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SELLING TO THE OTHER THREE BILLION A cellphone shop in Accra, Ghana, which carries and repairs a variety of handsets.

By SARA CORBETT

Published: April 13, 2008

If you need to reach Jan Chipchase, the best, and sometimes only, way to get him is on his cellphone.

The first time I spoke to him last fall, he was at home in his apartment in Tokyo. The next time, he was in Accra, the capital of [Ghana](#), in West Africa. Several weeks after that, he was in [Uzbekistan](#), by way of [Tajikistan](#) and China, and in short order he and his phone visited Helsinki, London and Los Angeles. If you decide not to call Jan Chipchase but rather to send e-mail, the odds are fairly good that you'll get an "out of office" reply redirecting you back to his cellphone, with a notation about his current time zone — "GMT +9" or "GMT -8" — so that when you do call, you may do so at a courteous hour.

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Shaul Schwarz/Reportage, for The New York Times
"HUMAN-CENTERED DESIGN"
 Chipchase talks to Accra street vendors about what an ideal phone (ideally made by Nokia) might do.

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Keep in mind, though, that Jan Chipchase will probably be too busy with his job to talk much anyway. He could be bowling in Tupelo, Miss., or he could be rummaging through a woman's purse in Shanghai. He might be busy examining the advertisements for prostitutes stuck up in a São Paulo phone booth, or maybe getting his ear hairs razored off at a barber shop in Vietnam. It really depends on the moment.

Chipchase is 38, a rangy native of Britain whose broad forehead and high-slung brows combine to give him the air of someone who is quick to be amazed, which in his line of work is something of an asset. For the last seven years, he has worked for the Finnish cellphone company [Nokia](#) as a "human-behavior researcher." He's also sometimes referred to as a "user anthropologist." To an outsider, the job can seem decidedly oblique. His mission, broadly

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Shaul Schwarz/Reportage, for The New York Times

IDENTITY FOR SALE A cell phone in the developing world gives a person a fixed location, particularly important for those displaced by war or drought.

defined, is to peer into the lives of other people, accumulating as much knowledge as possible about human behavior so that he can feed helpful bits of information back to the company — to the squads of designers and technologists and marketing people who may never have set foot in a Vietnamese barbershop but who would appreciate it greatly if that barber someday were to buy a Nokia.

What amazes Chipchase is not the standard stuff that amazes big multinational corporations looking to turn an ever-bigger profit. Pretty much wherever he goes, he lugs a big-bodied digital Nikon camera with a couple of soup-can-size lenses so that he can take pictures of things that might be even remotely instructive back in Finland or at any of Nokia's nine design studios around the world. Almost always, some explanation is necessary. A Mississippi bowling alley, he will say, is a social hub, a place rife with nuggets of information about how people communicate. A photograph of the contents of a woman's handbag is more than that; it's a window on her identity, what she considers essential, the weight she is willing to bear. The prostitute ads in the Brazilian phone booth? Those are just names, probably fake names, coupled with real cellphone numbers — lending to Chipchase's theory that in an increasingly transitory world, the cellphone is becoming the one fixed piece of our identity.

Last summer, Chipchase sat through a monsoon-season downpour inside the one-room home of a shoe salesman and his family, who live in the sprawling Dharavi slum of Mumbai. Using an interpreter who spoke Tamil, he quizzed them about the food they ate, the money they had, where they got their water and their power and whom they kept in touch with and why. He was particularly interested in the fact that the family owned a cellphone, purchased several months earlier so that the father, who made the equivalent of \$88 a month, could run errands more efficiently for his boss at the shoe shop. The father also occasionally called his wife, ringing her at a pay phone that sat 15 yards from their house. Chipchase noted that not only did the father carry his phone inside a plastic

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bag to keep it safe in the pummeling seasonal rains but that they also had to hang their belongings on the wall in part because of a lack of floor space and to protect them from the monsoon water and raw sewage that sometimes got tracked inside. He took some 800 photographs of the salesman and his family over about eight hours and later, back at his hotel, dumped them all onto a hard drive for use back inside the corporate mother ship. Maybe the family's next cellphone, he mused, should have some sort of hook as an accessory so it, like everything else in the home, could be suspended above the floor.

