

The Interoperation

Architecture had given way to software management. So he turned buildings into construction programs.

By Bruce Sterling

Yuri pulled his sons from school to watch the big robot wreck the motel. His wife had packed a tasty picnic lunch, but 11-year-old Tommy was a hard kid to please. "You said a giant robot would blow that place up," Tommy said. "No, son, I told you a robot would 'take it down,'" said Yuri. "Go shoot some pictures for your mom." Tommy swung his little camera, hopped his bamboo bike, and took off. Yuri patiently pushed his younger son's smaller bike across the sunlit tarmac. Nick, age seven, was learning to ride. His mother had dressed him for the ordeal, so Nick's head, knees, feet, fists, and elbows were all lavishly padded with brightly colored foam. Nick had the lumpy plastic look of a Japanese action figure.

Under the crystalline spring sky, the robot -towered over the Costa Vista Motel like the piston-legged skeleton of a monster printer. The urban recycler had already briskly stripped off the motel's roof. Using a dainty attachment, it remorselessly nibbled up bricks.

The Costa Vista Motel was the first, last, and only building that Yuri Lozano had created as a certified, practicing architect. It had been "designed for disassembly," way back in 2020. So today, some 26 years later, Yuri had hired the giant -deconstruction--bot to fully reclaim the motel's materials: the bricks, the solar shingles, the electrical fixtures, the metal plumbing. The structure was being defabricated, with a mindless precision, right down to its last, least, humble hinges.

As he patiently guided the wobbling Nick across the motel's weedy, deserted parking lot, Yuri's reaction to the day was deep relief. He had never liked the Costa Vista. Never--not since it had left his design screen.

Once it had looked so good: poised there, safe within the screen. He'd been so pleased with the plan's spatial purity, the way the 3-D volumes massed together, the nifty way the structure fit the site But the motel's contractors had been a bunch of screwups. Worse yet, the owners were greedy morons.

So Yuri had been forced to stand by while his digi-tal master plans were cruelly botched at the hands of harsh reality. Cheap, flimsy materials. Bottom-of-the-barrel landscaping. Tacky signage. Lame interior décor. Even the name "Costa Vista" was a goofy choice for a motel off an interstate in Michigan.

Yuri had derived one major benefit from this painful experience. He had stopped calling himself an "architect." After his humiliation at the Costa Vista, he'd packed up his creative ego and thrown in his lot with the inevitable.

He had joined the comprehensive revolution attacking every aspect of the construction--architecture--engineering business. The "Next Web." The "Geo-Web." "Ubiquity." The "Internet of Things." It had a hundred names because it had a thousand victims, for the old-school Internet had busted loose to invade the world of atoms. Not just certain aspects of harsh reality--the works.

The architect's blueprints were just the first frontier to fall to comprehensive software management. The structural engineering would go, too. Then construction: the trades, the suppliers Then the real-estate biz, the plumbing and electrical, the energy flows, the relationships to the city's grids and the financing sector, the ever-growing thicket of 21st-century sustainability regulation: yes, all of it would digitize. Everything. "Total building life-cycle management." People didn't wire houses anymore--they "sheltered the network."

Nowadays, in the stolid and practical 2040s, Yuri called himself the "sysadmin-CEO" of the "Lozano

Building Network." Yuri's enterprise was thriving; he had more work than he and his people could handle. He had placed himself in the thick of the big time. Whenever he carved out one day off to spend with his two sons, a sprawling network sensed his absence and shivered all over.

The Lozano Building Network was ripping up dead midwestern suburbs and heaving up sustainable digital buildings by the hundreds. That was the work of the modern world.

Yuri knew that system: its colossal strength, and its hosts of cracks, shortfalls, and weaknesses.

Yuri also knew that his company's contract buildings were crap.

Ninety percent of all buildings were always crap. That was because 90 percent of all people had no taste. Yuri understood that; he was almost at peace with that. But it still burned him, it ached and it stung, that he had never built a thing that deserved to last.

The Lozano Building Network didn't create fine buildings. It instantiated shelter goods. The mass of workaday, crowd-pleasing real-estate fakery that arose from his network wasn't "architecture." It was best described as "hard copy."

To watch this building disassembled in this sweet spring morning reminded him that his life hadn't always been this way. In his own sweet spring, Yuri had dreamed of creating classics. He'd dreamed of structures that would tower on the planet's surface like brazen, gleaming symbols of excellence.

Yuri had never built any such place. He was coming to realize, with a sinister middle-aged pang, that he never would.

Watching the Costa Vista Motel disappear without a trace--no, he couldn't call himself unhappy about that. He felt eased and liberated. Denied the glory, he could at least erase the shame.

Tommy, always a bundle of energy, had pedaled all around the doomed motel. Somewhere, the kid had ditched his safety helmet. "Look, Dad, why don't you just blow it up? The way that big dumb robot picks at it, this'll take us all day!"

"We've got all day," Yuri told him serenely. "Tonight we bring jackhammers."

Tommy brushed hair from his eager eyes. "Jackhammers, Dad? Can I touch the big jackhammers?"

"Maybe, son. If you don't tell your mom."

