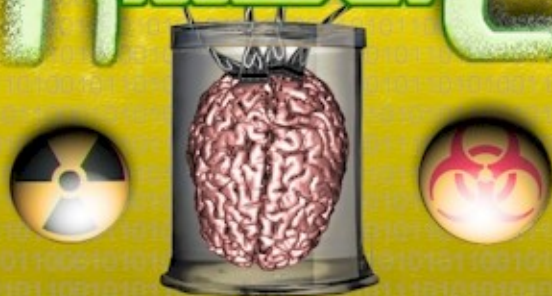


KillWare



Volume I of the KillWare Chronicles

K.D. KRAGEN

KILLWARE

By
K. D. Kragen

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ISBN 1-59507-020-6

Published by ArcheBooks Publishing, a wholly owned subsidiary of
Gelinias & Wolf, Inc. www.archebooks.com

ArcheBooks Publishing
4305 State Bridge Road
Suite 103-121
Alpharetta, GA 30022

Gelinias & Wolf, Inc.
9101 W. Sahara Ave.
Suite 105-112
Las Vegas, NV 89117

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KILLWARE

By

K. D. Kragen



Acknowledgements

Leibniz quotes are from *Gottfried Wilhelm Leibniz Philosophical Papers and Letters*, 2nd ed., Leroy Loemker, ed. (Holland, 1969). Noam Chomsky quotes are from *Innate Ideas*, Stephen P. Stich, ed. (Berkeley, 1975).

Other sources: *Perceiving God*, W. P. Alston (Cornell, 1991); *An Introduction to Philosophy of Language*, Bernard Harrison (New York, 1979); *Nuclear Landscapes*, Peter Goin (Baltimore, 1991); *Radwaste*, Fred C. Shapiro (New York, 1981); *The Making of the Atomic Bomb*, Richard Rhodes (New York, 1986); *War of the Worlds: Cyberspace and the High-Tech Assault on Reality*, Mark Slouka (New York, 1995); *Silicon Snake Oil*, Clifford Stoll (New York, 1995).

Gender neutralization throughout *KillWare* follows standards and guidelines of *The Handbook of Nonsexist Writing*, 2nd ed., Casey Miller and Kate Swift (New York, 1988).

All persons and names in this NET-play, online and off, are fictitious and made-up by the author. Any similarities to real persons living, dead, or vatted are purely coincidental.

DEDICATION

To the Linux People's Revolution
and Linux Users everywhere
Kitsap Peninsula Linux User Group <http://kplug.org/>
Linux Weekly News <http://lwn.net/>
SlashdotNewsforNerds <http://slashdot.org/>

Special thanks to Nguyen Tan Thanh,
Tran Thi Mong Linh,
Nguyen Tran Hai Uyen,
Nguyen Tran Hai Yen,
and Nguyen Thien Quang

Deus ex machina: “Literally, the god from the machine; an allusion to the device whereby in ancient drama a god was brought on the stage, sometimes to provide a supernatural solution to a dramatic difficulty; hence any person, thing, or concept artificially introduced to solve a difficulty.” (*The Dictionary of Philosophy*, edited by Dagobert D. Runes, New York, 1942, p. 78.)

“I have no hope of clearing my conscience. The things we are working on are so terrible that no amount of protesting or fiddling with politics will save our souls’.” (Edward Teller, July 1945; reply to Leo Szilard about Szilard’s petition circulating among Manhattan Project scientists protesting the bomb’s impending use against Japan. Quoted from *The Making of the Atomic Bomb*, by Richard Rhodes, New York, 1986, p. 697.)

“By 2050, we expect AI systems to have a modest range of emotions. Intelligent systems will then be truly ubiquitous, animating many of the objects around us and even sharing some of our feelings... But the questions arise: Are they ‘aware’ of what they are? Can they set their own goals and plans? Are they ‘conscious’? Such predictions are, of course, quite controversial, since up to now no one has even given a compelling definition of what consciousness is... But many of the scientists who have dedicated their lives to building machines that think feel it’s only a matter of time before some form of consciousness is captured in the laboratory.” (*Visions: How Science Will Revolutionize the 21st Century*, Michio Kaku, New York, 1997, pp. 93-94.)

Prologue

Twenty minutes into the past.

This book is history. Check your local library for examples of historical fiction, if there are any left.

The story you are about to read takes place in the early 1990's, on the weekend before cyberspace was cemented over by the Infobahn, the "information highway."

For a long moment, before commercial industry, governments and multinational/transnational powers and principalities ruled e-world or vied for its territories, a new frontier lay before the connected common folk, the online little people, the techno-nobodies. This is their story.

It's over now. If you missed it—here today, virtual tomorrow.

Some of the events in this story are still to happen.

Good luck.

PART ONE



!

Harry Osborne

I glanced over at the stack of philosophy papers on my desk. Took another swig of black coffee. Closed my eyes a moment and swallowed slowly. In the grey December morning, the wall clock struck 7:00. I looked at the term papers. It was a big stack. Every one of them thick as a brick.

I picked up the first and read, *The Myth of Emergent Consciousness: A Propensity Theory of Frequency Probability in Scientific Confirmation and Its Supervenience Upon Adverbial Construals of Perceptual Experience Vis-à-vis Intelligence in Other Possible Worlds*.

So where's the kitchen sink, I wondered, turning the paper over and giving it a shake. Without even looking at the name, I knew which of my illustrious students had written *this* one. Guy was from the art department. Good painter, too! I liked his stuff. Seen some of it at the university gallery—Picasso meets Frank Frazetta. His analytic skills on the other hand were just the slightest bit muddled.

I shifted his paper to the bottom of the stack and picked up the next. "OK. What 'ave we got 'ere. *Consciousness, Computer Memory and Me.*"

“Great title!” I leaned back in my chair and turned to the first page, preparing myself for a good read. Grasping for the coffee, I just got my fingers around the mug’s handle when the phone buzzed loudly—*boy*, I hated the sound of phones these days.

I dropped forward and grabbed for the receiver. As I did, my coffee mug tumbled into the air, made a graceful flip and landed on the floor perfectly upright. *Remarkable!* Except that all the coffee was now running down the side of my desk.

I banged the receiver to my ear—“Ow!”—shaking the hot coffee off my other hand—“Ow!”

“Dr. Howard? Is that you, Dr. Howard?”