This sort of on-the-ground intelligence-gathering is central to what's known as human-centered design, a business-world niche that has become especially important to ultracompetitive high-tech companies trying to figure out how to write software, design laptops or build cellphones that people find useful and unthreatening and will thus spend money on. Several companies, including [Intel](#), [Motorola](#) and [Microsoft](#), employ trained anthropologists to study potential customers, while Nokia's researchers, including Chipchase, more often have degrees in design. Rather than sending someone like Chipchase to Vietnam or India as an emissary for the company — loaded with products and pitch lines, as a marketer might be — the idea is to reverse it, to have Chipchase, a patently good listener, act as an emissary for people like the barber or the shoe-shop owner's wife, enlightening the company through written reports and PowerPoint presentations on how they live and what they're likely to need from a cellphone, allowing that to inform its design.

The premise of the work is simple — get to know your potential customers as well as possible before you make a product for them. But when those customers live, say, in a mud hut in Zambia or in a tin-roofed hutong dwelling in China, when you are trying — as Nokia and just about every one of its competitors is — to design a cellphone that will sell to essentially the only people left on earth who don't yet have one, which is to say people who are illiterate, making \$4 per day or less and have no easy access to electricity, the challenges are considerable.

One morning last fall, I arranged to meet Chipchase in a neighborhood in Accra where he and a few other Nokia people were doing research. At his suggestion, I took a taxi to the general area and then called him on his cellphone. This part of the city, called

Nima, was a jumble of narrow alleyways hemmed in by a few major thoroughfares and anchored by a teeming marketplace. The homes in Nima were small, low-roofed and usually one or two rooms made from concrete or crumbling mud bricks, often set back behind a homegrown business — someone's peanut stand or a shack selling dust-coated secondhand stereos and television sets. The streets around the market were swollen with a slow-moving river of people. On their heads, Ghanaian women toted pyramids of pomegranates, bagged loaves of fresh bread, baskets of live chickens. Trucks belched diesel exhaust; men pushed carts full of sugar cane and fat, purplish bulbs of garlic.

From an unseen distance, Chipchase used his phone to pilot me through the unfamiliar chaos, allowing us to have what he calls a “just in time” moment. “Just in time” is a manufacturing concept that was popularized by the Japanese carmaker [Toyota](#) when, beginning in the late 1930s, it radically revamped its production system, virtually eliminating warehouses stocked with big loads of car parts and instead encouraging its assembly plants to order parts directly from the factory only as they were needed. The process became less centralized, more incremental. Car parts were manufactured swiftly and in small batches, which helped to cut waste, improve efficiency and more easily correct manufacturing defects. As Toyota became, in essence, lighter on its feet, the company's productivity rose, and so did its profits.

There are a growing number of economists who maintain that cellphones can restructure developing countries in a similar way. Cellphones, after all, have an economizing effect. My “just in time” meeting with Chipchase required little in the way of advance planning and was more efficient than the oft-imperfect practice of designating a specific time and a place to rendezvous. He didn't have to leave his work until he knew I was in the vicinity. Knowing that he wasn't waiting for me, I didn't fret about the extra 15 minutes my taxi driver sat blaring his horn in Accra's unpredictable traffic. And now, on foot, if I moved in the wrong direction, it could be quickly corrected. Using mobile phones, we were able to coordinate incrementally. “Do you see the footbridge?” Chipchase was saying over the phone. “No? O.K., do you see the giant green sign that says ‘Believe in God’? Yes? I'm down to the left of that.”

To someone who has spent years using a mobile phone, these moments are common

enough to feel banal, but for people living in a shantytown like Nima — and by extension in similar places across Africa and beyond — the possibilities afforded by a proliferation of cellphones are potentially revolutionary. Today, there are more than 3.3 billion mobile-phone subscriptions worldwide, which means that there are at least three billion people who don't own cellphones, the bulk of them to be found in Africa and Asia. Even the smallest improvements in efficiency, amplified across those additional three billion people, could reshape the global economy in ways that we are just beginning to understand. This is part of what Chipchase was eager to show me, if only I could spot him. "I'm by the hair-salon stall," he was saying into his phone. "Next to that goat. Do you see it? See me? Ah, yes," he said brightly, "there you are." And then, face to face and sweating in the climbing equatorial sun, we hung up.

