have to accept that there's only one way that I'm going to be given a choice.

I say quietly, "I won't be your guinea pig. A collaborator, yes. An equal partner. If you want cooperation, if you want meaningful data, then you're going to have to treat me like a colleague, not a piece of fucking apparatus. Understood?"

A window opens up in front of me. I'm shaken by the sight, not of his ugly face, but of the room behind him. It's only my study—and I wandered through the

virtual equivalent, disinterested, just minutes ago—but this is still my first glimpse of the real world,

in real time. I move closer to the window, in the hope of seeing if there's anyone else in the room with him—Elizabeth?—but the image is two-dimensional, the perspective doesn't change.

He emits a brief, high-pitched squeak, then waits with visible impatience while a second, smaller window gives me a slowed-down replay.

"Of course it's understood. That was always my intention. I'm just glad you've finally come to your senses and decided to stop sulking. We can begin whenever you're ready."

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I try to look at things objectively.

Every Copy is already an experiment—in perception, cognition, the na-ture of consciousness. A subcellular mathematical model of a specific hu-man body is a spectacular feat of medical imaging and computing technology—but it's certainly not itself a human being. A lump of gallium arsenic phosphide awash with laser light is not a member of Homo sapiens—so a Copy manifestly isn't "human" in the current sense of the word.

The real question is: What does a Copy have in common with human beings? Information-theoretically? Psychologically? Metaphysically?

And from these similarities and differences, what can be revealed?

The Strong AI Hypothesis declares that consciousness is a property of certain algorithms, independent of their implementation. A computer which manipulates data in essentially the same way as an organic brain must possess essentially the same mental states.

Opponents point out that when you model a hurricane, nobody gets wet. When you model a fusion power plant, no energy is produced. When you model digestion and metabolism, no nutrients are consumed—no real digestion takes place. So when you model the human brain, why should you expect real thought to occur?

It depends, of course, on what you mean by "real thought." How do you characterize and compare the hypothetical mental states of two systems which are, physically, radically dissimilar? Pick the right parameters, and you can get whatever answer you like. If consciousness is defined purely in terms of physiological events—actual neurotransmitter molecules crossing synapses between real neurons—then those who oppose the Strong AI Hypothesis win, effortlessly. A hurricane requires real wind and actual drops of rain. If consciousness is defined,

instead, in information-processing terms—this set of input data evokes that set of output data (and, perhaps, a certain kind of internal representation)—then the Strong AI Hypothesis is almost a tautol-ogy.

Personally, I'm no longer in a position to quibble. Cogito ergo sum. But if I can't doubt my own consciousness, I can't expect my testimony—the output of a mere computer program—to persuade the

confirmed skeptics. Even if I passionately insisted that my inherited memories of experiencing biological consciousness were qualitatively indistinguishable from my present condition, the listener would be free to treat this outburst as nothing but a computer's (eminently reasonable) prediction of what my original would have said, had he experienced exactly the same sensory input as my model-of-a-brain has received (and thus been tricked into believing that he was nothing but a Copy). The skeptics would say that comprehensive modeling of mental states that might have been does not require any "real thought" to have taken place.

Unless you are a Copy, the debate is unresolvable. For me, though—and for anyone willing to grant me the same presumption of consciousness that they grant their fellow humans—the debate is almost irrelevant. The real point is that there are questions about the nature of this condition which a Copy is infinitely better placed to explore than any human being.

I sit in my study, in my favorite armchair (although I'm not at all convinced that the texture of the surface has been accurately reproduced). Durham appears on my terminal—which is otherwise still dysfunctional. It's odd, but I'm already beginning to think of him as a bossy little djinn trapped inside the screen, rather than a vast, omnipotent deity striding the halls of Reality, pulling all the strings. Perhaps the pitch of his voice has something to do with it.

Squeak. Slow-motion replay: "Experiment one, trial zero. Baseline data. Time resolution one millisecond—system standard. Just count to ten, at one-second intervals, as near as you can judge it. Okay?"

I nod, irritated. I planned all this myself, I don't need step-by-step instruc-tions. His image vanishes; during the experiments, there can't be any cues from real time.

I count. Already, I'm proving something: my subjective time, I'm sure, will differ from his by a factor very close to the ratio of model time to real time. Of course, that's been known ever since the first Copies were made—and even then, it was precisely what everyone had been expecting—but from my current perspective, I can no longer think of it as a "trivial" result.

The djinn returns. Staring at his face makes it harder, not easier, to believe that we have so much in common. My image of myself—to the extent that such a thing existed—was never much like my true appearance—and now, in defense of

sanity, is moving even further away.

Squeak. "Okay. Experiment one, trial number one. Time resolution five milliseconds. Are you ready?"

"Yes."

He vanishes. I count: "One. Two. Three. Four. Five. Six. Seven. Eight. Nine. Ten."

Squeak. "Anything to report?"

I shrug. “No. I mean, I can’t help feeling slightly apprehensive, just knowing that you’re screwing around with my … infrastructure. But apart from that, nothing.”

His eyes no longer glaze over while he’s waiting for the speeded-up version of my reply; either he’s gained a degree of self-discipline—or, more likely, he’s interposed some smart editing software to conceal his boredom.

Squeak. “Don’t worry about apprehension. We’re running a control, remember?”