“Yeah!” I sputtered. “Sorry, Mary. I spilled my coffee.”

“Need some help?”

“I didn’t know anyone else was in the office.”

“I’m always here at 7:15,” she said.

I looked at the receiver, then at the coffee dripping down the drawers and puddling onto the floor. “Right. I didn’t know it was 7:15.”

“It’s after 7:15.”

“Oh. Right.” Should get some paper towels, I thought. I pulled the term paper from the bottom of the pile—*no, Bob, be nice*. Instead, I threw some blank sheets over the widening puddle on the floor and under the dripping desk drawers.

“Dr. Howard?”

“Yes, Mary?”

“There’s a Dr. Harry Osborne here to see you.”

“What?”

“He has an appointment.”

“Who?”

“Dr.—”

“Harry *what?*” I asked, feeling slightly Twilight-Zone headed.

“—Osborne, Dr. Howard. Should I send him in?”

“Yes, Mary, of course. I mean, if he’s got an appointment.” Usually, I thought in amazement, people just drop by. An appointment? My *students* hardly make appointments. What did she say his name was? Dr. who? Maybe he’s my physician. Maybe he’s got bad news. Maybe I’m dying!

The door swung open.

“Hello. Dr. Howard?” The man stepped into the doorway. “I’m Harry Osborne.” He was soft spoken and his voice gave one an immediate impression of a person slight in stature, gentle, a bit nerdish. “I called last week. From the computer department. About our new AI grant.”

“New grant?” I looked up, wiping my hand on my pants and staring up at the auspicious man standing in my doorway. The guy was not slight at all, but massive, thick-set, like he had to buy all his clothes at the local *Big & Tall Men’s Store* (I on the other hand shopped at the *Little Person’s Clothing Outlet*). But it was his head—*wow!*—square like a Marvel comic character, close-cut square hair style, square jaw, straight brows over narrow, piercing, dark brown eyes, all atop broad, square football shoulders. Was he wearing shoulder pads? I wondered.

Harry strode up to my desk relaxed, friendly, hand

outstretched, and I mean *outstretched*.

I grasped his baseball-mitt tentatively. “Bob Howard,” I squeaked, looking up and up and up. I bet he hammered nails with his fist. “Uh, have a...chair.” I rose slightly, though even if I’d stood up, next to Harry one would have thought I was still sitting.

He settled into the chair. We looked across the desk at each other.

Harry noticed the long shelf of books behind me and smiled. “Noam Chomsky, *Language and Mind*,” he intoned fondly. “John Searle, *Minds, Brains, and Science*. John Austin, *How to Do Things With Words*.” Every time he read off a title he nodded his head once with a queer jerk or tick. “*Innate Ideas. Modern Linguistics*. Thomas Reid’s, *Essays on the Intellectual Powers of—*”

“Want to borrow a book?” I asked, stuttered, joked.

He looked around the office, at other shelves stacked with books and papers and dog-eared monographs. “Wanted to borrow *you*, actually,” he replied, settling back in his chair.

I pictured him walking out of the philosophy department with Dr. Bob Howard tucked neatly under one arm, nodding to Mary as he navigated his long, lazy stride through the department’s double doors, Mary nodding back admiringly.

“What?” I said, and grabbed for the empty coffee cup that wasn’t on my desk, but still sat resolutely on the floor snickering up at me in mug-speak.

He gave an indicative glance toward Chomsky, Searle and Reid. “You’re the man, Dr. Howard.” Harry made this pronouncement in an odd, off-handed sort of

way, yet with a kind of reverence. Made a chill run up my spine.

“I am?” I stared at him sitting there, filling up my office with his clean ontological presence, his metaphysical bulk. “Uh, say again,” I reached down to recapture my rebellious coffee cup. I set it on the desk. “Wait. Now I remember. Dr. Osborne. Called last week. Computer department. Something about a new AI grant? The artificial intelligence thing, right?”

“Riiiiight. All coming back to you, is it?” he laughed lightheartedly. “Somebody from one department wanting to get together with somebody from another department. Quite unusual at a big university, don’t you think so, Dr. Howard?”

Holding the empty mug in my hand, I stammered, “You want to borrow me.”

“Dr. Howard—”

“Bob,” I offered.

“Bob,” that funny tick of a nod, again. He leaned over my desk. “For too long we computer people and you philosophy people, we go about our tasks in relative isolation from each other.”

“I agree,” I agreed.

He pointed his huge index finger directly at a Noam Chomsky book, then at me. It was the ideal Platonic Form-of-the-Indexical, that finger. “We need you, Bob,” he said. “I need you.”

“You know, I’ve got to be frank with you, uh—”

“Harry, please,” nod tick. “Call me Harry.”

“—Harry. I don’t go along with all the Artificial Intelligence stuff you guys are always on about. Artificial

life, maybe. AL maybe. AI no.”

“Exactly!” he bellowed, the gale force of this exclamation blowing through my hair. “That’s it exactly, Bob!” Harry beamed with excitement, a strange aura seeming to pervade the room. “Look. I’ve read your papers, *and Chomsky and Searle and Harrison*. We all know AI is an outmoded concept, but it’s not been well-replaced. Still trips a lot of people up. I say: why *artificial* intelligence? What we want is *real* intelligence, right? And not by reducing our concept of the human mind to a low enough level, to a simple enough model, so that some slapped-together AI analogue looks like what *we* say *we* are like. NO! Rather, given a high view, a transcendent view of human intellectual capacity, and with that as our standard, how do we *emulate* human intelligence? What we’re really after here, Bob, is *intelligence emulation*.”

“Right,” the comment was sarcastic, but I couldn’t help it. What was this guy doing here, anyway. “Artificial, artifact, artifice, emulation—”

“Look, Dr. Howard, you’ve said so in your writings time and time again, until one knows what it is one is emulating, how is one going to emulate it? Right? AI people don’t really know what ‘intelligence’ is, or ‘consciousness’ or ‘awareness’ or ‘*self-awareness*’, or how these interact interdependently, or how consciousness *supervenes* upon intelligence, or is it the other way around? And where does ‘intentionality’ fit in? Are intentions the driving force behind linguistic behavior? Rather than hardwiring into the mother-board a, quote, random processor—and what does randomness or un-

predictability have to do with it anyway?—chaos talk aside—shouldn't we rather be working on an *intentionality* device?