To get a sense of how rapidly cellphones are penetrating the global marketplace, you need only to look at the sales figures. According to statistics from the market database Wireless Intelligence, it took about 20 years for the first billion mobile phones to sell worldwide. The second billion sold in four years, and the third billion sold in two. Eighty percent of the world's population now lives within range of a cellular network, which is double the level in 2000. And figures from the International Telecommunications Union show that by the end of 2006, 68 percent of the world's mobile subscriptions were in developing countries. As more and more countries abandon government-run telecom systems, offering cellular network licenses to the highest-bidding private investors and without the burden of navigating pre-established bureaucratic chains, new towers are going up at a furious pace. Unlike fixed-line phone networks, which are expensive to build and maintain and require customers to have both a permanent address and the ability to pay a monthly bill, or personal computers, which are not just costly but demand literacy as well, the cellphone is more egalitarian, at least to a point.

"You don't even need to own a cellphone to benefit from one," says Paul Polak, author of "Out of Poverty: What Works When Traditional Approaches Fail" and former president of International Development Enterprises, a nonprofit company specializing in training and technology for small-plot farmers in developing countries. Part of I.D.E.'s work included setting up farm cooperatives in Nepal, where farmers would bring their

vegetables to a local person with a mobile phone, who then acted as a commissioned sales agent, using the phone to check market prices and arranging for the most profitable sale. “People making a dollar a day can’t afford a cellphone, but if they start making more profit in their farming, you can bet they’ll buy a phone as a next step,” Polak says.

Last year, the World Resources Institute, a Washington-based environmental research group, published a report with the International Finance Corporation entitled “The Next Four Billion,” an economic study that looked at, among other things, how poor people living in developing countries spent their money. One of the most remarkable findings was that even very poor families invested a significant amount of money in the I.C.T. category — information-communication technology, which, according to Al Hammond, the study’s principal author, can include money spent on computers or land-line phones, but in this segment of the population that’s almost never the case. What they’re buying, he says, are cellphones and airtime, usually in the form of prepaid cards. Even more telling is the finding that as a family’s income grows — from \$1 per day to \$4, for example — their spending on I.C.T. increases faster than spending in any other category, including health, education and housing. “It’s really quite striking,” Hammond says. “What people are voting for with their pocketbooks, as soon as they have more money and even before their basic needs are met, is telecommunications.”

There are clear reasons for this, but understanding them requires forgetting for a moment about your own love-hate relationship with your cellphone, or [iPhone](#), or BlackBerry. Something that’s mostly a convenience booster for those of us with a full complement of technology at our disposal — land-lines, Internet connections, TVs, cars — can be a life-saver to someone with fewer ways to access information. A “just in time” moment afforded by a cellphone looks a lot different to a mother in Uganda who needs to carry a child with malaria three hours to visit the nearest doctor but who would like to know first whether that doctor is even in town. It looks different, too, to the rural Ugandan doctor who, faced with an emergency, is able to request information via text message from a hospital in Kampala.

Jan Chipchase and his user-research colleagues at Nokia can rattle off example upon example of the cellphone’s ability to increase people’s productivity and well-being,

mostly because of the simple fact that they can be reached. There's the live-in housekeeper in China who was more or less an indentured servant until she got a cellphone so that new customers could call and book her services. Or the porter who spent his days hanging around outside of department stores and construction sites hoping to be hired to carry other people's loads but now, with a cellphone, can go only where the jobs are. Having a call-back number, Chipchase likes to say, is having a fixed identity point, which, inside of populations that are constantly on the move — displaced by war, floods, drought or faltering economies — can be immensely valuable both as a means of keeping in touch with home communities and as a business tool. Over several years, his research team has spoken to rickshaw drivers, prostitutes, shopkeepers, day laborers and farmers, and all of them say more or less the same thing: their income gets a big boost when they have access to a cellphone.

It may sound like corporate jingoism, but this sort of economic promise has also caught the eye of development specialists and business scholars around the world. Robert Jensen, an economics professor at [Harvard University](#), tracked fishermen off the coast of Kerala in southern India, finding that when they invested in cellphones and started using them to call around to prospective buyers before they'd even got their catch to shore, their profits went up by an average of 8 percent while consumer prices in the local marketplace went down by 4 percent. A 2005 London Business School study extrapolated the effect even further, concluding that for every additional 10 mobile phones per 100 people, a country's G.D.P. rises 0.5 percent.

Text messaging, or S.M.S. (short message service), turns out to be a particularly cost-effective way to connect with otherwise unreachable people privately and across great distances. Public health workers in South Africa now send text messages to tuberculosis patients with reminders to take their medication. In Kenya, people can use S.M.S. to ask anonymous questions about culturally taboo subjects like AIDS, breast cancer and sexually transmitted diseases, receiving prompt answers from health experts for no charge.