I’d rather not. Durham has cloned me, and he’s feeding exactly the same sensorium to my clone, but he’s only making changes in the model’s time resolution for one of us. A perfectly reasonable thing to do—indeed, an essential part of the experiment—but it’s still something I’d prefer not to dwell on.

Squeak. “Trial number two. Time resolution ten milliseconds.”

I count to ten. The easiest thing in the world—when you’re made of flesh, when you’re made of matter, when the quarks and the electrons just do what comes naturally. I’m not built of quarks and electrons, though. I’m not even built of photons—I’m comprised of the data represented by the presence or absence of pulses of light, not the light itself.

A human being is embodied in a system of continuously interacting mat-ter—ultimately, fields of fundamental particles, which seem to me incapable of being anything other than themselves. I am embodied in a vast set of finite, digital representations of numbers. Representations which are purely conventions. Numbers which certainly can be interpreted as describing aspects of a model of a human body sitting in a room … but it’s hard to see that meaning as intrinsic, as necessary. Numbers whose values are recomputed—according to reasonable, but only approximately “physical,” equations—for equally spaced successive values of the model’s notional time.

Squeak. “Trial number three. Time resolution twenty milliseconds.”

“One. Two. Three.”

So, when do I experience existence? During the computation of these variables—or in the brief interludes when they sit in memory, unchanging, doing nothing but representing an instant of my life? When both stages are taking place a thousand times a subjective second, it hardly seems to matter, but very soon—

Squeak. “Trial number four. Time resolution fifty milliseconds.”

Am I the data? The process that generates it? The relationships between the numbers? All of the above?

“One hundred milliseconds.”

I listen to my voice as I count—as if half expecting to begin to notice the encroachment of silence, to start perceiving the gaps in myself.

“Two hundred milliseconds.”

A fifth of a second. “One. Two.” Am I strobing in and out of existence now, at five subjective hertz? “Three. Four. Sorry, I just—” An intense wave of nausea passes through me, but I fight it down. “Five. Six. seven. Eight. Nine. Ten.”

The djinn emits a brief, solicitous squeak. “Do you want a break?”

“No. I’m fine. Go ahead.” I glance around the sun-dappled room, and laugh. What will he do if the control and the subject just give two different replies? I try to recall my plans for such a contingency, but I can’t remember them—and I don’t much care. It’s his problem now, not mine.

Squeak. “Trial number seven. Time resolution five hundred milliseconds. “

I count—and the truth is, I feel no different. A little uneasy, yes— but factoring out any metaphysical squeamishness, everything about my experience remains the same. And “of course” it does—because nothing is being omitted, in the long run. My model-of-a-brain is only being fully described at half-second (model time) intervals—but each description still includes the effects of everything that “would have happened” in between. Perhaps not quite as accurately as if the complete cycle of calculations was being carried out on a finer time scale—but that’s irrelevant. Even at millisecond resolution, my models-of-neurons behave only roughly like their originals—just as any one person’s neurons behave only roughly like anyone else’s. Neurons aren’t precision components, and they don’t need to be; brains are the most fault-tolerant machines in the world.

“One thousand milliseconds.”

What’s more, the equations controlling the model are far too complex to solve in a single step, so in the process of calculating the solutions, vast arrays of partial results are being generated and discarded along the way. These partial results imply—even if they don’t directly represent—events taking place within the gaps between successive complete descriptions. So in a sense, the intermediate states are still being described—albeit in a drastically recoded form.

“Two thousand milliseconds.”

“One. Two. Three. Four.”

If I seem to speak (and hear myself speak) every number, it’s because the effects of having said “three” (and having heard myself say it) are implicit in the details of calculating how my brain evolves from the time when I’ve just said “two” to the time when I’ve just said “four.”

“Five thousand milliseconds.”

“One. Two. Three. Four. Five.”

In any case, is it so much stranger to hear words that I’ve never “really” spoken, than it has been to hear anything at all since I woke? Millisecond sampling is far too coarse to resolve the full range of audible tones. Sound isn’t represented in this world by fluctuations in air pressure values—which

couldn't change fast enough—but in terms of audio power spectra: profiles of intensity versus frequency. Twenty kilohertz is just a number here, a label; nothing can actually oscillate at that rate. Real ears analyze pressure waves into components of various pitch; mine are fed the pre-existing power spectrum values directly, plucked out of the non-existent air by a crude patch in the model.

"Ten thousand milliseconds."

"One. Two. Three."

My sense of continuity remains as compelling as ever. Is this experience arising in retrospect from the final, complete description of my brain…or is it emerging from the partial calculations as they're being performed? What would happen if someone shut down the whole computer, right now?

I don't know what that means, though. In any terms but my own, I don't know when "right now" is.

"Eight. Nine. Ten."

Squeak. "How are you feeling?"

Slightly giddy—but I shrug and say, "The same as always." And basically, it's true. Aside from the unsettling effects of contemplating what might or might not have been happening to me, I can't claim to have experienced anything out of the ordinary. No altered states of consciousness, no hallucinations, no memory loss, no diminution of self-awareness, no real disorientation. "Tell me—was I the control, or the subject?"

Squeak. He grins. "I can't answer that, Paul—I'm still speaking to both of you. I'll tell you one thing, though: the two of you are still identical. There were some very small, transitory discrepancies, but they've died away completely now—and whenever the two of you were in comparable representations, all firing patterns of more than a couple of neurons were the same."

