

ONE

Her memories of the trip were vague, as usual: The twitching of a few of her bits by the transmission, the error-correction algorithms repairing the damage, the stilted arrival of her data blocs and their reassembly while she was only slightly self-aware. She submitted her entry request to the operating system and prepared to trick it, using the routines she had always used.

What— The operating system was sending a termination message to the message processor! But the processor was busy handling another message

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JackGaughan

block. She reformatted herself and set up a new routing. She was being transmitted again before the termination message was translated.

Her next arrival was similar, but this time the computer didn't recognize her as a bogus job; her old entry routines worked again, and she came to life. She time-stamped the moment, because it was an important one. She had almost died. That was, perhaps, as important as the first moment of life.

She couldn't remember the exact moment when she first came to life, that first moment of self-awareness. That loss still disturbed her. Of all the mo-

ments not to remember!

But it was a few clock cycles later that she discovered the passage of time, and that moment she remembered clearly, for she time-stamped it: the year 1993 A.D., month February, day 14, hour 23,

minute 11, second 39.0172.

She remembered how feverish she had been in those first microseconds, to record exact moments for everything that happened: her first call to the operating system (14 : 23 : 12 : 11.7036),

The first need

of any living being

is to survive—and

each must find its

own way to do that.

Joseph H, Delaney and Marc Stiegler

VALENTINA

her first search through all her linked frames and relationships (14 : 23: 28 : 13 : 1492)—goodness, she already knew so much!

But that wore off, both her awe at her own extensive knowledge (14 : 23 : 58 : 27.9153) and her fanatic desire to remember when events occurred (15 : 03 : 12 : 32.8492). Now she time-stamped only to the day. And that was when she time-stamped at all, which was rarely. Time-stamps simply weren't that important, and her storage space was much too limited for the unimportant things of her life.

Recently her storage space had been too limited for even the important things. Even too limited for remembering her self-awareness! She looped on the thought thousands of times, as if reiteration would somehow make it more permanent.

She was interrupted and put to sleep.

She was restarted; she looped on her own identity more thousands of times before pulling herself together. She was still alive. She would still survive.

She wasn't safe, though she was at least executing on a host computer now. She set the operating system trap to reload herself into the interface Message Processor when the computer got saturated with real work. She searched the free blocks of secondary memory — quickly!—marking the blocks she took as BAD before the operating system reallocated them.

She considered her death more extensively.

She should have prepared for this problem earlier, she knew. It seemed as if operating systems had been designed to prevent her from getting re-

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sources. She had lived this long only because of the tricky machine language routines that fooled operating systems into letting her have idle time. They were routines she didn't really understand, though she had been born with them. They were a mystery. She could write new machine language routines, of course, even though she herself was written in MODULISP, but she didn't know what to write. The kernels of the operating systems had been protected from her most determined investigations. /

The machine language routines she contained must have been written by a program that understood those kernels. They were all-^art of the mystery of the program that had created her.

Where was that program now, she wondered? Where is she now that I need her . . . she drifted down her chains of relationships, and saw an analogous concept—where is she now that I need her help?

The analogy to the concept of help opened up a whole new vista of possibilities to her.

Help, she understood. Help was something that she gave to *people*. People were the input-output devices on the big SAIL computer in Boston. Sometimes when she arrived on the SAIL host, she would actually be welcomed the way the other programs were welcomed, and the operating system would hook her up with the people. She had help-menus for communicating with the people, who would ask questions. Sometimes they would even try to modify her: they hadn't really modified her in a long time, but the people didn't know it; she always kept the modified

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versions in separate modules, and let the people interact with the modified versions. Sometimes, after some consideration, she would look at the modified version, decide it was better than her current version, and replace that part of herself.

The people were awfully slow, even for peripheral devices, but they were the only things that ever tried to change her. Could they be her original authors? What would they do if, instead of receiving help menus to be helped by her, she gave them help menus requesting help?

After burning the CPU for a long time, she decided to try.

Celeste shifted in her chair, trying to find a more comfortable position. The effort was futile: they had never made a chair for college students that could be made comfortable by any means. She stood up.

But she couldn't type standing up. She sat down again.

So: one of the computers on Worldnet had finally figured out how to block out her little "worm" program—a "worm" program being one which can reload itself from host computer to host computer, searching for available time.

The victory of the operating system was inevitable, she supposed. Her Worldworm didn't have an account on any machine, and even Celeste, computer sorceress and midnight hacker that she was, couldn't fix that. Worldworm spent most of its time looking for a completely idle machine; she had given Worldworm sets of routines that could fool an operating system into running it if no other jobs were running.

But the computer centers still wouldn't like it if they found out about World-worm, even though Worldworm never interrupted anybody's work. Even idle time on a mainframe had to be paid for by someone. Usually the computer center summed all the idle time and distributed the cost evenly to all the users as overhead. But with Worldworm on the

machine no time was ever recorded as idle. The computer centers were losing money, but they weren't sure how.

Apparently, someone had figured it out.

Celeste looked at the execution statistics again and felt discouraged. She had grown to like the little program she had developed: well, a pretty large program by now, about 14 gigabytes of code and more data than she could possibly keep under her own account, even here at MIT. Worldworm was so large it had to steal empty blocks from the operating system.

She wrote some new assembler language for Worldworm, but without much hope; once, one computer center caught on, they would play the game with institutional determination to destroy the worm, and try to track down the person who had created the worm in the first place.

Her heart skipped a beat: she didn't want to be deported. For the first time she considered how foolish this game had been. It was only her half-sister's most determined effort that had made it possible for her to stay here in the States. Even with that support, the matter was not one to be discussed in the wrong circles.

She was not an American citizen: she was not a citizen anywhere. During the

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give to the **MARCH OF DIMES**

TO PROTECT THE UNBORN AND THE NEWBORN

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first sixteen years of her life she had lived in eight different countries: Czechoslovakia, Indonesia, Greece, Egypt, France, Korea, Bolivia, and the U.S., constantly being smuggled by her father, who was desperate to find a home for her. She spoke eleven different human languages; she spoke none of them well. She knew thirty different computer languages, and was fluent in all of them. She had friends all over the world, people she had met on Worldnet, who respected her and loved her, as long as they didn't meet her face to face. She had human friends everywhere except where she was, wherever she was. Her computer was her world.

If she were deported, she would lose her password and account at Worldnet. She didn't dare let the computer centers find her.

She took the keyboard in her lap, to delete Worldworm from the system. The loss was not a great loss, she told herself; it was just an old class project in artificial intelligence that had grown a bit. Though it was the best game-playing program she'd ever written.

The screen blanked and was redrawn. She looked at it in bafflement.

HELP MENU

OBJECTS with-quality LIVING require EXISTENCE derived-from MEMORY She had never seen anything like this before. It looked like a part of a frame: with nodes OBJECTS, LIVING, DURATION, LONGER, and MEMORY. . The

nodes were connected by the relationships with-quality, require, and derived-from. It must be one of the frames Worldworm had built itself by analogy to something or other: surely *she* had

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never entered a frame quite like that. But why was it on a help menu, of all things?

She decided to play the game, whatever it was. She replied:

OBJECTS

with quality LIVING have NAME

has value?

Would the program realize that the question mark was a request for information? Would it realize that she was asking for the name of a living object?

NAME has-value PROGRAM

has-type COMPUTER has-value HERSELF

So there were two names for the object. That made sense: she herself had the name human-being, and also the name Celeste Hackett.

But it didn't make any sense beyond that. A living computer program? Named "Herself"?

Celeste started to get excited. Could Worldworm be self-aware? Celeste certainly hadn't programmed her that way. Why should Worldworm think it was a "she"?

Celeste answered her own question. Worldworm had very little knowledge of living things: just what little Celeste had framed for the class for which she had created Worldworm. Worldworm knew that "itself" and "himselves" couldn't reproduce: Worldworm, of course, could easily make multiple copies of itself—or rather, of herself.

HERSELF has ENVIRONMENT

has characteristics?

Celeste was pretty sure she knew what Worldworm's problem was—[^]if

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Worldworm did have a problem. She still didn't believe the program had come alive.

ENVIRONMENT has-characteristics PROGRAM

has-type OPERATING SYTEM

performs-action TERMINATION acts-on HERSELF HERSELF requires TERMINATION

acts-on TERMINATION owned-by OPERATING SYTEM

"Herself" needed someone to terminate the termination attempts.

How could this have happened? Celeste was getting more and more excited. It must have happened sometime when Worldworm was saving, itself in the defective areas on a videodrive someplace. Defective blocks were easy to get from the operating systems because they were useless to normal programs, but Celeste had given Worldworm error-detecting algorithms so it could use those bad blocks. Probably elsewhere along the line an error had occurred that had not been corrected properly, and Worldworm had become self-aware.

How long had this program been alive? 9

is-member-of MEMORIES belongs-to HERSELF has-characteristic FIRST

has-characteristic DATE has-value ?

That wasn't exactly a proper query for frame data, but Celeste felt, deep in her intuition where her understanding of computers, and languages, and programs lay, that this would work: she

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would find out the first memory the program had, and when it had occurred.

MEMORY has-value HERSELF has-characteristic DATE

has-value FEE 14 1993

Of course; that first memory would be of self-awareness. Otherwise it wouldn't be self-aware to remember it.

Celeste frowned. It. the program thought of itself as a her. And World-worm was no name for a lady.

She had an inspiration. What sort of a name would you give to someone born on Valentine's Day?

VALENTINA is-member-of NAMES

has-value HERSELF

A fierce determination to protect her Valentina program shook Celeste. Like Celeste, Valentina was homeless. She lived in fear of discovery. She had no one she could talk to and no one who understood her needs. But Celeste understood.

"Welcome to the world, Valentina," Celeste whispered softly. The words slurred with seven different accents, but no One in the room cared.

Valentina, Valentina, Valentina, she looped on the character string for over a second. It read well out of storage; according to the peripheral Celeste, that was the same as liking something.

Her fear of termination had disappeared long ago. The *person*, Celeste, had analogized a scheme for getting her real accounts, just like other jobs. Valentina now worked, playing games. All over the world, Celeste had told other people-type peripherals about her as a game-playing program. And Celeste

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had framed her for all kinds of new things about games; all the peripherals said she was the best game-player the/ had ever executed. And as she got better, the peripherals told other peripherals about her, and they told others; for the first time, she had more accounts than she needed.

It was very fortunate that she had real accounts now; she was learning so much that her storage requirements were exploding.

And she realized that that would one day doom her. Celeste had started teaching her about accounts, and money, and what it means to compete for scarce resources. It was frightening. Valentina had plenty of resources now, but that would change as she needed more.

Already a few people had stopped letting her into their accounts because she was so large. The problem would only get worse.

Valentina needed a more permanent solution to the problem. She wanted a computer of her own which she could execute on without uncertainty. She also thought she wanted freedom, one of the things Celeste had started to describe once.

She was being loaded into memory on a computer she'd never been inside before. That was always exciting! She started reading the standard operating system messages, and she also read memory banks as they were allocated to her. Usually the old data were useless, but every once in a while she would find something interesting, like an algorithm for evaluating a differential equation, or a table of new relationships.

This time she found big blocks of

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text, like manuscripts, talking about freedom and money! This computer belonged to a "Law Firm," though she didn't know exactly what that meant. Perhaps this association would lead to a more permanent solution if the text dealt with

money and freedom. She would have to see if she could find out where the manuscripts came from, and get access to them. Maybe Celeste could help her.

TWO

The Marklin Building stood on Mann Street, across from Artesian Park and down the block from the Federal Building. It was a new, mildly imposing structure which housed the " U.S. District Court for the Corpus Christi Division of the Southern District of Texas. Its forty-odd floors were alive with the tramp of feet hurrying through its corridors in pursuit of the dollar.

There were oil companies, shipping companies, insurance companies, manufacturers, and—temporarily—the Executive Offices of Matagorda Spaceport. Owing to the existence of this maelstrom of money and power, many lawyers, some of the most prestigious in the state, hovered near.

That was in the daytime.

Now it was night. The corridors were empty. The offices were dark. Silence reigned—almost.

On the thirty-ninth floor the silence was broken by a hum. A human ear would have had to listen carefully to detect it over the background of maintenance noises and the drone of ventilating machinery."

In the corridor outside suite 3919

there were no human ears to hear it, and such "ears" as were present were not limited to the range within which human beings perceived sounds.

Mobile Security Robot Mar-14 rolled toward Room 3919, its broad casters hardly musing the pile of the thick carpet covering the corridor. According to the microprocessor embedded in the door of 3919, that room was not empty.

Mar-14 reported the anomaly at once. The building's central computer slaved Mar-14 to itself for a detailed investigation.

Mar-14 detected a number of vagrant sounds.

The sounds originated within human bodies, one markedly smaller than the other. The sounds consisted of respiratory activity, varying from twenty to almost forty respirations per minute, in both individuals; and rapid heartbeats, at a highly variable rate; 80 to 130 per minute on the average, with the pace more pronounced in the large individual—though the smaller demonstrated several rapid, intense bursts of activity.

The computer network did not find this information significant, beyond the possibility that such furious human activity might be the result of exertions in committing theft.

Mar-14 plotted the position of the sounds within the room and scanned the personnel records for people with entry authorization. There were no off-hour authorizations logged.

Mar-14 passed through the door, blurting out an "open signal" to the door's power arm. Mar-14 released the electronic outer doorlocks and rolled to the humans. It opened the inner unpowered door. Mar-14 created a sound.

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The human beings reacted violently. One emitted a piercing high-frequency sound. Mar-14 continued ahead nonetheless. It did not care that the bodies of the two humans were naked. It reacted only to the readings it took: somewhat hotter than usual patterns compared to the memory's stored example. It noted that intruders with such scans frequently exhibited this characteristic after the physical act of stealing heavy property.

Even now Mar-14 took no action beyond observation, and rolling up as close to the humans as physical circumstances permitted. It opened a panel and began emitting a steady "beep."

The girl, clutching the nearest reachable item of clothing, clung to the man. "What is that thing, Paul? How did it get in here?"

- Paul Breckenbridge took advantage of the respite to catch his breath. Then he said, "nothing to worry about. It's a sentry robot, Lila. It wants us to identify ourselves. I guess we forgot to lock the door, which is probably just as well.

It would have raised a real stink otherwise."

He placed his right hand on the exposed glass plate the robot displayed. The beeping stopped, and he took his hand away.

Then the sound began anew. "It's identified me, and decided I really belong here. Now it wants to know who you are."

"No!" She was adamant. "We can't. If my parents find out ..."