Some of the mobile phone's biggest boosters are those who believe that pumping international aid money into poor countries is less effective than encouraging economic

growth through commerce, also called “inclusive capitalism.” A cellphone in the hands of an Indian fisherman who uses it to grow his business — which presumably gives him more resources to feed, clothe, educate and safeguard his family — represents a textbook case of bottom-up economic development, a way of empowering individuals by encouraging entrepreneurship as opposed to more traditional top-down approaches in which aid money must filter through a bureaucratic chain before reaching its beneficiaries, who by virtue of the process are rendered passive recipients.

For this reason, the cellphone has become a darling of the microfinance movement. After Muhammad Yunus, the Nobel-winning founder of Grameen Bank, began making microloans to women in poor countries so that they could buy revenue-producing assets like cows and goats, he was approached by a Bangladeshi expat living in the U.S. named Iqbal Quadir. Quadir posed a simple question to Yunus — If a woman can invest in a cow, why can’t she invest in a phone? — that led to the 1996 creation of Grameen Phone Ltd. and has since started the careers of more than 250,000 “phone ladies” in Bangladesh, which is considered one of the world’s poorest countries. Women use microcredit to buy specially designed cellphone kits costing about \$150, each equipped with a long-lasting battery. They then set up shop as their village phone operator, charging a small commission for people to make and receive calls.

The endeavor has not only revolutionized communications in Bangladesh but also has proved to be wildly profitable: Grameen Phone is now Bangladesh’s largest telecom provider, with annual revenues of about \$1 billion. Similar village-phone programs have sprung up in Rwanda, Uganda, Cameroon and Indonesia, among other places. “Poor countries are poor because they are wasting their resources,” says Quadir, who is now the director of the Legatum Center for Development and Entrepreneurship at [M.I.T.](#) “One resource is time, another is opportunity. Let’s say you can walk over to five people who live in your immediate vicinity, that’s one thing. But if you’re connected to one million people, your possibilities are endless.”

During a 2006 field study in Uganda, Chipchase and his colleagues stumbled upon an innovative use of the shared village phone, a practice called sente. Ugandans are using prepaid airtime as a way of transferring money from place to place, something that’s

especially important to those who do not use banks. Someone working in Kampala, for instance, who wishes to send the equivalent of \$5 back to his mother in a village will buy a \$5 prepaid airtime card, but rather than entering the code into his own phone, he will call the village phone operator (“phone ladies” often run their businesses from small kiosks) and read the code to her. She then uses the airtime for her phone and completes the transaction by giving the man’s mother the money, minus a small commission. “It’s a rather ingenious practice,” Chipchase says, “an example of grass-roots innovation, in which people create new uses for technology based on need.”

It’s also the precursor to a potentially widespread formalized system of mobile banking. Already companies like Wizzit, in South Africa, and GCash, in the Philippines, have started programs that allow customers to use their phones to store cash credits transferred from another phone or purchased through a post office, phone-kiosk operator or other licensed operator. With their phones, they can then make purchases and payments or withdraw cash as needed. Hammond of the World Resources Institute predicts that mobile banking will bring huge numbers of previously excluded people into the formal economy quickly, simply because the latent demand for such services is so great, especially among the rural poor. This bodes well for cellphone companies, he says, since owning a phone will suddenly have more value than sharing a village phone. “If you’re in Hanoi after midnight,” Hammond says, “the streets are absolutely clogged with motorbikes piled with produce. They give their produce to the guy who runs a vegetable stall, and they go home. How do they get paid? They get paid the next time they come to town, which could be a month or two later. You have to hope you can find the stall guy again and that he remembers what he sold. But what if you could get paid the next day on your mobile phone? Would you care what that mobile costs? I don’t think so.”

In February of last year, when [Vodafone](#) rolled out its M-Pesa mobile-banking program in Kenya, it aimed to add 200,000 new customers in the first year but got them within a month. One year later, M-Pesa has 1.6 million subscribers, and Vodafone is now set to open mobile-banking enterprises in a number of other countries, including Tanzania and India. “Look, microfinance is great; Yunus deserves his sainthood,” Hammond says. “But after 30 years, there are only 90 million microfinance customers. I’m predicting that

mobile-phone banking will add a billion banking customers to the system in five years. That's how big it is."