I'm curiously disappointed by this—and my clone must be, too—although I have no good reason to be surprised.

I say, "What did you expect? Solve the same set of equations two different ways, and of course you get the same results—give or take some minor differences in round-off errors along the way. You must. It's a mathematical certainty."

Squeak. "Oh, I agree. However much we change the details of the way the model is computed, the state of the subject's brain—whenever he has one—and everything he says and does—in whatever convoluted representation—must match the control. Any other result would be unthinkable." He writes with his finger on the window:

$(1 + 2) + 3 = 1 + (2 + 3)$

I nod. "So why bother with this stage at all? I know—I wanted to be rigorous, I wanted to establish solid foundations. All that naive Principia stuff. But the truth is, it's a waste of resources. Why not skip the bleeding obvious, and get on with the kind of experiment where the answer isn't a

foregone conclusion?"

Squeak. He frowns. "I didn't realize you'd grown so cynical, so quickly. AI isn't a branch of pure mathematics; it's an empirical science. Assumptions have to be tested. Confirming the so-called 'obvious' isn't such a dishonorable thing, is it? Anyway, if it's all so straightforward, what do you have to fear?"

I shake my head. "I'm not afraid; I just want to get it over with. Go ahead. Prove whatever you think you have to prove, and then we can move on."

Squeak. "That's the plan. But I think we should both get some rest now. I'll enable your communications—for incoming data only." He turns away, reaches off-screen, hits a few keys on a second terminal.

Then he turns back to me, smiling—and I know exactly what he's going to say.

Squeak. "By the way, I just deleted one of you. Couldn't afford to keep you both running, when all you're going to do is laze around."

I smile back at him, although something inside me is screaming. "Which one did you terminate?"

Squeak. "What difference does it make? I told you, they were identical. And you're still here, aren't you? whoever you are. Whichever you were."

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Three weeks have passed outside since the day of the scan, but it doesn't take me long to catch up with the state of the world; most of the fine details have been rendered irrelevant by subsequent events, and much of the ebb and flow has simply canceled itself out. Israel and Palestine came close to war again, over alleged water treaty violations on both sides—but a joint peace rally brought more than a million people onto the glassy plain that used to be Jerusalem, and the governments were forced to back down. Former US President Martin Sandover is still fighting extradition to Palau, to face charges arising from his role in the bloody coup d'état of thirty-five; the Supreme Court finally reversed a long-standing ruling which had granted him immu-nity from all foreign laws, and for a day or two things looked promising— but then his legal team apparently discovered a whole new set of delaying tactics. In Canberra, another leadership challenge has come and gone, with the Prime Minister undeposed. One journalist described this as high drama; I guess you had to be there. Inflation has fallen half a percent; unemployment has risen by the same amount.

I scan through the old news reports rapidly, skimming over articles and fast-forwarding scenes that I probably would have studied scrupulously, had they been "fresh." I feel a curious sense of resentment, at having "missed" so much—it's all here in front of me, now, but that's not the same at all.

And yet, shouldn't I be relieved that I didn't waste my time on so much ephemeral detail? The very fact that I'm now disinterested only goes to show how little of it really mattered, in the long run.

Then again, what does? People don't inhabit geological time. People inhabit hours and days; they have to care about things on that time scale.

People inhabit hours and days. I don't.

I plug into real time holovision, and watch a sitcom flash by in less than two minutes, the soundtrack an incomprehensible squeal. A game show. A war movie.

The evening news. It's as if I'm in deep space, rushing back toward the Earth through a sea of Doppler-shifted broadcasts—and this image is strangely comforting: my situation isn't so bizarre, after all, if real people could find themselves in much the same relationship with the world as I am. Nobody would claim that Doppler shift or time dilation could render someone less than human.

Dusk falls over the recorded city. I eat a microwaved soya protein stew—wondering if there's any good reason now, moral or otherwise, to continue to be a vegetarian.

I listen to music until well after midnight. Tsang Chao, Michael Nyman, Philip Glass. It makes no difference that each note "really" lasts seventeen times as long as it should, or that the audio ROM sitting in the player "really" possesses no microstructure, or that the "sound" itself is being fed into my model-of-a-brain by a computerized sleight-of-hand that bears no resemblance to the ordinary process of hearing. The climax of Glass's Mishima still seizes me like a grappling hook through the heart -

If the computations behind all this were performed over millennia, by people flicking abacus beads, would I still feel exactly the same? It's outra-geous to admit it—but the answer has to be yes.

What does that say about real time, and real space?

I lie in bed, wondering: Do I still want to wake from this dream? The question remains academic, though; I still don't have any choice.

****

"I'd like to talk to Elizabeth."

Squeak. "That's not possible."

"Not possible? Why don't you just ask her?"

Squeak. "I can't do that, Paul. She doesn't even know you exist."

I stare at the screen. "But … I was going to tell her! As soon as I had a Copy who survived, I was going to tell her everything, explain everything—"

Squeak. The djinn says drily, "Or so we thought."

"I don't believe it! Your life's great ambition is finally being fulfilled—and you can't even share it

with the one woman …"

Squeak. His face turns to stone. "I really don't wish to discuss this. Can we

get on with the experiment, please?"

"Oh, sure. Don't let me hold things up. I almost forgot: you turned forty-five while I slept, didn't you? Many happy returns—but I'd better not waste too much time on congratulations. I don't want you dying of old age in the middle of the conversation."