Nick yelped, jealous for attention. "Come on, Dad! Push the bike, push it, Dad!" Nick was the frailer and smarter of the two boys. His mother doted on him.

Yuri hitched his pants and shoved Nick's bike. The kid almost had the hang of it. Yuri secretly let him go.

Nick rolled off beautifully, his padded feet eager on his pedals. Then instability set in. Nick teetered into a wobbly, desperate struggle. Finally he crashed.

Tommy circled his fallen brother, derisively ringing his bike bell. "Get up, wimp, loser!"

Yuri bent and disentangled Nick from the candy-colored frame. "Fail early, fail often, Nick. You're not hurt."

"I'm not hurt," Nick agreed mournfully.

"A ride in a parking lot is just prototyping. Get back in your saddle."

Nick balked, and looked searchingly into Yuri's face. "Are you sad, Dad? You look sad."

"I'm not sad, son."

"I'll never learn how to ride a bike. Will I?"

"Yes, son, you will! You will master this bicycle! A bicycle is the world's most efficient means of transportation! And this bicycle will give you--Nicholas Lozano--a vastly increased power to navigate urban space!"

Nick was properly impressed. He climbed back on his bike.

"Nick, you are learning this much faster than your brother did. Don't tell Tommy I said that."

"Yeah, sure, Dad! Okay! Push me now!"

Tommy zoomed back and skidded to a sudden halt, his freckled face pale. He slung his arm out. "Dad, Mom is coming! And she brought Aunt Carmen!"

Yuri glanced across the lot. Tommy's dire news was true.

Tommy was panting. "Are we in big trouble, Dad?"

"You'd better let me handle this."

Yuri's wife and sister-in-law floated toward him on twin Segways. Like their famous father, the Roebel sisters were obsessed with Segways. After 45 years of niche applications, the ingenious machines had achieved a certain period charm, like monorails and the Graf Zeppelin.

It was unlike Gretchen to show up when he was taking some quality time with the boys. On the contrary: when the kids were out from underfoot, Gretchen indulged herself by taking scented bubble baths and surfing upscale websites.

And Carmen was here with her, all the way from San Francisco. Carmen, arriving with no warning? Carmen? Nobody had ever been able to do a thing with Carmen.

The Segway smoothly bobbed into place, and his wife's narrow face was the picture of woe. "Oh, honey, it's just the worst."

"Somebody's died?"

"No, no," Carmen wailed. "My dad got a big new commission!"

The people who were nearest to François Roebel were a frantically unhappy lot. For Roebel was a grand master of computer-aided architecture.

Roebel was a major world architect who had forced digital design to speak its own aesthetic language--comprehensive, authentic, symphonic. His signature buildings were like nothing previously seen on planet Earth. They made the work of Gehry and Calatrava look like dress rehearsals.

Roebel himself was a squinty, boozy, bewhiskered little geek. He had an ego the size of the rock of Gibraltar and was given to splashy overspending, frantic womanizing, major fits of temper, and impromptu trips to Indonesia.

Certain people imagined that he, Yuri Lozano, had married Gretchen Roebel in order to get closer to her

famous architect father. The truth was entirely the opposite: he'd married Gretchen in order to take her far away from Roebel. Snatching Gretchen from her dysfunctional family was like hauling a young woman from a burning car.

Yuri had no regrets about his bold intervention. Gretchen loved him, and besides, the scary example of Carmen had fully validated his choice. Carmen had never escaped from the black-hole orbit of -Roebel, who'd always been the center of his own private universe. So poor Carmen had ended up exactly like her late mom: a doomy, subservient, hand-flapping mystic with a brain like scattered granola.

For François Roebel, architectural design space was a dark and terrible domain. It was a harsh arena of combative nightmare, a realm of endlessly ramifying pull-ins, pop-outs, twists, deformations, mirrored ramps, and cryptic passages. Ever the hero within his own mind, Roebel relentlessly pushed design software past all sane limits, feverishly conjuring structures, then bullying them into raw physical existence in a welter of lawsuits and scandals.

Roebel had lived for decades on the virtual-actual edge, where the unprecedented phantoms roiling in his screen became awesome urban showcases fit to stun and amaze passers-by. Given their wild-eyed engineering, they might also spindle and mutilate their inhabitants, but the risks of his art to others never concerned the great man.

For Roebel, anyone willing to settle for less than the insanely great was a traitor to be pitilessly scourged. Roebel made enemies the way lesser men made popcorn.

Yuri took a train to San Francisco to pay court to the grand master. It took him two days to arrive on Roebel's doorstep.

Roebel, as was his habit, was all ticked off about that.

"Where the hell is Carmen?" Roebel screeched. "I haven't had a decent meal in five days! Carmen's trying to starve me!"

The ancient visionary, always scrawny, looked downright spidery by now--he'd lost so much flesh that he'd been reduced to vector graphics.

"Oh, the nephews always love a visit from their favorite aunt," Yuri lied gallantly.

"I am the very last global starchitect! I am the last instantiation of a dying breed!" rasped Roebel. "And you couldn't fly over here?"

"I needed some time on the train to clear my construction agenda," Yuri soothed. Yuri always agreed to "help" Roebel with his projects. There was very little risk in this. Sooner or later, Roebel's clients always realized that Roebel had become impossible.