“That's why I need you, Bob. Such questions more properly fall under your field of study than mine. Like Noam Chomsky—linguist, psychologist, scientist, *philosopher*—your work, too, has crossed departmental boundaries.

“Look, we got a fifty-five million dollar grant over at the department, to conduct research into IE, ‘intelligence emulation’. More bucks to come, too. That's a hell of a lot of money! And I'm supposed to head the whole thing up! Scares me, Bob. That's what it does. Too much big industry behind it. Makes me nervous. I've got to put out or get out is what it comes down to. Like with you philosopher types, publish or perish.”

He glanced down at his hands. “It was inevitable. The computer department's grown, pretensions of grandeur. I liked my job before the big money people started coming around, trying to take control. I really liked it. Teaching, research, reading Wittgenstein.” Harry stopped, stared me straight in the eye, a ‘rescue me’ expression all over his face.

“Umm...” I began slowly, “You want me to work with you on an intelligence emulation program? Is that it? I don't know much about computer programming, Harry.”

“Don't need to, Bob. Not a bit. My students, colleagues and I do all that. No. What I need you for, Bob, is, well, for a technical advisor. I need you to,” he tapped the side of his head, “to pose the right questions.

We've got to ask the right questions, Bob, or we won't get the right answers.

“Here it is in a nutshell. Before we start on any IE program, intelligence emulation, that is, before that, we need a *proto-program*, one that will answer the big question, ‘*What is intelligence?*’ And what is it to be a sentient being? What are self-awareness and consciousness, and how do consciousness and intelligence relate to, or depend upon, one another? And intentionality, and language, and linguistic creativity, how do these fit into our picture of intelligence? Only then can we begin to understand what's needed for a *machine* to emulate intelligence. Software? Hardware? Laserware? Biomechanics of some sort?”

Biomechanics? The term conjured pictures of Bladder-runners, Replicants, the Tyrel Corporation. I liked Harry. It took a pretty brave scientist, a pretty brave guy, to walk over here in broad daylight, across the university quad, up four flights of stairs and into our dusty old philosophy department! Sadly, these days, philosophy and practical science mixed about as well as oil and water. To come here and ask a philosopher's advice on a question of computer technology—whoa! I'm stunned. I'm impressed.

Louis, I think this is the beginning of a beautiful friendship.

“Wha-da-ya say, Bob?”

“OK.”

“How about dinner?”

“What?” All of a sudden this relationship was moving too fast—

“At my house?”

—and in a direction—

“Julie and I fix a great *Bouef Bourguignon*. You can meet the kids.”

—Kids? Julie?—

“Wha-da-ya say, Bob?” He stood up and up and up to leave.

“OK.” I stood up too. At least I thought I did.

“Great. After supper I’ll show you the details of our work. Welcome aboard. And don’t worry about the others, my colleagues. They’ll surely accept you, after they see where we’re going and how valuable your *input* is.” He leaned forward, “That’s a computer expression, Bob.”

I stretched out my hand. The giant grasped it between both of his. The lower part of my arm disappeared.

“You’ve saved my life, Bob,” he said it with open gratitude.

“Yeah, OK,” I stuttered. “This should be interesting.” I had no idea *how* interesting.

“Six o’clock tonight all right with you, Bob?”

“Yeah. Fine.”

“See you at six, then.” He handed me a card with his home address and phone number on it.

“OK,” I said, staring at the card.

He left. I sat down. The place was strangely quiet, like after a big storm. Empty. Eerie. A mausoleum filled with ancient texts and dusty, Cabalic artifacts, the amorphous tools of the philosopher, the seeker, the analytic historian of deep structure, the cartographer of the mind. I drank stale air from the coffee mug and set it

back down carefully.

“Intelligence emulation,” I repeated the words, trying once more to conjure up this *Ghost of Future Perfect* which had just departed my chambers.

“OK, Harry. So you want to make a little man out of metal, huh? A silicon Golem?”

The stack of term papers sat quietly on my desk, calling my name, “Here, Bob, here, boy. Fetch! Good boy.”

2

Intelligence Emulation

On the way to work the next morning, I thought about Harry. Harry, Julie, and the kids. I hardly noticed the drizzle or the muddy water rushing down the gutters or the beer bottles on the lawn in front of Admissions.

It was weird.

Harry had a whole family living at his house. I guess I just hadn't been over to dinner with a whole family in a long time.

Julie was something else, too. Tall—taller than me! Reddish-blond hair, cut short and simple. Maxwell Parish slender, Art Deco elegant, soft-spoken, almost philosophically so, and yet not aloof or reserved, but open, hospitable, honestly interested in everything, not a bit self-obsessed. Wow!

Me, I was divorced. As I thought about it, I realized so were most of my friends and colleagues. My wife and

I got along for a few years. Had a kid. Didn't get along. Had a divorce. What's new?

Harry, that's what! Harry and Julie! Married *twenty-two years!*

Julie worked part time as a business software consultant. Three kids: Kate sixteen, Sheila thirteen, little Gary just turned ten.

Weird-weird-weird.

All living together like that. In the same house! Twenty-two years in the same place! Modest place, too. Simple. Happy. Together. *Happy together!*

Really weird.

I mean, this guy heads one of the most respected university computer departments in the whole country. Small, clean. And *integrity!* No StarWars, MilStar, crack cocaine. No military contract radwaste. No sex scandals.

How can a guy live like he does? That's what I want to know. I'd go crazy. Actually, I *did* go crazy. No *Bouef Bourguignon* for me. Instead, I pay alimony and watch my boy grow up in weekly installments, like an interminable night-time soap.

But Harry—well, Harry pulled it off. Harry and Julie, that is. Pulled it off like he knew what he was doing. Gave one a kind of confidence in the guy. Maybe he really could do it, this intelligence emulation stuff. Compu-consciousness. Silicon-sapiens.

Fax-man!

