

THE PHONE GUY

How Nokia designed what may be the best-selling cellular products on earth.

BY MICHAEL SPECTER

Frank Nuovo seems somehow out of place on the frosty streets of Helsinki. Not lost, exactly, and certainly not unhappy, but different. Surrounded everywhere by tall blonds, Nuovo is a short, dark, carefully assembled man who looks as if he might be Jerry Seinfeld's younger, slightly more credulous brother. He dresses in tastefully coordinated palettes of gray, olive, and black,

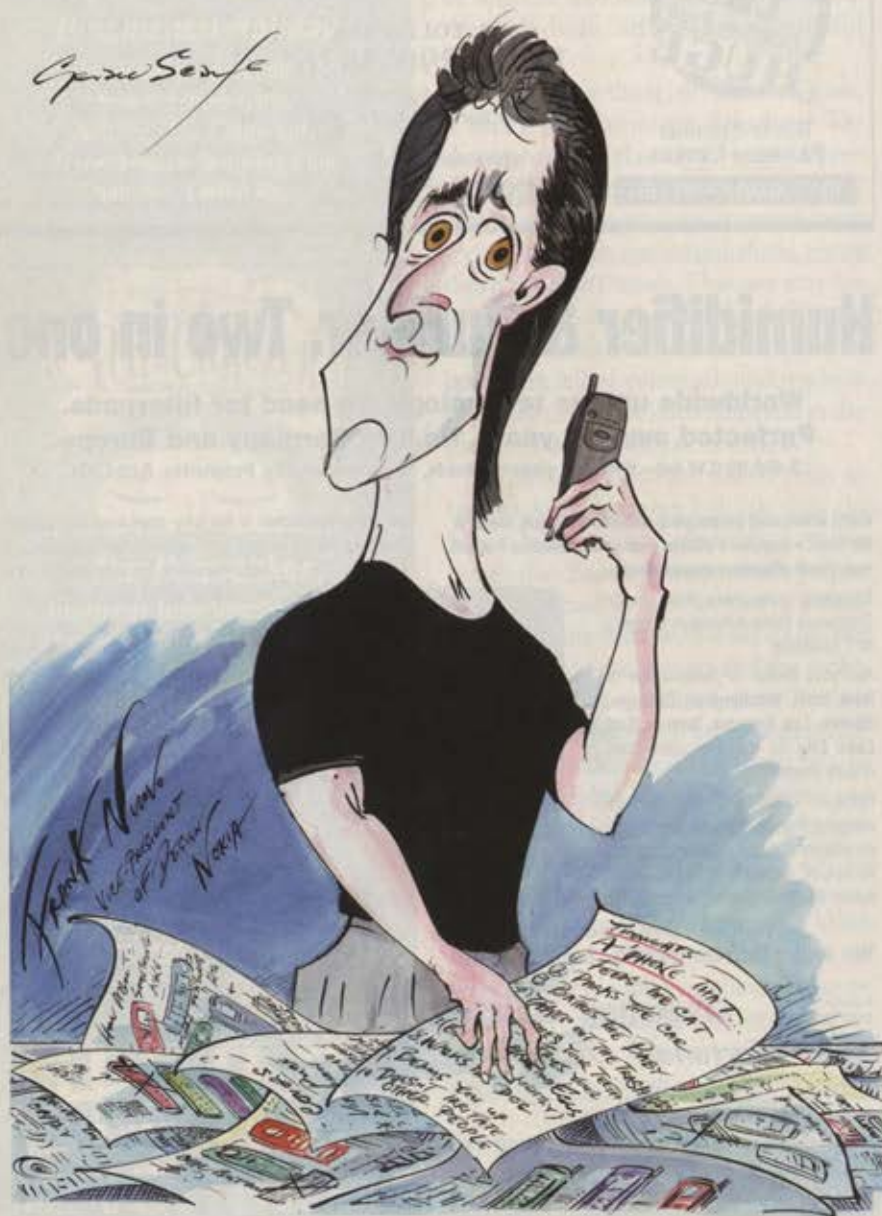
and, as he settled into a seat at a café along one of the city's central esplanades late on a recent afternoon, he fell into what can only be described as a fugue state.

