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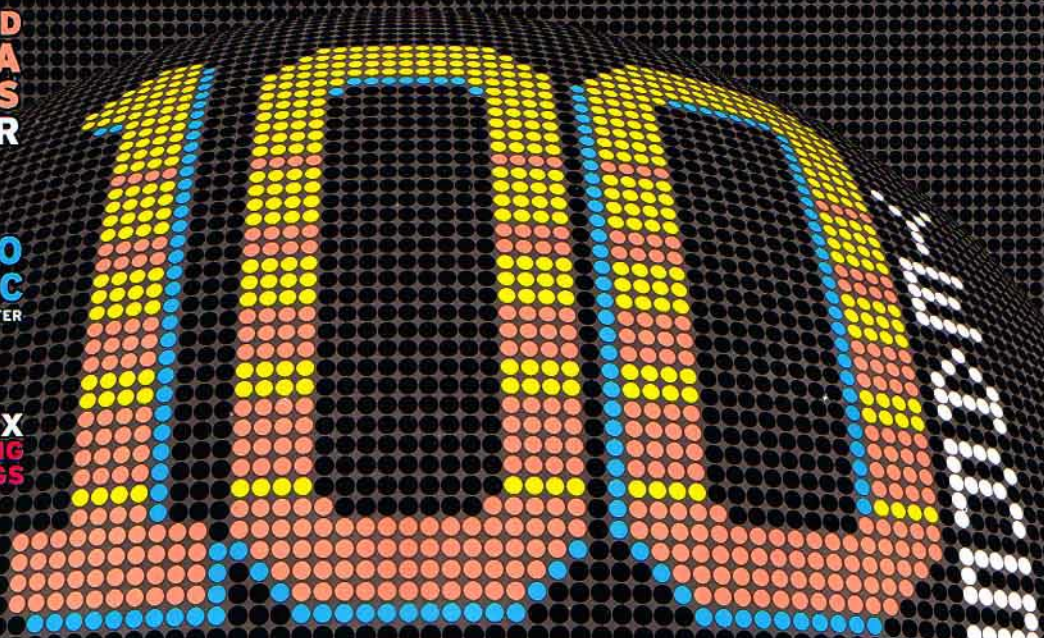
A STORY SO FUTURISTIC

YOU MIGHT SAVE IT FOR LATER

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AFTER VIOXX UNDERSTANDING DRUG WARNINGS

P. 76



(OF WHICH, 64 HAVE BEEN EXTREMELY FUN)



AN ILLUSTRATED HISTORY



FEATURING OLD VEGAS vs. NEW VEGAS

PLUS: A TOUR OF VINTAGE CHICAGO



ILLUSTRATIONS BY JOHN HERSEY

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ROADS

OF

TECHNOLOGY

THIS STORY IS ABOUT SOMETHING HARD TO UNDERSTAND AND POTENTIALLY CONTROVERSIAL. AND VERY ... COOL. IT'S ABOUT HOW INTEL'S FUTURISTIC URBAN ATMOSPHERES LAB WANTS TO USE TECHNOLOGY TO HELP US TALK TO STRANGERS IN WAYS YOU'VE NEVER THOUGHT OF.

by LINDA BAKER

Nokia wireless in hand, Eric Paulos is wending his way around the DKNY watch displays and Chanel makeup counters at Macy's in San Francisco. It's a Wednesday afternoon, but the 36-year-old Intel researcher isn't taking a day off to do some shopping. Instead, Paulos is demonstrating a new mobile phone application that allows users to visualize what he calls "familiar strangers": the people you see on a regular basis but whom you don't otherwise know.

Think of the guy you see on the bus going to work every day. Or the woman you saw at the Macy's jewelry counter, whom you glimpsed an hour later at Caffe Espresso one block off Union Square.

According to Paulos, a lead researcher at Intel's Berkeley-based Urban Atmospheres' project, recognizing such familiar strangers is an important part of living in the city. And mobile technologists, he says, need to pay more attention to these kinds of subtle interactions on the street.