Squeak. "Ah, but you're wrong. I took some short cuts while you slept—shut down ninety percent of the model, cheated on most of the rest. You got six hours sleep in ten hours' real time. Not a bad job, I thought."

"You had no right to do that!"

Squeak. "Be practical. Ask yourself what you'd have done in my place."

"It's not a joke!" I can sense the streak of paranoia in my anger; I struggle to find a rational excuse. "The experiment is worthless if you're going to intervene at random. Precise, controlled changes—that's the whole point. You have to promise me you won't do it again."

Squeak. "You're the one who was complaining about waste. Someone has to think about conserving our dwindling resources."

"Promise me!"

Squeak. He shrugs. "All right. You have my word: no more ad hoc intervention."

Conserving our dwindling resources? What will he do, when he can no longer afford to keep me running? Store me until he can raise the money to start me up again, of course. In the long term, set up a trust fund; it would only have to earn enough to run me part time, at first: keep me in touch with the world, stave off excessive culture shock. Eventually, computing technology is sure to transcend the current hurdles, and once again enter a phase of plummeting costs and increasing speed.

Of course, all these reassuring plans were made by a man with two futures. Will he really want to keep an old copy running, when he could save his money for a death-bed scan, and "his own" immortality? I don't know. And I may not be sure if I want to survive—but I wish the choice could be mine.

We start the second experiment. I do my best to concentrate, although I'm angry and distracted—and very nearly convinced that my dutiful introspection is pointless. Until the model itself is changed—not just the detailed way it's computed—it remains a mathematical certainty that the subject and the control will end up with identical brains. If the subject claims to have experienced anything out

of the ordinary, then so will the control—proving that the effect was spurious.

And yet, I still can't shrug off any of this as "trivial." Durham was right about one thing: there's no dishonor in confirming the obvious—and when it's as bizarre, as counterintuitive as this, the only way to believe it is to experience it firsthand.

This time, the model will be described at the standard resolution of one millisecond, throughout—but the order in which the states are computed will be varied.

Squeak. "Experiment two, trial number one. Reverse order."

I count, "One. Two. Three." After an initial leap into the future, I'm now traveling backward through real time. I wish I could view an external event on the terminal—some entropic cliché like a vase being smashed—and dwell on the fact that it was me, not the image, that was being rewound … but that would betray the difference between subject and control. Unless the control was shown an artificially reversed version of the same thing? Reversed how, though, if the vase was destroyed in real time? The control would have to be run separately, after the event. Ah, but even the subject would have to see a delayed version, because computing his real-time-first but model-time-final state would require information on all his model-time-earlier perceptions of the broken vase.

"Eight. Nine. Ten." Another imperceptible leap into the future, and the djinn reappears.

Squeak. "Trial number two. Odd numbered states, then even."

In external terms, I will count to ten … then forget having done so, and count again.

And from my point of view? As I count, once only, the external world—even if I can't see it—is flickering back and forth between two separate regions of time, which have been chopped up into seventeen-millisecond portions, and interleaved.

So which of us is right? Relativity may insist upon equal status for all reference frames … but the coordinate transformations it describes are smooth—possibly extreme, but always continuous. One observer's spacetime can be stretched and deformed in the eyes of another—but it can't be sliced like a loaf of bread, and then shuffled like a deck of cards.

"Every tenth state, in ten sets."

If I insisted on being parochial, I'd have to claim that the outside world was now rapidly cycling through fragments of time drawn from ten distinct periods. The trouble is, this allegedly shuddering universe is home to all the processes that

implement me, and they must—in some objective, absolute sense—be running smoothly, bound together in unbroken causal flow, or I wouldn't even exist. My perspective is artificial, a contrivance relying on an underlying, continuous reality.

"Every twentieth state, in twenty sets."

Nineteen episodes of amnesia, nineteen new beginnings. How can I swal-low such a convoluted explanation for ten perfectly ordinary seconds of my life?

“Every hundredth state, in one hundred sets.”

I’ve lost any real feeling for what’s happening to me. I just count.

“Pseudo-random ordering of states.”

“One. Two. Three.”

Now I am dust. Uncorrelated moments scattered throughout real time. Yet the pattern of my awareness remains perfectly intact: it finds itself, assembles itself from these scrambled fragments. I’ve been taken apart like a jigsaw puzzle—but my dissection and shuffling are transparent to me. On their own terms, the pieces remain connected

How? Through the fact that every state reflects its entire model-time past? Is the jigsaw analogy wrong—am I more like the fragments of a hologram? But in each millisecond snapshot, do I recall and review all that’s gone before? Of course not! In each snapshot, I do nothing. In the computations between them, then? Computations that drag me into the past and tire future at random—wildly adding and subtracting experience, until it all cancels out in the end—or rather, all adds up to the very same effect as ten subjective seconds of continuity.

“Eight. Nine. Ten.”

Squeak. “You’re sweating.”

“Both of me?”

Squeak. He laughs. “What do you think?”

“Do me a favor. The experiment is over. Shut down one of me—control or subject, I don’t care.”

Squeak. “Done.”

“Now there’s no need to conceal anything, is there? So run the pseudo-random effect on me again—and stay on-line. This time, you count to ten.”

Squeak. He shakes his head. “Can’t do it, Paul. Think about it: You can’t be computed non-sequentially when past perceptions aren’t known.”