We had been playing a geek parlor game—one that only Nuovo could have devised. As people passed, he would guess, simply by glancing at them, what model cell phone they used. He was

never wrong, and, because Finland is the world's first great wireless Utopia, he had plenty of material to work with. In Helsinki, nearly everyone carries a phone, and it often seems that people there are speaking, or sending each other text messages, every moment of every day. Three teen-agers approached, all with brightly colored, elliptical pieces of plastic attached to their ears. "The classic," Nuovo said, by which he meant that they were using the basic model introduced by Nokia three years ago—the 5100 series, whose removable faceplates created an international market for colorful, personalized phones. "Look," he said, pointing to a crisply dressed businessman. "That guy has to have the new version of the Communicator," a gizmo that lets people surf the Web, download news clips, fax, and chat. "I'll bet he got it the very week it came out." Suddenly, Nuovo stopped speaking, and his breathing slowed. His eyes fastened on a tall woman who had just broken into a run, about fifteen yards away. She was clearly angry. We could see her moving fast in high heels, screaming into her telephone, and carrying a large bag. It's not easy to do all that at once.

"Look at her," Nuovo said with genuine delight, as if he were an anthropologist who had stumbled upon some new tribal custom. "She has a 6110 rigged with a strap. I have never seen that in Europe." The 6110 has an illuminated high-graphics L.C.D. display, an infrared link to compatible devices, and thirty-five different ring tones; what it doesn't have is a strap. Yet, as the woman ran past us, we could see it fastened comfortably to the palm of her hand. "I'll be damned," Nuovo said. "The Japanese do this. So do the Koreans. They all have straps, and they decorate them in every conceivable way. But I have never seen that in Finland. I guess I'll have to start paying more attention."

Nuovo already pays a good deal of attention to the 6100 series, because he designed it. He also designed the slightly more prosaic 5100—it ranks among the most successful pieces of consumer electronics in the world—not to mention Nokia's gleaming, haute-couture 8800 phone, the minuscule, intensely fashionable digital accessory that



the company introduced on the runways of Paris and Milan, rather than in the usual teleconferences for business journalists. In fact, starting with the Nokia 101, in 1992, the first truly global phone, and working from a decidedly un-Finnish office in a high-end strip mall in Southern California, Frank Nuovo has designed nearly every mobile phone that Nokia produces. If you don't count fast-food items like cans of Coca-Cola or ephemera like Kleenex, Nokia phones may be the best-selling products on earth.

That makes Nuovo the Henry Ford—or, at least, the Calvin Klein—of cellular communication. More than any other person, Nuovo has set forth a vision of the mobile phone as personal accessory—a fashion item like a watch or a pen. He is convinced that within a few years having just one phone will seem as odd to most people as owning a single pair of shoes. A decade ago, cell phones were mainly curios for the rich; fewer than ten million people had used one. Next year, the figure will inch past a billion. In the United States, where cell-phone use lags far behind Europe, more than a hundred and thirty million people will have service contracts by December. Perhaps no industrial product of any kind has had a more rapid effect on a greater number of people. “Nokia started to take off just as the Soviet Union was falling apart,” J. P. Roos, a professor of social policy at the University of Helsinki who studies the effect of cell phones on society, told me. “Finland was in desperate shape, and the mobile phone created a new culture.” It became the symbol of a world in which people wanted to be independent and yet connected. “I don't know how you label that culture,” Roos says. “It is clearly about style and form, but when you slip this small piece of plastic into your hands and see what it has done—well, I don't think the automobile had a bigger effect on the way people live, or what they expect from their lives.”

When I first met with Nuovo, at his office near Los Angeles, I had intended to ask about the mechanics of industrial design: how does one make a piece of equipment that will find its way into the hands of a sizable por-

tion of the world's population? “My only goal is to create something people need to have,” Nuovo told me. “They need to have it because it's useful and because it improves their lives in some clear way. If it's a lovely phone, they will want it more—for the same reason a woman buys a fabulous dress, or maybe for the reason you choose a particular car. You might need the dress or the car. But you also have to *want* it.”

Although Nuovo is the vice-president in charge of design for Nokia, he has never moved to Finland (despite many requests from his bosses), because he believes that Los Angeles, as the center of the American image industry and of its automotive soul, is the place where beauty and style matter most. Nuovo is a former jazz drummer from Monterey who grew up worshipping such American icons as Charlie Parker. He is forty, and was raised, he says, in a world dominated by “The Jetsons,” “Lost in Space,” and “Star Trek.” “The fascination with gadgets and the interaction with cool little things was a basic part of my life. My age is the space age, the age of incredible instruments. And they are beautiful, by the way. They don't really work if they are not beautiful.”