The genius could be humored, but only when his burning obsessions were channeled into some narrow, immediate path.

So Yuri loudly dragged a clanging metal chair over the naked cement of Roebel's dusty garage studio. He set himself before the architect's legendary personal workstation, jacked up a knee, and bridged his fingers over it. "So, François, here I am at last. Just show me what you've got. Let's see all the concept sketches!"

Roebel tottered over, rolled up his blue linen sleeves over his stick-thin, liver-spotted forearms, and reached reluctantly through a clutter of empty sport-drink cans. He fished out a cheap toy peripheral. It was a skull-wrapping plastic headset, badly faded with age. "I'm sure you've never seen one of these."

"Tell me all about that."

Roebel drew himself up regally. "I'm sketching in ClearWorks with this cortico-cognitive headset!"

Yuri cleared his throat. "You're designing in ClearWorks? With some kind of brain-reader gizmo?"

"ClearWorks is the finest design program ever crafted!"

"François, ClearWorks is 30 years old." Roebel would be better off with pencils and a set of children's blocks.

"Well, what the hell are you here for?" Roebel barked. "I need you to make ClearWorks interoperate with that foul malarkey that your nest of thieves calls software!" Roebel was breathing heavily. "Those so-called 'tools' you use--you can't drill one hole in a girder without 40 interlocking safety forms!"

"If you're having trouble with your system, I'd be glad to have a look." Yuri popped the chromed clips on his moroccan-leather shoulder bag. "I brought some top-end diagnostics in the laptop."

"Put that stupid toy away, I know you're a software monkey!" snarled Roebel. "ClearWorks is architecture! Because it's software architecture by an information architect!"

"I haven't seen ClearWorks since I left college," said Yuri. "Does ClearWorks interoperate with current legal codes?"

"I need your lawyers like I need a hole in the head!"

His question answered, Yuri offered a sunny smile. "I always loved that kind of boldness, François! Fire up your program--let's have a good long look!"

With his bluff called, Roebel reluctantly pressed the lozenge-shaped metal Start button on his towering desktop engine. Roebel still used a specialty CAD workstation. The discolored machine, its shell scrubbed with acetone and its keyboard worn to nubs, had a militant, strutting, look-at-me-being-all-cyber aesthetic. Roebel's workstation looked fit to redesign the whole Milky Way, though, truth be told, it had about 10 percent of the processing capacity of a modern kid's throwaway wristwatch.

"User lock-ins and proprietary formats," Roebel muttered, his throaty old-man's voice matching the ancient growl of his workstation's stricken hard disk. "Those punk-ass chumps in the channels of distribution, they won't even show you the end-user license agreements."

The archaic vacuum tube flickered as the workstation struggled to boot. "And what on earth happened to the people?" Roebel griped, avoiding Yuri's eyes. "The banks, the unions, the professions, every level of government ... all of 'em melted down into one giant ball of software mud! No more creative giants ... they're all nickel-and-dime windup monkeys in a crazy world that gets more interactive every day!"

"Tell me about your client," said Yuri, angling for a change of subject.

Roebel gave a sly yellow grin. "The Church of Symbiosis."

"They're commissioning another temple from you? That's terrific news," said Yuri. His heart sank.

The Church of Symbiosis ... could it get any worse than this? François Roebel was the picture of sanity compared with his favorite clients.

The Church of Computer-Human Symbiosis was an aging group of California hacker cranks who had

inherited the vast fortune of a vanished social-software company. They had long been Roebel's ideal patrons, for they were crazily rich, all-forgiving, and incapable of judgment.

Over the decades, Roebel had built the cult an awesome set of monumental churches. His temples were top-end architecture glamour hits; glossy photo books about them weighed down coffee tables on six continents.

Nobody ever worshiped in the amazing churches Roebel had built, because the cult was too crazy and scary. Furthermore, the roofs leaked and all the utilities malfunctioned. Still, that didn't much matter to the cultists. They were serenely indifferent to such earthly concerns, since they spent most of their waking lives playing immersive simulation games.

Roebel tinkered aimlessly with his keyboard. The glassy screen was blank.

"It'll launch any minute," he lied. "The system's been a little temperamental."

Pity gnawed at Yuri. Pity was a dangerous sentiment in the company of the grand master, but Yuri couldn't help it. Year by year, Roebel had lost so much. His fancy downtown office, his staffers, his financial contacts, his engineers and subcontractors. Roebel still worked--when he worked at all--on this ancient CAD system designed for building French fighter aircraft.

The screen flickered. "There it goes," he crowed, as if the machine's effort had achieved something. "I'll just have to strap on the skull set. Later."

Whatever had happened to the old man? Normally he'd shed a violent storm of wild schemes and concepts, each one less practically achievable than the last.

Yuri wasn't sure if this grim void meant disaster or deliverance for him. In either case, he felt sincere dismay.

"François, I have a very positive feeling about your new commission. We'll have a job of work with the interoperation issues, but at least we've got a client sympathetic to your aims."

Roebel squinted. "You're not fooling me any, you know."

"I beg your pardon?"