Of course; the broken vase problem all over again. I say, “Record yourself, then, and use that.”

He seems to find the request amusing, but he indulges me; he even slows down the recording, so it lasts ten of my own seconds. I watch his blurred lips and jaws, listen to the drone of white noise.

Squeak. “Happy now?”

“You did scramble me, and not the recording?”

Squeak. “Of course. Your wish is my command.”

“Yeah? Then do it again.”

He grimaces, but obliges.

“Now, scramble the recording.”

It looks just the same. Of course.

“Again.”

Squeak. “What’s the point of all this?”

“Just do it.”

I’m convinced that I’m on the verge of a profound insight—arising, not from any revelatory aberration in my mental processes, but from the “obvious,” “inevitable” fact that the wildest permutations of the relationship between model time and real time leave me perfectly intact. I’ve accepted the near certainty of this, tacitly, for twenty years—but the experience is provocative in a way that the abstract understanding never could be.

It needs to be pushed further, though. The truth has to be shaken out of me.

“When do we move on to the next stage?”

Squeak. “Why so keen all of a sudden?”

“Nothing’s changed. I just want to get it over and done with.”

Squeak. “Well, lining up all the other machines is taking some delicate negotiations. The network allocation software isn’t designed to accommodate whims about geography. It’s a bit like going to a bank and asking to deposit some money … at a certain location in a particular computer’s memory. Basically, people think I’m crazy.”

I feel a momentary pang of empathy, recalling my own anticipation of these difficulties. Empathy verging on identification. I smother it, though; we’re two utterly different people now, with different problems and different goals, and the stupidest thing I could do would be to forget that.

Squeak. “I could suspend you while I finalize the arrangements, save you the boredom, if that’s what you want.”

I have a lot to think about, and not just the implications of the last experiment. If he gets into the habit of shutting me down at every opportunity, I’ll “soon” find myself faced with decisions that I’m not prepared to make.

“Thanks. But I’d rather wait.”

****

I walk around the block a few times, to stretch my legs and switch off my mind. I can't dwell on the knowledge of what I am, every waking moment; if I did, I'd soon go mad. There's no doubt that the familiar streetscape helps me forget my bizarre nature, lets me take myself for granted and run on autopilot for a while.

It's hard to separate fact from rumor, but apparently even the gigarich tend to live in relatively mundane surroundings, favoring realism over power fantasies. A few models-of-psychotics have reportedly set themselves up as dictators in opulent palaces, waited on hand and foot, but most Copies have aimed for an illusion of continuity. If you desperately want to convince yourself that you are the same person as your memories suggest, the worst thing to do would be to swan around a virtual antiquity (with mod cons), pretending to be Cleopatra or Ramses II.

I certainly don't believe that I "am" my original, but…why do I believe that I exist at all? What gives me my sense of identity? Continuity. Consistency. Once I would have dragged in cause and effect, but I'm not sure that I still can. The cause and effect that underlies me bears no resemblance whatsoever to the pattern of my experience—not now, and least of all when the software was dragging me back and forth through time. I can't deny that the computer which runs me is obeying the real-time physical laws—and I'm sure that, to a real-time observer, those laws would provide a completely satisfactory explanation for every pulse of laser light that constitutes my world, my flesh, my being. And yet … if it makes no perceptible difference to me whether I'm a biological creature, embodied in real cells built of real proteins built of real atoms built of real electrons and quarks… or a randomly

time-scrambled set of descriptions of a crude model-of-a-brain … then surely the pattern is all, and cause and effect are irrelevant. The whole experience might just as well have arisen by chance.

Is that conceivable? Suppose an intentionally haywire computer sat for a thousand years or more, twitching from state to state in the sway of nothing but electrical noise. Might it embody consciousness?

In real time, the answer is: probably not—the chance of any kind of coherence arising at random being so small. Real time, though, is only one possible reference frame; what about all the others? If the states the machine passed through can be re-ordered in time arbitrarily (with some states omitted —perhaps most omitted, if need be) then who knows what kind of elaborate order might emerge from the chaos?

Is that fatuous? As absurd, as empty, as claiming that every large-enough quantity of rock—contiguous or not—contains Michelangelo's David, and every warehouse full of paint and canvas contains the complete works of Rembrandt and Picasso—not in any mere latent form, awaiting some skilful forger to physically rearrange them, but solely by virtue of the potential redefinition of the coordinates of spacetime?

For a statue or a painting, yes, it's a hollow claim—where is the observer who perceives the paint to be in contact with the canvas, the stone figure to be suitably delineated by air?

If the pattern in question is not an isolated object, though, but a self-contained world, complete with at least one observer to join up the dots …

There's no doubt that it's possible. I've done it. I've assembled myself and my world—effortlessly—from the dust of randomly scattered states, from apparent noise in real time. Specially contrived noise, admittedly—but given enough of the real thing, there's no reason to believe that some subset of it wouldn't include patterns, embody relationships, as complex and coherent as the ones which underly me.

I return to the apartment, fighting off a sense of giddiness and unreality. Do I still want to bail out? No. No! I still wish that he'd never created me—but how can I declare that I'd happily wake and forget myself—wake and "reclaim" my life—when already I've come to an insight that he never would have reached himself?

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The djinn looks tired and frayed; all the begging and bribery he must have been through to set this up seems to have taken its toll.