After graduating from Pasadena's Art Center College of Design, Nuovo got a job at Designworks/USA (which is now an in-house design shop for BMW). There he became involved in a project to improve the ergonomics of air-traffic-control consoles. (“That's a system where design isn't just nice, it's vital—you *really* don't want to hit the wrong button by mistake.”) He also designed sewing machines, car dashboards, and patio furniture. He started working for Nokia as a consultant when he was twenty-eight. “It was Christmas, everyone was gone, and a company named Nokia called. I had no idea where they were from. I guess I assumed Japan. At that time, big bag phones, the kind you'd carry in a suitcase, were all we had. But I had been working on dashboards, and they were always on my mind. So when they asked me to design a car phone I said sure, why not?”

Nuovo's California office is a sort of hidden Disneyland for gadget freaks. There is no Nokia sign on the door, or

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on the building. Nuovo worries about security, and industrial spies. He asked me not to print the name of the town where he and his team of designers, color experts, and materials scientists work. Inside, the studio looks as if it might belong to a clothing designer. Drawings of the slinkiest creations by Versace and Chanel are pinned on the wall, as are sketches of the most outrageously futuristic-looking cars, bicycles, even Rollerblades.

Nuovo is particularly proud of his vast collection of pens, all arranged like trophies on the shelves. Some are expensive and rare, made of titanium, cork, or single strips of unusual wood; others are cheap, the familiar sticks of injection-molded plastic. Nuovo loves pens because they are "simple, simple, simple," he says. "They do one thing, and they come in an almost endless assortment of designs. Just like phones."

In general, Nuovo favors bubbles and elliptical shapes, the aerodynamic icons of speed. Phones are everywhere in his studio: in cradles, on desks, on the wall. Most are prototypes. He produces the earliest versions out of wax on what is essentially a 3-D printer—but not before he draws them. Nuovo sketches phones habitually. In fact, during meetings Nuovo may often take notes, but he always draws telephones. When he's

starting to design a new model, he typically roughs out his first drafts on anything—an envelope, a notebook, the back of a fax. Then he puts the design on a piece of tissue-thin paper to show his colleagues in L.A., often leaving the next step of the process—the refinements made possible by computer-aided design—to them.

"In 1991, everyone had boxy little phones with rectangular displays," he said. "Most of our competitors did all they could to pack in every possible feature. I thought we needed space. Believe me, it was a very radical thing to put empty space on a phone then." At this point, Nuovo grabbed my phone, which is very small. "Feel the ridge between these keys. They are actually touching, but you can feel the distance because of the topography. They are the best keys for the size that you can have. Many people want a very small product. But, obviously, if you do an ergonomic study you will get into something *this* size." He reached across the table to grab a larger telephone. "You can do 'perfect reach' studies, and if you take the largest person with huge hands and the smallest person with tiny hands you can find an optimal average. We hit a sweet spot between large and small that accommodates all sizes—it's the 6110. But if you hit only that medium every-



"It's dawn, Dad. Want to knock off for breakfast?"

thing will look that way all the time. It's boring. So there is always this clash between form and function in every design. Look at women's shoes: purely for the sake of style, women will wear shoes that are expensive and painful."

He reached for a gold version of the 8850, a costly little phone that was introduced this year, in Asia, and has a cult following. "This never made it to market in the U.S. When this first came out, it was going for twenty-eight hundred dollars. It was unbelievable what was happening. Take this stylistically—I call this the pressure wave." Nuovo caressed two little ridges on the lower half of the phone. You wouldn't even notice them if you were not looking for them. "Think about cars, aerodynamics, wind tunnels. Look at our styling here—it is so copied around the planet. The language we have put forward is about the emotion of speed and increasing velocity. The influence of the auto is there, of course. But it's not about cars. It's about movement, and it's about"—he paused before delivering his mantra—"the attempt to *do one thing well*."

