TANGENTS

GREG BEAR

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There is a principle in nature I don't think anyone has pointed out before. Each hour, a myriad of trillions of little live things—bacteria, microbes, ''animalcules''—are born and die, not counting for much except in the bulk of their existence and the accumulation of their tiny effects. They do not perceive deeply. They do not suffer much. A hundred billion, dying, would not begin to have the same importance as a single human death.

Within the ranks of magnitude of all creatures, small as microbes or great as humans, there is an equality of ''elan,'' just as the branches of a tall tree, gathered together, equal the bulk of the limbs below, and all the limbs equal the bulk of the trunk.

That, at least, is the principle. I believe Vergil Ulam was the first to violate it.

It had been two years since I'd last seen Vergil. My memory of him hardly matched the tan, smiling, well-dressed gentleman standing before me. We had made a lunch appointment over the phone the day before, and now faced each other in the wide double doors of the employees' cafeteria at the Mount Freedom Medical Center.

"Vergil?" I asked. "My God, Vergil!"

"Good to see you, Edward." He shook my hand firmly. He had lost ten or twelve kilos and what remained seemed tighter, better proportioned. At university, Vergil had been the pudgy, shock-haired, snaggle-toothed whiz kid who hot-wired doorknobs, gave us punch that turned our piss blue, and never got a date except with Eileen Termagent, who shared many of his physical characteristics.

"You look fantastic," I said. "Spend a summer in Cabo San Lucas?"

We stood in line at the counter and chose our food. "The tan," he said, picking out a carton of chocolate milk, "is from spending three months under a sunlamp. My teeth were straightened just after I last saw you. I'll explain the rest, but we need a place to talk where no one will listen close."

I steered him to the smoker's corner, where three diehard puffers were scattered among six tables.

"Listen, I mean it," I said as we unloaded our trays. "You've changed. You're looking good."

"I've changed more than you know." His tone was motion-picture ominous, and he delivered the line with a theatrical lift of his brows. "How's Gail?"

Gail was doing well, I told him, teaching nursery school. We'd married the year before. His gaze shifted down to his food—pineapple slice and cottage cheese, piece of banana

cream pie—and he said, his voice almost cracking, "Notice something else?"

I squinted in concentration. "Uh."

"Look closer."

"I'm not sure. Well, yes, you're not wearing glasses. Contacts?"

"No. I don't need them anymore."

"And you're a snappy dresser. Who's dressing you now? I hope she's as sexy as she is tasteful."

"Candice isn't—wasn't responsible for the improvement in my clothes," he said. "I just got a better job, more money to throw around. My taste in clothes is better than my taste in food, as it happens." He grinned the old Vergil self-deprecating grin, but ended it with a peculiar leer. "At any rate, she's left me, I've been fired from my job, I'm living on savings."

"Hold it," I said. "That's a bit crowded. Why not do a linear breakdown? You got a job. Where?"

"Genetron Corp.," he said. "Sixteen months ago."

"I haven't heard of them."

"You will. They're putting out common stock in the next month. It'll shoot off the board. They've broken through with MABs. Medical—"

"I know what MABs are," I interrupted. "At least in theory. Medically Applicable Biochips."

"They have some that work."

"What?" It was my turn to lift my brows.

"Microscopic logic circuits. You inject them into the human body, they set up shop where they're told and troubleshoot. With Dr. Michael Bernard's approval."

That was quite impressive. Bernard's reputation was spotless. Not only was he associated with the genetic engineering biggies, but he had made news at least once a year in his

practice as a neurosurgeon before retiring. Covers on *Time, Mega, Rolling Stone.*

"That's supposed to be secret—stock, breakthrough, Bernard, everything." He looked around and lowered his voice. "But you do whatever the hell you want. I'm through with the bastards."

I whistled. "Make me rich, huh?"

"If that's what you want. Or you can spend some time with me before rushing off to your broker."

"Of course." He hadn't touched the cottage cheese or pie. He had, however, eaten the pineapple slice and drunk the chocolate milk. "So tell me more."

"Well, in med school I was training for lab work. Biochemical research. I've always had a bent for computers, too. So I put myself through my last two years—"

"By selling software packages to Westinghouse," I said.

"It's good my friends remember. That's how I got involved with Genetron, just when they were starting out. They had big money backers, all the lab facilities I thought anyone would ever need. They hired me, and I advanced rapidly.

"Four months and I was doing my own work. I made some breakthroughs"—he tossed his hand nonchalantly—"then I went off on tangents they thought were premature. I persisted and they took away my lab, handed it over to a certifiable flatworm. I managed to save part of the experiment before they fired me. But I haven't exactly been cautious . . . or judicious. So now it's going on outside the lab."

I'd always regarded Vergil as ambitious, a trifle cracked, and not terribly sensitive. His relations with authority figures had never been smooth. Science, for him, was like the woman you couldn't possibly have, who suddenly opens her arms to you, long before you're ready for mature love—leaving you

afraid you'll forever blow the chance, lose the prize. Apparently, he did. "Outside the lab? I don't get you."

"Edward, I want you to examine me. Give me a thorough physical. Maybe a cancer diagnostic. Then I'll explain more."

"You want a five-thousand-dollar exam?"

"Whatever you can do. Ultrasound, NMR, thermogram, everything."

"I don't know if I can get access to all that equipment. NMR full-scan has only been here a month or two. Hell, you couldn't pick a more expensive way—"

"Then ultrasound. That's all you'll need."