Using your cell phone to go online or text-message friends while waiting at a bus stop is all very well and good, explains Paulos. "But does everything have to be a road-map onto the Web?" he asks. "What about the networks that don't always require global connectivity ... like networks of strangers or networks of coincidence?"

Welcome to the world of "urban computing," a rapidly expanding, too-hip area of research that operates at the intersection of microelectronics and city life. Urban computing technologies are not always practical. But they're important for the future because they encourage community interaction and are helping to shed light on how people will interact in the 21st century's

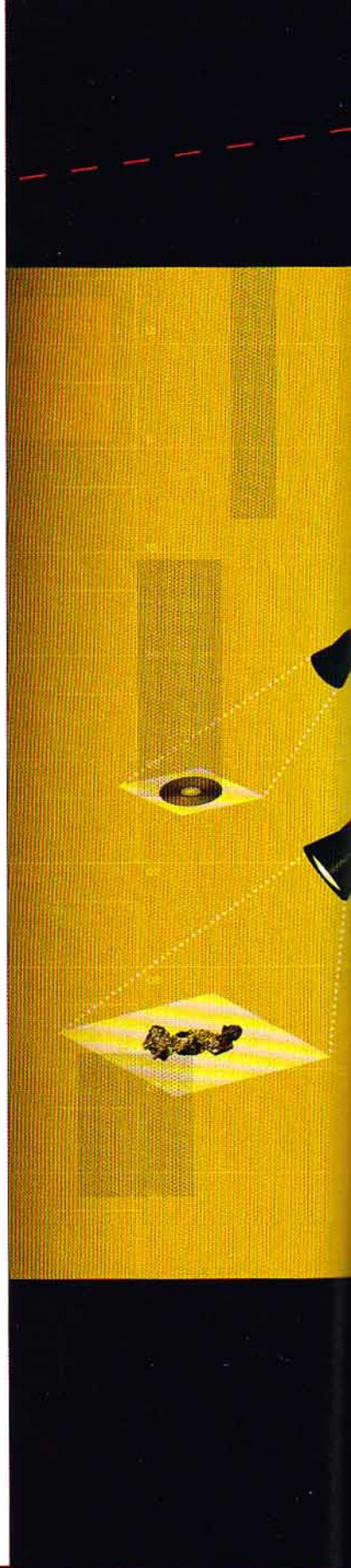
digital cities, when wireless technology is embedded on every street corner.

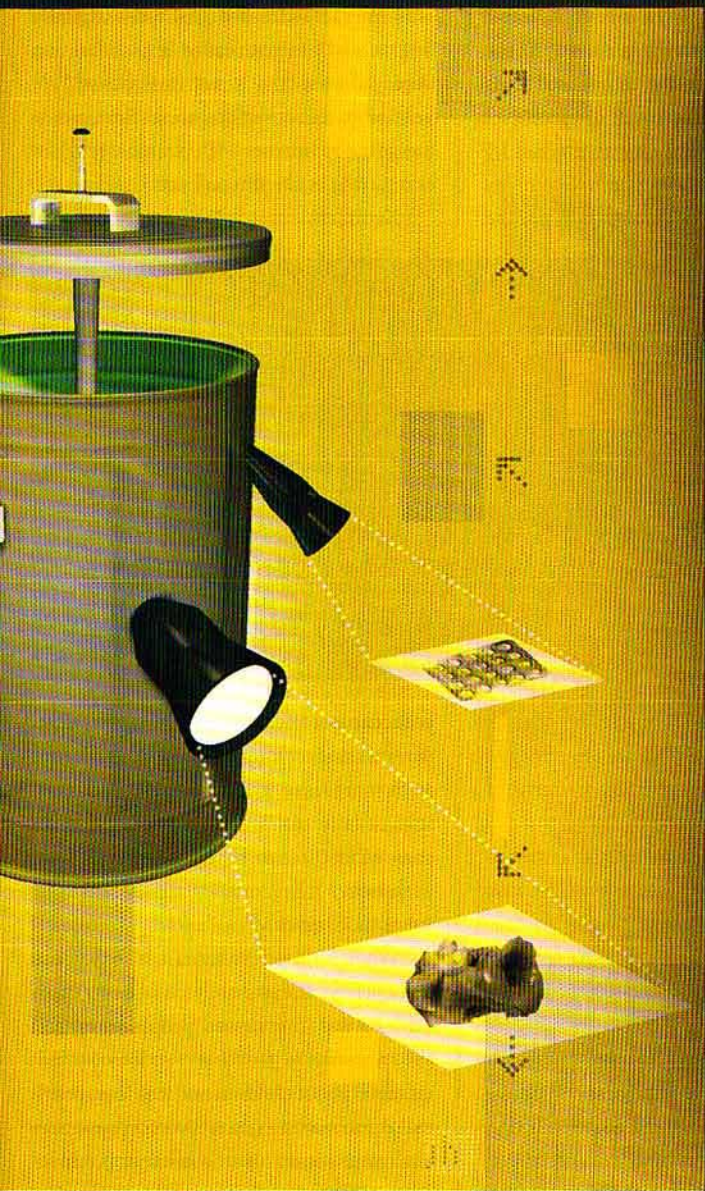
Paulos talks about the present "synergistic moment" in global history: burgeoning urban populations, rapid adoption of Bluetooth mobile devices, emerging microscopic sensor networks and widespread penetration of wireless technologies. The United Nations predicts that by 2007, more than 50 percent of the world's population will live in cities. Current studies project Bluetooth-enabled devices to reach 1.4 billion units in 2005 alone. Globally, WiFi access points are installed at the rate of one every four seconds. The question is, How will it affect our lives? That's what Paulos and his team are trying to determine.