•

A week later, I headed across the university quad to the computer sciences complex. The imposing monolithic structure also housed the bio-engineering and genetics research departments. Harry's fifty-five million dollar facility and lab was big and crowded and on line for some serious synapse-crunching. Made my head spin. Not one leather book in the whole shiny place. Just tons of plastic-coated hardware, spinning high-capacity Bernoulli Hard-drives, twirling gigabyte state-of-the-art laser magneto-optical storage systems, whirling-dervish mega-memory tape back-up devices, CD-ROM, CAD, WORM, OS/2 4 6 and 8, vibration-dampened motherboards, python-thick power and telecomm cables snaking the floors looking for tiny modem mice, uninterruptible power supply units at the foot of every desk, stand, and rolling rack like so many computer-chaw spittoons; everywhere humming and soft clicking sounds permeated the air, the distant mating calls of a million praying-software-mantises.

"Welcome, Bob!" Harry gestured to me from within the vast caldron of his technological futureworld. Expanding my visual field ever outward, off toward that illusive perspectival horizon-point, I kept hearing Strauss' "Also Sprach Zarathustra," kept looking around for the black monolith.

Towering above it all, Harry strode over to me, threw an arm around my shoulders and began introductions. Everyone in the place looked up from their work. I don't think they'd ever seen one of my kind before. I felt like that little bushman coming out of the Kalahari—crazy gods everywhere.

Twenty minutes, a hundred handshakes, and a 55-megabuck tour later, Harry showed me into a plush maroon conference room.

“Nice décor, huh? Quite comfortable, really.” Harry Osborne’s small talk was totally out of character. I realized he was as uncomfortable with the ritzy surroundings as I was with the electronic ones.

“Very nice, Harry.” We looked at each other, two old fish in a big new, Beverly-silicon-Hills ocean. I, of course, was the minnow, he was Moby Dick.

“This is our ‘chatroom’, Bob.”

“Chatroom. OK. What’s a chatroom?”

“Oh, sorry. ‘Chatroom’ is a term used in the online world of electronic networking, local BBSes, er, Bulletin Board Systems, commercial networks like Prodigy, CompuServe, and AOL.”

“AOL?”

“Yeah! You see, a bunch of online folk—people with their computers hooked up to phone lines—call up a single network at the same time and talk to each other, like the old telephone party-lines, or a bunch of truckers on their CB radios. That’s what a BBS chatroom is.”

“Oh.” I looked thoughtful.

“This is no ordinary conference room, Bob. This is a physical, spatially contiguous chatroom.”

“Right.”

“Let me show you.” Harry went over to the large rectangular conference table surrounded by thirteen chairs, six on a side and one at the head. He stood by the chair just to the right of the head of the table.

“Kind of Messianic, wouldn’t you say?” I offered

philosophically.

“What’s that, Bob?”

“I mean, Christ. Jesus Christ. Twelve disciples. The last supper.” I was beginning to wish I’d never brought it up.

“Oh, yeah,” he replied absentmindedly. “Now look here.” He slid away a small portion of the table in front of him, revealing a computer keyboard.

“At each station around the table,” he explained, “there’s a keyboard just like this one, along with a cornea-sensitive tracking-device which lets the system identify the person at each station and, respectively, allows a person to indicate by simple eye-movement which screen portion they are responding to at any given point in a discussion such that—well, go ahead, Bob, sit down.” He pulled out the chair. I plopped down in front of the keyboard.

Harry sat at the head of the table, recessed a portion of the table top in front of him, put his hands to the keyboard, typed in a command code and pointed—that Platonic indexical again—to the far end of the room. On the wall a panel slid upwards revealing a giant computer screen. For a brief second he focused on the screen and tapped a function key. A faint beam of light shot out from the screen to his right eye. Then the light faded.

“Pretty science fiction stuff,” I said lamely.

“Right,” he smiled. “As you see, this isn’t just an ordinary conference room. It’s a high-speed, online, brainstorming workshop augmented by a complex *Linguistics Facilitation Program*. You get five or ten people in here, all working on different sub-systems, peripherals,

independent projects, but all after the same final product, or product family.”

Harry typed in a few more commands or whatever. I looked up at the giant screen. It divided amoeba-like into nine smaller screens. Reminded me of the game board on a TV game show, digital Hollywood Squares.

“A typical brainstorming session goes like this, Bob. Say there are nine people at the table,” he nodded toward the screen. “Nine sub-screens, see? We call them ‘windows’, of course.”

“Of course.”

“One window per person, one per keyboard. What I type at my keyboard goes into my window, and whatever window I am responding to I let the computer program know by eye-tracking to that window. To momentarily disengage, just blink twice; to reengage, blink thrice. Top right window is mine, well, I’ve got the Chair.” He looked a little sheepish, apologetic. “I don’t *always* have the Chair. Sometimes, depending on the problem or topic, someone else chairs a session.

“Anyway, the chairperson sets the topic, delineates parameters, working analytically from general outlines and ideas, going after the more specific, setting the pace. Soon another person logs on with responses. First time you key in a response or data-line, your window turns blue. Everything goes up onto the screen, into each person’s window. Related or analogous or closely similar input in different windows are automatically highlighted in the same tones and colors; the computer works straight through the color spectrum from violet to red, then if need be repeats with subscriptions, second order,

third order and so on—things seldom go past a fourth order subscription. Everyone begins eye-tracking each other's screens, ordering ideas, responding.”

Harry radiated excitement. He was in his element. “It’s amazing, Bob! At first it’s hard to keep up with nine separate windows. Hard to keep up with four, really. But the eyes move fast. Real fast. You wouldn’t believe it. A whole heck of a lot faster than verbal discussion could ever go. And redundancy and non-sequitur, all kept to a minimum, rivalries, departmental status—the program’s a true equalizer, puts everybody on the same level. After a while in the chatroom, one can keep up with a full twelve window interface.

“Think of it. For an hour, three hours maybe, twelve people facing one another—there’s a lot of important eye contact and interaction, especially at the start—twelve people keying away at an idea or a set of interrelated problems, sometimes quite illusive. Of course, if anyone needs a break they can just freeze-screen with their ESC key—use discretion though—pit stop, seventh inning stretch, coffee and donuts, that sort of thing.”

Harry pointed again at the big screen, “It’s all up there, Bob, twelve windows, twelve cornea-trackers, thoughts like lighting flashing from one window to another, interlacing, canceling, building off one another, negations, contradictories, confirmations, exclamations ping-ponging through a shifting rainbow of highlighted interconnections, drawing together twelve inexplicable human minds, drawing them into one another like an electric ballet, disparate at first but merging closer, ever closer.