Nuovo thinks that too often designers overlook this consideration. For years, the companies that make mobile phones—and many of their customers—have pursued a sort of Grand Unified Theory of Gadgetry, seeking a phone that will do everything: keep schedules, record memos, play music, surf the Web. "Today, the kids are all obsessed with convergence," he said. "Young industrial designers often want to be modular. They want to make vacuum cleaners that can mix drinks and lawnmowers that serve coffee. But a product needs to be *about* something. It can't be about ten things. I would rather have five phones that do five things than one that does a little bit of everything. Right now, that seems strange to many people. But soon it won't. How many brilliant combos are there? Can you think of a more brilliant combination than a pocket and a phone?"

Nokia is the most Finnish of companies, and, to an uncanny degree, its history reflects the transformation of Finland itself, from an insignificant duchy to one of the world's most wired—and wireless—countries. Nokia—and the town of the same

name—was founded more than a hundred and thirty years ago, near the southwestern Finnish city of Tampere. It began as a producer of paper and pulp, and at one time was a leading manufacturer of rubber boots. (These are considered collector's items among the Wellington-boot crowd; occasionally, a pair is offered for sale on eBay.) It has also produced tires, television sets, and electricity. By the early nineties, however, Nokia decided to focus on cellular communications. It was seen as a risky decision, but the first call using G.S.M., or Global System for Mobile Communications, was placed from a Nokia phone in Finland, in 1991. G.S.M. became the technology that permitted phones to roam throughout the world, and Nokia helped create it. It also manufactured the first digital phone. The company now accounts for more than sixty per cent of the activity on the Finnish stock market. It employs fifty-eight thousand people, and its headquarters, Nokia House, is situated in the center of Espoo, which is Finland's second-largest city and, with an almost comically large fleet of Volvos and sleek city buses, perhaps the most upper-middle-class company town in the world. Nokia House—a giant latticework of ecologically friendly glass and natural woods—seems to embody the company's vision of itself. The building's airy, open space is anchored by flights of circular stairs, and during the time I spent there I kept waiting for somebody to trip on one of them and plummet to the cafeteria floor, because people never appear to look where they are going. It seems to be an assignment for every employee to walk around at all times clutching the latest piece of digital technology, talking to himself, staring at the video screen in his hand, or rapidly sending text messages.

For better or worse, the company has come to dominate economic life in Finland just as completely as the Soviet Union once did. Nokia has nine factories—three in the Americas, three in Europe, and three in Asia. The most advanced of them is a four-hundred-and-twenty-thousand-square-foot plant in Salo, about a hundred kilometres west of Helsinki. As it happened, I went there to meet another American, Erik Anderson, who is in charge of pro-

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ducing the phones that Nuovo designs. Anderson is a wiry, intense man with an undergraduate degree in electrical engineering from Princeton; he is completing a Ph.D. in Renaissance architectural history at Harvard. Anderson is married to a Finnish woman and has lived in Finland for twelve years, although he occasionally takes sabbaticals to continue research on the sixteenth-century architect Andrea Palladio.

A clothing designer can sketch a dress, order the fabric, and tell a tailor how to cut it. Making an industrial device isn't that simple. Most cell phones have several hundred parts, and to produce them by the million requires a complicated collaboration. As I took a seat opposite Anderson in one of the conference rooms not far from the factory floor, he slid a sheaf of papers across the table to me. "Our instruction manual," he said with a wink. It consisted of excerpts from Leon Battista Alberti's classic Renaissance treatise "On the Art of Building." Before we got to Alberti,

though, Anderson started talking about Vitruvius, the only ancient writer on architecture whose major work survives, and his three pillars. "*Firmitas, utilitas, venustas*," Anderson said, practically chanting. "Firmness—it stands. Utility—it works, it's ergonomics. And *venustas*—beauty. A classical building had to be beautiful. They are all three equal. That is what is classical. They have to be in balance."

Anderson reached for his briefcase and turned it upside down; at least a dozen telephones came tumbling out. He grabbed the oldest among them, the nine-year-old 101. "See the space here?" He pointed to a gap between the numeric keypad and the scrolling keys above it. "Frank did it with his own hand," he said. "Look at the racetrack, a curved oval shape. It was subtle. You wouldn't notice it consciously." He rubbed his thumb slowly across every line and contour. "Look at the earpiece. It has three holes. But what shape are the holes? Three *ovals*. Look at the microphone.

It's a little *oval*. It cost money to make those holes into oval shapes. A circle would have been cheaper. You don't notice it—but you see it, you feel it. The phone creates a feeling of coherence, of understanding, which is both intellectual and emotional. It is a sense of organic rightness." He glanced over at me. "You think this is a bunch of crap, don't you?" he asked, amused as my eyes moved from the cell phone to Alberti's essay, passages of which Anderson had underlined. "What could making a goddam cell phone have to do with the Renaissance?"