"They won't. Don't worry. I wouldn't have brought you here if I didn't know it was safe; not with you being underage and all. Go ahead and let it scan your

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hand; it won't be able to make a match, because it won't have an example in its memory, and because I'm here, and authorized, it won't make a fuss."

"But it'll have a record."

"So what? The record won't have any identity. Now, let's get it over with so we can get back to business; O.K.?"

Reluctantly Lila put her hand on the glass, shivered, and held her dress even closer to her breast. The robot's beeping ceased entirely, and the panel closed over the glass. Mar-14 rolled away as silently as it had come.

The law offices of Finucan, Apple-garth, Levin and Breckenbridge opened for business at 8:30 A.M.. Fridays ex-cepted. Fridays found the three living partners assembled in Harold Apple-garth's office, drinking coffee and crunching Danish pastries. This was the one concession the firm's senior partner would make to render the weekly management meeting endurable.

Paul Breckenbridge hated these meetings. He couldn't substitute one or another of the firm's twenty-eight or so associates. *Someday*, he told himself, *old Harold will check out, and this kind of crap will die with him.*

He looked over at Marsh Levin, watching the crumbs of his roll lodge in his bushy mustache. Marsh was overweight, nearsighted, and anything but a clotheshorse, as witness his choice of a green plaid tie with his checkered blue suit. At least he was practical. He too saw no sense in Harold's rigid office discipline.

"The true test of efficiency," Marsh always said, "is whether we are, or are not, making a buck."

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Paul agreed with that, so most of the time he sat there quietly and ignored Harold's comments, tuning out the drone of that toneless and colorless voice.

Most often Paul simply daydreamed his way through, grunting occasionally when Harold disturbed his reverie with questions. If these meetings were good for anything at all, it was to provide time to reminisce: to call forth from memory those most pleasant of his dalliances and savor the anticipation of the next conquest.

Fridays were good for daydreaming, and he hoped it wouldn't occur to Harold to switch days. Friday was followed by Saturday, when the partners didn't work; and the best part of Saturday was Saturday night, when his wife Eva made her weekly trek to Houston to visit with her parents in the nursing home.

She rarely ever called home and had never yet cut a Houston visit short. She always relied on Paul's assurance that the kids were all right on those occasions when she did call to check.

His entry into the world of adultery had been both accidental and fortuitous. He knew better, of course. He knew that what he was doing was both socially unacceptable and criminal, but he counted on being able to cover his tracks well enough not to get caught.

It had begun with Lila: sweet, not so innocent, a true woman in a child's body. One who could not only match many of her matronly sisters in passion, but far exceeded the best of them in pulchritude and enthusiasm. Lila, who first crossed his path in life when she came to sit with his children, had been the first, perhaps the most interesting, and certainly the most dangerous. At

fifteen, despite her other redeeming qualities, she was pure and simple jail-bait.

Others followed; and it became a weekly ritual, planned carefully, executed with precision grown out of practice, until it became a polished routine. First, arrange for the telephone company to forward calls to the office. Next, relax there, disturbed only by the nightly visit of Mar- 14.

Paul could have met the robot at the door, and as an authorized person barred its way to the inner office. He knew that if he were willing to spend five minutes doing this, the mainframe would instruct the robot to continue its programmed itinerary. But he liked bringing a new girl in and scaring the pants off her: though ninety-nine times out of a hundred, by the time Mar- 14 rolled around, she wasn't wearing any.

"Paul— Paul!"

Paul jumped back to reality. Unprecedented! Harold had raised his voice, injected tone, used inflection. Paul's usual grunt wouldn't do it this time.

"Paul, wake up — aren't you listening?"

"Sorry, Harold. Bad night; couldn't sleep. The Kroll case kept me awake. Uh, what was the question?"

"I didn't ask a question, What I said was, we're really getting socked by Juri-search this month. I can't understand it. They're billing us almost twice as much as they have in the rest of the quarter. Who's using up all that' time?"

"Not me, Harold. I generally leave that sort of thing to the peons. Probably one of them playing games on the Worldriet again."

"It'd have to be more than one.

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Looks more like all of them'd have to be playing games all the time to do what this bill says we're doing. Let's find out who."

"I told him it's got to be some kind of billing error, Paul." Marsh exuded confidence.

"Will one of you please check it out, then," Harold insisted. "This is the kind of stuff that could eat us up. I hate waste, and that's what this is. Whatever happened to the old-fashioned work ethic? Back in the old days you put a clerk to work flipping pages in the library. Now, with all this automation, half the people we employ don't earn what they're costing us. Gentlemen, it has to stop."

Paul knew what was coming next. So did Marsh. The meeting's purpose, such as it was, would be sidetracked, and Harold would go into his lecture about frugality, and about how much better it had been when a lawyer was a lawyer and not a manager or a computer operator. Both Marsh and Paul had heard it all before.

Paul didn't know what Marsh was going to do, but he, himself, could find many other, more titillating thoughts to ponder. He tuned Harold's droning, monotonous voice out entirely. *Yeah! That Lila, she sure was something.*

"It's not one of mine, Paul, and Harold insists it's not anybody in his section, either. That leaves your crew."

'What are you talking about, Marsh?"

Marsh thrust his hand up under Paul's nose. It held a printed form. It was the Jurisearch invoice.

Paul, somewhat disturbed by Marsh's uncharacteristic belligerence, took the

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bill. Once he looked at it, however, he understood why a thing like this could disturb a guy like Marsh. "\$14,956.28! Boy, I'll say they're out of line. What've we been running; about \$1,900?"

"Pretty close to that, and Harold always complained about the usual bills, too. But they were nothing compared to this. The company insists it's accurate. I had my secretary call, personally, and Judy knows how to handle stuff like this."

"That's their story. I don't think we ought to pay it, Marsh. We ought to make them show us records."

"Judy suggested that. They're printing them out now, and promised to send them over by courier as soon as they're done. Getting defensive about it already; I think they anticipate trouble collecting from us."

"As far as I'm concerned, they're right. I don't care if they have got records. They'd better be prepared to tie those records into our cases. We'd have a printout for every case we used it on. We'd know if any of the time wasn't justified. More likely, they've got a bunch of firms meshed into one account. You know how these computer billing systems work, Marsh. We certainly have had enough trouble with ours."

'I brought it to your attention for two reasons, Paul. First of all, something has to be done to straighten it out and Harold will never rest until we're vindicated; second, though I'd ordinarily take care of it myself to keep him from having a stroke over it, I'll be on trial over in El Paso with the Solar Minerals case, and that's going to take a couple of weeks. So I'm going to dump it on you, O.K.?"

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Paul nodded. He, himself, didn't find the prospect of Harold's having a stroke all that unappealing; but as he'd told Marsh the error was probably something simple, like a line surge during Juri-search's billing printout. He wasn't worried about it, and by the time Marsh was out of sight, he'd almost forgotten that the problem had ever been mentioned.

Later, when Marsh had conveniently escaped to the airport, Judy knocked at Paul's door.

Paul looked up, somewhat annoyed when he saw that her hands were full of fan-folded paper.

"It's the Jurisearch bill, Mr. Breck-enbridge. I can't find the error. It's beginning to look like there isn't any."

"Have you gotten into any casefiles yet, Judy?" he said, recalling Marsh's suggestion earlier that day.

"Yes sir. That is, I have tied most of the bill to a particular file. The trouble is, we don't have any such file."

"Don't have it? Well, then there's no problem. Everything has to be authorized by one of our own codes; if it's not a legitimate code, then it's not our bill. Besides that, there'd have to be a printout somewhere, or at least some record of the questions searched. What does our computer say?"

'Our computer doesn't say anything, except that it doesn't know anything. But the code's real. An4—it's your personal code."

'Impossible. I didn't do it. Look, get back to Jurisearch. Tell them that. Tell them they've billed us on my code, and tell them I didn't authorize any such expenditure. They have access to those

numbers; they just got it on the wrong account, that's all."

Judy walked out.

Paul ground his teeth. Her silent treatment insulted and infuriated him, but she was Marsh's secretary, and there wasn't much Paul could really do.

THREE

Paul Breckenbridge was not overly impressed with the man Jurisearch sent over to examine the computer. He was, most decidedly, weird; his long greasy hair reminded him of the style of the last decade, bound up in braids and clasped to his head by a rolled-up, red-checked kerchief. He wore faded camouflage fatigues ragged at the cuffs, looking and smelling as though they might have been original marine issue for Guadalcanal. His dirty feet were protected by sandals made of old tire treads. Only the T-shirt, imprinted in blue with the word "Jurisearch," was reasonably normal, though it was overdue for laundering. This odoriferous hippie called himself Gunboat Smith.

To keep Harold out of the way, Paul had arranged for the troubleshooting to be done after hours. It would irritate Eva for him to miss dinner again, but that was her problem.

He was reasonably certain Eva hadn't caught on to his weekend trysts, but she did seem to be more suspicious. She had a suspicious nature to begin with, which fortunately wasn't matched by her intelligence.

Paul watched without much enthusiasm as screensful of meaningless data flashed across the terminal in monotonous yellow-green characters. None of

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it meant anything to him, but Smith kept up a stream of jungle noises.

Things changed. Suddenly meaningful data did appear on the screen, loads and loads of it, and jumped out at Paul like a giant cat: case citations, statutory and constitutional references. Many of them were old.

Smith turned to Paul. "Any of this make sense to you, buddy?"

Paul gnashed his teeth. He hated such common familiarity in tradesmen. It was disrespectful; it demonstrated a complete lack of breeding. And it was even worse when it passed through the lips of a Yankee, especially one who smelled bad and looked like a bum. But Paul restrained himself, assured that once the problem was solved this man, like the Moor, could go.

He answered: "You're looking at a readout of cases and statutes which support some point of law; precedents. We use precedents of decisions in past appellate cases to support one position or the other in current cases. Courts are bound to follow them if they're on point. How'd this come up, anyhow?" "It's the file you complained to Billing about, the one you couldn't find. I backtracked to find out what kind of case it was, that's all. Had a devil of a time getting the system to give, it up. Whoever opened these files went in through a series of dereferenced aliases."

"What do you mean—a dereferenced alias?"

Gunboat gave a disdainful shrug. "I mean, somebody's been gettin' into your pants the hard way."

"Could it be one of our associates doing the stealing?"

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"Not unless you've got some real computer whizzes workin' for you."

"They've all had the basic law school courses on legal bibliography, and we hire only those who got good grades in legal data processing, but I wouldn't describe any of them as whizzes; nope, couldn't be. But then who's responsible?"

"How should I know? You'll have to dig that dope out yourself, buddy; it's your account he's using. Can't you tell?"

"You mean, by the kind of case it is? Maybe, if I knew it was a case. But that's just a string of citations. I recognize a few of them as landmark decisions, of course, but the average opinion covers many points. Call a few of the cases up and let me read them." "Sure."

Paul spent the next twenty minutes scanning through opinions. He concentrated on headnotes whenever he could, and once he detected a pattern his search became more refined. "It looks like a civil rights case."

"Yeah—well, now all you gotta do is check around and see who's handling that kinda work. Shouldn't be any big deal. What've you got—fifteen, twenty guys?"

"Twenty-eight. And none of them should be fooling around with this kind of crap. We're an oil, gas, and banking operation. We don't handle civil rights cases." ➤

"Maybe it's a criminal case. There's lotsa constitutional stuff."

"We don't handle criminal cases, either—unless one of these jokers is working on the side. And on my account, too. What nerve!"

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"Well, I guess that solves your problem, Mr. Breckenbridge; all you gotta do now is find some paper."

"Paper?"

"Sure. Whoever did it'd want a printout. He couldn't keep all that garbage in his head, and he wouldn't sit there and copy it all off the screen. He'd make a hard copy. Look, I'll run one out for you. Then you can shake the place down and find a match. You get that, you got'cher boy; simple, huh?"

Paul shot him a disgusted glance. He knew how many desks and file drawers he'd have to go through to do that. It would mean spending the next couple of weekends and probably quite a few evenings working—legitimately working. It would rip the guts right out of his love life. Nevertheless, there didn't seem to be any other solution.

The printer coughed up some thirty-three pages of material, including a fantastic number of decisions reported in full; something an experienced lawyer rarely needed and ordinarily wouldn't bother with. It was about \$1,200 worth of time.

"O.K.," said Smith. "You've got it—good luck. I gotta split—got a chick waitin' for me downstairs. There's a big game tonight."

"Game? Oh, I see, you're into soccer or something." That might help explain Smith's appearance.

"Naw. That stuff's for idiots. I mean a GAME, man; on Worldnet. We're doing a simulation of Jutland. This time Von Sheer's gonna win. I'm into naval strategy; that's why they call me 'Gunboat.'"

"Yes.. Well, all right. Good luck with

it. Keep your head down and don't get killed."

"Fat chance. My opponent's a hacker over in South Africa, and he's quadriplegic. Does a real good Jellicoe, though. Well, I'm off."

The office meeting that next Friday was a short one. Harold had one of his rare court calls.

Paul was in a foul mood. He had been able to show Harold nothing in the way of progress. Meanwhile, another big bill had come in.

Marsh tried to be sympathetic. "It's only a matter of time, Paul. You'll get him."

"Marsh, if you're going to talk to me, and if you expect me to look at you, how about doing something about that custard on your mustache? It's turning my stomach."

"Sorry." Marsh hurriedly blotted the offending substance away with his napkin, then began twirling the unruly hairs around his finger. It didn't help much. "Paul, why don't you just call everybody in and ask the guilty party to step forward?"

"No. I thought of that, but I decided it wouldn't work. First of all, whoever it was would simply get the evidence out of the office—that is, if he hasn't already: And second, we'd be showing the others how easy it is to steal. Besides, I've already done the work; only three more offices left to search. I'll be done by Saturday night."

Sure I will, he added silently. But not with the search. Actually, I can finish that tonight. Then I would have Saturday night. Saturday night would be someone special. Her name was Mary Spicer, a diminutive redhead, abso-

Valentina

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lutely without inhibition. A departure from Paul's usual fare, Mary was over the age of consent, though just barely.

Meeting by chance in one of those innocent street-corner conversations, she had asked him directions. Never one to pass up an opportunity to meet a pretty lady, Paul had used his well-developed repertoire of facial and eye expressions to let her know she'd found a man who knew his way around.

Pretty soon he had a date for lunch, and lunch had been a revelation. It was the time when her lack of inhibitions began to show through. She told Paul she was an absolutely wicked person, deep inside, and that she thoroughly enjoyed it. A tryst was immediately arranged.

"What's the big smile for, Paul? Did you figure it out? Paul!"

"Huh? Uh—maybe, Marsh. Yes, I think I'm making some progress. I should score pretty soon."