"Vergil, I'm an obstetrician, not a glamour-boy lab-tech. OB-GYN, butt of all jokes. If you're turning into a woman, maybe I can help you."

He leaned forward, almost putting his elbow into the pie, but swinging wide at the last instant by scant millimeters. The old Vergil would have hit it square. "Examine me closely and you'll . . ." He narrowed his eyes. "Just examine me."

"So I make an appointment for ultrasound. Who's going to pay?"

"I'm on Blue Shield." He smiled and held up a medical credit card. "I messed with the personnel files at Genetron. Anything up to a hundred thousand dollars medical, they'll never check, never suspect."

He wanted secrecy, so I made arrangements. I filled out his forms myself. As long as everything was billed properly, most of the examination could take place without official notice. I didn't charge for my services. After all, Vergil had turned my piss blue. We were friends.

He came in late at night. I wasn't normally on duty then, but I stayed late, waiting for him on the third floor of what the nurses called the Frankenstein wing. I sat on an orange plastic

chair. He arrived, looking olive-colored under the fluorescent lights.

He stripped, and I arranged him on the table. I noticed, first off, that his ankles looked swollen. But they weren't puffy. I felt them several times. They seemed healthy but looked odd. "Hm," I said.

I ran the paddles over him, picking up areas difficult for the big unit to hit, and programmed the data into the imaging system. Then I swung the table around and inserted it into the enameled orifice of the ultrasound diagnostic unit, the hum-hole, so-called by the nurses.

I integrated the data from the hum-hole with that from the paddle sweeps and rolled Vergil out, then set up a video frame. The image took a second to integrate, then flowed into a pattern showing Vergil's skeleton. My jaw fell.

Three seconds of that and it switched to his thoracic organs, then his musculature, and, finally, vascular system and skin.

"How long since the accident?" I asked, trying to take the quiver out of my voice.

"I haven't been in an accident," he said. "It was deliberate."

"Jesus, they beat you to keep secrets?"

"You don't understand me, Edward. Look at the images again. I'm not damaged."

"Look, there's thickening here"—I indicated the ankles—"and your ribs—that crazy zigzag pattern of interlocks. Broken sometime, obviously. And—"

"Look at my spine," he said. I rotated the image in the video frame.

Buckminster Fuller, I thought. It was fantastic. A cage of triangular projections, all interlocking in ways I couldn't begin to follow, much less understand. I reached around and tried to

feel his spine with my fingers. He lifted his arms and looked off at the ceiling.

"I can't find it," I said. "It's all smooth back there." I let go of him and looked at his chest, then prodded his ribs. They were sheathed in something tough and flexible. The harder I pressed, the tougher it became. Then I noticed another change.

"Hey," I said. "You don't have any nipples." There were tiny pigment patches, but no nipple formations at all.

"See?" Vergil asked, shrugging on the white robe, "I'm being rebuilt from the inside out."

In my reconstruction of those hours, I fancy myself saying, "So tell me about it." Perhaps mercifully, I don't remember what I actually said.

He explained with his characteristic circumlocutions. Listening was like trying to get to the meat of a newspaper article through a forest of sidebars and graphic embellishments.

I simplify and condense.

Genetron had assigned him to manufacturing prototype biochips, tiny circuits made out of protein molecules. Some were hooked up to silicon chips little more than a micrometer in size, then went through rat arteries to chemically keyed locations, to make connections with the rat tissue and attempt to monitor and even control lab-induced pathologies.

"*That* was something," he said.

"We recovered the most complex microchip by sacrificing the rat, then debriefed it—hooked the silicon portion up to an imaging system. The computer gave us bar graphs, then a diagram of the chemical characteristics of about eleven centimeters of blood vessel . . . then put it all together to make a picture. We zoomed down eleven centimeters of rat artery. You never saw so many scientists jumping up and down, hugging each

other, drinking buckets of bug juice." Bug juice was lab ethanol mixed with Dr. Pepper.

Eventually, the silicon elements were eliminated completely in favor of nucleoproteins. He seemed reluctant to explain in detail, but I gathered they found ways to make huge molecules—as large as DNA, and even more complex—into electrochemical computers, using ribosome-like structures as "encoders" and "readers" and RNA as "tape." Vergil was able to mimic reproductive separation and reassembly in his nucleoproteins, incorporating program changes at key points by switching nucleotide pairs. "Genetron wanted me to switch over to supergene engineering, since that was the coming thing everywhere else. Make all kinds of critters, some out of our imagination. But I had different ideas." He twiddled his finger around his ear and made theremin sounds. "Mad scientist time, right?" He laughed, then sobered. "I injected my best nucleoproteins into bacteria to make duplication and compounding easier. Then I started to leave them inside, so the circuits could interact with the cells. They were heuristically programmed; they taught themselves. The cells fed chemically coded information to the computers, the computers processed it and made decisions, the cells became smart. I mean, smart as planaria, for starters. Imagine an *E. coli* as smart as a planarian worm!"

I nodded. "I'm imagining."

"Then I really went off on my own. We had the equipment, the techniques; and I knew the molecular language. I could make really dense, really complicated biochips by compounding the nucleoproteins, making them into little brains. I did some research into how far I could go, theoretically. Sticking with bacteria, I could make a biochip with the computing capacity of a sparrow's brain. Imagine how jazzed I was! Then I saw a way to increase the complexity a thousandfold, by

using something we regarded as a nuisance—quantum chit-chat between the fixed elements of the circuits. Down that small, even the slightest change could bomb a biochip. But I developed a program that actually predicted and took advantage of electron tunneling. Emphasized the heuristic aspects of the computer, used the chit-chat as a method of increasing complexity."