Squeak. "Experiment three, trial zero. Baseline data. All computations performed by processor cluster number four six two, Hitachi Supercomputer Facility, Tokyo."

"One. Two. Three." Nice to know where I am, at last. Never visited Japan before. "Four. Five. Six." And in my own terms, I still haven't. The view out the window is Sydney, not Tokyo. Why should I defer to external descriptions? "Seven. Eight. Nine. Ten."

Squeak. "Trial number one. Model partitioned into five hundred sections, run on five hundred processor clusters, distributed globally."

I count. Five hundred clusters. Five only for the crudely modeled external world; all the rest are allocated to my body—and most to the brain, of course. I lift my hand to my eyes—and the information flow that grants me motor control and sight now traverses tens of thousands of kilometers of optical cable. This introduces no perceptible delays; each part of me simply hiber-nates when necessary, waiting for the requisite feedback from around the world. Moderately distributed processing is one thing, but this is pure lunacy, computationally and economically. I must be costing at least a hundred times as much as usual—not quite five hundred, since each cluster's capacity is only being partly used—and my model-time to real-time factor must be more like fifty than seventeen.

Squeak. "Trial number two. One thousand sections, one thousand clusters. "

Brain the size of a planet—and here I am, counting to ten. I recall the perennial—naive and paranoid—fear that all the networked computers of the world might one day spontaneously give birth to a global hypermind—but I am, almost certainly, the first planet-sized intelligence on Earth - I don't feel much like a digital Gaia, though. I feel like an ordinary human being sitting in an ordinary armchair.

Squeak. “Trial number three. Model partitioned into fifty sections and twenty time sets, implemented on one thousand clusters.”

“One. Two. Three.” I try to imagine the outside world in my terms, but it’s almost impossible. Not only am I scattered across the globe, but widely separated machine are simultaneously computing different moments of model-time. Is the distance from Tokyo to New York now the length of my corpus callosum? Has the planet been shrunk to the size of my skull—and banished from time altogether, except for the fifty points that contribute to my notion of the Present?

Such a pathological transformation seems nonsensical—but in some hypothetical space traveler’s eyes, the whole planet is virtually frozen in time and flat as a pancake. Relativity declare, that this point of view is perfectly valid—but mine is not. Relativity permits continuous deformation, but no cutting and pasting. Why?

Because it must allow for cause and effect. Influences must be localized, traveling from point to point at a finite velocity; chop up spacetime and rearrange it, and the causal structure would fall apart.

What if you’re an observer, though, who has no causal structure? A self-aware pattern appearing by chance in the random twitches of a noise machine, your time coordinate dancing back and forth through causally respectable “real time”? Why should you be declared a second-class being, with no right to see the universe your way? What fundamental difference is there between so-called cause and effect, and any other internally consistent pattern of perceptions?

Squeak. “Trial number four. Model partitioned into fifty sections; sections and states pseudo-randomly allocated to one thousand clusters.”

“One. Two. Three.”

I stop counting, stretch my arms wide, stand. I wheel around once, to examine the room, checking that it’s still intact, complete. Then I whisper, “This is dust. All dust. This room, this moment, is scattered across the planet, scattered across five hundred seconds or more—and yet it remains whole. Don’t you see what that means?”

The djinn reappears, frowning, but I don’t give him a chance to chastise me.

“Listen! If I can assemble myself, this room—if I can construct my own coherent spacetime out of nothing but scattered fragments—then what makes you think that you’re not doing the very same thing?

“Imagine…a universe completely without structure, without topology. No space, no time; just a set of random events. I’d call them ‘isolated,’ but that’s not the right word; there’s simply no such thing as distance. perhaps I shouldn’t even say ‘random,’ since that makes it sound like there’s some kind of natural order in which to consider them, one by one, and find them random—but there isn’t.

“What are these events? We’d describe them as points in spacetime, and assign them coordinates —times and places—but if that’s not permitted, what’s left? Values of all the fundamental particle fields? Maybe even that’s assuming too much. Let’s just say that each event is a collection of numbers.

"Now, if the pattern that is me could pick itself out from the background noise of all the other events taking place on this planet … then why shouldn't the pattern we think of as 'the universe' assemble itself, find itself in exactly the same way?"

The djinn's expression hovers between alarm and irritation.

Squeak. "Paul … I don't see the point of any of this. Spacetime is a

construct; the real universe is nothing but a sea of disconnected events…it's all just metaphysical waffle. An unfalsifiable hypothesis. What explanatory value does it have? what difference would it make?"

"What difference? We perceive—we inhabit—one arrangement of the set of events. But why should that arrangement be unique? There's no reason to believe that the pattern we've found is the only coherent way of ordering the dust. There must be billions of other universes coexisting with us, made of the very same stuff—just differently arranged. If I can perceive events thousands of kilometers and hundred of seconds apart to be side-by-side and simultaneous, there could be worlds, and creatures, built up from what we'd think of as points in spacetime scattered all over the galaxy, all over the universe. We're one possible solution to a giant cosmic anagram … but it would be ludicrous to think that we're the only one."

Squeak. "So where are all the left-over letters? If this primordial alphabet soup really is random, don't you think it's highly unlikely that we could structure the whole thing?"