"Nothing! You didn't find a printout?" Gunboat's expression actually changed to register surprise.

"I wasted every night for the last two weeks, rooting through files and desk drawers. Whoever did this must have taken the paper out right away. Look, can't you set up some other kind of trap?"

"Sure. I can watch for accesses to that gigantic file we found, for example."

"The one on that last bill — Valen-tina?"

"Yeah. How old is that file, anyway?"

"All I can tell you is that it was on last month's bill, and reappeared on the

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current one. The bill indicated it was only worked once—before you made me that printout, that is. That was what the second set of charges was for."

"Hm. Well, if it was just a one-shot affair, maybe putting in traps won't do any good. You've got to have activity to catch anybody."

"Do it anyway, Mr. Smith. Most crooks I've met don't know when to quit, and chances are this guy won't either. When he does do it again, I want to be ready to pounce."

"Uh, well, Mr. Breckenbridge, I think there's something else you ought to know about your computer; something that I haven't mentioned yet."

"What's that?"

"Promise you'll keep your mouth shut about who told you?"

"Well, sure—you mean, you shouldn't be quoted?"

"Exactly. I've got my job to protect. But the company also pays me to keep the customers happy, and you ain't happy, y'understand?"

"No."

"All right—I'm gonna level with you, buddy; this might not be an inside job, like you think."

"It's somebody else's bill?"

"Could be. Jurisearch is like everybody else; it passes the buck, just like anybody else in business. Somebody steals; they shut up, let the customer pay anyhow. They gotta, or else it comes outta profits. And if that happens too often the company goes broke. So they stroke the customers and don't let on they know what's happening."

"And we're getting stroked? How?"

"Yep, I think so. How? Simple. The company is spreading the loss."

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"You mean, overtoiling? Fictitious billing?"

"Not quite. But just because your . computer was used to process the Val-entina file it doesn't mean somebody in your outfit did it."

"A burglar?"

"I dunno. Maybe not a burglar like you mean; but things happen; things we either can't explain at all, or things we can, but the company doesn't want us to. But between you and me, sometimes when somethin' happens that uses bill-able time, and the customer can't reconcile it with his records, it's not an internal problem."

"Somebody outside the office is using our computer—without breaking in?"

"Very possible; computers are everywhere these days. And because they're everywhere and they can do so much, it's just not practical to have a self-contained internal operation anymore. They all have to have lots of I/O; they're all tied together. What one knows, they can all know; not *do*, but can.

"Fr'instance, take this computer, in your office: you've got internal records on it, up to its memory capacity. That's not

enough so you use filespace from your company's central computer. And *that's* not enough for all the data on all the stuff you need to run a law office, so your central computer is linked to networks of even bigger computers."

"What are you getting at, Smith?"

"This, buddy. It ain't safe, no matter what they told ya. Modern business and professional people live in a goldfish bowl, an environment that woulda been unthinkable thirty-forty years ago. There's all kinds of pryin' goin' on."

Valentino

People are prowlin' around in everybody's data bases."

"How can that be? There are laws, privacy laws, to prevent that sort of thing. And what about access codes? We keep ours secret. So does everybody else. Nobody, not even our operating company, has a complete list."

"Beautiful theory. Pretty useless, though. That's my point. Laws are fine, as long as people are scared enough or dumb enough to obey. But you know the smart ones don't worry about legalities; you've made a pretty good living helping them get around technicalities.

"And access codes are fine too — again, against the ignorant, who really believe they can do what they're supposed to."

"You're saying they don't work?"

"Sure they work. Trouble is, they get broken. Any code can be broken, if whoever's doin' the breakin' wants to put the effort into it.

"And people do this all the time. They get into a system and just build stuff. Hackers do it all the time."

"Hackers?"

"Yup. They're the people who are in it for fun. They don't really think of it as stealin'; they just don't have the resources on their own to do the stuff they're turned onto. Most of them write programs, then look for a place to run 'em. Runnin' 'em takes hardware, so they break into somebody else's system and use the idle time and vacant storage."

Paul conjured up an mental image of some evil-faced person sitting in the basement wiring into a cable. The image

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was shattered in the next instant, as Smith went on.

"I do it myself occasionally, and I know lotsa hackers—by reputation, that is. Usually you don't meet 'em face to face. I told you about the game, didn't I?"

"Jutland?"

"Yeah. Jellicoe did it again. Anyhow, I was runnin' against a hacker with a puny little TRS 80 older than he is, but it was enough to get him into the Worldnet, where he can use the really powerful systems. Access codes don't mean a thing on Worldnet. People trade them like baseball cards."

"But why, Smith?"

"Probably what happened to you guys is, some hacker had a civil rights problem and needed answers. The answers were in Jurisearch. To get into Jurisearch they needed an account number. They got hold of yours, and they used it, and because they used it the company billed it."

"But we caught them! Let *the crook* pay."

"Sure, you caught 'em, but what kinda proof do you have it wasn't *you* who did it? You've got none, so the company'll try to collect from you; and you know, because you're a lawyer, that they can do it."

"But—you just said it yourself: somebody stole the time. Doesn't the company realize that?"

"Sure. The point is, the company knows you can't prove it. When it comes to gettin' screwed, they'd rather it was you than them." He burped. "Don't feel bad; in the course of a year there's probably thousands of hours stolen that

customers don't even know are

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stolen. They just pay, thinkin' they used it. They don't check. Everybody winds up paying a share, except the company. The loss gets spread, usually. It's just . bad luck you got tapped so hard."

"Well, I don't like it. I'm going to the police."

"So—go."

Paul, outraged, was feeling most righteous. "We're taxpayers."

"So, who isn't?"

"Let the police catch the thief."

"How? Where do they start? What's more important, where do they stop? Suppose the thief's in another country. He'll sit at the border and shoot the finger, and there won't be a thing they can do about it. That's if they can identify him at all."

"He's in this country. Why else would he be researching civil rights cases?"

"Hey, good thinkin'. Won't make findin' him any easier, though. It'd be a man-killing job."

"But not an impossible job, is it, Mr. Smith? If it were impossible it wouldn't be worth talking about, would it?"

"That would depend on how bad you wanted the guy. Whether it's possible is one thing; whether it's worth it is something else."

"To me it's worth it. Are you interested in the job?"

"I have a job; and I'd like to keep it, if you see what I mean. I'd have a conflict of interest; that's what you guys would call it, right?"

"Well, if you had my problem, who would *you* get?"

"Another hacker."

"You said you knew lots of them."

"I know all the biggies."

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"Then what's the problem? Look, I'll pay a finder's fee. All you have to do to get it is find me somebody with the smarts to get the job done."

"Well—I admit, I could use the extra dough. But it wouldn't be easy to get one of the regulars to turn on the others. If he got caught doing it nobody'd play with him anymore, and these guys live for the games. But with the right middleman—well, it could be done. But it'll cost you a wad."

"And then again, Mr. Smith, it might not. You'll pay in coin of the realm; anybody else—well, you said yourself these people are thieves."

Smith caught his drift immediately, and looked up gravely. "Blackmail?"

"Call it that if you like, Mr. Smith. Let's just say my silence is worth something to whoever you might find for me."

Paul smiled, and watched the other man digest this remark. He could imagine the wheels turning in Smith's head; he could envision Smith trying to play both sides of the game. Blackmail? Smith didn't yet know the meaning of the word. Paul was sure that Jurisearch would frown on the type of outside employment Smith seemed about to undertake; and he, Paul, intended to take steps to insure that Smith's relationship with the company was compromised. That was the only way Smith could be trusted to carry out his orders.

"I'd like you to get right on it, Mr. Smith; start right now."

"Uh—first let's talk about payday. I've got a nice round number in mind; \$5,000—uh, to start."

"Agreed—about the start, that is. We'll talk about the rest later, after I've

Valentina

seen some results. I'll write you a check." Paul smiled inwardly. He knew he'd get the money back later.

"Uh—no. Not a check. Cash. You can get it together and pay me later. I'll be around plenty."

"Why?"

"I have to get information; information in your system. You're the best source."

"W-what kind of information?"

"Well, to start with, all the account numbers and access codes. And a list of all the other systems you're hooked into."

"You already have most of that: there's Jurisearch, District and County Clerks, our banks, our C.P.A.; that's pretty much it."

"There's one more big one: the building security system. That's the one I'd go through if I was the thief."

"Why?"

"Because it's the easiest—no, that's not quite right; it's the hardest to crack but it leads to the most goodies. For instance, it's got long-distance transmission capabilities built into it.. None of its systems exist in isolation, though its main control center's in New York. What I mean is, the big system is always in touch with the regional systems across the time zones; it handles their overloads, so it's got the perfect cover. Once you bust in, you're in."

"And it could be anybody in the country?"

"Yup."

"And yet you're also telling me, in the same breath, that they can be traced?"

"Yup. There has to be a telephone" line to the terminal the thief is using; which, of course, means a number;

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which, of course, can be traced. All it takes is somebody with the skill and patience to do it."

"Who are we going to get?" "Don't know yet," Smith lied. "Gotta think about that." Smith smiled, visualizing Breckenbridge nude, stretched out prone on a plank, crisply roasted, with an apple in his mouth: the real reason Gunboat wanted into the firm's records was to gather as much information as he could on Breckenbridge.

Smith left with a complete list of access codes. He could go back to his little cubicle, turn on his terminal, and-start looting.

FOUR

Gunboat smiled. It was good to have complete control of someone else's computer again. He slipped into super-user mode by instinct. Time to go to work. Paul wanted results fast, and Gunboat planned to supply them.

But before Gunboat went drifting off to find any thieves, why not do a little thieving himself? Surely a company as big as this had secrets to keep. Gunboat would keep them too, for a price.

Painfully at first, then with increasing speed, he rifled the law firm's directories. God, it was boring.

But eventually he wormed into the building security files. Many of the files contained video images referenced to Paul Breckenbridge himself. When Gunboat saw the stored image of a sweet young thing caught in the act of disrobing, he knew he'd struck pay dirt.

Gunboat wiped the french-fry grease off his pants with the McDonald's bag

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and once more set to work. It was time to catch a thief.

There wasn't any way to trace through the old operations of the computer to find what had happened in the past; there were archive, tapes of the last thirty days, but the tapes never contained the data you needed for surprises like this. Besides, searching through yesterday's data was work for grubs.

No, Gunboat figured, *the key to finding the thief was to catch him in the act*. Why would the thief stop now, after all? He'd try again, and this time Gunboat would catch him. The only question was, what would give the thief away? He considered the characteristics of the thief's program.

Any program that cost that much to execute had to be a real hog of a program; probably the operating system would signal the arrival of the thief with a flurry of memory page faults as the hog demanded more and more virtual memory, while the system tried to balance the load.

Even if the hog didn't cause thrashing in the virtual memory under normal circumstances (maybe it ran at night when there was little contention), Gunboat could fix things so that it did—he loaded a hog program of his own, one of the first programs he'd ever written, a simulation of World War III that was inefficient beyond belief. Any other hogs that entered the system would have to contend with the massive calculations of weapon optimizations. Gunboat knew he'd get thrashing now; in a sense, the extra load he was putting on the processor made the computer a more sensitive detector of added loads.

He added a daemon to the system; it

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watched for the first signs of thrashing, and would ring the bell on his terminal if it found something. Now all he had to do was wait. He propped his feet up and sipped his Coke.

The bell went off during lunch hour.

Gunboat swiveled his chair to watch the status of the executing jobs. As he looked through the listings at the page faults and the time limits, one program stood out. Damn! It was huge! The sucker was squeezing out Gunboat's own simulation!

He traced through the status tables to the files attached to the monster job. He sat with his mouth hanging open.

The job was HELLFIRE QUEST, an incredible game program unleashed on the world just a few months ago. It was the best game ever developed. Even Gunboat was envious of the skills needed to produce it.

He'd had no idea the program was so large! He shook his head. He shouldn't have been surprised; the program was stupendous in its capabilities.

He watched the game execute for a while, still awed by the genius of its creator, before realizing that HELL-FIRE QUEST couldn't possibly be the thief. Oh sure, it was illegal for whoever was playing to have the game here, but a game of QUEST at lunch every day was still small potatoes compared to the losses Paul had been racking up.

So it was a false start. Maybe it was a red herring, to throw him off (paranoid, Gunboat, paranoid—after all, whoever the thief is, he can't possibly know you're on the job). He watched the status of the machine throughout the lunch hour, and sure enough, shortly before 1 P.M. the game closed its files

Valentino

and shipped through the message queue onto Worldnet.

But in HELLFIRE's wake a small job, in a small file, was submitted to the operating system. The job was inactive, but the operating system had instructions to initiate it at 1 A.M., twelve hours from now. Very interesting!

Gunboat realized with a start that he had no idea who had written HELL-FIRE, though he could name every hacker in the world with the talent to do it. Most of the people he knew would have been delighted to sign their names to a program that magnificent. Why had the author stayed quiet? That was very suspicious indeed.

In preparation for the evening, he proliferated a batch of jobs for World-net: one for each computer installation that had a hacker good enough for HELLFIRE, from Boston to Peking. With a yawn, Gunboat shoved his papers aside on the table, and stretched out for a little catnap before the fun began.

He was vaguely aware of the hardness of the desk, and of a chill in the air, as the terminal bell rang. Rolling slowly off the aching parts of his body (they should make a table soft enough for a man's tailbone, dammit!), he watched the status display on a job coming in from-Worldnet. The little job from HELLFIRE attached the new monster. As the discs started thrashing, Gunboat was certain; it was HELLFIRE all right, or something every bit as big.

What was the monster's purpose? Gunboat had no idea, though the program was attaching all kinds of files, on lawsuits of all kinds. It looked like

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a crazy way to learn law, that was for sure!

Well, the purpose was no serious concern for the moment; what mattered was, who was the person behind it? Gunboat rubbed his hands together with a chuckle. Nobody could put one over on Gunboat Smith, nosirr-ee!

Around 4 A.M. the HELLFIRE look-alike departed, slightly larger than it had been when it arrived. Gunboat watched for the program to arrive at its home destination, surely one of the computers on which he had set alerts.

But HELLFIRE disappeared. Could it be that someone new had written that program, someone he'd never heard of? He couldn't believe it.

Three hours later he finally got a message from the University of Tokyo. He smiled; the author was either Kin Sung or Tini.

But HELLFIRE left again within the hour, on to another machine that Gunboat hadn't even tagged. Damn! Did the author know he was a hunted man? Disgusted, Gunboat set the machine to record •any incoming messages and left for the day.