Roebel tossed his peripheral aside and abandoned his keyboard. "Just knock all that off, that crap when you sweet-talk me! You sound like a real-estate agent! You ran off with my daughter--and that's the last thing you did that took any guts! You never soar, boy! You're like a pig in mud!"

"Let's take that discussion offline," Yuri said. "Let's call Gretchen right now, and the grandsons, back in Michigan. They'll be wondering how things are going here. You never call us, you know."

"A 12-year-old and an eight-year-old."

"The boys are 11 and seven."

"I was thinking ahead. Do I look like I want to wet-nurse your kids? I just received a major commission! 'Back to Michigan'--to hell with your Michigan. That whole place is nothing but forest! You can hear the crickets chirping in Flint, Saginaw, and Grand Rapids! Your kids are like two sandlot baseball kids straight outta Norman Rockwell! And Gretchen ... Gretchen doesn't even show up here! Where the hell is she--still putting her spice racks in order?"

"Gretchen looks after the network in my absence. She's got a talent for billing and accounting."

"That's not a 'talent,' you dolt! I know you understand what's really at stake here! I taught you architecture when you were some cornshuck kid from Kentucky wandering into my office like a lost soul! And speaking of lost souls--where the hell is Preston? I told Preston to be here with us half an hour ago!"

Preston Mengies was an architecture critic who had once been the PR man in Roebel's San Francisco office. He had earnestly pumped up Roebel's worldwide reputation, until his doomed relationship with the hopelessly unstable Carmen Roebel made that effort impossible.

Despite everything Preston had suffered at the old man's hands, he arrived. He'd bicycled in from South of Market and thoughtfully brought some Chinese food.

Yuri sorrowed at the sight of him. Preston -Mengies had once been a very sharp and fluent guy--a sarcastic little weirdo, to tell the truth, but fun to hang around with.

As a result of his long entanglement with Roebel, though, he had become a threadbare, gaunt, myopic, beaten character.

Nowadays, Preston spent his lonely hours grooming architecture websites. There he gamely removed the moronic popular commentary and tried to drum up some intelligent interest in the doctrines of Arts & Crafts, Futurism, the modern movement, the postmodern movement, and New Urbanism.

These were architectural schemes that long--forgotten people had created with pencils on paper. No proper 21st-century person could tell these primi-tive notions apart. Still, some critic was bound to take a keen interest in such efflorescences of human genius, and it was bound to be some weedy obsessive like Preston Mengies.

Roebel sipped and scowled at the hot-and-sour soup, but he had clearly lost the thread of the action. All the old man could do was bitterly rant about "lawyers" and "hoodwinking" and "bank fraud." The client's demands had caught him flat-footed. When he tottered off for his customary afternoon nap, it was a relief for all concerned.

He left Yuri and Preston to patch something together for the client's imminent visit.

"How are the kids?" ventured Preston, who had never had any kids.

"The boys are both great, thanks."

"They're normal kids?" said Preston, his eyes flickering sideways.

"Oh, yeah, they're completely normal boys," said Yuri. "Not at all like the maestro there; they just faded right back into the universal gene pool."

Preston brightened at this sally; he was a critic, so a little acerbic sarcasm always cheered him up. He munched his cold shrimp chow mein and gestured at the workstation with his cheap plastic chopsticks. "Did he ask you to touch that dinosaur? I sure wouldn't touch that wreck if I were you."

"Why is that, Preston?"

"You know how he's trying to patch that fossil to modern standards--and to get his own way, right in the teeth of the entire construction industry? Well, he finally blew it. He had a massive, comprehensive data loss. No upgrade path forward. And no way back. He's completely stuck now. He's neck deep in the mud of defunct code."

Yuri munched a heat-blistered egg roll stuffed with gleaming California tofu. "He claimed he was designing on ClearWorks. I just couldn't believe that."

"Nobody runs ClearWorks," scoffed Preston. "That's the greatest design platform ever created, but no modern professional could use it. It doesn't interoperate with other disciplines."

"It's even worse than that," Yuri admitted. "Out in the Midwest, we do interoperate, so we became all the other disciplines. As soon as I gave up on 'architecture' and admitted that I was administering software, well ... step by step, I took over the site, the structure, the skin of the building, all the services. We supply the space plans; we even retail the furnishings. But we're never architects. Not at all. We're real estate, interior design, engineering, landscaping, plumbing, electrical ... we're the Net."

Yuri knotted his hands. "And it's all bucket-of-mud piece-of-junk legacy code! Every bit of it! Those programs all hate each other's guts! I spend 90 percent of my working time as a software clerk!"

"So basically, you never design and you never create. You just interoperate."

Yuri considered this grim assessment. "Well, yeah, that's pretty well put."

Preston warmed to his theme. "But you have to do that. Because there's a shearing force in all those different layers of software. It's a thing of eddies, and whirlpools, and brief bursts of financial energy. And the craft of architecture sold its soul so that it could survive there."

Yuri set aside a stenciled carton of moo goo gai pan. "Can I ask you something? At the Milwaukee Design Regulation Board, I've got this big keynote speech coming up ..."

"How long a speech?"