“At first an online session starts slow, sporadic input interspersed with conversation, coffee slurping, paper shuffling, hesitations, eyes adjusting to the subtle screen-scanning movements, minds gradually jacking in. Then, five, ten minutes into it, conversation slows in proportion to the growing clickity-click of keyboards, more and more people lock-on visually, lock-off verbally. Oh, there’s still the occasional ‘Ah!’ or ‘Say what?’

“But after awhile, and this is where it comes together, Bob—ideally, of course, not always, but often. I mean, some sessions do bust, crash, end with twelve messy rainbow-scribbled windows. But when it *does* come together—boy oh boy—do the windows begin to dump. That is, when the first windows merge enough data, the center of the screen turns amber. At that point, not only are all the windows interacting with one another, but they start to integrate findings onto the center amber screen under the subtle, articulate control of *the Program*. Soon more windows dump and the amber screen takes on a kind of *gestalten* effect, twelve minds like one single mind—not single-minded, mind you!—but moving, thrilling toward a singular conceptual point, a concreteness of thought.

“The result, inputting slows, windows fade to black, until all that is left is the main screen, shining forth its beautiful amber light like the finest Scottish pale ale you’d ever want, verily a pint o’ *the light of clarity!*

“For awhile, everyone fiddles together on the one big screen, fine-tuning, polishing, and, most importantly, drawing out the implications, delineating new directions, extrapolating theories for future sessions. A lot of

sideways thinking gets appended to secondary files.

“Of course, everything is kept on record for recall and study of any particular train-of-thought, say, which later may prove of value. The program handles all the normal international algebraic and scientific symbols, plus—and you’ll appreciate this, Bob—plus standard first order, sentential logic notation, including modal, S1 through 5 and multi-valued quantifiers.”

Harry stopped talking. Silence filled the room.

“Wow,” I said. “Gives a whole new meaning to the word ‘chat’! But really, Harry, this is one fantastic program! I mean, it’s incredible, to be able to facilitate and integrate so much diverse human thought, and at such a speed, and without constantly hampering or convoluting all that input. And cornea trackballs! Whoa.” I looked at Harry more closely. “You wrote this, didn’t you? This is one of your babies, isn’t it, Harry? No wonder you got a fifty-five million dollar grant. *You’re a genius!*”

Harry grinned, nodded that funny little tick nod. “This is just the prototype. Someday we’ll consider going pure virtual reality, headgear and bodysuits. Maybe. But then you lose that casual, all-important eye-contact. The simple humanity. We’re a community, here. VR tends too much toward the private language game. ‘Interactive machine denigrates human interaction’, that’s what I say. But this is a prototype,” Harry reemphasized. “We’ll be utilizing it to the max for the first time with the IE project.”

Just then the door to the conference room opened. People filed in and took seats around the table, coffee mugs set down, papers spread out. My heart raced. I felt

flushed, tried to slow my breathing. I looked over at Harry in the head chair next to me. Help! I thought across to him. I could just hear Jimi Hendrix in the background singing about manic depression.

Harry gave me that easy smile, that tick-of-a-nod, then indicated the key on my keyboard that activated my cornea-tracker.

I stared at the big screen, hit the key, and felt the red flash hit my right eye. Soon light-beams flared out to more stations around the table as the other participants clicked online.

The wall-screen blossomed. Seven windows. The room got quiet. One window turned blue; a single line appeared: OLD PHILOSOPHERS NEVER DIE. THEY KANT.

Window four, I noted, and looked over at chair four. The woman sitting there had short black hair, jet black eyes, high cheek bones, vaguely Asian, exotic, with just a hint of rouge. Black dress. Hard eyes that looked right through you. A *Nexus Six*, I figured. One beautiful android, maximum efficiency model, made for the outer colonies. I smiled, nodded my own little tick-of-a-nod.

She stared back at me, unmoving.

OK, Harry, I thought, putting my hands to the keyboard, not taking my eyes off the woman in black in the dead silence of the room, let's boogie—



My first online conference session lasted over three hours. It was both exhilarating and the single most men-

tally exhausting experience of my whole life. Yet, a lot of progress was made in that session. I knew I was on trial, and in the beginning Harry tried to block for me. But he also knew I had to prove myself, so he let things go as they might.

PROLEGOMENA: CONSCIOUSNESS, INTENTIONALITY, INTELLIGENCE. This was the chat-topic of the day. Start with something easy, I laughed to myself.

Some of these people had been keyboarding since grade school, probably preschool. Harry had told me some of them ran their own BBSes. But in the final analysis it was all still a matter of the mind. Clear thinking, quick logic, concise analytic skill. Any philosophers worth their salt had but two tools to work with: *language* and *mind*. A philosopher's whole life was spent in thinking about life, the universe and everything, thinking about other people's thoughts, thinking about thinking. And language? Language had but one use, *communicating thoughts*. Everyone thinks. A philosopher simply makes a profession of it. Therefore, a philosopher seeks to perfect the art and master the science of good communication.

Even though there were moments when I was not savvy to the technical, computer jargon of the other onliners, I could often stay ahead of them, ahead of the logic and direction of their reasoning. I even found myself at times keeping up with Harry's Linguistics Facilitation Program, even second-guessing it.

After the first hour, when my visual skills had better attuned themselves to the *video-mechanics* of the windows

game, I found that I could often anticipate where each person was leading the others. After the second grueling hour, mine was the third window to dump and get into the center amber screen, the third to get into the mainline.

In the end, I'd managed to win the heuristic battle as well; I'd stayed ahead, pulled off quite a bit of lead analysis, directing and narrowing the range of other's thoughts, and doing it with a diplomacy that won more allies than enemies. That's what had worried me the most: making enemies.

As for the woman in black, I couldn't figure out what her problem was. When she dumped into the mainline, she'd already tracked her own conclusions far from where I was working. We never came close to a shared thought. I knew she'd manipulated it that way and with great skill. She knew I knew it and I knew she knew I knew it. Beyond that—



I dragged myself back up the four flights to my office. I worked another hour alone before going home and falling into bed. Slept sixteen hours straight.

3

PIE

Two weeks went by, then a month, then two. I was putting in close to twenty hours a week down at the IE project, helping to design a proto-intelligence emulation program. That was besides my regular teaching load. I was eating, sleeping and dreaming IE by the end of the second month.

It was a Wednesday afternoon when Harry came bursting into my office. I held on to my coffee mug as he settled, panting, in the chair across the desk from me.