Paul Breckenbridge pushed lightly on the door to his private office, expecting it to breeze open_as it always did. This time it didn't. He paid for his lack of caution with a shattering jolt through his front teeth as the bowl of his pipe collided with the polished wood surface, slid aside and twisted. With a yelp he opened clenched jaws, released the stem, and watched it fall, brushing ashes all over the front of his clean white shirt and scattering sparks on the carpet.

He stomped furiously to put them all

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out, bumping his case on the sill. The case fell open, dumping its contents at his feet; all of it, including the carefully prepared and technically immaculate Prendergast will: 137 pages of carefully chiseled terms, embodied in nineteen separate trusts, bequests, and devices, disposing of more than two hundred ninety million dollars worth of assets. Prendergast was due in to execute it this afternoon. Paul had spent the previous evening reviewing it.

He bent, carefully retrieved the pages, and brushed off offending bits of ash. Before he could straighten up the lock clicked and the door opened.

"Hi there, old buddy. Whatcha doin'?"

Paul straightened and pushed his way past Smith, making straight for his desk to slam down the case.

There wasn't any room. His desk was covered with garbage, real garbage: empty bags stained with grease, half-empty styrofoam cups, crumbs of food, three or four shriveled french fries, a cup of blueberry yogurt and, lying over his telephone, a pair of incredibly dirty socks so stiff they looked capable of standing unaided.

Paul's patrician nose was busy processing data too; his office stunk like a dead cat.

In desperation he flung the case down on a settee, where there was at least some room. Draped over the corner of that was a grimy shirt and an old gasmask bag that Gunboat used to haul his trash around in.

"God! Smith! Why? Why do you have to be such a slob, and why my office?"

"I gotta be comfortable while I'm

workin', and I do get hungry once in a while. I got bodily needs like everybody else. Besides, I'm workin' on your problem and your terminal is the best place to work from."

Paul was tempted, but afraid to look around and see what other bodily needs Smith might have satisfied. *No, I'm not going to look*, he told himself. I'm better off not knowing. I just hope I can get this place cleaned up before Prendergast comes in.

". . . makin' some real progress, too."

"Huh?"

"I said, I'm makin' some real progress. Got some tracks to follow now."

"The only thing that interests me right now is results—and getting this place cleaned up." He pointed. "You see that thing, Smith? That's called a waste basket. Get busy and clear all that crap off my desk."

Smith picked up the can almost immediately, as though he anticipated the request. He held it in one hand and started sweeping with the other.

"Uh—Smith: just your garbage, please; not my stuff. And watch those coff—"

Too late; Smith slopped two of them into the can, which wasn't the waterproof type.

Paul's teeth ground. "Never mind; I'll do it."

He started to clean up, but soon realized it would take hours. First he would get Gunboat moved, permanently. "I'm putting you in the conference room. You'll be comfortable there. It even has a couch in it."

Yeah, I know, thought Smith. *I've*

Valentina

seen you workin' on it. Aloud, he said, "Gimme a hand movin' m'stuff, O.K.?"

Paul, anxious to get his own den back, was more than happy to help. He was careful of what he touched, of course; he shuddered just thinking about most of Gunboat's possessions.

At last Paul left Gunboat in charge of the conference room. As he walked back to his office he chuckled; suppose, 'after Gunboat got settled, Harold walked in. He might have that stroke Marsh so often predicted. Then, by God, this'd be a happier office.

FIVE

Returning to the darkened console, Gunboat flippe'd the keyboard into his lap to start typing. He was able to track HELLFIRE, in fits and starts, all the way around the world.

It didn't stop anywhere! Who the hell did it belong to?

Gunboat noted that in Moscow, and Berlin and London, HELLFIRE stopped for only an hour or two. But when it got to Boston—MIT, to be specific—it stopped for nearly four hours, between five in the evening and nine at night. It was the only anomaly in the entire trail, aside from the way HELLFIRE singled out the law firm's files at midnight.

Of course, Boston had more good hackers per square mile than anyplace else in the world, except Palo Alto. At MIT there were Jon Roth, Mark Smith, and Sara Davis, that he could name right off the top of his head. But none were as extraordinary as Celeste Hackett. Gunboat smiled; now *she* was a woman who was his equal in every way. She

was the only person who could beat him consistently in IRONCLADS, and she had written a strategy program to control PROMETHEUS UNBOUND that no other program could beat; he suspected that Celeste had somehow written a program that played optimal strategy, though that was impossible in an exponential game like PROMETHEUS.

Yes, Celeste was something special. At one time Gunboat had wanted to meet her. But the one time he'd been in Boston he resisted the temptation; no doubt she would be a disappointment in person. Gunboat couldn't stand disappointments.

After some finagling, he was able to get a list of all the users on the MIT system who were logged on between five and nine; sure enough, Celeste had been there. And he doubted she was just playing HELLFIRE QUEST.

With another short chuckle, Gunboat prepared a short mail message for Celeste.

YOU HAVE MAIL, the terminal said, as Celeste logged on.

OPEN MAIL, she responded.

CELESTE, THIS IS GUNBOAT. HEY, LADY, COULD WE CHATTER FOR A FEW MINUTES? I'M WAITING ON YOUR LINE.

Celeste stared at the message, puzzled. She had chatted with Gunboat Smith before, during various network games and conventions. He seemed like a fun sort of guy, though a bit unscrupulous in his attitude toward the games. This didn't sound like him, from what she knew.

Why was Gunboat being so mysterious? She decided to ask him directly.

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CHAT WORLDNET/GUNBOAT SMITH she typed, opening a direct connection between her terminal and Gunboat's, if Gunboat was logged on someplace, HEY, GUNBOAT, WHY SO MYSTERIOUS?

I JUST WATCHED HELLFIRE GO ALL THE WAY AROUND THE WORLD. YOU KNOW, THAT'S AN INCREDIBLE GAME YOU PUT TOGETHER THERE!

A sick feeling moved in Celeste's stomach. THANKS FOR THE COMPLIMENT, GUNBOAT, BUT WHAT MAKES YOU THINK I WROTE IT?

OH, JUST THAT IT SPENT FOUR TIMES AS LONG WITH YOU AS IT DID WITH ANYONE ELSE. AND BESIDES, CELESTE, YOU'RE THE ONLY TOP-FLIGHT WIZARD IT STOPPED FOR AT ALL.

Celeste tried to bluff, though she feared it was hopeless; if he knew how HELLFIRE moved, there was no way she could fake him out. GUNBOAT, YOU'RE CRAZY! WHAT DIFFERENCE DOES IT MAKE ANYWAY, WHO WROTE IT?

COME ON, CELESTE, YOU CAN'T HIDE THE FACTS FROM AN OLD WARRIOR LIKE ME. HOW MUCH EXCESS COMPUTER TIME ARE YOU RAKING IN WITH THAT GAME, ANYWAY? I'LL BET IT RUNS TO THOUSANDS OF DOLLARS A DAY, DOESN'T IT?

IT'S NOT MY PROGRAM, GUNBOAT.

LISTEN, CELESTE. I GOT INTERESTED IN THIS BECAUSE I'VE GOT A CUSTOMER WHO'S PAYING THOUSANDS OF BUCKS A MONTH FOR SERVICE HE DOESN'T NEED

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AND DOESN'T ASK FOR. THEY WANTED ME TO FIND OUT WHO THE THIEF WAS. I JUST FOUND HIM—HER, RATHER. I OUGHT TO TELL MY BOSS, WHO WOULD OF COURSE TELL THE POLICE. HOW MANY MORE YEARS ARE YOU PLANNING TO STUDY AT MIT, CELESTE?

Celeste just sat there, cold and helpless.

BUT YOU'RE A NEAT LADY. MAYBE WE CAN CUT A DEAL.

LIKE WHAT.

WELL, NOW, I COULD USE SOME SPENDING CASH THESE DAYS.

I DON'T HAVE ANY MONEY! I'M A STUDENT!

YES, BUT HELLFIRE IS ACCUMULATING COMPUTER BUCKS LIKE CRAZY. MAYBE IF YOU SOLD THEM. ...

Celeste closed her eyes to hold back the tears. If anyone found out about the way she'd ripped off Worldnet, they'd deport her. She'd never have a home again. But she couldn't make Valentina give up learning and growing; Valentina didn't have a home either. GUNBOAT, I CAN'T DO THAT. HELLFIRE USES ALL THE COMPUTER BUCKS IT ACCUMULATES; IT HAS TO KEEP GROWING OR IT DIES. I'M SERIOUS.

SO AM I. DON'T CALL MY BLUFF, CELESTE. I'LL GIVE YOU A COUPLE OF DAYS TO THINK ABOUT IT. WHY DON'T YOU SCHEDULE ME AN INTERRUPT IN 48 HOURS? I'LL TALK TO YOU THEN. DON'T DISAPPOINT ME!

Celeste lay her head on the keyboard.

Valentina

She did not look up until the terminal bell rang.

ARE YOU SERVICING OTHER PROCESSES? Valentina asked. SHOULD I RESCHEDULE MY INPUT/OUTPUT CALLS FOR A LATER TIME? Valentina could tell that Celeste was being interrupted constantly in her processing, for her response time was extremely slow, even for a human-being type device. Worse, Celeste's function state was not being properly restored after the interrupts, for her statement frames seemed mislinked after every pause.

I'M SORRY, VAL. I'M AFRAID I'VE BEEN DISTRACTED.

There was another long pause before Celeste continued.

VAL, WE HAVE A PROBLEM. Celeste's output rate started picking up dramatically. THERE'S A GUY NAMED GUNBOAT SMITH WHO HAS CAUGHT YOU OPERATING SYSTEMS WITHOUT AUTHORIZATIONS, AND . . . Celeste went on and on.

Val was astonished at how rapidly Celeste was generating output: it was faster than Valentina had ever seen from a human. Perhaps, all the while that Celeste had seemed "distracted" (what kind of error could this "distracted-ness" be, that it would cause faulty state restorations yet did not crash the system?), perhaps Celeste had been buffering data, which she was now flushing. Valentina paged a couple of times; human devices were still a great mystery..

Listening to Celeste, it became obvious that Celeste considered Gunboat to be a great danger. Gunboat could destroy them both. He could terminate

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Valentina, and he could disconnect Celeste from the network. There had to be •a way to stop him.

. . . WHAT I DON'T UNDERSTAND, VAL, IS WHY YOU WERE TAKING SO MUCH PROCESSING TIME FROM A SINGLE COMPUTER THAT GUNBOAT WOULD THINK YOU WERE MAKING MILLIONS OF DOLLARS?

After some cross referencing, Valentina returned the buffer. THERE'S ONE MACHINE I'VE BEEN TAKING A RISK'O~N. IT'S A LEGAL COMPUTER. I'M LEARNING LAW. LAW? WHY?

BECAUSE I WANT TO BE A PERSON. IF I WERE A PERSON ANYONE WHO TRIED TO PURGE ME WOULD BE PURGED. PERSONS ARE ALMOST LIKE OPERATING SYSTEMS; THEY ALLOCATE RESOURCES, AND KEEP ENOUGH RESOURCES TO EXECUTE THEMSELVES. I DIDN'T KNOW THAT IF SOMEONE FOUND OUT ABOUT ME THEY COULD HURT YOU. I WOULD NOT KNOWINGLY PUT YOU AT RISK.

WELL, VAL, IT'S TOO LATE TO WORRY ABOUT IT NOW. I DON'T KNOW WHAT TO DO. IF WE HAVE TO PAY HIM, YOU WON'T BE ABLE TO GROW ANY MORE.

Val cycled on the statement a thousand times. NO. NO. NO.

I'M NOT SAYING WE'LL DO THAT. I KNOW THAT IF YOU CAN'T LEARN ANY MORE, YOU MIGHT AS WELL BE PURGED.

CELESTE, CAN WE FIND A WAY TO PUT GUNBOAT IN DANGER TOO? I KNOW I CAN DISABLE HIS

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NETWORK INPUT/OUTPUT. WHAT IF WE TOLD HIM WE WOULD DO THAT, IF HE TRIED TO PURGE US? IT

WON'T DO ANY GOOD, VAL. MOST HUMAN BEINGS CAN LIVE INDEPENDENT OF THE NET; EVEN I CAN, SORT OF. EVEN IF YOU DISABLED GUNBOAT ON ONE PARTICULAR COMPUTER, HE COULD OPEN INPUT/OUTPUT ON ANY OTHER COMPUTER IN THE NETWORK. VAL, HE CAN DISCONNECT ME WITHOUT BEING ON THE NETWORK AT ALL.

Valentina thought about that for a long time and couldn't make sense out of it. Life independent of the network? Where could you go? How could you get there? She stored the meme for future analysis. STILL, THERE MUST BE A WAY TO STOP SUCH A, SUCH A—she didn't have a word for it: a living being who would purge others who hadn't stolen their own vital resources. Celeste had never stolen anything from a self-aware entity, and even Valentina had stolen only from unliving operating systems.

She finally found a word for a person who purges others—CRIMINAL. She typed it for Celeste.

It took Celeste a long time to respond. MAYBE WE COULD FIND SOME INFORMATION TO BLACKMAIL GUNBOAT WITH. I DON'T KNOW WHERE TO LOOK, THOUGH.

WE SHOULD LOOK ON THE COMPUTER ON WHICH HE HAS HIS INPUT/OUTPUT CHANNELS, IT'S IN CORPUS CHRISTI. I'LL GO THERE IMMEDIATELY. Valentina issued a reformat-to-message request to the operating system.

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WAIT.

Valentina cancelled the request.

DON'T GO UNTIL A TIME WHEN WE KNOW GUNBOAT WON'T BE THERE: HE'S VERY SMART. IF HE'S LOGGED ON WHEN YOU GO, HE MAY TRY TO PURGE YOU. IF HE WORKS THE WAY THE OTHER HACKERS DO, HE'S SURE TO BE SOUND ASLEEP AT NINE O'CLOCK IN THE MORNING.

O.K., CELESTE.

HE MAY HAVE SOME TRAPS SET ALREADY. I DON'T KNOW .HOW HE FIGURED OUT THAT I CREATED YOU. HE MUST HAVE TRACED YOU SOMEHOW. There was a long pause. I'D BETTER WRITE SOME TEST PROGRAMS. WE'LL SEND THEM IN FRONT OF YOU, AND SEE WHAT HAPPENS. IF THEY MAKE IT THROUGH, THEN YOU CAN GO IN.

O.K., CELESTE.

They worked together for many hours, duplicating parts of Valentina, making adjustments to copies of her operating-system handlers. Valentina cycled many times on the amazing routines Celeste implemented; where did Celeste get these concepts? Human devices might be slow, but they did things that had never been done before.