"We try to get a read on why people want to live in the city," says Paulos. "Then we try to play into social themes and behaviors that already exist in urban spaces." The proliferation of mobile and embedded technologies raises serious issues about privacy and surveillance, he acknowledges. But like it or not, he says, the new technological wave is coming. "We want to create a dialogue now, so there aren't problems later."

To capture the essence of the digital metropolis, Urban Atmospheres created a mobile phone download called Jabberwocky, which Paulos named after the Lewis Carroll nonsense poem.

Designed "to promote the familiarity and anxiety in public urban places," the program detects and logs, in the form of a red square, the presence of other Bluetooth-enabled devices—which in turn serve as proxies for the people who carry them. As the user moves from home to work to school, the program identifies previously logged "strangers" and records them again,





EQUIPPED WITH COMPUTER, SENSOR, DIGITAL SCALE, CAMERA AND PROJECTOR, THE GARBAGE CAN DETECTS CANDY WRAPPERS AND OLD BUS TICKETS AS THEY ARE THROWN AWAY, THEN PROJECTS THEIR IMAGES ONTO THE STREET.

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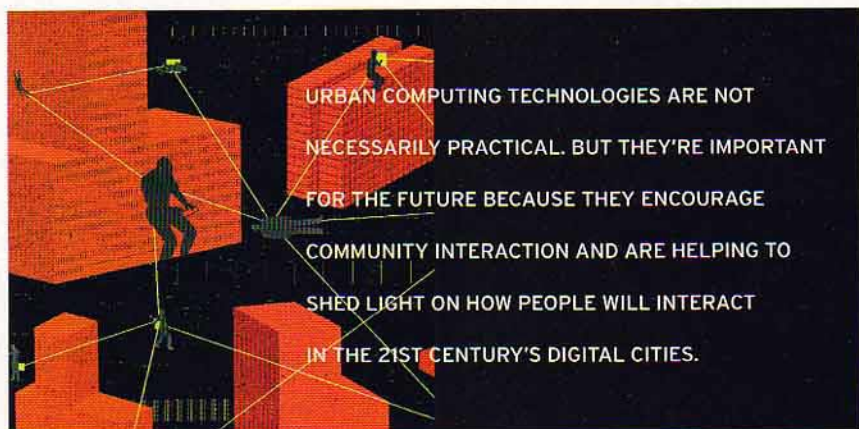
SWSPIRIT

this time as green squares.