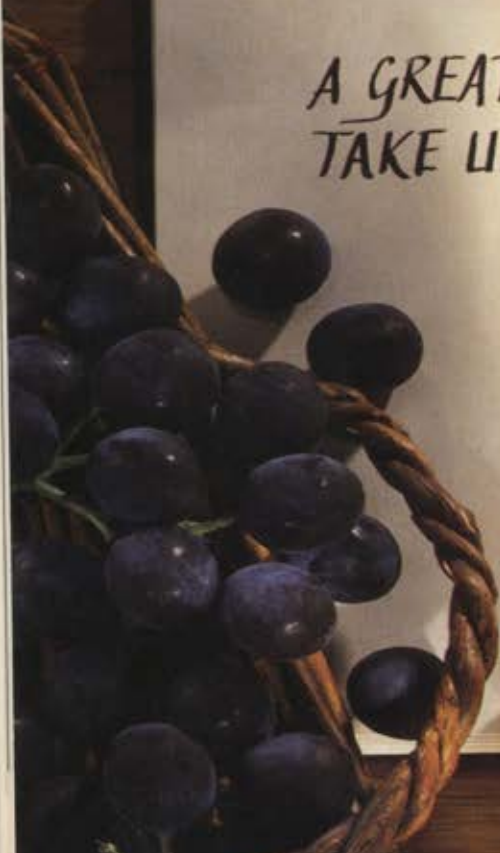
The question had occurred to me. I looked at what he had highlighted in Alberti's essay: "All care, all diligence, all financial consideration must be directed to insuring that what is built is useful, commodious, yes—but also embellished and wholly graceful." Alberti was writing about building in ancient Egypt and Greece. Egypt was rich and powerful. Anderson picked up the essay and read aloud: "Next came Greece, a country where upright and noble minds flour-

Tuesday

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ished, and the desire for embellishing what was theirs was evident. . . . It was their part to surpass through ingenuity those whose wealth they could not rival."

Anderson leaped out of his chair. "Don't you see? The Egyptians were Motorola in 1989. They were so strong and so powerful we could never beat them head on. We had to find another way. We had to use ingenuity, because they had wealth we could not rival." He did have a point. In the early nineties, Motorola dominated the mobile-phone market. In 1993, for example, Motorola sold more than a third of all the cell phones in the world. Today, in a remarkable reversal, Nokia sells more than a third of the world's cell phones. In fact, Nokia's sales are greater than those of its three closest rivals combined: Motorola, Ericsson, and Siemens.

"Originally, we had one phone—the phone Frank designed," Anderson said. "And we tried to make it that one perfect phone. By 1993, I was on leave, working on my dissertation. I realized then that

making one perfect phone wasn't going to work for us. We needed to make many perfect phones, and they needed to be different.

"There is a bar in Salo. Rikala, it's called. It's a seedy place, and Nokia engineers always went there on Friday nights. They would get there and take their big phones off their belts, slap them down on the bar, and they would drink beer and eat peanuts until 4 A.M. Then one of the engineers would say, 'Oh, my God, which is my phone?' How would they know? They all had the same damn phone in the same color with the same ring. So they went out and painted the phones themselves with high-quality car paint. It isn't so glamorous, but that's where the route to color and fashion phones begins—in a bar in Salo."

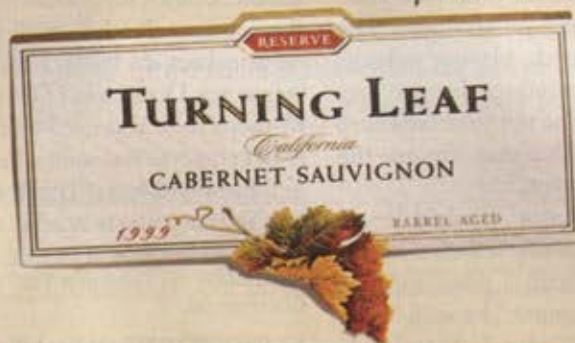
Anderson returned to his desk and started to rummage through his pyramid of phones. "Any growing market will segment—it's an economic law of nature. First, you have a heavy black mobile phone. Then a red and a green

one. Then you have small phones and phones with ring tones. The first segments in cell phones were people who preferred longer battery life and others who preferred smaller phones. Battery weight long ago ceased to be a problem. The antenna could be made smaller and often tucked inside the phone. And, as technology improves, variations become easier.