"You're losing me," I said.

"I took advantage of randomness. The circuits could repair themselves, compare memories, and correct faulty elements. I gave them basic instructions: Go forth and multiply. Improve. By God, you should have seen some of the cultures a week later! It was amazing. They were evolving all on their own, like little cities. I destroyed them all. I think one of the petri dishes would have grown legs and walked out of the incubator if I'd kept feeding it."

"You're kidding." I looked at him. "You're not kidding."

"Man, they *knew* what it was like to improve! They knew where they had to go, but they were just so limited, being in bacteria bodies, with so few resources."

"How smart were they?"

"I couldn't be sure. They were associating in clusters of a hundred to two hundred cells, each cluster behaving like an autonomous unit. Each cluster might have been as smart as a rhesus monkey. They exchanged information through their pili, passed on bits of memory, and compared notes. Their organization was obviously different from a group of monkeys. Their world was so much simpler, for one thing. With their abilities, they were masters of the petri dishes. I put phages in with them; the phages didn't have a chance. They used every option available to change and grow."

"How is that possible?"

"What?" He seemed surprised I wasn't accepting everything at face value.

"Cramming so much into so little. A rhesus monkey is not your simple little calculator, Vergil."

"I haven't made myself clear," he said, obviously irritated. "I was using nucleoprotein computers. They're like DNA, but all the information can interact. Do you know how many nucleotide pairs there are in the DNA of a single bacteria?"

It had been a long time since my last biochemistry lesson. I shook my head.

"About two million. Add in the modified ribosome structures—fifteen thousand of them, each with a molecular weight of about three million—and consider the combinations and permutations. The RNA is arranged like a continuous loop paper tape, surrounded by ribosomes ticking off instructions and manufacturing protein chains . . ." His eyes were bright and slightly moist. "Besides, I'm not saying every cell was a distinct entity. They cooperated."

"How many bacteria in the dishes you destroyed?"

"Billions. I don't know." He smirked. "You got it, Edward. Whole planetsful of *E. coli*."

"But Genetron didn't fire you then?"

"No. They didn't know what was going on, for one thing. I kept compounding the molecules, increasing their size and complexity. When bacteria were too limited, I took blood from myself, separated out white cells, and injected them with the new biochips. I watched them, put them through mazes and little chemical problems. They were whizzes. Time is a lot faster at that level—so little distance for the messages to cross, and the environment is much simpler. Then I forgot to store a file under my secret code in the lab computers. Some managers found it and guessed what I was up to. Everybody panicked. They thought we'd have every social watchdog in the country on our backs because of what I'd done. They started to destroy my work and wipe my programs. Ordered me to sterilize my

white cells. Christ." He pulled the white robe off and started to get dressed. "I only had a day or two. I separated out the most complex cells—"

"How complex?"

"They were clustering in hundred-cell groups, like the bacteria. Each group as smart as a four-year-old kid, maybe." He studied my face for a moment. "Still doubting? Want me to run through how many nucleotide pairs there are in a mammalian cell? I tailored my computers to take advantage of the white cells' capacity. Four billion nucleotide pairs, Edward. And they don't have a huge body to worry about, taking up most of their thinking time."

"Okay," I said. "I'm convinced. What did you do?"

"I mixed the cells back into a cylinder of whole blood and injected myself with it." He buttoned the top of his shirt and smiled thinly at me. "I'd programmed them with every drive I could, talked as high a level as I could using just enzymes and such. After that, they were on their own."

"You programmed them to go forth and multiply, improve?" I repeated.

"I think they developed some characteristics picked up by the biochips in their *E. coli* phases. The white cells could talk to each other with extruded memories. They found ways to ingest other types of cells and alter them without killing them."

'You're crazy."

"You can see the screen! Edward, I haven't been sick since. I used to get colds all the time. I've never felt better."

"They're inside you, finding things, changing them."

"And by now, each cluster is as smart as you or I."

"You're absolutely nuts."

He shrugged. "Genetron fired me. They thought I was going to take revenge for what they did to my work. They

ordered me out of the labs, and I haven't had a real chance to see what's been going on inside me until now. Three months.''

''So . . .'' My mind was racing. ''You lost weight because they improved your fat metabolism. Your bones are stronger, your spine has been completely rebuilt—''

''No more backaches even if I sleep on my old mattress.''

''Your heart looks different.''

''I didn't know about the heart,'' he said, examining the frame image more closely. ''As for the fat—I was thinking about that. They could increase my brown cells, fix up the metabolism. I haven't been as hungry lately. I haven't changed my eating habits that much—I still want the same old junk—but somehow I get around to eating only what I need. I don't think they know what my brain is yet. Sure, they've got all the glandular stuff—but they don't have the *big* picture, if you see what I mean. They don't know *I'm* in here. But boy, they sure did figure out what my reproductive organs are.''

I glanced at the image and shifted my eyes away.

''Oh, they look pretty normal,'' he said, hefting his scrotum obscenely. He snickered. ''But how else do you think I'd land a real looker like Candice? She was just after a one-night stand with a techie. I looked okay then, no tan but trim, with good clothes. She'd never screwed a techie before. Joke time, right? But my little geniuses kept us up half the night. I think they made improvements each time. I felt like I had a goddamned fever.''