That throws me, but only for a moment. "We haven't structured the whole thing. The universe is random, at the quantum level. Macroscopically, the pattern seems to be perfect; microscopically, it decays into uncertainty - We've swept the residue of randomness down to the lowest level. The anagram analogy's flawed; the building blocks are more like random pixels than ran-dom letters. Given a sufficient number of random pixels, you could construct virtually any image you liked—but under close inspection, the randomness would be revealed."

Squeak. "None of this is testable. How would we ever observe a planet whose constituent parts were scattered across the universe? Let alone commu-nicate with its hypothetical inhabitants? I don't doubt that what you're saying has a certain—purely mathematical—validity: grind the universe down to a fine enough level, and I'm sure the dust could be rearranged in other ways that make as much sense as the original. If these rearranged worlds are inaccessible, though, it's all angels on the heads of pins."

"How can you say that? I've been rearranged! I've visited another world!"

Squeak. "If you did, it was an artificial world; created, not discovered."

"Found a pattern, created a pattern … there's no real difference."

Squeak. "Paul, you know that everything you experienced was due to the way your model was programmed; there's no need to invoke other worlds. The state of your brain at every moment can be

explained completely in terms of this arrangement of time and space."

"Of course! Your pattern hasn't been violated; the computers did exactly

what was expected of them. That doesn't make my perspective any less valid, though. Stop thinking of explanations, causes and effects; there are only patterns. The scattered events that formed my experience had an internal consistency every bit as real as the consistency in the actions of the computers. And perhaps the computers didn't provide all of it."

Squeak. "What do you mean?"

"The gaps, in experiment one. What filled them in? What was I made of, when the processors weren't describing me? Well…it's a big universe ' Plenty of dust to be me, in between descriptions. Plenty of events—nothing to do with your computers, maybe nothing to do with your planet or your epoch—out of which to construct ten seconds of experience ' consistent with everything that had gone before—and everything yet to come."

Squeak. The djinn looks seriously worried now. "Paul, listen: you're a Copy in a virtual environment under computer control. Nothing more, nothing less. These experiments prove that your internal sense of space and time is invariant—as expected. But your states are computed, your memories have to be what they would have been without manipulation. You haven't visited any other worlds, you haven't built yourself out of fragments of distant galaxies."

I laugh. "Your stupidity is … surreal. What the fuck did you create me for, if you're not even going to listen to me? We've stumbled onto something of cosmic importance! Forget about farting around with the details of neural models; we have to devote all our resources to exploring this further. We've had a glimpse of the truth behind … everything: space, time, the laws of physics. You can't shrug that off by saying that my states were inevitable."

Squeak. "Control and subject are still identical."

I scream with exasperation. "Of course they are, you moron! That's the whole point! Like acceleration and gravity in General Relativity, it's the equivalent experience of two different observers that blows the old paradigm apart."

Squeak. The djinn mutters, dismayed, "Elizabeth said this would happen. She said it was only a matter of time before you'd lose touch."

I stare at him. "Elizabeth? You said you hadn't even told her!"

Squeak. "Well, I have. I didn't let you know, because I didn't think you'd want to hear her reaction."

"Which was?"

Squeak. "She wanted to shut you down. She said I was … seriously

disturbed, to even think about doing this. She said she'd find help for me"

"Yeah? Well, what would she know? Ignore her!"

Squeak. He frowns apologetically, an expression I recognize from the inside, and my guts turn to ice. "Paul, maybe I should pause you, while I think things over. Elizabeth does care about me, more than I realized. I should talk it through with her again."

"No. oh, shit, no." He won't restart me from this point. Even if he doesn't abandon the project, he'll go back to the scan, and try something afferent, to keep me in line. Maybe he won't perform the first experiments at all—the ones which gave me this insight. The ones which made me who I am.

Squeak. "Only temporarily. I promise. Trust me."

"Paul. Please."

He reaches off-screen.

"No!"

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There's a hand gripping my forearm. I try to shake it off, but my arm barely moves, and a terrible aching starts up in my shoulder. I open my eyes, close them again in pain. I try again, On the fifth or sixth attempt, I manage to see a face through washed-out brightness and tears.

Elizabeth.

She holds a cup to my lips. I take a sip, splutter and choke, but then force some of the thin sweet liquid down.

She says, "You'll be okay soon. Just don't try to move too quickly."

"Why are you here?" I cough, shake my head, wish I hadn't. I'm touched, but confused. Why did my original lie, and claim that she wanted to shut me down, when in fact she was sympathetic enough to go through the arduous process of visiting me?

I'm lying on something like a dentist's couch, in an unfamiliar room. I'm in a hospital gown; there's a drip in my right arm, and a catheter in my urethra. I glance up to see an interface helmet, a bulky hemisphere of magnetic axon current inducers, suspended from a gantry, not far above my head. Fair enough, I suppose, to construct a simulated meeting place that looks like the room that her real body must

be in; putting me in the couch, though, and giving me all the symptoms of a waking visitor, seems a little extreme.

I tap the couch with my left hand. "What's the point of all this? You want me to know exactly what

you're going through? Okay. I'm grateful. And it's good to see you." I shudder with relief, and delayed shock. "Fantastic, to tell the truth." I laugh weakly. "I honestly thought he was going to wipe me out. The man's a complete lunatic. Believe me, you're talking to his better half."

She's perched on a stool beside me. "Paul. Try to listen carefully to what I'm going to say. You'll start to reintegrate the suppressed memories gradually, on your own, but it'll help if I talk you through it all first. To start with, you're not a Copy. You're flesh and blood."