Walk to the corner cafe, for example, and a series of green squares might crop up on your mobile phone screen, representing people you've previously encountered—the woman who runs the sidewalk flower shop, the group of teenagers coming home from soccer practice, the moms and dads pushing strollers. The result is your personal path through the city as marked by familiar people, says Elizabeth Goodman, an Intel researcher who interned on the

board or Windows interface. Hence "urban probes," a series of Urban Atmospheres projects that involve placing technological installations in cities to elicit opinions, brainstorm and reactions from the people who interact with them, such as a digitally augmented trash can called Jetsam that was deployed on a busy street in Berkeley. "We wanted to ask questions about how people are going to interact with technology when computing is ubiquitous," says Paulos.

Equipped with computer, sensor, digital



Jabberwocky project. "Familiar Strangers is a compass," she says. "It's a way to navigate the sometimes unrecognizable patterns of the city."

The idea is to get users to pay attention to the people on the street they might otherwise ignore. Jabberwocky gives people another way to look at the city by pointing out patterns in city life that would otherwise go unnoticed.

Jabberwocky has another purpose. Think about all those annoying cell phone users—the kind who spread noise pollution in stores, restaurants and trains. Jabberwocky, the future gazers at Urban Atmospheres hope, will encourage people with mobile phones to engage with the street, not isolate themselves from it. Already, several major mobile handset makers and service providers, such as Nokia and T-Mobile, have expressed an interest in Jabberwocky.

One of the challenges behind urban computing is envisioning human uses of technology that don't involve a mouse, key-

scale, camera and projector; the garbage can detects candy wrappers and old bus tickets as they are thrown away, then projects their images onto the street. The pieces of trash then orbit the can based on their weight, with heavy items moving slowly and light items more quickly.

What kind of patterns and behaviors emerge from the point of view of a city trash can? Paulos interviewed people who used the trash can to get their reactions. Stories emerged about children and lost toys, political discussions about overconsumption and commentary about consumer products with RFID (radio frequency identification tags) moving through public trash receptacles. A teenage graffiti artist thought the display was so cool he gathered a bunch of his friends to watch—but only after sticking his head in the can and watching it rotate on the sidewalk display.

Paulos envisions a digital scenario that would capture the trash can as a focal point for communication about city life: with

the help of a mobile phone application, the can would tacitly acknowledge receipt of garbage and its relation to other discarded items. "The trash can would convey some information to the user," he says. "But it would be very light, like receiving a glance or a nod from someone in a cafe."


The convergence of embedded sensors and portable computing devices provides "huge opportunities" for reconceptualizing the city, says Anthony Burke, a University of California at Berkeley architecture professor who has collaborated with Paulos. In this everyday digital metropolis, he says, "even something as benign as grocery shopping becomes reconsidered as a design opportunity." One in which, perhaps, you are able to detect who's buying the same items as you or receive real-time information on the source of your produce.

During the annual Conference on Ubiquitous Computing held in Nottingham, England, last September, Paulos co-organized an "Urban Frontiers" workshop, a project that brought together engineers, artists, geographers, urban planners and designers to examine the ways mobile and wireless computing will be integrated into the urban landscape. The conference papers included a digital art project in which wireless networks form spontaneously as people open up their umbrellas during a rainstorm. Equipped with Bluetooth-enabled PDAs, the umbrellas communicate with each other when opened in close proximity to other Bluetooth-enabled umbrellas. The connection is then made visible to onlookers by illuminating the umbrellas with light-emitting diodes. The researchers note that future applications could include data sharing, such as personal and information and music files, via the umbrella networks. What is the purpose of the umbrella network? To cast light on new kinds of urban communities and to show how embedded and mobile technology is going to radically change the simple act of walking through the city.

"It's important to acknowledge that things we actually cherish in life in home or the city are often intangible," says Paulos,

whose next urban probe may allow users to explore invisible aspects of city infrastructure such as the inner workings of active sewer lines or subway trains. "They get at emotional experiences. It's what constitutes the richness of people's lives."

Outside the Westin Hotel in San Francisco, Paulos glances at a sea of red squares on his Nokia that have yet to turn green.

Then he stoops to look at a set of keys someone has dropped on the ground. "People are voyeurs at heart," he says. "They love to create these fictitious stories. At Urban Atmospheres, we want technology to reveal that aspect of the city." 

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