His smile vanished. ''But then one night my skin started to crawl. It really scared me. I thought things were getting out of hand. I wondered what they'd do when they crossed the blood-brain barrier and found out about *me*—about the brain's real function. So I began a campaign to keep them under control. I figured, the reason they wanted to get into the skin was the simplicity of running circuits across a surface. Much

easier than trying to maintain chains of communication in and around muscles, organs, vessels. The skin was much more direct. So I bought a quartz lamp.'' He caught my puzzled expression. ''In the lab, we'd break down the protein in biochip cells by exposing them to ultraviolet light. I alternated sunlamp with quartz treatments. Keeps them out of my skin and gives me a nice tan.''

''Give you skin cancer, too,'' I commented.

''They'll probably take care of that. Like police.''

''Okay. I've examined you, you've told me a story I still find hard to believe . . . what do you want me to do?''

''I'm not as nonchalant as I act, Edward. I'm worried. I'd like to find some way to control them before they find out about my brain. I mean, think of it, they're in the trillions by now, each one smart. They're cooperating to some extent. I'm probably the smartest thing on the planet, and they haven't even begun to get their act together. I don't really want them to take over.'' He laughed unpleasantly. ''Steal my soul, you know? So think of some treatment to block them. Maybe we can starve the little buggers. Just think on it.'' He buttoned his shirt. ''Give me a call.'' He handed me a slip of paper with his address and phone number. Then he went to the keyboard and erased the image on the frame, dumping the memory of the examination. ''Just you,'' he said. ''Nobody else for now. And please . . . hurry.''

It was three o'clock in the morning when Vergil walked out of the examination room. He'd allowed me to take blood samples, then shaken my hand—his palm was damp, nervous—and cautioned me against ingesting anything from the specimens.

Before I went home, I put the blood through a series of tests. The results were ready the next day.

I picked them up during my lunch break in the afternoon, then destroyed all of the samples. I did it like a robot. It took me five days and nearly sleepless nights to accept what I'd

seen. His blood was normal enough, though the machines diagnosed the patient as having an infection. High levels of leukocytes—white blood cells—and histamines. On the fifth day, I believed.

Gail came home before I did, but it was my turn to fix dinner. She slipped one of the school's disks into the home system and showed me video art her nursery kids had been creating. I watched quietly, ate with her in silence.

I had two dreams, part of my final acceptance. In the first, that evening, I witnessed the destruction of the planet Krypton, Superman's home world. Billions of superhuman geniuses went screaming off in walls of fire. I related the destruction to my sterilizing the samples of Vergil's blood.

The second dream was worse. I dreamed that New York City was raping a woman. By the end of the dream, she gave birth to little embryo cities, all wrapped up in translucent sacs, soaked with blood from the difficult labor.

I called him on the morning of the sixth day. He answered on the fourth ring. "I have some results," I said. "Nothing conclusive. But I want to talk with you. In person."

"Sure," he said. "I'm staying inside for the time being." His voice was strained; he sounded tired.

Vergil's apartment was in a fancy high-rise near the lake shore. I took the elevator up, listening to little advertising jingles and watching dancing holograms display products, empty apartments for rent, the building's hostess discussing social activities for the week.

Vergil opened the door and motioned me in. He wore a checked robe with long sleeves and carpet slippers. He clutched an unlit pipe in one hand, his fingers twisting it back and forth as he walked away from me and sat down, saying nothing.

"You have an infection," I said.

"Oh?"

"That's all the blood analyses tell me. I don't have access to the electron microscopes."

"I don't think it's really an infection," he said. "After all, they're my own cells. Probably something else . . . some sign of their presence, of the change. We can't expect to understand everything that's happening."

I removed my coat. "Listen," I said, "you really have me worried now." The expression on his face stopped me: a kind of frantic beatitude. He squinted at the ceiling and pursed his lips.

"Are you stoned?" I asked.

He stood his head, then nodded once, very slowly. "Listening," he said.

"To what?"

"I don't know. Not sounds . . . exactly. Like music. The heart, all the blood vessels, friction of blood along the arteries, veins. Activity. Music in the blood." He looked at me plaintively. "Why aren't you at work?"

"My day off. Gail's working."

"Can you stay?"

I shrugged. "I suppose." I sounded suspicious. I glanced around the apartment, looking for ashtrays, packs of papers.

"I'm not stoned, Edward," he said. "I may be wrong, but I think something big is happening. I think they're finding out who I am."

I sat down across from Vergil, staring at him intently. He didn't seem to notice. Some inner process involved him. When I asked for a cup of coffee, he motioned to the kitchen. I boiled a pot of water and took a jar of instant from the cabinet. With cup in hand, I returned to my seat. He twisted his head back and forth, eyes open. "You always knew what you wanted to be, didn't you?" he asked.

"More or less."

"A gynecologist. Smart moves. Never false moves. I was

different. I had goals, but no direction. Like a map without roads, just places to be. I didn't give a shit for anything, anyone but myself. Even science. Just a means. I'm surprised I got so far. I even hated my folks.''

He gripped his chair arms.

''Something wrong?'' I asked.

''They're talking to me,'' he said. He shut his eyes.

For an hour he seemed to be asleep. I checked his pulse, which was strong and steady, felt his forehead—slightly cool—and made myself more coffee. I was looking through a magazine, at a loss what to do, when he opened his eyes again. ''Hard to figure exactly what time is like for them,'' he said. ''It's taken them maybe three, four days to figure out language, key human concepts. Now they're on to it. On to me. Right now.''