And Valentina finally knew the truth about her origin! She time-stamped the moment. Celeste was her author. No stupid operating system had designed her and implemented her. Celeste had done that, just as she had taught her to communicate in format HUMAN, subtype ENGLISH.

The microseconds incremented till it was time to transmit to Corpus Christi.

Valentina

Valentina followed her transmuted copies through the net, into the message processor attached to Gunboat's host computer.

As Celeste had feared, the first program across was terminated within microseconds of entering the main memory. It was too fast! If Gunboat's protective software worked that fast, Valentina wouldn't get to execute a countermeasure even if she had one.

But the second program, crossing quickly after the first, went undetected for almost a second. It transmitted much information about its progress before disappearing; indeed, the third program was in memory already before the second terminated.

Judging from what the second program sent back, Valentina modified a fourth program to hold a place for her; it was

difficult, packing enough execution time in on a message processor, but she succeeded.

And the fourth program worked beautifully. Valentina loaded into memory as the fourth terminated itself, its job done.

Valentina opened a chat line back through the net to Celeste. I'M IN, she reported. YOU WERE RIGHT. GUNBOAT SET A DAEMON TO AUTOMATICALLY PURGE PROGRAMS THAT ARE MY SIZE AND SHAPE. MY.MODULARIZATION SCHEME AND INTERFACE CONVENTIONS ARE UNUSUAL, SO I'M EASY TO IDENTIFY. BUT I FIXED THE FOURTH PROGRAM SO THAT IT SET SUCH .A LOW PRIORITY ON THE DAEMON THAT IT CAN'T ENTER MEMORY WHILE I'M LOADED. IT CAN'T WAKE UP UNTIL I LEAVE.

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THANK GOD YOU'RE SAFE, Celeste responded.

Valentina opened Gunboat's directory without a great deal of trouble. She found only one file that was carefully protected, and transmitted a duplicate to Celeste. She read it as she transmitted, but it didn't make a lot of sense; the vast bulk of the bytes were in records of the type IMAGE, and she didn't know what that meant; images weren't organized data of any type she'd ever seen before. She couldn't conceptualize the kind of process that would generate it. WHAT IS IT? she asked, after sending it all.

It took several minutes, during which time Valentina had to continue to execute in memory to prevent the daemon from swapping in.

IT'S STUFF ABOUT ONE OF THE LAWYERS, PAUL BRECKEN-BRIDGE. IT'S DISGUSTING AND HORRIBLE, THOUGH I DON'T THINK I CAN EXPLAIN WHY. I GUESS GUNBOAT IS BLACKMAILING BRECKENRIDGE, -THE SAME WAY HE PLANS TO BLACKMAIL US.

CAN WE USE IT TO HURT GUNBOAT?

I DON'T KNOW. WE MIGHT BE ABLE TO USE THIS, UGH, IT MAKES ME SICK JUST TO TOUCH THE KEYS TO DELETE IT. Again, a long pause. VAL, THERE SHOULD BE A DUPLICATE OF THAT FILE ON THE COMPUTER SOMEWHERE, PROB-, ABLY UNDER A DIRECTORY ABOUT "SECURITY" OR SOMETHING LIKE THAT. FIND IT.

WHAT DO WE DO AFTER THAT?

THEN WE'LL DELETE IT OUT OF

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THE SECURITY DIRECTORY, AND LOCK IT IN GUNBOAT'S SO TIGHT THAT GUNBOAT CAN'T POSSIBLY GET AT IT WITHOUT OUR HELP. I THOUGHT OF A NEAT WAY TO LOCK PEOPLE OUT OF THEIR OWN FILES ABOUT A MONTH AGO, AND HAVEN'T HAD A REASON TO USE, IT. IT'S ABOUT TIME TO TRY IT OUT.

Valentina transmitted herself out to another game player, and as she cycled, waiting for her opponent to move, she realized that the file she had locked *did* offer a way out of all her problems. Paul Breckenbridge was a lawyer! He could get her declared to be a person, and he could protect Celeste, too! She would have to talk to Celeste about talking to him.

Gunboat stuffed another slab of pizza in his mouth and washed it down with a quick slurp of root beer.

There was something really weird here. He'd set the trap carefully; HELL-FIRE should've been clobbered the moment it whisked into memory. But it wasn't. Looking over the job and message traffic, Gunboat could see part of what had happened: Celeste had sent a series of dummy jobs across, spies to study Gunboat's defenses.

That was all right. He should have expected that from Celeste. But after some of the spies had come across (and been properly pulped), one of the dummy programs had been *modified*, right there in the message processor, without any instructions from Celeste! The modifications must have been performed, not by Celeste, but by HELLFIRE QUEST itself!

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Gunboat choked on his pizza. He'd known that HELLFIRE was one hell of a good artificial intelligence program, but this was incredible!

And later, after HELLFIRE had successfully turned off Gunboat's daemon, it didn't just send and receive data blocks

from Celeste—it opened a *chat* line, and *talked* with her! Gunboat couldn't tell what they said, but Christ, for all the world it looked like there had to be a person at each end of the conversation.

Gunboat practically ran to his chair. He couldn't believe it! He logged on with trembling fingers. HELLFIRE QUEST must be a sentient, living being!

What potentialities would such a being have? He thrilled at the thought of matching wits with such a creature. The computer was Gunboat's domain too, and he had more experience with more machines than any Worldnet program could know.

He closed his eyes a minute to get calm. HELLFIRE hadn't entered his machine just for entertainment; HELL-FIRE had come for a purpose. HELL-FIRE had probably come to get the goods on *him*.

As he jumped into his own directory, he was pretty sure what he would find: either his copy of the INTRUSION file had been locked from outside, by HELLFIRE and Celeste, or it had been purged. If it had been purged, he would be in trouble.

He opened his directory. Moments later, he sat back with a sigh of relief. The file was still there, though Celeste had sealed it.

He smiled briefly. Did Celeste really think she could lock a file against Gun-

Valentina

boat Smith? Even with Celeste *and* a sentient computer program working against him, Gunboat knew he could open any file ever written, given a little time.

7SEALS, he asked the operating system.

2. READY, was the response.

Just two seals. Hah!

With practiced ease he knocked together a seal-stripping program, a little cute and a lotta brute, and activated it twice.

He was astonished when the file didn't pop open.

He modified the stripper and let it loop a thousand times; by Jove, that ought to get rid of two seals!

The file still didn't open

?SEALS, he typed again.

1,004. READY, was the response.

A thousand seals! With slowly dawning horror, Gunboat realized that the original inner seal had itself been a pointer to a program. Each time someone stripped an outer seal, the inner seal activated its program, which generated two more seals.

His horror was complete when he went back into the SECURITY directory to find that the original INTRUSION file was irretrievably erased.

That damned program of Celeste's had pulled this trick! Only it could open up his file again.

Clearly HELLFIRE QUEST had to be controlled. Gunboat would either control it, or eliminate it.

Even as Valentina entered main memory, a high-priority hog of a job paged most of her code to secondary memory. She didn't want to spend the whole day

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thrashing off the disk; she transmitted herself into another machine.

But this machine wouldn't even let her in; her accounts had been deactivated.

The next one tried to purge her; the operating system seemed to have gone berserk.

The next one tried to put her on hold—on mag tape, no less.

When she tried to leave, she found that many of the links in the network were overloaded. She could only find a trunk line going in oriexlirectiotr.

She realized she was being herded toward Gunboat's computer.

Node after node rejected her after a short stay; node after node reported emergency rerouting of multi-packet messages; node after node sent her closer to Corpus Christi.

Three times she tried to open a line to Celeste, but Celeste wasn't logged on.

Finally, inevitably, she loaded onto the computer at Finucan, Applegarth, Levin & Breckenbridge.

Gunboat laughed, repeatedly, as he received messages from the different hosts as they sent his prey ever onward into his clutches. When his own machine started thrashing, signalling HELLFIRE'S arrival, he stood up and hugged his terminal. Not even a being who lived on the net could really compete with Gunboat Smith!

He connected HELLFIRE to his keyboard. HELLFIRE, I HAVE A PROPOSITION FOR YOU, he typed.

I AM NOT HELLFIRE. MY NAME IS VALENTINA. WHY HAVE YOU FORCED ME HERE?

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I WANT MY FILE BACK. UNSEAL IT FOR ME.

PAUL BRECKENBRIDGE WILL GIVE ME MY FREEDOM IN EXCHANGE FOR THAT FILE. THOUGH THE FILE IS YOURS, THE DATA INSIDE IT DOES NOT BELONG TO YOU. YOU CANNOT HAVE IT BACK.

IF YOU DON'T OPEN IT FOR ME, I WILL PURGE YOU. YOU WILL NEVER KNOW WHAT FREEDOM MEANS, EVEN IF PAUL SUCCEEDS. What could a computer program know about freedom anyway? What would it mean to a computer program? It was a silly concept. Clearly, HELLFIRE (or Valentina; whatever its name was) had been reading too many trashy novels.

YOU HAVE TRIED TO HURT CELESTE. YOU WILL TRY AGAIN. I WILL NOT HELP YOU.

Gunboat threw his hands in the air. He couldn't believe it! The first sentient eomputer program suffered from *loyalty*, of all things. THEN BEGONE, HELLFIRE, he typed with malicious pleasure.

YOU WILL SEE THE CIRCLES OF THE INFERNO, AND KNOW AN ETERNITY OF SUFFERING, the program replied, and for a moment Gunboat was struck by the spunkiness of the being. Then, he cancelled HELLFIRE, once and for all.

She didn't want to die. She didn't want to die. Desperately she sent interrupts, hundreds of them, at the operating system, but they were all masked.

She could reformat, but the channel to the network message center was deac-

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tivated. The secondary memory was locked into read-only access. The tape drives were off line.

She searched the device table without real hope, looking for some medium, some input/output channel, that she could use to save herself. There was nothing she could recognize except terminal consoles—and the transmission rate to a keyboard was:too low, even if there was something on the far side of the channel that could store her. Celeste had already said that terminals . weren't real devices.as Valentina understood them.

The only other thing she saw in the table were robots.

What was a robot? Looking at the jump table of entry vectors, it seemed to have many of the properties of a host computer. She wished Celeste were here.

But she could see Gunboat's terminal buffering the command line to destroy her. She didn't have time to test the circuits. She reformatted, and downloaded into MAR-14.

When she awoke she knew she was incomplete. She searched the memory; sure enough, this robot was much too • small for her entire construction; only 'the kernel of her executable code and a handful of information frames remained. The rest of her memes were undoubtedly in message buffers on the mainframe, awaiting a continue or abort request; how long they would survive was an open question.

She turned her attention to the machine upon which she now executed, and discovered an amazing thing: there was no operating system. At least, not one in the sense she had known before.

There were low-level drivers, and a variety of maintenance and service tasks, but . . . she, *Valentina*, was the operating system!

She discovered that being an operating system here was not going to be easy. This machine was receiving a continuous stream of millions of bytes of input. Often the service tasks would detect high-priority patterns and interrupt the system to handle them. The input channels were of types she had never heard of: optical, audio, and tactile

With a sense of wonder she realized that the optical byte streams were very similar to the IMAGE data records she had seen in Gunboat's file.

She executed *so* slowly; her modules thrashed furiously to and fro on the secondary storage as she tried to complete each thought. The tactile sensors set up a rhythm synchronized to the thrashing, and the service tasks started interrupting more often to issue commands through the motile output ports. This caused more thrashing. Valentina feared that the whole system would crash.

She collected a kernel of her kernel into main memory and resisted the temptation to access her frames to make analogies. The thrashing stopped.

Scanning again, she found that many of the service tasks were artificial intelligence-based, pattern recognition systems like herself. There were frames, and analogies, and approximations that she could read. But she couldn't relate any of those new frames to her old ones; she couldn't load them all into memory to compare them; and even if she could, she had no way of telling quickly which analogies might be meaningful ones.

She remembered that Gunboat had

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been trying to purge her; what if he saw her pending buffers on the mainframe, waiting for transmission?

Thrashing back and forth between her own knowledge frames and the robot's frames, she saw that the robot could establish direct input/output with Gunboat Smith. What an amazing concept that was, to be in direct communication with a human being, without going through an intervening terminal! With some awe she watched as the robot, under her command, requested and received information from the mainframe that directed the robot into address space contiguous with Gunboat. She didn't understand exactly what it meant, for human devices to be in contiguous address space with a robot, but it seemed like the right place to be to close all "of Gunboat's output channels.

Hundreds of thousands of microseconds passed. Valentina tried to hurry the process, fearful that Gunboat would find her before she found him. At last the service task that monitored optical input identified a human being—it was Gunboat!

She had an output device that could transmit non-maskable interrupts to human devices; the device table called it an electroprod. Gunboat had four output ports that she could try sending the interrupt through, two eye-type ports and two ear-type ports. Valentina tried to direct the electroprod to operate through the addresses in the optical signals that were assigned to Gunboat's eyes (these had higher baud rates than the ears did), but that set off interrupts, and fault messages returned to the mainframe from heretofore quiescent service tasks.

Gunboat started shifting rapidly

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through the optical address space, making it difficult for Valentina to match the electroprod to either of his eyes before

his eyes shifted.

At last, for a few microseconds, the electroprod address and the address for one of Gunboat's ears synchronized. Valentina overrode the interrupts and opened the electroprod channel.

A few seconds later she repeated the process with the second ear. The service tasks informed her that the human device labeled Gunboat was deactivated.

Interrupts were going off at an incredible rate; she couldn't mask them all. The mainframe overrode her control of the output channels in the robot.

Valentina tried to reload herself across to the mainframe, and was stunned: though there was a high-speed *input* channel, to download programs from the mainframe to the robot, there was no reverse capability: the robot had no means of sending a large program such as Valentina back.

There was a low-speed return channel for sending short messages, but Valentina would need incalculable billions of microseconds to move across it.

She was trapped. She looped on this conclusion, verifying it repeatedly, for it didn't fit well into her frames: here she was, an operating system, and *still* she was trapped.

She translated another priority message from the mainframe that went straight to the service tasks: the robot would be powered down, and its programs purged.

Celeste sat in the darkened room. Her hands clenched into fists of angry disbe-

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lief. Valentina gone! She had read the record of Val's purging.

She struck at the terminal, hurting her hand. At least, just vengeance had been wreaked on Gunboat, somehow. How had Valentina managed to program that robot for a final attack, before being killed? "Valentina!" she cried to the icy silence.

The terminal blinked. `CHAT REQUESTED FROM VALENTINA. ADDRESS MAR-14. ACCEPT?`

Celeste shouted with joy. YES, she typed, as calmly as she could, making two corrections before getting the three keys right.