"Full hour. Big dinner speech. Man, I hate those."

"How big a crowd?"

"I dunno--seven, eight hundred. Typical industry drones."

"Could you give me a grand to write that for you?"

Yuri blinked a little. "Yeah, sure, okay."

That money was peanuts, but it was clearly more cash than Preston had seen in a while, for he sat up in his steel-framed chair and seemed to regain his appetite. "Well, there's one consolation in all this. Roebel's never gonna do another building."

Yuri laughed. "Oh, sure, people keep saying that, but he keeps surprising 'em. That mean old man is gonna bury us all! He's gonna live to be 90 years old!"

"Roebel *is* 90 years old."

Yuri did some swift mental arithmetic. "Darn--where does the time go?"

Preston snagged an empty can from the desktop. "This is all he eats now--these vitamin drinks. Carmen dragged him into a couple of clinics last year. They took one look at him and they washed their hands. I don't know how he stays on his feet. He persists out of sheer spite."

Yuri considered this bleak diagnosis. Yes, François was especially gaunt and erratic, even for François. There had been one little flash where he was like his keen old self, but ... no concept sketches? François

Roebel was 110 percent concept sketches. "Maybe the lamp finally went out."

"Yeah, 'the well ran dry.' That's what Carmen says. You add that to his big software crash, and ..."
Preston flapped his hands. "It's Game Over for Pac-Man."

"Carmen came to visit us. Carmen seems pretty distraught about all this."

Carmen Roebel was always distraught--Carmen was the Queen of Distraughtness--but Preston took that news hard. It had him all itchy and gritting his teeth. The poor guy still carried a big torch for -Carmen. That was a pitiful thing to see.

"She's up to her ears in debt," said Preston. "Did she tell you that?"

In point of fact, Carmen had swiftly hit Yuri up for a personal loan. Every member of the extended -Roebel family hit Yuri up for loans. He'd come to consider that a basic cost of his business, something like a corporate gift to a Little League team.

Yuri sighed. "I don't suppose that François would write his will and put his affairs in good order."

"François wouldn't leave Carmen a dime! If he had a dime, he'd endow the François Roebel -Perpetual Commemoration Fund." Preston shook his head. "After all these years, it's come to the crunch! Those church lunatics will show up here soon ... they want to see his proposal. He's gonna fire up that relic there, and he'll show them a screen full of snow."

An empty silence stretched in Roebel's spider hole of an office, and somewhere a seagull screeched.

Yuri was no longer an architect--in point of fact, he'd probably never really been one--but he'd spent his whole adult life glossing over the bitter contradictions between complicated systems of software.

There just had to be a hack somewhere for a dire situation like this one.

"Preston, I know that this isn't quite honest, but--suppose you show 'em something out of the old man's archives? He must have dozens of unbuilt proposals. Surely those clowns can't tell the difference anyway."

"The old man sold those clowns his archives. He sold them all his files three years ago. The church paid top dollar for them, too. They've got 'em all stored down a zinc-lined bomb shelter someplace."

How, where, and why did computers let crazy geeks make so much money? Yuri wondered. Had the world ever been better off for that? Seeding the world with computers was like sprinkling it with the fairy dust of pure madness.

Preston had the shameless look of a guy doing something very stupid for the woman he loved. "Listen, Yuri: for you this story must seem pretty simple. The old man loses this commission--so what? You're doing great out there in the Rust Belt. Because you're in deconstruction; you could spend the rest of your life just tearing down the Motor City. But Carmen needs that retainer fee. She's at her wits' end."

Poor old Preston. If only he'd found the courage to abandon his idealistic dreams and take some practical action! Just tell the old man off, clonk the girl on the head, throw her into the trunk of a car, and drive off across a state line!

But it took a certain hillbilly lack of savoir faire to do something so blunt, immediate, helpful, and misogynistic. That basic course of action had worked out fine for Yuri, but Preston possessed a gentler and more refined sensibility.

The cuffs of Preston's pants were badly frayed. This tiny detail was somehow Yuri's tipping point.

"Okay," he said, straightening, "I tell you what we're gonna do here. I'm gonna fire up ClearWorks and put the program through its paces. When that old man comes back here from his nap, I'll get him jump-started on something."

Preston scratched his bald spot. "You really think you can do that?"

"Yeah. I know I can do it. Because I was his star student once. It's pretty simple with François. You just do something that's very clear and simple and obvious. Then he gets all excited and he bawls you out. He can't help taking over the work and redoing it all himself. So: if this piece of junk runs at all, well, the two of us will cook up some concept plan. It doesn't have to be the Taj Mahal for him to show it to his favorite client."

Preston had no better scheme to offer. He left Yuri in peace with the machine.

Yuri woke the workstation and settled in.

When he first saw the ClearWorks interface, he felt a shock of profound nostalgia. Yeah, it really was ClearWorks running there! No kidding!

ClearWorks was a simple white pane with a pair of tiny, almost invisible icons in the upper right corner. ClearWorks was so entirely clear that it looked starkly absurd. Compared to Yuri's working interfaces for the modern construction business, ClearWorks was alien.