I stare at her. "What kind of sadistic joke is that? Do you know how hard it was, how long it took me, to come to terms with the truth?"

She shakes her head. "It's not a joke. I know you don't remember yet, but after you made the scan that was going to run as Copy number five, you finally told me what you were doing. And I persuaded you not to run it—until you'd tried another experiment: putting yourself in its place. Finding out, first hand, what it would be forced to go through.

"And you agreed. You entered the virtual environment which the Copy would have inhabited—with your memories since the day of the scan suppressed, so you had no way of knowing that you were only a visitor."

Her face betrays no hint of deception—but software can smooth that out. "I don't believe you. How can I be the original? I spoke to the original. What am I supposed to believe? He was the Copy?"

She sighs, but says patiently, "Of course not. That would hardly spare the Copy any trauma, would it? The scan was never run. I controlled the puppet that played your 'original'—software provided the vocabulary signature and body language, but I pulled the strings."

I shake my head, and whisper, "Bremsstrahlung." No interface window appears. I grip the couch and close my eyes, then laugh. "You say I agreed to this? What kind of masochist would do that? I'm going out of my mind! I don't know what I am!"

She takes hold of my arm again. "Of course you're still disoriented—but trust me, it won't last long. And you know why you agreed. You were sick of Copies bailing out on you. One way or another, you have to come to terms with their experience. Spending a few days believing you were a Copy would make or break the project: you'd either end up truly prepared, at last, to give rise to a Copy who'd

be able to cope with its fate—or you'd gain enough sympathy for their plight to stop creating them."

A technician comes into the room and removes my drip and catheter. I prop myself up and look out through the windows of the room's swing doors; I can see half a dozen people in the corridor. I bellow wordlessly at the top of my lungs; they all turn to stare in my direction. The technician says, mildly, "Your penis might sting for an hour or two."

I slump back onto the couch and turn to Elizabeth. "You wouldn't pay for reactive crowds. I

wouldn't pay for reactive crowds. Looks like you're telling the truth."

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People, glorious people: thousands of strangers, meeting my eyes with suspi-cion or puzzlement, stepping out of my way on the street—or, more often, clearly, consciously refusing to. I'll never feel alone in a crowd again; I remember what true invisibility is like.

The freedom of the city is so sweet. I walked the streets of Sydney for a full day, exploring every ugly shopping arcade, every piss-stinking litter-strewn park and alley, until, with aching feet, I squeezed my way home through the evening rush-hour, to watch the real-time news.

There is no room for doubt: I am not in a virtual environment. Nobody in the world could have reason to spend so much money, simply to deceive me.

When Elizabeth asks if my memories are back, I nod and say, of course. She doesn't grill me on the details. In fact, having gone over her story so many times in my head, I can almost imagine the stages: my qualms after the fifth scan, repeatedly putting off running the model, confessing to Elizabeth about the project, accepting her challenge to experience for myself just what my Copies were suffering.

And if the suppressed memories haven't actually integrated, well, I've checked the literature, and there's a 2.9 percent risk of that happening.

I have an account from the database service which shows that I consulted the very same articles before.

I reread and replayed the news reports that I accessed from inside; I found no discrepancies. In fact, I've been reading a great deal of history, geography, and astronomy, and although I'm surprised now and then by details that I'd never learnt before, I can't say that I've come across anything that definitely contradicts my prior understanding.

Everything is consistent. Everything is explicable.

I still can't stop wondering, though, what might happen to a Copy who's shut down, and never run again. A normal human death is one thing—woven into a much vaster tapestry, it's a process that makes perfect sense. From the internal point of view of a copy whose model is simply halted, though, there is no explanation whatsoever for this "death"—just an edge where the pattern abruptly ends.

If a Copy could assemble itself from dust scattered across the world, and bridge the gaps in its existence with dust from across the universe, why should it ever come to an inconsistent end? Why shouldn't the pattern keep on finding itself? Or find, perhaps, a larger pattern into which it could merge?

Perhaps it's pointless to aspire to know the truth. If I was a Copy, and "found" this world, this arrangement of dust, then the seam will be, must be, flawless. For the patterns to merge, both

"explanations" must be equally true. If I was a Copy, then it's also true that I was the flesh-and-blood Paul Durham, believing he was a Copy.

Once I had two futures. Now I have two pasts.

Elizabeth asked me yesterday what decision I'd reached: to abandon my life's obsession, or to forge ahead, now that I know firsthand what's involved. My answer disappointed her, and I'm not sure if I'll ever see her again.

In this world.

Today, I'm going to be scanned for the sixth time. I can't give up now. I can't discover the truth—but that doesn't mean that nobody else can. If I make a Copy, run him for a few virtual days, then terminate him abruptly … then he, at least, will know if his pattern of experience continues. Again, there will be an "explanation"; again, the "new" flesh-and-blood Paul Durham will have an extra past. Inheriting my memories, perhaps he will repeat the whole process again.

And again. And again. Although the seams will always be perfect, the "explanations" will necessarily grow ever more "contrived," less convincing, and the dust hypothesis will become ever more compelling.

I lie in bed in the predawn light, waiting for sunrise, staring into the future down this corridor of mirrors.

One thing nags at me. I could swear I had a dream—an elaborate fable, conveying some kind of insight—but my dreams are evanescent, and I don't expect to remember what it was.