When he is not doing his field work, Jan Chipchase goes to a lot of design conferences, where he gives talks with titles like "Connecting the Unconnected." He also writes a popular blog called Future Perfect, on which he posts photographs of some of the things that amaze him along with a little bit of explanatory text. "Pushing technologies on society without thinking through their consequences is at least naïve, at worst dangerous . . . and IMHO the people that do it are just boring," he writes on his blog's description page. "Future Perfect is a pause for reflection in our planet's seemingly headlong rush to churn out more, faster, smaller and cheaper."

Clearly, though, Chipchase's work puts him smack in the middle of this rush, and no company churns out phones like Nokia, which manufactures 1.3 million products daily. Forty percent of the mobile phones sold last year were made by Nokia, and the company's \$8.4 billion profit in 2007 reflects as much. Chipchase seems distinctly uncomfortable talking about his part as a corporate rainmaker, preferring to see himself as a mostly dispassionate ethnographer, albeit one with Nokia stock options. The only time I saw him get even slightly prickly — or indeed behave like anything but a mild-mannered guy who is wholly absorbed by the small, arcane things that serve as clues to bigger patterns of communication — was when I happened to muse that maybe there were still places in the world where technology might not be so vital.

We were sitting under a slow-revolving ceiling fan in a small restaurant in Accra, eating bowls of piquant Ghanaian peanut-and-chicken stew. Chipchase told a story about meeting some monk disciples at a temple in Ulan Bator, when he vacationed in Mongolia a few Decembers ago. (Most of Chipchase's vacation stories, it turns out, take place in less-developed countries, often in forbidding weather and frequently relating back to cellphone use.) Despite their red robes and shaved heads and the fact they were spending their days in a giant monastery at the top of a windy hill where they were meant to be in dialogue with God, some of the 15 monk disciples had cellphones — Nokia cellphones — and most were fancier models than the one Chipchase was carrying. One of the disciples asked to look at Chipchase's phone. "So he's got my phone and his phone," Chipchase told

me. “And as we’re talking, he’s switching on the Bluetooth. And he then data-mines my phone for all its content, all my photographs and so on, which is absolutely fine, but it’s kind of a scene where you think, I’m here, I’m so away from everything and yet they’re so technically literate. . . .”

This is when I voiced a careless thought about whether there might be something negative about the lightning spread of technology, whether its convenience was somehow supplanting traditional values or practices. Chipchase raised his eyebrows and laid down his spoon. He sighed, making it clear that responding to me was going to require patience. “People can think, yeah, monks with cellphones, and tsk, tsk, and what is the world coming to?” he said. “But if you wanted to take phones away from anybody in this world who has them, they’d probably say: ‘You’re going to have to fight me for it. Are you going to take my sewer and water away too?’ And maybe you can’t put communication on the same level as running water, but some people would. And I think in some contexts, it’s quite viable as a fundamental right.” He paused a beat to let this sink in, then added, with just a touch of edge, “People once believed that people in other cultures might not benefit from having books either.”

For the last year, Chipchase has been working on a project he calls Future Urban, the goal of which is to explore what the cities of tomorrow will be like. Which is why one afternoon in Ghana he provided me with minute-to-minute cellphone instructions (“Do you see the sewing stall? O.K., now look to the right”) for finding him at the outskirts of Buduburam, a densely populated refugee settlement about an hour’s drive west of Accra. For the previous 11 days, Chipchase, two of his female colleagues from Tokyo — Indri Tulusan and Younghee Jung — and a small group of hired Ghanaians had been running what they called an “open design studio” in the heart of Buduburam, which is home to approximately 40,000 people, most of whom had fled from the civil wars in neighboring Liberia, Sierra Leone and Ivory Coast.

Nokia’s temporary design studio sat in a rented two-room concrete hut at the intersection of two busy dirt lanes, across from a woman selling chunks of watermelon and peeled lemons and next to a large water tank labeled “Church of God.” There was a sheet of fabric strung up in front, with neat painted lettering that read: “Your Dream Phone. Share

it with the world.” It went on to describe how the community was invited to come share ideas and drawings for the ideal mobile phone. Prizes were offered. So far, 140 people had shown up to sketch their dream phone.