Where was the riffling host of toolbars, templates, menus, dynamic panels, auto-updaters, dialog panels, widgets, dashboards, collision detectors, and tags? Where was the bustling cloud of counters, winkers, beepers, and blinkers?

ClearWorks was a void. A glassy, glossy innocence. ClearWorks was as pearly-white and blank as the inside of a skull.

The program's mouse, or rather its airborne bat, sat atop Roebel's workstation. When Yuri's fingertips gripped the familiar ridges of the wand, the look and feel of the program came back to him as if college were yesterday.

Space and form. Yuri was peeling through space and form. Through the torque in that bat he could actually feel space--the massiness of space, the shapeliness of space. The orderliness and rightness of planned spatiality. Geometry sliced through the white panes of simulation like a white ceramic knife through pure white cheese.

ClearWorks did just one thing well: it did form. ClearWorks did nothing but form. ClearWorks was a world in which there was only form.

Yuri recalled that ClearWorks had been programmed by just one guy. It was the brainwork of a single geek, some embittered dissident from the early CAD business. The name of this lonesome genius was Greg Something, or Bob Something, or Jim -Something, and he was the type of arrogant, self-aggrandizing, utterly unworldly, Unix-bearded software-genius figure who wanted to create a programmatic universe all by himself.

Greg-Jim-Bob had never managed that feat, but he'd managed to create ClearWorks. That program had become a legend among its users. All the cognoscenti and digerati and designerati vied to praise ClearWorks. Of course, nobody actually used it. If you gave people the tools that were perfect for their jobs, they'd have nothing to do but their jobs.

The whole secret of the network revolution was that it connected everybody, and it therefore caused everybody to do everybody else's jobs.

It came to Yuri with a shock that ClearWorks did not interoperate. No. ClearWorks didn't even hook to the Internet. ClearWorks was a single tool for one single human mind. There was no crowdsourcing in it, no open-source collaboration, no "with enough eyes all bugs are shallow" ... no add-ons, no plug-ins, no open application programming interfaces.

ClearWorks was a simple bone-white space for imagination.

Yuri couldn't believe the program was such a little sandbox. He could remember tackling ClearWorks as a student. At the time, he had felt the program was incredibly advanced: it was cosmic, infinite, awesome.

How had ClearWorks become such a tinkertoy?

Yuri shook his head and recalled his purpose. The task at hand was some conceptual proposal for a -François Roebel temple. The maestro might ramble in from his nap at any minute, and Yuri had to show him something sure to snag his interest.

What the heck, any pastiche had to start somewhere: the Golden Rectangle. Always a sound choice: it never looked awkward no matter how it was used.

Bang, up it came, the good old Golden Rectangle, and then: boo000000ooom ... that was the oldest, purest joy of computer design: the effortless replication. Yuri gripped his little wand. Hook a twist on that series--a ram's-horn fractal thing ...

What would the maestro do? Well, he'd do something off the wall that nevertheless seemed eerily necessary. Because despite his many personal quirks, Roebel was the true golden wizard of the rubrics of assemblage: "The parts grow out of the rules, while the rules grow out of the parts."

Insert a barrel vault. Who couldn't like barrel vaults? Especially intersecting barrel vaults. Multiple intersecting barrel vaults.

Yuri forgot himself. He forgot his purpose; he forgot where he was. The chair vanished and the screen became vapor. Yuri splashed in pure potentiality, free of care, liberated, purely enjoying himself ...

Until it dawned on him that Roebel wasn't going to much care for this plan. The plan had a whole lot going on, but the plan wasn't very François Roebel.

Worse yet, the strict limits of ClearWorks were starting to bug Yuri. ClearWorks was a 30-year-old program. Furthermore, the whole shebang had been created by just one guy, and though he had made a really cool sandbox, it was pretty much nothing but sand.

Yuri had begun to sense the way the programmer thought. No geek from 30 years ago could ever think like a modern builder. Though he had a cunning intuitive arsenal of cool ways to assemble his sand, he lacked any cool ways to disassemble his sand.

It was as if he thought that real buildings went up in some Platonic cyberspace where gravity, friction, and entropy had never existed. Where the passage of the years was just an abstraction. The author of ClearWorks was pure geek, so he didn't realize that when you meshed bits and atoms, you had to respect the atoms. Bits were the servants of atoms. "Bits" were just bits of atoms.

Bits came and went at the flick of a switch, but atoms had deep and dark and permanent physical laws. Atoms didn't go away when you shut down the screen. When you lacked a responsible way to deal with

the atoms, you were a menace to yourself and all around you.

Armed with this ethical knowledge, Yuri set to work to repair the oversight. Suddenly ClearWorks was fighting him all the way. To get ClearWorks to tear apart its own constructions, Yuri had to break its elements right down to their little, least, voxel-sized bricks.

Now Yuri really had a fight on his hands. The program had been mumbling along in its Wagnerian grandeur, all pale timeless majesty and the sonorous sawing of spatial strings--but Yuri's blood was up. He heard a Ride of the Valkyries in his mind's ear, a -Götterdämmerung theme song He had to tear that pure simplicity apart.