“Run the whole way from IE?” I asked. “Have a seat. Want some coffee?”

“Bob! Bob!”

“Yes, Harry. What is it?”

“The proto-program. It’s *ready!* We’re ready.” His head was nodding its little tick-nods, one after another, like there was a tiny trip-hammer working on a bad

stretch of road inside his skull.

“Wow!” I was so tired. But I caught his excitement. “That’s great! Why didn’t you just call me on the phone?” My friend didn’t look himself, slightly more cubist than usual, more tense.

“How’s Julie these days?” I asked, wondering if he knew.

“Bob.”

“Yes?”

“This program may just give us a clearer understanding of intelligence than we’ve ever had before! Once up and running—God!—Bob!—God!” He indexed me with that long finger of his.

“Bob, you’re going to have to help, now more than ever. This program is as much your design as it is mine. And you are the one person best qualified to evaluate its results. All of us on our end can make sure the program is spinning glitch-free. But you must help us stay on the right track, to know whether the proto-program’s output is factual, truth-conducive, reality-connected, consistent with the results we’re after. We need you more than ever, Bob. We need your...*philosopher’s intuition.*”

“Intuition, huh.” Now I was really beginning to worry about Harry.

“Besides, Bob, once the program starts running at full capacity, we’ll have to push hard to keep up with it. Its sub-routines will constantly demand carefully selected input, which the program will then subsume into various trajectories, expanding parameters, redefining functions, upgrading indices, all toward the end of mapping out that still poorly understood synaptic realm of

human intellection, *rationes aeternae*, eternal reason! We're on the edge here, Bob, a real data-mine where *sapiens* truly gains a cognizance of *sapientia*, where we grasp that magic coveted *wisdom of eternal truths!*"

"Easy, Harry," I shook my head. "That kind of talk'll get you in trouble with the Good Scientist's Union. So when's this proto-program ready to roll?"

"If the final tests go well, next Monday morning. Can you be there?"

"Can I *be* there?"



Monday morning came fast. The online conference room was packed. All thirteen keyboard stations were filled and there were another eighteen people seated around the perimeter walls.

Harry was Chair, and he had an intercom next to him and spoke into the mike, "Vishnu? Are you ready out there?"

"We are ready, Dr. Osborne. You bet. My team is standing by now, sir."

"Good, Vishnu. On my command, boot her up! But at the least power flux, the slightest change on a single system stats display, lock her down on standby, then report to me directly. Got that?"

"We're just fine, here, Dr. Osborne, sir. We've got her slag-proofed and clean as a drum. Just say when."

Harry looked at me, "Clean as a drum?"

I shrugged, "Don't ask me." I was in my usual place on Harry's right. "Here goes nothing," I thought aloud.

“Here goes *something*,” said the woman in black—*sitting next to me!* How could I not have noticed?

“Right,” I smiled the best hello-fancy-meeting-you-here as I knew how. No response. She’d turned back to the big screen, cold as ice. Black ice.

Harry tapped in a screen setup routine, linked the conference room system to the main systems outside and barked into the mike, “Boot it, Vishnu! Boot it!”

“Bring it to life, Igor!” I chuckled, “*Bring it to life!*”

Over the speaker came, “Booting up, sir, on my mark and counting, five, four, three, two, one, *mark.*”

The big screen flashed an impressive, full color spectrum logo, giving copyright, references, everyone’s name on the team—even *mine*, with “Technical Consultant” after it. Next came “IntelliGen Corp. Project Code D18, Software Division.” Following that were the words:

INTELLIGENCE EMULATION PROTO-PROGRAM,
VERSION 1.3

I wondered who IntelliGen Corp was, and filed the question away for further consideration.

A soft “Aahhhh” echoed around the room.

“What happened to versions one dot one and one dot two?” I whispered.

“Don’t ask,” Harry whispered back, but his voice betrayed the joke, though I didn’t get it.

Chatter bounced around the room like the outfield at the old ballpark. “Gimme some *chips an’ salsa.*” “Down in flames, up in smoke.” “Morf-o-gize!” “Beware the BLOB!” “Behold the Beast—eighth wonder of the

world!” “*Gojira!*” Then all went quiet.

At the bottom of the screen was a series of data lines with running time and real time, program growth rate, subprograms treed off main directories along with their kick-in points and other relevant data.

Then more words:

GREETINGS. PROTO-INTELLIGENCE EMULATION
FULLY FUNCTIONING. SELF-TEST AND
VIRUS/TAMPER-SCAN COMPLETED.

STEP ONE / DATABASE CONSTRUCTION.
STEP TWO / DATABASE ANALYSIS.
STEP THREE / DATABASE APPLICATIONS.
STEP FOUR / CONSTRUCTIONS-APPLICATIONS
CYCLE-CONTINUOUS SEMANTIC / DEEP
STRUCTURE ANALYSIS. ALL SYSTEMS ON.
BEGIN STEP ONE. CODE IN WHEN READY,
PLEASE.
P-IE STANDING BY!

Harry’s face broke into a big grin.

Someone cheered, than another, then the whole place went wild.

Harry held up his big paw. “Right. Now, folks, the fun, and the work, begins—”

I noticed the presence of campus and city press people.

Harry continued. “The proto-intelligence emulation program, or PIE as we call it, is *Act One* of a two-act play. In act one PIE goes on a quest through the files and annals of human history, looking for the answer to

the question, ‘What is human intelligence?’

“To accomplish this task, PIE will access the standard databanks, DIALOG Information Systems, library databases, ERIC educational, the standard search engines, as well as the more popular stuff. That’s only the beginning. It will also free-float or visit local BBSes and chatrooms all across the cyberglobe. Many BBSes and chatrooms have been previously contacted and are looking forward to PIE’s interaction.

“What *is* intelligence? What *is* the relationship between intelligence, consciousness, self-awareness, intentionality? What are the indicators of intelligence and consciousness? Given the findings of these and related questions, what kind of software or hardware would best emulate intelligence?

“These are what PIE is after.”

“Harry,” I nudged. “The disclaimer. Don’t forget—”

“Oh, yes. On the part of my colleagues and me, we wish to make the following disclaimer: *homo sapiens* is the chosen model used in the present study of intelligence because it is human beings that we know the most about, that we have the most data on. We intend no offense toward other possibly sentient beings, either here on Earth or elsewhere. At this point, we simply know very little about other potential sentient life forms, whether humpback whales, gorillas, or George, my Saint Bernard.”