''How's that?''

He claimed there were thousands of researchers hooked up to his neurons. He couldn't give details. ''They're damned efficient, you know,'' he said. ''They haven't screwed me up yet.''

''We should get you into the hospital now.''

''What in hell could other doctors do? Did *you* figure out any way to control them? I mean, they're my own cells.''

''I've been thinking. We could starve them. Find out what metabolic differences—''

''I'm not sure I want to be rid of them,'' Vergil said. ''They're not doing any harm.''

''How do you know?''

He shook his head and held up one finger. ''Wait. They're trying to figure out what space is. That's tough for them: They break distances down into concentrations of chemicals. For them, space is like intensity of taste.''

''Vergil—''

''Listen! Think, Edward!'' His tone was excited but even. ''Something big is happening inside me. They talk to each other across the fluid, through membranes. They tailor something—viruses?—to carry data stored in nucleic acid chains. I think they're saying 'RNA.' That makes sense. That's one way I programmed them. But plasmidlike structures, too. Maybe that's what your machines think is a sign of infection—all their chattering in my blood, packets of data. Tastes of other individuals. Peers. Superiors. Subordinates.''

''Vergil, I still think you should be in a hospital.''

''This is my show, Edward,'' he said. ''I'm their universe. They're amazed by the new scale.'' He was quiet again for a time. I squatted by his chair and pulled up the sleeve to his robe. His arm was crisscrossed with white lines. I was about to go to the phone when he stood and stretched. ''Do you realize,'' he said, ''how many body cells we kill each time we move?''

''I'm going to call for an ambulance,'' I said.

''No, you aren't.'' His tone stopped me. ''I told you, I'm not sick, this is my show. Do you know what they'd do to me in a hospital? They'd be like cavemen trying to fix a computer. It would be a farce.''

''Then what the hell am I doing here?'' I asked, getting angry. ''I can't do anything. I'm one of those cavemen.''

''You're a friend,'' Vergil said, fixing his eyes on me. I had the impression I was being watched by more than just Vergil. ''I want you here to keep me company.'' He laughed. ''But I'm not exactly alone.''

He walked around the apartment for two hours, fingering things, looking out windows, slowly and methodically fixing himself lunch. ''You know, they can actually feel their own thoughts,'' he said about noon. ''I mean, the cytoplasm seems to have a will of its own, a kind of subconscious life counter to

the rationality they've only recently acquired. They hear the chemical 'noise' of the molecules fitting and unfitting inside."

At two o'clock, I called Gail to tell her I would be late. I was almost sick with tension, but I tried to keep my voice level. "Remember Vergil Ulam? I'm talking with him right now."

"Everything okay?" she asked.

Was it? Decidedly not. "Fine," I said.

"Culture!" Vergil said, peering around the kitchen wall at me. I said good-bye and hung up the phone. "They're always swimming in that bath of information. Contributing to it. It's a kind of gestalt thing. The hierarchy is absolute. They send tailored phages after cells that don't interact properly. Viruses specified to individuals or groups. No escape. A rouge cell gets pierced by the virus, the cell blebs outward, it explodes and dissolves. But it's not just a dictatorship. I think they effectively have more freedom than in a democracy. I mean, they vary so differently from individual to individual. Does that make sense? They vary in different ways than we do."

"Hold it," I said, gripping his shoulders. "Vergil, you're pushing me to the edge. I can't take this much longer. I don't understand, I'm not sure I believe—"

"Not even now?"

"Okay, let's say you're giving me the right interpretation. Giving it to me straight. Have you bothered to figure out the consequences yet? What all this means, where it might lead?"

He walked into the kitchen and drew a glass of water from the tap then returned and stood next to me. His expression had changed from childish absorption to sober concern. "I've never been very good at that."

"Are you afraid?"

"I was. Now, I'm not sure." He fingered the tie of his robe. "Look, I don't want you to think I went around you, over

your head or something. But I met with Michael Bernard yesterday. He put me through his private clinic, took specimens. Told me to quit the lamp treatments. He called this morning, just before you did. He says it all checks out. And he asked me not to tell anybody." He paused and his expression became dreamy again. "Cities of cells," he continued. "Edward, they push tubes through the tissues, spread information—"

"Stop it!" I shouted. "Checks out? What checks out?"

"As Bernard puts it, I have 'severely enlarged macrophages' throughout my system. And he concurs on the anatomical changes."

"What does he plan to do?"

"I don't know. I think he'll probably convince Genetron to reopen the lab."

"Is that what you want?"

"It's not just having the lab again. I want to show you. Since I stopped the lamp treatments, I'm still changing." He undid his robe and let it slide to the floor. All over his body, his skin was crisscrossed with white lines. Along his back, the lines were starting to form ridges.

"My God," I said.

"I'm not going to be much good anywhere else but the lab soon. I won't be able to go out in public. Hospitals wouldn't know what to do, as I said."

"You're . . . you can talk to them, tell them to slow down," I said, aware how ridiculous that sounded.

"Yes, indeed I can, but they don't necessarily listen."

"I thought you were their god or something."

"The ones hooked up to my neurons aren't the big wheels. They're researchers, or at least serve the same function. They know I'm here, what I am, but that doesn't mean they've convinced the upper levels of the hierarchy."

"They're disputing?"

"Something like that. It's not all that bad, anyway. If the lab is reopened, I have a home, a place to work." He glanced out the window, as if looking for someone. "I don't have anything left but them. They aren't afraid, Edward. I've never felt so close to anything before." The beatific smile again. "I'm responsible for them. Mother to them all."