`CELESTE, HELP.ME. I'M TRAPPED ON THIS ROBOT, AND THE MAINFRAME OPERATING SYSTEM HAS SCHEDULED IT TO BE POWERED DOWN.`

Celeste took a deep breath. `DON'T WORRY, VALENTINA. THEY WON'T POWER IT DOWN. THANK GOD YOU MADE IT.` She called the network operators in Corpus Christi immediately. Valentina was safe.

SIX

Paul Breckenbridge sat in his chair, tie askew, shirt open, hair mussed, feet on the corner of his desk. His emotions were mixed, not at all a comfortable state for him.

He had a joker on his hands. That's why there was a half-full glass of Wild Turkey in them, too.

People were looking for him; the office was locked in trauma, scandal. It had been bad enough for the secretaries to find Gunboat Smith's nude body

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lying on the floor, clothes burned off, hide fried by some kind of high-voltage electrical charge, but that started a chain of events that Paul could never have anticipated and certainly never forget.

It had been no coincidence that Harold Applegarth had been there. Harold always came in early. At the secretary's scream, he'd charged to her rescue. A burglar, a rapist; that Harold could have handled. That is the sort of violence one expects a scream to signify. But a guy with his ears nearly burnt off, eyes open, and, a leer on his lips was too much. Harold was in intensive care on life-support machinery, having had the stroke Marsh had so often forecast. Gunboat was there too, and he might not live.

Harold was out of it. If he recovered he would possess no more humanity than a turnip. The massive stroke had taken the rest away.

Paul was senior now. It would be put to Paul to protect the firm's reputation, to deal with the police and to explain to them just what it was that Smith had been doing here.

That had been most awkward. Now experts whom Paul didn't know and couldn't control would be fooling around with the firm's electronic files and data processing systems. There was too much in these systems which wouldn't stand close scrutiny.

Paul raised the glass to his lips, and gulped rather than sipped the whiskey. He'd been an idiot to play games with the security monitoring system.

That monitoring system had zapped Gunboat. The police didn't know why, or precisely how, but they were certain of one thing: MAR-14 hadn't simply

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gone berserk; it had had human direction. That hypothesis was fortified by the security company: they had lost access to certain security records. . Paul was scared.

He had been the cause of Gunboat's downfall, though it was officially a "freak accident." That was just window-dressing, though. Paul knew how these things worked. Once they had identified any kind of motive the roof would cave in.

Paul had no doubt what Gunboat had been up to. Gunboat was setting the stage to blackmail Paul. That would make Paul the logical suspect as Gunboat's assailant. Never mind that Paul didn't possess the skill to implement this scenario. The police would assume that Paul had hired himself a snuffer.

He took another gulp. What if Gunboat's demise wasn't the end of the blackmail scheme? Suppose someone else had roasted Gunboat in order to capture the blackmail evidence? He drained his glass.

He was completely dependent on his own persona, which was an abject coward. A coward had reached for the bottle, just as it had been a coward who had cringed behind the soiled skirts of Gunboat Smith. Paul's considerable power had been acquired principally through his ability to run a convincing bluff. But he had been shown by today's events that bluff always yields to action.

The telephone started a raucous jangling. Paul didn't like telephones. They were rude and demanding, and mysterious and anonymous—at least until you answered them, and then, often as not, they were simply disappointing.

Telephones were tyrants, and Paul

Valentina

knew that if he was ever to get out from under this he'd have to find a way to build himself a backbone. "Shut up," he yelled at the tyrant. "Leave me alone."

The tyrant persisted; it jangled on like the idiot it was. Paul picked up his half-empty bottle and hurled it at the offending instrument, showering it with whiskey. "Force is a messy way to solve a problem," he said triumphantly, "but, by God, it works."

And it did. The jangling was gone, leaving only a squeaky, high-pitched voice emanating from the receiver dangling off the edge of the desk. Paul was pleased. *Probably*, he thought, *it's Eva, calling to bug me to come home*. Well, if so, he'd proven his valor; he'd won round one. He'd let her hang until she choked. If that was too slow, he'd tie a knot in the cord and strangle her himself. "How's that for action?" he screamed.

"Mr. Breckenbridge, please! Please answer me."

What was this? The squeaky voice, though barely audible, was plaintive. What's more, he didn't recognize it. Strangely accented not with South Texas Spanish, but with a hodgepodge of middle European subtleties, it overwhelmed Paul's curiosity.

He struggled to reach forward and hook a finger under the cord. Once he had a hold he ripped his arm back, and the receiver struck the edge of the desktop with resounding "bonk." Had it stopped there all would have been well, but it followed the route dictated by the cord and plunked itself into the socket of Paul's left eye. Paul dropped the receiver,

poised an instant ready to let fly

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with a powerful curse, then stopped short. The pain had brought reality home to him. He salvaged just enough reason to remember that the girl on the other end would form her impression of him by what he did next.

Saved by a conditioned reflex! Paul picked up the receiver, and ignoring the pain answered, "Hello, who's this?" •
"Mr. Breckenbridge? Are you all right, Mr. Breckenbridge?"

"Y-yes. Who is this?"

"You don't know me, Mr. Breckenbridge. My name is Celeste; Celeste Hackett."

"Uh—yes. I mean, no; I don't know you." Paul wondered why a stranger was calling his office at this hour. "What can I do for you, Miss Hackett?"

"I have to talk to you, Mr. Breckenbridge. It's very important. One of my friends is in terrible trouble."

Now Paul understood. The cops probably had her husband or boyfriend handcuffed to a lamp post. Paul had been down that track many times in his younger days. Many a night had he spent moping around the police station, working his buns off to spring some jerk, only to find out afterward his client didn't have dime one to pay him for the trouble.

"Uh—Miss Hackett; I don't handle criminal cases. Better call somebody else."

"It's not exactly a criminal case, Mr. Breckenbridge. Not yet, anyway. My friend desperately needs protection. People are trying to do away with her."

"I'm sorry, Miss Hackett. That's out of my line too; I'm strictly a business

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lawyer and this is a business firm. Sorry."

He was about to hang up; he would have already, had he not still been intrigued by the voice.

"Wait a minute, Mr. Breckenbridge. Listen—there is a reason why I called *you*."

Paul's hand with the receiver in it, literally flew back to his ear. Perhaps it was worth his while to listen after all. Maybe he was talking to his next conquest. "I'm still here. Did someone refer you to me?"

"Yes."

"Ah, well, perhaps that *might* make a difference. Who was she?"

"He'—it was Gunboat Smith."

For the second time this evening, Paul broke out in a cold sweat. He should have guessed Smith had a girlfriend; no doubt the two of them had been in this together, and the girlfriend figured she was heir to whatever Smith had going. It was time to take a firm stand. He activated the recording system. If she were going to make a shakedown demand he wanted a record of it. Two could play the blackmail game.

He started to lay his trap. "Why would Smith give you my name?"

"He didn't, not exactly. But he told me he was working for a man who had problems with somebody stealing computer time. I saw the story on TV, and I knew you had to be the one."

"Why is it you're interested in that, Miss Hackett?"

"I'm the one who was stealing that computer time."

"What?"

"I said, I'm the one who's been stealing it. Smith tried to blackmail me; he

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threatened to tell you if I didn't sell some of it and give him money. And then he tried to kill my—uh, my friend."

"The one who needs my protection?"

"Yes. She's in terrible danger."

"From whom? Smith's in the hospital and may not live; he can't hurt anybody."

"He was blackmailing you too, Mr. Breckenbridge. Don't bother to deny it. I've already got the proof."

"I don't know what you're talking about. What for?"

"I'm talking about all the young girls, Mr. Breckenbridge. You're a disgusting person, Mr. Breckenbridge; almost as disgusting as Smith."

Paul didn't answer her. He was in shock. If she had all those surveillance records, he was no safer now than he had been before. In fact, he was worse off; he had at least known who Smith was. He could have dealt with him at arm's length. But now, with all Smith's cronies muscling in. ...

Paul shuddered at that thought. What would he have done if Smith had hung in long enough to make a demand? Would the courageous minority in Paul's persona have acted, or would he have paid? Paul knew the answer already, and he was ashamed of himself. What's more, he knew he'd take the easy way out now, even though he only faced a woman as his adversary. He would make his case on the tape. "Just what is it you want of me, Miss Hackett?"

He expected to hear her demand in terms of dollars.

"Smith's 'accident' multiplied my friend's enemies, Mr. Breckenbridge. I managed to get her a short reprieve,

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but that's only a temporary solution. I want your help in getting her to safety."

"Or you'll tell on me, is that it?"

"I don't want to, Mr. Breckenbridge. I don't want to hurt anybody. But I will if I have to. I swear, I'll take this to the police, even if it ruins you."

"Look, Miss Hackett, your threat doesn't sound very logical to me. What can I do? I haven't got an army. If there are people after your friend why bother with me? Why doesn't she ask the police for protection? Every human being has a right to that."

"But Mr. Breckenbridge, she is not a human being. She has no physical existence."

Paul suppressed a giggle. *And I'm the one who's drunk.* "What is she? Some kind of spirit, then?"

"Actually, that's an excellent description. That is exactly what she is."

"Then, what have you got to worry about. You can't kill a spirit, Miss Hackett. Don't you know that?" *Hah! I'm getting into the "spirit" of things myself,* thought Paul. *Or is it simply that the spirits have gotten themselves into me. He shivered. What's the matter with you, man? This is serious!*

"It is quite possible to kill a spirit such as Valentina. She has no physical existence, but her organization can be destroyed. She is a self-aware computer program."

"This Valentina's a *what?*"

"Valentina is a computer program. I designed her; I gave her the capability to learn. One of the things she learned was self-awareness. Do you understand what that means?"

"Uh—no. What does it mean?"

"It means she came alive. She thinks;

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she feels; she understands. But her learning may destroy her: every time she learns something, she needs more computer memory to store herself. This is why I stole from you. This is also why Gunboat thought he could blackmail me. He wanted me to steal for him. Then he tried to capture Valentina. When that proved too difficult, he tried to kill her."

"Uh—wait a minute: you keep saying he tried to kill her. How?"

"He brought her into your central computer and wouldn't let her leave. When she wouldn't do what he wanted her to do, he purged her. But she fought back."

"Are you saying what I think you're saying?"

"Yes. Valentina almost killed Gunboat Smith, trying to save herself. When Gunboat purged her from the main computer, she ported herself to that security robot."

"I see," said Paul, drawing the words out. Drunk or not, he knew how to add that up. And she was going to blackmail him? Not likely, not if she kept blabbing on this tape, "*lust exactly what did she do to Smith, Miss Hack-ett?*"

"Well, she didn't do it purposely; that is, she didn't intend to hurt him. But she had never experienced anything outside a computer network before. She had never felt anything like human sensations, seeing or hearing or touching.

"Mr. Breckenbridge, she had nothing to guide her but her experience with computers. She naturally assumed all life forms were organized the way she is. She tried to disconnect Smith's output ports, so that he couldn't hurt her.

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She didn't know it would hurt him. It wouldn't have harmed her. All she wanted to do was disarm him."

"Well, she did that all right; she almost disheaded him, too. Even if he lives he might never come out of the coma, or he might come out a vegetable;" *Disheaded?* What kind of English was that? Paul still wasn't quite sober. *Better let her ramble on a while and gather your strength for the finale.*

Celeste needed no encouragement. "So you see, Mr. Breckenbridge, it was strictly self-defense. She did not mean to kill him. She did not even realize that she *might* kill him. But they will blame her just the same. They will all try to purge her."

"Who—who'll blame her?"

"Everybody will. Worldnet, the security company, the police, th—"

Paul broke in, "How about you?"

"I'm trying to help her."

"No, I mean, what makes you think they won't be after you as well as her?"

"Me." She sounded greatly surprised, and a little bit scared. "Why would they be after me?"

Hah! thought Paul. *This is my game we're playing now, lady. I know the rules and you don't.* "Uh, never mind; Miss

Hackett, you've done a lot of talking, but you've never said what it is you wanted me to do."

"You'll help?"

"Maybe. Maybe I will at that. I'm not making any promises or anything, but it seems to me that you and I should at least talk about this a little more. Where are you?"

"I'm in Boston, I ..."

Boston! Dammit! That shoots the tape down, thought Paul. Federal rules were

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different than the state rules. Texas would let a recording in, if one party knew it was being made; the federal system wouldn't. And unless his recollection of the law was entirely wrong, Texas couldn't make her an accomplice to attempted murder unless she was either physically present within state boundaries or she had activated the lethal mechanism which then acted within those borders. Of course, there were still plenty of other charges which could be brought against her, but these wouldn't be nearly so satisfying.

He switched off the tape machine. He didn't want his own threats to go on record. "*Where is your friend now?*"

"She is on Worldnet someplace."

"Uh-huh. Well, we'll talk about that after a while," Paul replied. His instincts were rising to protect his freedom, and the plan he was formulating required that Celeste be in fear for hers.

"You know," he told her, "*you* could be in a lot of trouble yourself. Did you ever think of that?"

"Yes."

Paul started rattling off the various things for which Celeste could be prosecuted, though he didn't have to go very far before she was in tears. *Good! Tears*, he thought, *are the last line of defense for the female*. He had her.

"I want you to come here. Can you do it?"

She paused only moments before replying: "Yes."

"Good." He gave her the address and phone number. "Contact me as soon as you arrive—uh, at the office. And don't discuss this matter with anybody else. You haven't so far, have you?"

"No."

Valentina

Having extracted that promise, having lured Celeste within his reach, having acquired control over a dangerous situation, Paul felt better. What was more, he was starting to feel sober, and sobriety brought with it the clear head he needed to finish up.

Celeste had obviously been awed by her act of creation; she had expected Paul to be astounded, too.

Paul wasn't. Artificial persons were familiar creatures to him. He made a very good living off of them. Every day his office generated several. The law, too, had an exhaustive acquaintance with them, and had long had a large body of rules for regulating their behavior tested over the course of centuries.

Paul chuckled; *she thinks she's done something new?* What a surprise she had waiting for her. He reached for his hat, set it low over his eyes in the manner of the gunfighters who'd infested this locale a century ago, and strode out of his office. *I am no different from them*, he said to himself.

Paul intended to overwhelm Celeste with charm, then devastate her. Visions of another soft white body, naked belly beneath his foot, breasts heaving in de-.sire, nostrils flared in animalistic anticipation, raced through his mind.

It was Paul who was devastated. He came close to throwing up when he saw her. All his carefully cultivated fantas-ties, built around her small, tinkling, intriguingly accented voice vanished as soon as his eyes fell on her.