Break! Decay! Come apart, you stupid Total Work of Art! Quit trying to hold yourself together in defiance of all sense and sanity! From pixels you are, and to pixels you shall return

Light clicked on overhead. Preston was standing at the doorway, a beer in hand. Somehow, day had become evening.

"Are you still at it in here?"

Yuri blinked. "Is it late?"

"Yeah, you've been in here for five solid hours!"

Yuri abandoned the office chair. Suddenly his back was killing him. "Where's François?"

"The clients woke him," said Preston. "We're feeding them cocktails over in the solarium--cocktails, and hogwash." Preston walked over and stared. "Wow."

"I tinkered around."

"That's looking pretty different. That's looking ... pretty fresh."

"Design for disassembly," said Yuri. "I had to put it all on a kind of loop."

Preston watched the animated screen, absently sipping his beer.

"You know," he mused at last, "there is an aesthetic quality to old computer graphics that is truly haunting. It's very much like the scary, Gothic quality of silent film. Mankind will never be able to simulate buildings this badly again."

"I could work on the color tonalities."

"No, no, leave that, leave it!" Preston snatched the bat from Yuri's hand. "Did you use the cortico--cognitive headset?"

"What?"

"That neural brain-reading consciousness gizmo?"

"Oh, that," said Yuri. "It's funny, but I never even plugged that in."

"That instant brain reader was supposed to be extremely 'useful and convenient.'"

Yuri shrugged. "You can't step in the same river twice."

A stranger peered into Roebel's office, then stepped inside. He was young, nattily dressed in a tailored

suit, and he carried a fancy valise.

"What have we here?" he said.

"You've found the old man's design office," -Preston told him. "Yuri Lozano: Mark Quintaine. Mark is a local attorney."

Quintaine had an elegant haircut, a very practiced manner, and a slightly eccentric business suit. He might also conceivably have been gay, but those were just his San Francisco regionalisms: oh, yeah, this guy was a real-estate lawyer, all right. Yuri had met so many that he could smell them by now.

The code and the law: they were two sister practices. One of them was logical, and humane, and rigorous, and the backbone of civilization. And the other was crazy, and snarled, and corrupted, and full of loopholes. And nobody could tell which was which.

Quintaine's nostrils flared as he stared around the office. There were holes in the sheetrock, and nobody had dusted the blinds. He jerked his thumb over his pin-striped shoulder. "Did he have to string the power cables right over the door frame? That's not very feng shui."

Preston was quick to sense a slight. "I wouldn't have guessed that the Church of Computer-Human Symbiosis was so into feng shui."

"I never speak ill of my clients," said Quintaine, "but after the five solid decades those geezers have spent immersed in game environments, Chinese set design is the least of their problems."

This was a charming remark, and despite the fact that the man was a lawyer, Yuri found himself won over.

"I take it you're not a member of the church."

"My parents were members of that church," said -Quintaine. "They took me into every temple ever built by the maestro in there ... they are all works of genius. But if you spend enough time in the presence of a well-nigh supernatural talent, it can get a little samey." He had been drinking. "I'm sure the world could do with another François Roebel masterpiece, though." Quintaine had a long, goggling look at the workstation's flickering screen. "My God in heaven! What has he done?"

"That's not a François Roebel masterpiece," said Yuri.

"Okay, I can see that, but what is that thing? It looks like a million giant ants are eating Notre Dame."

"It's a little something I just cooked up."

"You're an architect?"

"Once. Yeah."

Quintaine lifted a brow. "'Once'?"

"I don't call myself that. Not anymore."

This remark hit Quintaine hard. "I used to call myself a lawyer." He dropped into the office chair and stared at the busy screen. "It took me a while to figure it out: I don't practice law. I am a fixer. I practice all kinds of stuff: Urban politics. Acquiring properties. Managing upkeep. The piecemeal growth of holding funds. Sweeping problems under the rug for the time being--I'm required to do a whole lot of that."

"That sure sounds like the law to me," Yuri said.

Quintaine looked up. "But I don't have any human clients."

"Really?"

"It's true. My only true client is a large sum of money. And the way that wealth-management system was structured ... well, it was so complex and restrictive that everybody ran away from it. Even the geeks who were supposed to own that wealth have fled into a fantasy world. That wealth is like some vast black bowling ball that rolls up and down Silicon Valley. Do you guys remember that word, 'silicon'?"

"I loved silicon," said Yuri.

"Oh, me too," said Preston with fervor. "Silicon used to be 25 percent of the planet's crust!"

"So I had it figured," said Quintaine, "that we would commission François Roebel and throw that 'Permanent Construction Fund' at him. Roebel is notorious for never completing any building on time or under budget. If you look at the way that construction fund was structured--well, we're a lot better off with fantastic, impossible, never-realized buildings. In today's sustainable economy, it's the total cost of ownership and the price of recycling that kill us."

"That's extremely interesting," said Yuri. "I hadn't heard a lawyer frame that issue like that before."

"California state law is always well ahead of the global and national curves."

"Yeah, that's right."

"Now that you've come up with this exciting proposal," said Quintaine, confronting the workstation, "I'm getting a brain wave. This plan here is not even a 'building,' as far as I can figure. The way the structure keeps looping around like that--that's a process that's permanently under construction and deconstruction. There's no final state where one has to legally sign off and accept ownership. So that's not a 'building,' legally speaking. That's a process. It's a process in permanent interoperation."