“For the first time, there are more people living in urban centers than in rural settings,” Chipchase explained as we sat in the shade outside the studio. “And in the next years, millions more will move to these places.” At current rates of migration, the [United Nations](#) Human Settlements Program has projected that one-quarter of the earth’s population will live in so-called slums by the year 2020. Slums, by sheer virtue of the numbers, are going to start mattering more and more, Chipchase postulated. In the name of preparing Nokia for this shift, he, Jung and Tulusan, along with a small group of others, spent several weeks in various shantytowns — in Mumbai, in Rio, in western China and now here in Ghana.

People in the mobile-handset business talk about adding customers not by the millions but by the billions, if only they could get the details right. How do you make a phone that can be repaired by a streetside repairman who may not have access to new parts? How do you build a phone that won’t die a quick death in a monsoon or by falling off the back of a motorbike on a dusty road? Or a phone that picks up distant signals in a rural place, holds a charge off a car battery longer or that can double as a flashlight during power cuts? Influenced by Chipchase’s study on the practice of sharing cellphones inside of families or neighborhoods, Nokia has started producing phones with multiple address books for as many as seven users per phone. To enhance the phone’s usefulness to illiterate customers, the company has designed software that cues users with icons in addition to words. The biggest question remains one of price: Nokia’s entry-level phones run about \$45; Vodafone offers models that are closer to \$25; and in a move that generated headlines around the world, the Indian manufacturer Spice Limited recently announced plans to sell a \$20 “people’s phone.”

Even as sales continue to grow, it is yet to be seen whether the mobile phone will play a significant, sustained role in alleviating poverty in the developing world. In Africa, it’s still only a relatively small percentage of the population that owns cellphones. Network towers are not particularly cost-effective in remote areas, where power is supplied by

diesel fuel. “I don’t see cellphones as a magic bullet per se, though they’re obviously very helpful,” says Ken Banks, founder of kiwanja.net, a nonprofit entity that provides free text-messaging software and information-technology support to grass-roots enterprises, mostly in Africa. “Many people in the developing world don’t yet have a phone — not because they don’t want one but because there are barriers. And the only way companies are going to sell phones is to understand what those barriers are.” He cites access to reliable electricity as a major barrier, noting that Motorola now provides free solar-powered charging kiosks to female entrepreneurs in Uganda, who use them to sell airtime. The company is also testing wind- and solar-powered base stations in Namibia, which could bring down the cost of connecting remote areas to cellular networks. “Originally mobile-phone companies weren’t interested in power because it’s not their business,” Banks says. “But if a few hundred million people could buy their phones once they had it, they’re suddenly interested in power.”

Many of the people in Buduburam who came to sketch their ideas for a perfect phone at the Nokia studio did not actually own one. The community’s power grid had been down for the last month, so those who did have one had been paying to have their phones charged at a local shop with a diesel-run generator. But when I paged through the fat three-ring binders where the Nokia team was storing those sketches, it was evident that the future, or at least some vision of it, had already arrived. Some of the drawings were basic pencil sketches; others were strikingly elaborate, with arrows pointing to different dream features, which were really just a way of pointing — I realized then — to the dreams themselves.

Jung and Tulusan said they’d found this everywhere, the phone representing what people are aspiring to. “It’s an easy way to see what’s important to them, what their challenges are,” Jung said. One Liberian refugee wanted to outfit a phone with a land-mine detector so that he could more safely return to his home village. In the Dharavi slum of Mumbai, people sketched phones that could forecast the weather since they had no access to TV or radio. Muslims wanted G.P.S. devices to orient their prayers toward Mecca. Someone else drew a phone shaped like a water bottle, explaining that it could store precious drinking water and also float on the monsoon waters. In Jacarèzinho, a bustling favela in

Rio, one designer drew a phone with an air-quality monitor. Several women sketched phones that would monitor cheating boyfriends and husbands. Another designed a “peace button” that would halt gunfire in the neighborhood with a single touch.

Interestingly, the recent post-election violence in Kenya provided a remarkable case study for the cellphone as an instrument of both war and peace. After the government imposed a media blackout in late December last year, Kenyans sought news and information via S.M.S. messages on their phones and used them to track down friends and family who’d fled their homes. Many also reported receiving unsolicited text messages to take up arms. The government responded with an admonition, sent, of course, via S.M.S.: “The Ministry of Internal Security urges you to please desist from sending or forwarding any S.M.S. that may cause public unrest. This may lead to your prosecution.”