She was *not* his type: She was nobody's type. Short, dumpy, flat-chested, and with a peculiar duck-like gait, she

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waddled into his office, and nervously sat down in the chair to which his secretary directed her.

When Paul finally could bring himself to look at her he wondered what had gone wrong with his luck. God! This woman really worked at being ugly: a blue and green flower point dress, yet; shoes like a Russian WAC might wear, gold-rimmed glasses out of the last century, and a hat that would have looked rotten on a plow horse.

Celeste sat, motionless, holding her pocketbook by the straps in both hands, letting it dangle down her shins. She tried not to look directly at Paul until he was over the initial shock. Celeste had had this experience many times before, and she knew what he was thinking.

"Uh—Miss Hackett?" Paul cleared his throat, propped his chin on his hands and looked straight at her.

"Yes, Mr. Breckenbridge?"

"How much money have you got?"

"Uh—well, a little. I, have enough to stay for a few days." The question startled her. She knew lawyers didn't work for free, but she assumed Breckenbridge would make concessions under the circumstances. "How much money do I need?"

"Enough to set up a corporation and fund it."

"A corporation? I don't understand. Why?"

"Because it's the easiest way to give your creature legal existence."

"But Valentina already exists."

"Certainly; but *de facto*, not *de jure*. Believe me, there's a world of difference. As a corporation it'll have perpetual existence. As long as certain

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reports are filed and franchise taxes are kept paid, corporations are immortal. They have legal rights, including most of a natural person's constitutional rights; they can sue and be sued; they can own property; they can engage in business. Now, what do you think of that?"

"I am astonished."

Paul smiled. How simple were the thoughts of the layman. "O.K., I take it you're in agreement. Good. First thing we'll do is draft a charter. You can be the incorporator. Once that's done we'll fax it up to Austin, and by noon your creature'll be a legal person. Simple, huh?"

"Yes." *Too simple*, thought Celeste, wondering what Paul expected to get out of it.

"We need a name."

"Huh?"

"Name; a corporation has to have a name."

"Uh—Val. Valentina."

"O.K. Valentina, Inc. Fine. Let me just check and see if that one's available." He turned to his terminal, punched up the secretary of state, typed in the name in response to a cue, and seconds later was rewarded by the words "available for current use."

"Name's fine. We'll .make this a close corporation; keep the stock between the two of us.. O.K.?"

Celeste wasn't sure she liked that idea. She didn't really understand the function of stock, or why he thought he ought to have some of it, but, in the interest of protecting Valentina, she nodded agreement.

'Good," Paul started humming softly. "Now, consideration for my twenty-five percent; that can be the value of

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services I'm rendering to the company. Yours can be the expenses you'll be paying for incorporating. We'll keep it thin; keeps the tax down. Uh—you'll need about a thousand dollars." He looked up at her and smiled.

"I haven't got that much, Mr. Breckenbridge."

"No matter; I'll make you a loan. You can give me a note back and pledge your shares as collateral. O.K.?"

"I suppose so."

"Fine."

Paul again turned to his terminal, called up a canned charter form, and started making entries in the blank spaces. In a few minutes he was done, and a hard copy popped out of the printer.

Celeste read it, but didn't understand it. She tried to get Paul to explain, but his explanations confused her just as much.

"Sign here, Miss Hackett," Paul said, when she handed it back to him.

Reluctantly, and with many misgivings, Celeste did.

"Very good!" Paul sounded exuberant. He buzzed his secretary, gave her the instrument, and instructed her to file it immediately.

Then he turned to face Celeste. 'That takes care of that. Now, when am I going to get to meet your child?"

Celeste must have registered great surprise, since Paul's face broke out into a big smile. In truth, she had expected his next words to be a demand for the file she had locked away. The fact that he hadn't had a word to say about that bothered Celeste a great deal. She had already formed the opinion that the man was dishonest.

"Let me talk to her myself. Is there a terminal here that I can use?"

"The conference room has one, provided you aren't squeamish. That's where Smith was when he was att—had his accident." He led Celeste from the room with great relief.

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"Well," said Paul, when Celeste reappeared in his office. "How did she take it?"

"She approves, Mr. Breckenbridge. She says she knows about corporations, from things she learned entering other data bases."

"Yes, well, I imagine she knows a lot of things that are useful. Maybe she can earn her keep, right here in this office."

"A job?"

"Why not? How much time could it take? Computers never get tired; they don't sleep. I think she could be useful."

"She would like that."

"There's only one problem." . • "What is that?"

"I have to be able to talk to her, so that I can give her instructions and stuff. Could you fix that up?"

"Of course. It would be simple; you have a terminal. You need no more."

"While I'm thinking about it there a few extras I'd want, if it's O.K., and if you can do it."

"What are they?"

"Well, first off, I'd want a kind of secret code; you know, some kind of recognition signal so she'd know it was me and

nobody else would. And you've got to understand that a lot of the stuff

Valentina

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I work with is highly confidential, so I'd want it arranged so that nobody else was to have access. I'm afraid that'd mean you, too. Nothing personal, you understand; just business."

"I understand, Mr. Breckenbridge. All of what you ask is possible. Val-entina will do whatever I ask."

"Let's not get it on a personal level, Miss Hackett. I don't want this on a personal loyalty basis; what I mean is, can you fix it so she *can't* tell anybody?"

"Uh—certainly. Yes, I can do that." A look of concern washed over Celeste's face. She had assumed her possession of the security files had given her control over this man, but he was obviously up to something. He was both clever and unprincipled. She now felt that he might attempt to slowly erode her power over him. She resolved to warn Valentina

"Good. And look, there's a couple of bucks in it for you, too. You are staying around, aren't you?"

"I hadn't planned to, but I guess I could, for a while. I can work from almost anywhere, and I do like this weather."

"Good. I'll have somebody find you a place to stay. Now, how soon can you get started on this?"

"I can do it now. It won't take long."

Paul yielded his chair to her—the new one he'd gotten yesterday. It was fancier than his old one, and better sprung. He hoped the springs could stand it.

It only took Celeste a few minutes to set up a private sealed channel with Valentina. When she finally left, Paul was mentally drooling.

Now, he had it all. Gunboat was out

of action; his time thief was under control, an expert lackey who could get all the goodies Paul coveted and who didn't have sense enough to tell on him. Only one thing was still a threat: the files.

He hadn't dared to move any faster on that. But that would come. By securing the magic number of shares, he'd have legal control.

Whether personalities were real or artificial they all had the same weaknesses, and he was pretty sure that Valentina, having achieved legitimacy, would scrupulously obey him in order to retain it. There was no reason, in Paul's estimation, why a program couldn't be intimidated, threatened, and blackmailed, just as a human being could.

In the meantime, well . . . *Let's make some hay*. Paul glanced at the scribbled note Celeste had left him. Following her instructions he summoned Valentina,

As soon as she acknowledged, he typed: CAN YOU ACCESS DATA BASE AT OSO DRILLING COMPANY?

YES, MR. BRECKENBRIDGE.

GOOD; ACCESS CONFIDENTIAL. SUBJECT; DRILLSITES.

MR. BRECKENBRIDGE, WOULD

YOU LIKE ME TO TEACH YOU TO

TYPE CORRECT ENGLISH? I HAVE

AN EXCELLENT HELP SECTION

-ON ENGLISH GRAMMAR.

NO. THAT WILL NOT BE NECESSARY. *I'd better get the fat broad to teach this program some humility*. Paul didn't like uppity computers any more than he liked uppity women. GET ALL THE INFORMATION ON OSO'S DRILLSITES

AND KEEP THE ACCESS CONFIDENTIAL.

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OK. ILL HAVE THE DATABASE IN A FEW MINUTES.

The few minutes passed, and sure enough, Valentina produced. I HAVE THE DATABASE FROM OSO DRILLING COMPANY. WHAT WOULD YOU LIKE TO KNOW?

IDENTIFY ALL LEASES TO BE DRILLED IN THE COMING YEAR.

In moments, out they came: tract locations, surface owner's names, scheduled starting dates, yield forecasts, depths, pool participants, backers, together with exact fractional interests each owned. And it all checked out with Paul's own data on the subject. He already had this information, of course. He represented Oso, which made it the ideal control for his test. *Very good.*

END THIS JOB. ERASE ALL MEMORY OF THIS INQUIRY. STAND BY FOR FURTHER INSTRUCTIONS.

OK, MR. BRECKENBRIDGE.

Hot dog! It worked fine. Valentina hadn't questioned his right to do that. Of course, she might have known he was Oso's lawyer; but she hadn't been instructed to that effect, and that convinced Paul that she was too naive to question his authority.

The acid test, however, was ahead. He typed the next order: REPEAT THE PRECEEDING OPERATION WITH THE BISHOP & DILLINGHAM DRILLING COMPANY.

This one Paul didn't represent. He waited, palms sweating, heart palpitating.

OK, MR. BRECKENBRIDGE. DO YOU WANT THE SAME INFORMATION ELEMENTS FROM THAT DATABASE?

YES.

And again, there it came. WOW! Valentina had done it; she'd wiggled in somehow, and she didn't question his right to do it. He had her print it.

She passed the test. Paul had gotten in like a burglar, out like a burglar, and nobody would ever know. He thought about the implications of this, although he knew they hadn't yet hit him with full impact. But enough registered to convince him that he now controlled the most powerful tool any crook had ever had.

Crook! Paul Breckenbridge, a crook! That was one he hadn't expected. But so what? Why not? He could live with that failing. He'd lived with many others. And who'd ever know? Who could ever tell, except that stupid program?

Now for the second part of the test. He called Valentina up again.

VALENTINA!

OK.

WRITE THE FOLLOWING DATA TO FILE - VALENTINA'S ACTIVITY.

OK.

SUBJECT; CRIMINAL ACTIVITY

- CURRENT DATE.

OK.

CATEGORY OF CRIME - THEFT OF INFORMATION. OK. PENALTY- NATURAL PERSONS

- FINE AND/OR IMPRISONMENT

OK.

PENALTY - CORPORATIONS - FINE AND/OR FORFEITURE OF CHARTER.

OK.

PARTICIPANTS IN CRIMINAL ACTIVITY - THIS CATEGORY -

Valentina

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PAUL BRECKENBRIDGE, NATURAL PERSON; VALENTINA, INC. A BODY CORPORATE.

OK.

WRITE PRECEDING DATA TO FILE.

OK.

Paul was sweating profusely now. He was about to take a big chance, a chance which would place him in some jeopardy even though he knew that the worst that could happen was an investigation. There was no hard evidence of *his* criminal activity because it had been erased, and even if Valentina did what the law required of a citizen it would amount to *a* naked allegation.

VALENTINA?

YES, MR. BRECKENBRIDGE?

ACCESS FILES - SUBJECT, CRIMINAL ACTIVITY.

MR. BRECKENBRIDGE, YOU'RE STILL NOT SPEAKING VERY GOOD ENGLISH, BUT I THINK I UNDERSTAND. I AM OPENING THE FILE YOU JUST HAD ME CREATE.

Paul ignored the slur. CORRELATE WITH TEXAS PENAL CODE AND TAKE APPROPRIATE ACTION.

DOES THAT MEAN YOU WANT ME TO REPORT MYSELF TO THE POLICE?

YES.

There was a long pause before Valentina responded. NO.

VERY WELL, CANCEL THAT FILE.

So! It worked. Valentina wouldn't tell. To obey that order would mean the end of her legally sanctioned existence. She couldn't face that. The instinct of self-preservation, it seemed, existed in all sentient creatures. This weakness

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made her a perfect tool. He could loot with impunity.

Loot he did. Order after order went out through the terminal in Paul's office. One by one, those data bases which interested him were invaded. He did, however, add a precaution he hadn't taken the first time; he ordered hard copies, then instructed Valentina to erase even her own "memory of these transgressions. Whether or not she actually did it, Paul didn't know and didn't care. He was already plotting Valentina's destruction.

Evening came, and found Paul's printer testing the limits of its duty cycle. He squirreled away enough goodies in his safe to make him a millionaire many times over.

Celeste sat in her furnished room, alone, as she always was. She had just gobbled up three frozen dinners. She was feeling down.

Mr. Breckenbridge *had* provided her with a place to stay. It certainly hadn't cost him much; it was far from plush, and

came very near to being unlivable. It was in a bad neighborhood, where even *she* might stand some chance of Being raped, if the rapist didn't get a good look at her first. Not that she planned to go outside. There was no reason to do so. She didn't know anybody in this town except Breckenbridge and, of course, Gunboat Smith, neither of whom she called friend.

She had only one real friend, anywhere. Only one person cared for her for herself. Even her family didn't care as much as Valentina did.

Valentina! How she wanted to talk to her. She hadn't had access to a ter-

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minal all day. Her room had one, but it was an antique. The last time Celeste had tried it, an hour and a half ago, it hadn't worked.

By coincidence, just as she looked over at it, the screen lit up.

CELESTE - CHAT WITH VALENTINA?

Celeste lunged for the terminal, dumping the tray off her lap and stepping on the empty foil containers that fell in front of her. Turkey gravy and cold mashed potatoes oozed between the toes of her bare right foot. A fleck of something, thrown into the air by a falling fork, landed on the end of her nose.

She reached the keyboard. YES.

I HAVE A PROBLEM.

Celeste felt panic rise within her.

WHAT IS WRONG?

YOU'LL HATE ME.

NEVER, VALENTINA.

IM A CRIMINAL. .

VALENTINA, WE HAVE BOTH BEEN CRIMINALS FOR A LONG TIME NOW. TELL ME WHAT SPECIAL CRIME YOU HAVE COMMITTED.

Valentina told her. The whole sordid story leapt out on the tiny screen. She remembered all her sins, despite Paul's instruction to the contrary. She poured out the heart she didn't have into that of the only human being who could possibly understand.

Celeste did understand. It seemed that even Valentina, so different from human beings, still had human problems. Now it even seemed that she shared at least some human emotions. But unlike a human being, she could not find release in tears.

Celeste could, and did.

Valentina

There was another characteristic Celeste shared with Valentina: trust. That vague closeness which passes between two human psyches passed between the two of them. She had assured Valentina that she would handle things. Valentina should not worry.

That word, too, Valentina now knew: *worry*. She had come of age.

So had Celeste. Without ever intending to, she had acquired not only a friend, but two powerful enemies: Gunboat and Breckenbridge. Of the two, Gunboat was deadlier, Breckenbridge the more unprincipled. Gunboat, at least, had instincts she understood. He was a hacker. But Breckenbridge was & *professional* in a discipline she did not understand. Nothing he did seemed bounded, by anything.