"You have no way of knowing what they're going to do." He shook his head.

"No, I mean it. You say they're like a civilization—"

"Like a thousand civilizations."

"Yes, and civilizations have been known to screw up. Warfare, the environment—"

I was grasping at straws, trying to restrain a growing panic. I wasn't competent to handle the enormity of what was happening. Neither was Vergil. He was the last person I would have called insightful and wise about large issues.

"But I'm the only one at risk."

"You don't know that. Jesus, Vergil, look what they're *doing* to you!"

"To me, all to me!" he said. "Nobody else."

I shook my head and held up my hands in a gesture of defeat. "Okay, so Bernard gets them to reopen the lab, you move in, become a guinea pig. What then?"

"They treat me right. I'm more than just good old Vergil Ulam now. I'm a goddamned galaxy, a super-mother."

"Super-host, you mean." He conceded the point with a shrug.

I couldn't take any more. I made my exit with a few flimsy excuses, then sat in the lobby of the apartment building, trying to calm down. Somebody had to talk some sense into him. Who would he listen to? He had gone to Bernard . . .

And it sounded as if Bernard was not only convinced, but very interested. People of Bernard's stature didn't coax the

Vergil Ulams of the world along unless they felt it was to their advantage.

I had a hunch, and I decided to play it. I went to a pay phone, slipped in my credit card, and called Genetron.

"I'd like you to page Dr. Michael Bernard," I told the receptionist.

"Who's calling, please?"

"This is his answering service. We have an emergency call and his beeper doesn't seem to be working."

A few anxious minutes later, Bernard came on the line. "Who the hell is this?" he asked. "I don't have an answering service."

"My name is Edward Milligan. I'm a friend of Vergil Ulam's. I think we have some problems to discuss."

We made an appointment to talk the next morning.

I went home and tried to think of excuses to keep me off the next day's hospital shift. I couldn't concentrate on medicine, couldn't give my patients anywhere near the attention they deserved.

Guilty, angry, afraid.

That was how Gail found me. I slipped on a mask of calm and we fixed dinner together. After eating, holding onto each other, we watched the city lights come on in late twilight through the bayside window. Winter starlings pecked at the yellow lawn in the last few minutes of light, then flew away with a rising wind which made the windows rattle.

"Something's wrong," Gail said softly. "Are you going to tell me, or just act like everything's normal?"

"It's just me," I said. "Nervous. Work at the hospital."

"Oh, lord," she said, sitting up. "You're going to divorce me for that Baker woman." Mrs. Baker weighed three hundred

and sixty pounds and hadn't known she was pregnant until her fifth month.

"No," I said, listless.

"Rapturous relief," Gail said, touching my forehead lightly. "You know this kind of introspection drives me crazy."

"Well, it's nothing I can talk about yet, so . . ." I patted her hand.

"That's disgustingly patronizing," she said, getting up. "I'm going to make some tea. Want some?" Now she was miffed, and I was tense with not telling.

Why not just reveal all? I asked myself. An old friend was turning himself into a galaxy.

I cleared away the table instead. That night, unable to sleep, I looked down on Gail in bed from my sitting position, pillow against the wall, and tried to determine what I knew was real, and what wasn't.

I'm a doctor, I told myself. A technical, scientific profession. I'm supposed to be immune to things like future shock.

Vergil Ulam was turning into a galaxy.

How would it feel to be topped off with a trillion Chinese? I grinned in the dark and almost cried at the same time. What Vergil had inside him was unimaginably stranger than Chinese. Stranger than anything I—or Vergil—could easily understand. Perhaps ever understand.

But I knew what was real. The bedroom, the city lights faint through gauze curtains. Gail sleeping. Very important. Gail in bed, sleeping.

The dream returned. This time the city came in through the window and attacked Gail. It was a great, spiky lighted-up prowler, and it growled in a language I couldn't understand, made up of auto horns, crowd noises, construction bedlam. I tried to fight it off, but it got to her—and turned into a drift of stars, sprinkling all over the bed, all over everything. I jerked

awake and stayed up until dawn, dressed with Gail, kissed her, savored the reality of her human, unviolated lips.

I went to meet with Bernard. He had been loaned a suite in a big downtown hospital; I rode the elevator to the sixth floor, and saw what fame and fortune could mean.

The suite was tastefully furnished, fine serigraphs on wood-paneled walls, chrome and glass furniture, cream-colored carpet, Chinese brass, and wormwood-grain cabinets and tables.

He offered me a cup of coffee, and I accepted. He took a seat in the breakfast nook, and I sat across from him, cradling my cup in moist palms. He wore a dapper gray suit and had graying hair and a sharp profile. He was in his mid sixties and he looked quite a bit like Leonard Bernstein.

"About our mutual acquaintance," he said. "Mr. Ulam. Brilliant. And, I won't hesitate to say, courageous."

"He's my friend. I'm worried about him."

Bernard held up one finger. "Courageous—and a bloody damned fool. What's happening to him should never have been allowed. He may have done it under duress, but that's no excuse. Still, what's done is done. He's talked to you, I take it."

I nodded. "He wants to return to Genetron."

"Of course. That's where all his equipment is. Where his home probably will be while we sort this out."

"Sort it out—how? Why?" I wasn't thinking too clearly. I had a slight headache.