As a joke, Chipchase sometimes pulls out his cellphone and pretends to shave his face with it, using a buzzing ring tone for comic effect. But there’s a deeper truth embedded here, not just for people in places like Kenya or Buduburam but for all of us. As cellphone technology grows increasingly sophisticated, it has cannibalized — for better or worse — the technologies that have come before it. Carrying a full-featured cellphone lessens your needs for other things, including a watch, an alarm clock, a camera, video camera, home stereo, television, computer or, for that matter, a newspaper. With the advent of mobile banking, cellphones have begun to replace wallets as well. That a phone might someday offer a nice close shave suddenly seems not so ridiculous after all.

One morning I followed Chipchase as he waded deep into the Nima market, a hodgepodge of vegetable stalls and phone-booth-size stores selling sundries like candles and palm oil. He was accompanied by a Ghanaian interpreter and two Nokia designers who had flown in from California to test the cultural waters for a phone that — if everything played out perfectly — could cost as little as \$5. The \$5 phone was still a pie-in-the-sky concept, explained Duncan Burns, one of the designers, something they were fiddling with to see if it might be possible someday probably years from now. Each time the group stopped to chat with someone, Burns pulled out several prototypes — or “physical sketches,” as he called them — for potential phones, handing them over one by one for examination.

These were elegant, futuristic-looking things, just odd enough to seem as if they'd arrived not from California but from outer space. One was long and wandlike, looking something like an aluminum version of a thick vanilla bean. Another was a slimmer rendering of an everyday phone but with no keypad and no screen, just a single unmarked button. A third did not look at all like a phone but rather like a credit card. There were a couple of small digital photos of people's faces stuck to the front of the card, and it came with a small stylus that could be used, Burns said, to touch a face on the card, which would then dial that person's number — a pictorial address book for someone who was illiterate. A fourth had a camera that took pictures and deposited them right into the phone's address book.

A young man selling beans stared at each of the pretend phones uncomfortably, as if he mistrusted the devices or perhaps the small crowd of sweat-soaked foreigners suddenly leaning in close to see how he handled them.

"How would you use that?" Chipchase asked through the interpreter, using a dialect called Twi and pointing to the wand phone. The bean seller tentatively lifted it to his ear. "Where would you keep it?" The young man gestured to his neck. "On a rope?" Chipchase said. The man, still looking bewildered, nodded yes.

Moments later, we came upon an ample-bodied woman dressed in a bright gold wrapper and matching head scarf, sifting rocks and twigs out of scoopfuls of corn beneath an umbrella in a quiet corner of the market.

"Hellllloooooo," Chipchase said, smiling broadly.

"Helllllooooo, Brudda," she said back in English.

"We work for Nokia. You know Nokia?"

The woman said nothing, but reached down and from the folds of her wrapper produced a Nokia phone. "Not good," she said, shaking her head disparagingly. "You call. It switches off."

Chipchase enlisted the interpreter to explain that her problem sounded like a network

problem and not a Nokia problem. Shrugging, the woman went on to inspect the prototype phones, testing their weight in her palm, pressing them against her cheek, punching buttons. She pooh-poohed the stylus phone but said she liked the one-button model if it meant she didn't need to use a lot of numbers. "Brudda, how do you charge it?" she asked. From his bag, Burns pulled another still-conceptual design, this one a thin metal cylinder with a whirlybird antenna on top. He showed the corn seller how to rotate the cylinder in small circles, causing the antenna to swing, which, he explained, in 15 minutes or so would generate enough power to charge her phone battery.

The woman picked up the futuristic gizmo and began to swing it; the antenna whipped around and around. She let out an enthusiastic whoop. Then a friend of hers who'd been sitting in the shadow of her umbrella started to laugh. Another woman, a spice seller perched on a stool next to small mountains of turmeric and cumin heaped on canvas cloths, began to laugh also. "Very nice," the corn seller said to Burns and Chipchase, swinging the antenna like a toy. "It's good!" Then, after a moment, she gathered her composure and handed the charger off to her son, a heavy-lidded teenager who was lounging on a sack of corn nearby. "Doing that," she said blithely as she returned to picking through her kernels of corn, "can be his job."

Sara Corbett is a contributing writer for the magazine.

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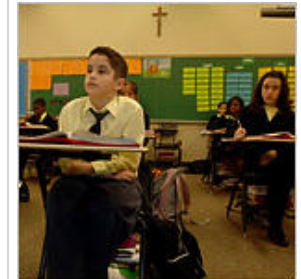
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