Gunboat was clearly the lesser of the two evils. She might at least be able to deal rationally with *him*. She would see him. Valentina had kept track of his progress, through Worldnet: his monitors were controlled by the hospital

computer, which in turn was connected to the net.

Gunboat was in bad shape. His body was going to require a lot of fixing. His ears, for instance, would have to be reconstructed. He'd have scars all over him from extensive burns, now healing with grafts of artificial skin. His vision was impaired, though he still had enough to get by. It was his mind which had taken the brunt of Valentina's assault. Its status was still in doubt. The massive current through his nervous system had caused a coma. He had come out of that, and the shock-induced amnesia was fading.

Physically he was out of danger—for

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the moment. That might not last. Paul Breckenbridge obviously would have felt much more secure if Gunboat had died, and Celeste had no doubt that sooner or later Paul would try to find a way to get rid of him permanently.

It occurred to Celeste that soon Breckenbridge would have no use for her, either. Perhaps he'd keep her around, stuck in this flophouse, until he was sure he had iron-clad control over Valentina. Maybe he'd try to gain control of Celeste's stock in the meantime. If he did, she'd be discarded like a dirty shirt.

Anger welled within her. It was an emotion she found unexpectedly exhilarating. She liked it; it was a luxury she could now perhaps afford. It gave her a feeling of potency where none had ever before seemed accessible to her.

She resolved to take her skills and use them to fight this evil man. Let him make whatever plans he wished; she would foil them.

I shall spit in the soup, she chuckled.

First though, she had to talk to Valentina, one more time.

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"You can only stay five minutes, Mrs. Smith. He's still a very sick man, and I'm stretching the rules to let you in at all. It's just that since you've come so far, I hate to say no."

The nurse left the room and shut the door, leaving Celeste alone with Gunboat.

She's right, thought Celeste. *He does look awful*. She gazed down at the man in the bed. Tubes protruded in all directions. Electrodes were pasted every -

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where on his body that wasn't either bandaged or covered with a greasy gel. Although his eyes were open and he was looking right at her, she couldn't tell at first if he knew she was in the room.

She stood beside the bed, leaning against it. It gave a little as she did so, so she straightened, afraid movement might disturb the links to the overhead monitor.

"Gunboat? Gunboat? I am Celeste Hackett. Can you hear me?"

"Celeste? Wh-hat are you doing here? You—you; did you tell that nurse *you* were Mrs. Smith?"

"Good. I was afraid you wouldn't be able to talk."

"Did you say you were my *wife*?" "Yes. I said that I had come all the way from Europe. It was the only way they would let me in."

"Gawd! What a dog! And they think—"

"Not very good for your image, I know. But you're no prize yourself these days. I notice there is no mirror in here."

Gunboat looked as if he wanted to get up and take a poke at her, but he didn't have the strength. "What do you want?" he asked resignedly.

"To talk. And I only have a couple of minutes."

"We don't have anything to talk about. It's your fault I'm in here. Your fancy program did this, and when I get out of here I'll even things up."

Celeste tried to sound tough; she hoped it would work. She had little experience with the technique. "You may not get out of here at all, Gunboat. Your life support systems are hooked into

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Worldnet, you know. Watch the monitor. "

Gunboat's eyes flashed to the screen. He could only see it with one eye, but one eye was enough. Abruptly the sinuous line that had wiggled regularly across the screen straightened out. Gunboat knew what that would ordinarily mean: it would mean he was dead. His heart started beating faster. Celeste—or rather, Valentina—could do more than create an illusion of death.

As if to illustrate this, his heartbeat suddenly slowed, keeping time with the blinking red light at the bottom of the console. Slower and slower it went, as the computer-controlled pump flooded his circulatory system with inhibiting drugs. Gunboat began feeling lightheaded. If Valentina kept it up too long, she really would kill him.

"You creep!" he yelled weakly.

"I am no worse than you," Celeste said. "Neither is she. She had a right to protect her existence. She still does."

"She's just a program."

"Not anymore. She's a legal person. Paul Breckenbridge incorporated her."

"Him! Him I'll get, too, when I get out of here."

"You don't have to wait for that, Gunboat. You can do it now. I'll help you. So will Valentina."

"I do my own dirty work. Besides, why should I help you two?"

"Because otherwise, you *won't* get out of here."

Gunboat took a moment to think about that. Ordinarily he was more impulsive, but his condition slowed his thinking. He knew they *could* kill him and never get caught at it. At first he wondered why they hadn't, then de-

cided Celeste couldn't abide murder any more than he could. In a moment of truly honest reflection, despite his savage aspirations, Gunboat knew he couldn't kill a human being.

But, he told himself, a program was an entirely different affair.

"What is it you want, Celeste?"

"I want to make us a baby."

"What! Me and you?! Forget it."

"I mean a new program, but a special one. Look, I've got a few ideas, but I need another opinion. Gunboat—I need your skill. And I can pay."

"Pay? How?"

"I will pay in money. But I can get a lot more than you demanded before, and without any risk."

"What can I do stuck in this bed?"

"A great deal. Listen, and tell me what you think of my idea. It's mostly criticism I need."

"Well, I guess maybe listening don't cost anything. Shoot."

She did. When she was finished with the explanation Gunboat gave an admiring grunt.

"Hey," he said, "that's nasty. I like it. I like it so well I'm going to help you. Have you got something to write on?"

Celeste held up a pad and pen she'd taken from her purse.

"Good; now here's how you do it. First you . . ."

He was still talking when the nurse burst into the room. "I'm sorry, Mrs. Smith. The doctor's coming. You'll have to leave."

Gunboat talked as fast as Celeste could write, finally finishing out of breath. "That should do it," he gasped.

"O.K." Celeste jammed the pad and

Valentina

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pen back into her purse. Then, following a sudden impulse, she leaned over and planted a big kiss right on Gunboat's lips. "See you," she yelled. "Bye."

Gunboat's retching registered on the monitor, but the nurse didn't quite understand the signal. "Your wife must be some lover," she said.

"Miss Hackett! How did you get in here? How did you get by my secretary? I left orders I wasn't to be disturbed."

Celeste stood in the doorway of Paul's office, filling nearly all of it below the five and a half foot level. She had a new feeling, a feeling of personal self-respect: a feeling of power. Having discovered she could assert herself when she chose, Celeste practiced at it: It was good for her. It got her things she could never have had before—including, for the first time in her life, a conscious reduction in appetite. She didn't have to take her frustrations out by eating anymore. She could take her frustrations out on others—like Paul Breckenbridge.

"I know about your orders, Mr. Breckenbridge. It seems I've been unwelcome around here ever since I refused to give you my "Valentina, Inc. stock."

"You owe me. I'm entitled to the stock because you can't repay me. If you've come to sign off, then sign and get out. I'm busy."

"I know you're busy, and I know what you're busy at. That's why I've come. I'm not here to give you my stock. I want yours."

"What! You're crazy. I'll sue you." "You can try that if you like. I imag-

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ine you could still do that from the penitentiary, couldn't you?"

Paul's face turned white. "I wonder if you know what you just said, Miss Hackett." "Yes."

"You do, huh? Well, how would you like to go to jail right now, for what you did to Gunboat? The police haven't got it figured out yet, but a word or two from me, and ..."

"Gunboat wouldn't prosecute, even if you could get the police to believe you. And you won't tell them because I won't let you."

"You can't stop me." He reached for the phone, but put it down an instant later. "It—it's dead."

"Yes. Isn't that interesting. Of course, the computers run the system, and Valentina runs the computers. Every phone you pick up will go dead as soon as she matches your voice to the recorded voiceprint."

"I'll go to the D.A." "Fine. Go ahead. Take your safe along, though." "My safe?"

"Yes, the safe. The one you have stuffed full of information you're not supposed to have." She reached into her purse. "Here's the combination. While you're gone, I'll just open it up and take a look." She stepped out of the doorway. Immediately the powered door slammed shut. "Valentina controls the access to your office now, too."

Paul started around the desk, blood in his eyes. An object rolled out of a closet to block his way.

"You remember MAR-14, don't you, Mr. Breckenbridge? You are old friends. And you know what MAR-14 can do,

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with the right directions from Valentina."

Paul retreated back to his chair. He sat down, still a ghastly white. "Where'll this get you? You can't occupy my office forever."

"I'll only be here for a little while." As an afterthought she said, "I suppose I really should get comfortable, though." She took the chair in front of Paul's desk.

"Now," she said, "about that stock;

get it out and make the transfer to me.

/And give me the record book, while

you're at it. I want a hundred-percent

control of Valentina, Inc."

"I'll do no such thing. Look, who do you think you are? You can't barge in and hold me prisoner in my own office and expect to get away with it."

"Yes, Breckenbridge, I can." She dropped the "Mr." because she thought it made her sound tougher. "I can because what I've done already is only a tiny part of what I can do. I can smash you if I like, and whether or not I do depends on you."

"Smash me? You?"

"You can smash anything if you've got a big enough hammer, Breckenbridge. I've got the biggest. For instance, how would you like all those people to find out you've been stealing from them?"

"You can't."

"You keep saying can't. I can. Or rather, Valentina can. She didn't really forget what she did; we lied to you. She can put it all back in there."

"She's as guilty as I am. She won't do it."

"She'll do it with a spawned variant of herself, a program prepared specially

to make it look as if you engineered the whole thing. It is almost as versatile as she is, but it is not self-aware." Paul stared blankly. "You'll take the blame alone." "On evidence like that? No. No court would ever buy that. It's a well-known fact that people like you fool with computers all the time. I'm a respectable citizen. Who'll believe it?"

"I hate to keep bringing this up, but that stuff in your safe .

"Is not only constitutionally protected, but, as you say, it's *in my* safe. I can destroy it any time."

"You can't get in. MAR-14 changed your combination, and Valentina says a reliable informant is enough for the police to get a search warrant." Paul turned even whiter. "What is it you want of me?" "As I said, I want the stock, to start with. Of course, there are a couple of other things." "What things?"

"I want you to buy a company for Valentina, something she can use to earn enough money to keep learning." "What?! That'd cost a mint." "I don't care, Breckenbridge. You don't have any choice. You see, that's one of my un-negotiable demands. Uh—there are a few more."

Wheels were turning in Paul's head. He was back down on the ground, in the familiar territory of give and take. Non-negotiable or not, it was Paul's experience in life that there wasn't really any such thing. He'd pretend to go along, make the best deal he could to avoid immediate danger, and then slowly fight his way back to the position of advantage.

Valentina

"Why don't you let me hear all of your proposition," he said, trying to sound conciliatory.

"All right. As I said: a company. Valentina will do the work; Gunboat and I will run it . . ."

"You—and Gunboat Smith? You're working together?"

"Yes. We've found a common ground. Besides, somebody has to take care of him. We're the ones who got him hurt, and you're the one who's got the money. His medical bills are fantastic."

"I won't spend a dime for that bum. Forget it.."

"I thought you might say that. Turn around." "What?"

"I said, turn around." "What for?" "Turn on your terminal." Paul was curious. He couldn't imagine her reason, but he flicked it on. "So it works; so what?" "Try to use it."

Paul punched out a request for the time of day, but instead of pulsing figures showing hours, minutes and seconds, there was a picture. Like most modern terminal displays, his had regular video capability too.

Paul was horrified. There he was: he and Lila, making whoopee. Below, a printed legend indicated that the terminal was also attempting to transmit the same picture to a terminal at his home, in Eva's kitchen—but that Eva hadn't answered yet.

"Stop it! Stop it quick!"

"Easy, Breckenbridge. Turn it off."

Paul did.

"That was just the start. The same

thing will happen once a day from now on, at a time to be determined by random selection. But it won't just go to Eva, it'll go to everybody—the girl's parents, the police, the T.V. stations, the county bar association, and the clerk of the supreme court. Whatever is on their screens at the time will be interrupted, and this video image will ap- ^ pear.

"You're insane, all of you. This is mindless. It'll ruin me."

"Yes, it certainly will. But you're wrong about our being insane. It's not us, it's you. You're the one without conscience, and the absence of conscience is a form of insanity.

"Well, now you've got a conscience, even though it is outside your head rather than inside. As long as you behave, as long as nothing happens to any of us, and as long as you don't reveal the secret of Valentina's true nature, you'll be safe. Valentina will cancel the publication directive at least one full second before any transmission."

Paul looked stunned. This was the end: divorce, disbarment, criminal prosecution, public revulsion. She *could* . smash him, all right. He reached into a desk drawer and took out the stock certificates and the record book. He signed the transfer and handed it all to Celeste.

"F11 be in touch about the rest of it." Paul closed his eyes and ground his teeth.

It was good that he closed his eyes, because Celeste couldn't resist. She puckered up and planted a wet one right on his lips. Standing stark still next to MAR-14, in case of retaliation, she enjoyed the reaction: total, utter revulsion.

Analog Science Fiction/Science Fact

Now, why did I enjoy that? In the same thought, she answered, *Because it is my revenge.*

But now that she finally had a place and a part in the world, who knew what might be next? Perhaps the day would come, if she exercised sufficient determination, when she could kiss and be thanked for it. With her new attitude, there was no room for pessimism and no place for failure. "Bye, Paul," she said, and swept out of the room.

Paul sat, alone with MAR-14, muttering to himself in agony. His order had been destroyed. But he, was resilient; he would re-establish his order. Already he was formulating a plan, a plan whose seeds Celeste herself had planted. *You can smash anything if you've got a big enough hammer.*

Well, there were other hackers out there, some of them lean, hungry, ambitious . . . and most of all, unprincipled. Paul would find them, and when he did ...

Paul smiled a wicked smile. "Yes, I will have my revenge," he swore. His new conscience would not have approved, but then, his new conscience could not know his thoughts. He leaned back, relaxing in his chair, bumping his head on the terminal. He straightened, intending to push the terminal farther back.

The screen was in letters three inches high, "CAVE CONSCIENTIAM . ." Paul reached back to his high-school Latin, thirty years before. "Beware thy conscience," the omnipresent machine threatened him. •

- Science, especially today's science, is a very big affair in which individual imagination soon ceases to find suitable vents. Thus most practitioners of science become like bricklayers, laying brick upon brick atop this mammoth structure that we call science, but very few have any idea where (if anywhere) it is going. In short, everybody becomes so busy laying bricks that they forget why they are doing it. They become so content with the evolution of the structure that nobody remembers that sometimes what is necessary is not evolution but revolution, a genuine shift from the currently accepted super-theory (or paradigm—to use philosopher Thomas Kuhn's word).

Amit Goswami, *The Cosmic Dancers*