"I can think of a large number of uses for small, superdense computer elements with a biological base. Can't you? Genetron has already made breakthroughs, but this is something else again."

"What do you envision?"

Bernard smiled. "I'm not really at liberty to say. It'll be revolutionary. We'll have to get him in lab conditions. Animal

experiments have to be conducted. We'll start from scratch, of course. Vergil's . . . um . . . colonies can't be transferred. They're based on his own white blood cells. So we have to develop colonies that won't trigger immune reactions in other animals.''

''Like an infection?'' I asked.

''I suppose there are comparisons. But Vergil is not infected.''

''My tests indicate he is.''

''That's probably the bits of data floating around in his blood, don't you think?''

''I don't know.''

''Listen, I'd like you to come down to the lab after Vergil is settled in. Your expertise might be useful to us.''

Us. He was working with Genetron hand in glove. Could he be objective? ''How will you benefit from all this?''

''Edward, I have always been at the forefront of my profession. I see no reason why I shouldn't be helping here. With my knowledge of brain and nerve functions, and the research I've been conducting in neurophysiology—''

''You could help Genetron hold off an investigation by the government,'' I said.

''That's being very blunt. Too blunt, and unfair.''

''Perhaps. Anyway, yes: I'd like to visit the lab when Vergil's settled in. If I'm still welcome, bluntness and all.'' He looked at me sharply. I wouldn't be playing on *his* team; for a moment, his thoughts were almost nakedly apparent.

''Of course,'' Bernard said, rising with me. He reached out to shake my hand. His palm was damp. He was as nervous as I was, even if he didn't look it.

I returned to my apartment and stayed there until noon, reading, trying to sort things out. Reach a decision. What was real, what I needed to protect.

There is only so much change anyone can stand: innova-

tion, yes, but slow application. Don't force. Everyone has the right to stay the same until they decide otherwise.

The greatest thing in science since . . .

And Bernard would force it. Genetron would force it. I couldn't handle the thought. ''Neo-Luddite,'' I said to myself. A filthy accusation.

When I pressed Vergil's number on the building security panel, Vergil answered almost immediately. ''Yeah,'' he said. He sounded exhilarated. ''Come on up. I'll be in the bathroom. Door's unlocked.''

I entered his apartment and walked through the hallway to the bathroom. Vergil lay in the tub, up to his neck in pinkish water. He smiled vaguely and splashed his hands. ''Looks like I slit my wrists, doesn't it?'' he said softly. ''Don't worry. Everything's fine now. Genetron's going to take me back. Bernard just called.'' He pointed to the bathroom phone and intercom.

I sat on the toilet and noticed the sunlamp fixture standing unplugged next to the linen cabinets. The bulbs sat in a row on the edge of the sink counter. ''You're sure that's what you want,'' I said, my shoulders slumping.

''Yeah, I think so,'' he said. ''They can take better care of me. I'm getting cleaned up, going over there this evening. Bernard's picking me up in his limo. Style. From here on in, everything's style.''

The pinkish color in the water didn't look like soap. ''Is that bubble bath?'' I asked. Some of it came to me in a rush then and I felt a little weaker; what had occurred to me was just one more obvious and necessary insanity.

''No,'' Vergil said. I knew that already.

''No,'' he repeated, ''it's coming from my skin. They're not telling me everything, but I think they're sending out scouts. Astronauts.'' He looked at me with an expression that

didn't quite equal concern; more like curiosity as to how I'd take it.

The confirmation made my stomach muscles tighten as if waiting for a punch. I had never even considered the possibility until now, perhaps because I had been concentrating on other aspects. "Is this the first time?" I asked.

"Yeah," he said. He laughed. "I've half a mind to let the little buggers down the drain. Let them find out what the world's really about."

"They'd go everywhere," I said.

"Sure enough."

"How . . . how are you feeling?"

"I'm feeling pretty good now. Must be billions of them." More splashing with his hands. "What do you think? Should I let the buggers out?"

Quickly, hardly thinking, I knelt down beside the tub. My fingers went for the cord on the sunlamp and I plugged it in. He had hot-wired doorknobs, turned my piss blue, played a thousand dumb practical jokes and never grown up, never grown mature enough to understand that he was sufficiently brilliant to transform the world; he would never learn caution.

He reached for the drain knob. "You know, Edward, I—"

He never finished. I picked up the fixture and dropped it into the tub, jumping back at the flash of steam and sparks. Vergil screamed and thrashed and jerked and then everything was still, except for the low, steady sizzle and the smoke wafting from his hair.

I lifted the toilet lid and vomited. Then I clenched my nose and went into the living room. My legs went out from under me and I sat abruptly on the couch.

After an hour, I searched through Vergil's kitchen and found bleach, ammonia, and a bottle of Jack Daniel's. I returned to the bathroom, keeping the center of my gaze away

from Vergil. I poured first the booze, then the bleach, then the ammonia into the water. Chlorine started bubbling up and I left, closing the door behind me.

The phone was ringing when I got home. I didn't answer. It could have been the hospital. It could have been Bernard. Or the police. I could envision having to explain everything to the police. Genetron would stonewall; Bernard would be unavailable.

I was exhausted, all my muscles knotted with tension and whatever name one can give to the feelings one has after—

Committing genocide?

That certainly didn't seem real. I could not believe I had just murdered a hundred trillion intelligent beings. Snuffed a galaxy. It was laughable. But I didn't laugh.

It was easy to believe that I had just killed one human being, a friend. The smoke, the melted lamp rods, the drooping electrical outlet and smoking cord.