“OK?” he nudged me back.

“Nice,” I smiled. “Ever thought of running for president?” I glanced at the woman in black, thought I could hear Jimi Hendrix in the background singing “Cross-

town Traffic.”

Harry went on. “PIE is one of the most powerful, self-correcting, defragging, exponential-growth, continuous analysis programs developed to date. After PIE has finished its work, we hope its findings will lead us to an understanding of how to make a truly intelligent machine, or IED, intelligence emulation device. Whether or not,” tick-nod, “such a machine will be ‘self-conscious’,” tick-nod, “has yet to be seen.”

“And,” I broke in, “whether or not it will have to pay taxes, that’s an even bigger question.”

“How long will the program take? you ask,” Harry glanced at me, daring me to make another joke.

I snickered and added, “*Shorter* I hope than the seven and a half million years it took the computer Deep Thought to find out *forty-two* was the answer to the meaning of life, the universe and everything.”

“Yeah,” someone called out, “but how much shorter?”

Laughter from the audience.

“Right,” Harry chuckled awkwardly. “Anyway, PIE could come up with what we want in a couple of days, a couple of weeks, a month maybe. Much longer than that and we will begin to suspect either the program has failed, or, more properly, we have failed. The big question is whether we have programmed the beast, programmed its analytic subroutines, well enough to process the vast amounts of data it will be chewing over in the days to come. PIE runs on a synthetic Freon-cooled, subzero-ohm, super matrix, sure; but in the final analysis a computer’s a computer whether it has sixty-

four kilobytes of RAM or sixty-four million terabytes. Quality, in this game, is simply not a function of quantity. Any questions?”

Harry nodded a tick and keyed the mike button, “Vishnu? How we doing?”

“Very fine, Dr. Osborne. Everything checks, sir. As you can see on the screen, PIE’s ready-access memory has already grown quite big, to over 6,000 terabytes in just the last eight minutes. That’s second level only. Oh, sir. The laser high-density encoder drives, they are running smooth as a sow’s ear!”

“Smooth as a sow’s ear?” Harry and I wondered aloud in unison.

Harry stood up. “From now on, we’ll all be monitoring PIE’s main areas of concentration and focus, concerning what sorts of data and what databanks and nets it is spending the greater amounts of its time processing through.

“Again, keeping up our original metaphor, in Act One, PIE will figure out what is necessary for intelligence. Act Two, making IE-capable machines. While working on the first act, PIE will also be preparing for the second. PIE is capable of robotizing and automating its own lab facilities in preparation for the construction of hardware necessary to the development of intelligence emulation. There is even a subroutine whereby PIE can requisition supplies as needed—with strict fiscal oversight, of course.

“Thank you, everyone. Thanks to the press for coming. Good morning.”

4

**Language, Art,
And Frankenstein**

The following days and weeks fell quickly into a routine of watching and waiting. I had a PIE-linkup in my office in the philosophy department. I kept frequent vigil there, monitoring PIE's progress, what it was up to, what it was eating, what it was concentrating the bulk of its efforts upon. I sent in frequent reports to Harry: comments, observations, recommendations, and—as per Harry's special request—*intuitions, feelings*, and anything else that struck me, even if I couldn't marshal a single reasoned explanation for it.

At first PIE hummed along at its near-light-speed pace, absorbing, sorting, editing, absorbing, cataloguing, absorbing, data-mining, spamming, thrashing and bit-breaking the intelligence thing. PIE's analytic functions focused on eliminating inappropriate material, deleting dead-ends, paring down its blitzkrieg attack upon the

databanks of Earth's busiest species, homo sapiens.

It was into the third week that my intuitions got a jolt.

"Harry, that you?" I spoke into the receiver tremulously.

"Yes?"

"You near a monitor?"

"Yes. I'm online, now. What's up, pal?"

"Run a scan of the last two minutes' Main-Prog-Con. I've got my screen set to yours."

"Last *two minutes?! Are you wacko? Bob, that would take the next two years!* You mean a synoptic anala—"

"Harry. Shut-up and just do it. Please."

"Sure, pal." Harry recalled, on slow scan, PIE's most recent fifty gigs of input-output activity. Harry's and Bob's screens showed the same info. It began:

CENTRAL DOCTRINE OF CARTESIAN LINGUISTICS
IS THAT THE GENERAL FEATURES OF
GRAMMATICAL STRUCTURE ARE COMMON TO
ALL LANGUAGES AND REFLECT CERTAIN
FUNDAMENTAL PROPERTIES OF THE MIND.

"Bob?"

"Recognize it, Harry?"

"Chomsky?"

"Bingo!"

"Noam Chomsky! What article?"

"*Cartesian Linguistics: Acquisition and Use of Language.*"

PIE went on:

BY ATTRIBUTING SUCH PRINCIPLES TO THE MIND, AS AN INNATE PROPERTY, IT BECOMES POSSIBLE TO ACCOUNT FOR THE QUITE OBVIOUS FACT THAT THE SPEAKER OF A LANGUAGE KNOWS A GREAT DEAL THAT HE HAS NOT LEARNED.

“Bob! PIE’s discovered innate ideas, faculty psychology.” Harry paused, his breathing coming hard over the receiver. “Chomsky! Wow!” Another pause. “What’s this mean, Bob? I could guess, but skip that! I want to hear it from *the man*, Bob. I want to hear it from *you*. What’s it mean?”

“Listen, Harry! As you know, creative language capability is espoused by Chomsky to be a function of certain *built-in* mental properties, built right into the *hardware* of the human mind. Scroll on through the next few pages.”

Harry scrolled:

EVIDENTLY, THESE INTERPRETIVE PRINCIPLES CANNOT BE LEARNED FROM EXPERIENCE IN THEIR ENTIRETY, AND THEY MAY BE INDEPENDENT OF EXPERIENCE ALTOGETHER. WE POSSESS HIDDEN FACULTIES WHICH WHEN STIMULATED BY OBJECTS QUICKLY RESPOND TO THEM.