"Mr. Quintaine, you must be a pretty good lawyer."

Quintaine spun himself in the chair. "My firm has stopped calling itself a 'law firm,' actually. We've moved into another set of practices that are ... well ... much more contemporary."

Yuri shot a look at Preston. In a gesture so subtle as to be almost invisible, Preston brushed one finger against his lips.

"When you've lost control of the flow of events," Yuri told the mirror, "your duty is to hope and plan for happy accidents."

"Stop muttering and complaining so much," Gretchen told him. She adjusted his bow tie, for the third time. "You should try to enjoy your big night."

"I'm still rehearsing my big speech," said Yuri. He had read the critic's speech six times. Preston -Mengies was finally back in top form, given that he had an exciting controversy to exploit. "Honey, that speech of his is a corker! It's full of raw meat for the interops crowd. I'm embarrassed to deliver a rant like that. Can I get away with it?"

"It's not a 'rant,' honey. They give you a major award, and you give them a major address. You have to rise to the occasion somehow. You can't pretend that you stole a cookie from the cookie jar."

Gretchen was dressed in a tawny-colored taffeta evening gown. Her hair was done, her painted face solemn, and she looked aggressively gorgeous.

This glamorous apparition, tidying him up and chivying him along and rolling him onto the stage: this was not Gretchen Lozano at her happiest. Gretchen looked toned, taut, tense, and very committed.

Gretchen was happy during summer camping trips in northern Michigan. A camping trip with Yuri, his two brothers, and his two sons: five howling, boisterous, dirty men all demanding that she gut and cook raw fish.

That made Gretchen happy. It took a situation that primeval to free Gretchen from her troubled, complex heritage. In the wilderness, Gretchen forgot all about her past traumas; instead, she griped cheerily about every new day's dirt, smoke, filth, scratches, blisters, and insect bites. In that drippy green wilderness, full of wolves, Canadians, and cari-bou, Gretchen ate like a horse, ran like a deer, and made love like a wildcat.

So he knew that Gretchen could be happy. And he knew how to make her happy. And there was a lot to be said for that.

This other kind of Gretchen Lozano, the woman at his shoulder tonight, was the scheming wife of a purported genius. Yuri's new construction was famous. It was a permanently unstable tower of plug-in plastic modules, all hemp, glue, and fly ash. And it rebuilt itself each and every night. This radically unstable, profoundly interactive, ever-shifting phenomenon was ironically named "The Monument." It was attracting hype in the way a puddle of honey drew flies.

The project's grand success had swiftly transformed Gretchen Lozano from a midwestern builder's wife into the elegant, high-society consort of a network-design superstar. Gretchen knew how to manage this. It was a quality that had been lurking inside her always, waiting to flicker into daylight.

Dressed for the banquet, Gretchen looked as sleek as a laser construction tool. She looked as if somebody could pick her up and use her nose to scratch plate glass.

"Preston knows that it was all just a lucky accident," Yuri said. "Preston is a smart guy; he was there when I did it. He knows I didn't really mean to do it."

"Oh, sure, it was all an accident, maestro. You're just one big fake, and so are the thousand rip-off artists trying to imitate you." Gretchen drew a breath within her décolletage. "People don't want to live in 'buildings' anymore, Yuri. People want to live inside construction programs. People are willing to pay top dollar to live in the way that modern people actually do live. That's no accident. We are rich and you are famous. Understand? Only a total sap could fail to understand that. And if you're too lazy and neurotic to live up to your potential, well, I'm going to beat you. I'm going to hit you on the head with a stick."

Gretchen had never spoken to him in that way--never before her father had died. It required his death to liberate her to echo him.

Tommy banged at the door and wandered into their bedroom. Tommy was 15 now, and shooting up like a weed, but in his dark, tailored suit he looked like a clockwork figurine. "Why are you two still standing around here? Can't we go yet? I'm starving."

Yuri wanted to spare him. "You really want to go to see some boring awards, Tommy? You could stay here and kill monsters with your little brother."

"Yeah, I gotta go to the banquet," Tommy said with a shrug. "Your building is great and all the other

buildings suck rocks, Dad."

"It's that simple, huh?"

"Yeah--my dad can make cool buildings that aren't crap!"

"We'll be right along, Tommy," said Gretchen, heels clicking as she fetched her wrap. "You can have a snack in the limo."

Tommy left. Gretchen watched him go, then printed Yuri's cheek with a kiss-proofed lip. "'Some men are born great, and others have greatness thrust upon them.' If you're at a party and five friends say that you're drunk, then you're drunk. And you'd better go lie down. But if five million people say that you are a genius, you had better aspire to genius. You're not a drunk, honey. You could have been, but you got the other fate. You're going to be just great."

"That's your final word on this subject?"

"Okay, maybe one more word. I always knew you had this in you. I just hoped it wouldn't be too messy, when it finally came oozing out."

Bruce Sterling is an American novelist, journalist, and critic. He edited the seminal cyberpunk anthology Mirrorshades.

Copyright Technology Review 2007.