Vergil.

I had dunked the lamp into the tub with Vergil.

I felt sick. Dreams, cities raping Gail (and what about his girlfriend, Candice?). Letting the water filled with them out. Galaxies sprinkling over us all. What horror. Then again, what potential beauty—a new kind of life, symbiosis and transformation.

Had I been thorough enough to kill them all? I had a moment of panic. Tomorrow, I thought, I will sterilize his apartment. Somehow, I didn't even think of Bernard.

When Gail came in the door, I was asleep on the couch. I came to, groggy, and she looked down at me.

"You feeling okay?" she asked, perching on the edge of the couch. I nodded.

"What are you planning for dinner?" My mouth didn't work properly. The words were mushy. She felt my forehead.

"Edward, you have a fever," she said. "A very high fever."

I stumbled into the bathroom and looked in the mirror. Gail was close behind me. "What is it?" she asked.

There were lines under my collar, around my neck. White lines, like freeways. They had already been in me a long time, days.

"Damp palms," I said. So obvious.

I think we nearly died. I struggled at first, but in minutes I was too weak to move. Gail was just as sick within an hour.

I lay on the carpet in the living room, drenched in sweat. Gail lay on the couch, her face the color of talcum, eyes closed, like a corpse in an embalming parlor. For a time I thought she was dead. Sick as I was, I raged—hated, felt tremendous guilt at my weakness, my slowness to understand all the possibilities. Then I no longer cared. I was too weak to blink, so I closed my eyes and waited.

There was a rhythm in my arms, my legs. With each pulse of blood, a kind of sound welled up within me, like an orchestra thousands strong, but not playing in unison; playing whole seasons of symphonies at once. Music in the blood. The sound became harsher, but more coordinated, wave-trains finally canceling into silence, then separating into harmonic beats.

The beats seemed to melt into me, into the sound of my own heart.

First, they subdued our immune responses. The war—and it was a war, on a scale never before known on Earth, with trillions of combatants—lasted perhaps two days.

By the time I regained enough strength to get to the kitchen faucet, I could feel them working on my brain, trying to crack the code and find the god within the protoplasm. I drank until I was sick, then drank more moderately and took a glass to Gail. She sipped at it. Her lips were cracked, her eyes blood-

shot and ringed with yellowish crumbs. There was some color in her skin. Minutes later, we were eating feebly in the kitchen.

"What in hell is happening?" was the first thing she asked. I didn't have the strength to explain. I peeled an orange and shared it with her. "We should call a doctor," she said. But I knew we wouldn't. I was already receiving messages; it was becoming apparent that any sensation of freedom we experienced was illusory.

The messages were simple at first. Memories of commands, rather than the commands themselves, manifested themselves in my thoughts. We were not to leave the apartment—a concept which seemed quite abstract to those in control, even if undesirable—and we were not to have contact with others. We would be allowed to eat certain foods and drink tap water for the time being.

With the subsidence of the fevers, the transformations were quick and drastic. Almost simultaneously, Gail and I were immobilized. She was sitting at the table, I was kneeling on the floor. I was able barely to see her in the corner of my eye.

Her arm developed pronounced ridges.

They had learned inside Vergil; their tactics within the two of us were very different. I itched all over for about two hours—two hours in hell—before they made the breakthrough and found me. The effort of ages on their timescale paid off and they communicated smoothly and directly with this great, clumsy intelligence who had once controlled their universe.

They were not cruel. When the concept of discomfort and its undesirability was made clear, they worked to alleviate it. They worked too effectively. For another hour, I was in a sea of bliss, out of all contact with them.

With dawn the next day, they gave us freedom to move again; specifically, to go to the bathroom. There were certain waste products they could not deal with. I voided those—my

urine was purple—and Gail followed suit. We looked at each other vacantly in the bathroom. Then she managed a slight smile. "Are they talking to you?" she asked. I nodded. "Then I'm not crazy."

For the next twelve hours, control seemed to loosen on some levels. I suspect there was another kind of war going on in me. Gail was capable of limited motion, but no more.

When full control resumed, we were instructed to hold each other. We did not hesitate.

"Eddie . . ." she whispered. My name was the last sound I ever heard from outside.

Standing, we grew together. In hours, our legs expanded and spread out. Then extensions grew to the windows to take in sunlight, and to the kitchen to take water from the sink. Filaments soon reached to all corners of the room, stripping paint and plaster from the walls, fabric and stuffing from the furniture.

By the next dawn, the transformation was complete.

I no longer have any clear view of what we look like. I suspect we resemble cells—large, flat, and filamented cells, draped purposefully across most of the apartment. The great shall mimic the small.

Our intelligence fluctuates daily as we are absorbed into the minds within. Each day, our individuality declines. We are, indeed, great clumsy dinosaurs. Our memories have been taken over by billions of them, and our personalities have been spread through the transformed blood.

Soon there will be no need for centralization.

Already the plumbing has been invaded. People throughout the building are undergoing transformation.

Within the old time frame of weeks, we will reach the lakes, rivers, and seas in force.

I can barely begin to guess the results. Every square inch

of the planet will teem with thought. Years from now, perhaps much sooner, they will subdue their own individuality—what there is of it.

New creatures will come, then. The immensity of their capacity for thought will be inconceivable.

All my hatred and fear is gone now.

I leave them—us—with only one question.

How many times has this happened, elsewhere? Travelers never came through space to visit the Earth. They had no need.

They had found universes in grains of sand.