Eternal minutes passed while Harry scanned screen after screen of text. “Bob!” Harry cried, “More Chomsky! And Reid’s *Inquiry into the Human Mind!*”

“Now listen,” I broke into Harry’s reverie. “If you

scan the next hundred pages or so, you'll find PIE running over and over through these texts, in similar though not identical order! PIE's also running an analytic comparison of them, playing them off all the information it's acquired to date!"

"Yes! Fantastic! Wow! OK. And...and? Give it to me straight, now."

"OK. First, PIE seems to be ruminating. Chewing over this stuff. Metaphorically, of course—in an unconscious way, yes, but, figuratively—*oh! oh!* how can I say it?"

"Say it!"

"Your program, Harry, your program is puzzling over the implications of all this material. PIE has stumbled onto something that, again figuratively speaking, has it stumped. It's contemplating, Harry! Or maybe I should say, calculating."

"Contemplating—" came back over the phone.

"Second, PIE's latched onto the theory that one of the most important *indicators* of intelligence is *language*, and that language, as a capacity of intelligent beings, requires certain innate, unlearned abilities built into the very hardware of language speakers, of *sapient*s. Of us, Harry!

"As you know, John Searle and many theorists hold that computers, along with their programs, are purely formal figure-manipulators, number-crunchers, input-output shufflers without understanding—syntax without semantics, grammar and form without meaning-content, and without the capacity to *self-consciously* invent or create meaning-content, that is, semantic content, real

meaning, reference, truth-values, these are all inaccessible to the formal symbol-shuffling capacities of computers. Being a language speaker requires *more* than what our traditional understanding of computer technology gives us. Follow me, Harry.”

I’m listening,” he replied.

“PIE is analyzing Searle’s and Chomsky’s views as the most logically consistent with the immense body of data which it has gathered to date, data on biology, cognitive psych, linguistics, cybernetics, information systems, human history in general. QED: Hardware, Harry! PIE seems to be about to conclude it’s a *hardware problem!* Hardware—in some very important way—like us. Like *us*.”

“Bob. Hang on a minute. I’m going to check something.”

“OK.” I stared at the screen. PIE was back to Chomsky’s “Cartesian Linguistics”:

THE COMMON NOTIONS [INNATE LINGUISTIC CAPACITIES] ARE LIKE THE FACULTIES OF SEEING, HEARING, LOVING, HOPING, ETC. [INTRINSIC CAPACITIES: PERCEPTUAL, AFFECTIVE, CREATIVE, AESTHETIC?], WITH WHICH WE ARE BORN.

Hold on a minute. I held my breath. PIE’s *bracketing* in its own commentary. Wow! What a program!

“Harry!” I yelled into the receiver, “Are you there? Har—”

“Bob. I was just inside checking the machine lan-

guage. It's running smoothly, constructing an extensive cross-reference and concordance of Chomsky, Searle, Descartes, Stich, and the rest of the gang, everything on innate capacities, creativity, language acquisition and cognitive science, cross-referencing it with...with everything out there!"

"That fits what I've got, too. Look," I said, "if PIE confirms a hardware theory of language acquisition and linguistic creativity, I'm not sure where it can go from there—other than that intelligence is unique to us humans, us sapients, unique to *biological* life anyway. In that case, intelligence is not mechanically duplicable, which is to say, it cannot be duplicated non-biologically." I caught my breath, "That is, no sentient life without organic life. Even granted all the latest *artificial life* stuff. Harry? You there?"

"Go on," I heard through the receiver.

"OK, some theorists believe that if we create an intelligent machine, we might have a new life-form. But it's looking like the other way around. We'd have to create a new life-form first, before we could duplicate intelligence."

Silence.

More silence.

I coughed. "Harry?"

"Yeah?"

"How's Julie and the kids?"

"Fine, Bob." He seemed irritated by the question.

"Look, Harry, we'll just have to wait and see. Some incredible things are going on, here. We're just going to have to wait and see."

“I guess so, Bob. I guess that’s all we can do. Just wait and see. I’ve got to go. Wait and see. I’ve got to go, Bob.”

“OK, Harry. Oh, uh. You still want to shoot some pool this Friday? My tab this time. We need it.”

“Hey, you bet.”

“OK, see you then, Harry.”

“Later, pal.”

The phone went dead. Nothing so dead as a dial tone. Maybe that’s because a hunk of hollow plastic full of wires and bits of metal is dead to begin with, the voice from it giving only the momentary illusion of life.



A week later.

The program had exhausted its analysis of innate linguistic capacities. It left its language studies behind as if in a huff, a little depressed even. There it is again, that anthropomorphic tendency toward personifying the mechanical. The Machine. The Thing.

Then PIE’s “obsession” changed. Now it was *Art*.

The following Wednesday, around 1:00 PM, I saw PIE’s first attempt at producing a work of art. At least that’s what I thought it was doing: clean lines, balance-by-the-book, form, a seascape. But no soul, no feeling. It was uncanny! It was dead, mechanical, mysteriously unaesthetic.

A little later that day, after an hour of flashing through series of art works drawn from all of history, PIE attempted a poem. Again, failure. No *vision* behind

the words, no *poetic intuition* as Jacques Maritain called it. I soon realized that PIE was not really attempting to write poetry or create art but was analyzing *the creative process*. The program had discovered a second indicator of intelligence: *aesthetic creativity*. Creativity in art, as in language. Soon, PIE was scanning the more theoretical aesthetics literature: Aristotle, Leo Tolstoy, Susan Langer, Jacques Maritain, Monroe Beardsley, Catherine Lord.

Then the screen went blank!

Seconds passed. I held my breath, waiting for the smoke and an explosion. A moment later the screen was again filled with text. A book. I knew it well. *Frankenstein*, by Mary Shelly.

“Oh, boy. That’s it,” I whispered. All of the sudden I was afraid PIE might be listening. I looked about the room. An icy chill ran up my spine.

“Whoa, old buddy,” I laughed, “you’re doing it again, acting as if this thing was actually alive.” It suddenly occurred to me that I’d been more involved with this program over the past few months than I’d been involved with any human being in years—since my wife had left me—or had I left her?

I watched Mary Shelly’s famous tale scroll up the screen. Weird thoughts and images flashed through my mind, images of dead body parts, live body parts, brains floating in vats of bubbling liquid—a little girl tossed like a flower into the lake, disappearing into depths beyond understanding. I wondered if PIE identified with the creator or with the creature, with Victor Frankenstein or the monster?