"This old 'good, better, best' segmentation is archaic. We are never going to say that if you are a little old lady you can't drive a Ferrari. That's nonsense. If you want to own something beautiful, is that really irrational? You try to maintain your market share by offering the best range of products." He was up on his feet again, but this time with a frown. "Seems simple, right? Well, if you make too many phones you go bankrupt. If you make lots of products but none are the best in their class, you will go bankrupt. If you make one good product, you might do really well with it, but there won't be enough profit, so

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"I've told you not to do that to the jury!"

you'll go bankrupt. In the end, it all really comes back to balance. Alberti was right."

Finland has embraced wireless technology more completely than any other country. That puts it in the vanguard of the mobile revolution, but it has also turned the country into a perfect laboratory in which to study the effects such rootlessness can cause. Each morning, tens of thousands of moms load phones, along with homework, into the backpacks of schoolchildren. There's a sense that it is no longer permissible to be "off line." People expect their phone calls and messages to be returned instantly. Social scientists believe that attention spans have been diminished, and so has tolerance for any kind of delay.

One afternoon, I went to visit the social anthropologist Kaisa Coogan in her apartment a few miles from the center of Helsinki. Not long ago, Coogan and a colleague completed a study of how such ubiquitous cell-phone use has affected relationships among teen-agers and between them and their parents. "It has completely changed the way young people communicate with parents," she told me. "I have called it Remote Parenting. People go to work and the kids come home late and the parents are asleep. So what

they have is a virtual link. They can call each other and send S.M.S. to each other." S.M.S. stands for "short-message service," which dispatches text messages of a hundred and sixty characters or less. By early 2000, G.S.M. phones sent more than three billion messages throughout the world each month. By the end of this year, that figure will have grown to thirty billion—nearly a billion messages a day.

"The parents think they know where the kids are because they can send a message. They don't necessarily see the kids' friends at all. Ever. They don't call to the land-line number. They call directly on each other's cell phones. So the parent is cut out." In her study, conducted in and around Helsinki over the past two years, she found that every participant between sixteen and eighteen years of age had a cell phone. "There are even four-year-old kids who carry phones here. The kids are in the park, playing outside, and the mother doesn't see them, so they call. Maybe half the ten-year-olds have phones. That was last year; I'm sure the number is higher now."

Later that evening, I asked Frank Nuovo whether he saw a darker side to this reliance on such a powerful new technology. "Of course," he said. "I am not one of those who feels technology is always blameless. But surely the

parent can make decisions about what is appropriate for a child. Cars cause pollution, and I don't like that. But that doesn't mean that we shouldn't have cars. We have to use technology responsibly."

These days, Nuovo is preoccupied with the next great thing. He won't talk about it—except to say that it represents a "paradigm shift" in the way phones will be used. Nokia has said publicly that it expects phones with built-in cameras to be an important advance toward a system of rapid and constant connection, involving text, video, and the Internet. When we were in California, Nuovo showed me several models that, when the network allows it, will permit people to send streaming video to whomever they like.

On the street in Helsinki, I asked him if he was worried that video phones and other added features will harm the simple aesthetic that he and others at Nokia seem to value. "Not if they are done the right way," he said. "Cramming features in doesn't work—but ignoring technological possibilities doesn't, either." In fact, Nokia almost passed up the opportunity to include S.M.S. in its phones. Now many people buy them just for that feature.

We walked into a phone shop. For Nuovo, it might as well have been Toys R Us. "Look at this phone," he said. It was a Siemens SL45, one of the newest and most feature-laden phones on the market. "It's a technophone. You can synch it with your computer and it has MP3 and God knows what else. But why do people buy it? Because it looks cool and it works well as a phone. Instead of talking about convergence, I see a future much like this." He waved his arms about the store, pointing at dozens of models. "They are all different. Like sneakers, bikes, motorcycles, and cars—those things all take people places. But do sneakers do what a car does? Of course not. Does a bike? Do you want *one* of them? No. You need them all." The look in his eyes was somewhere between giddiness and lust. "That's all I'm saying. You are going to need all of them." ♦

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