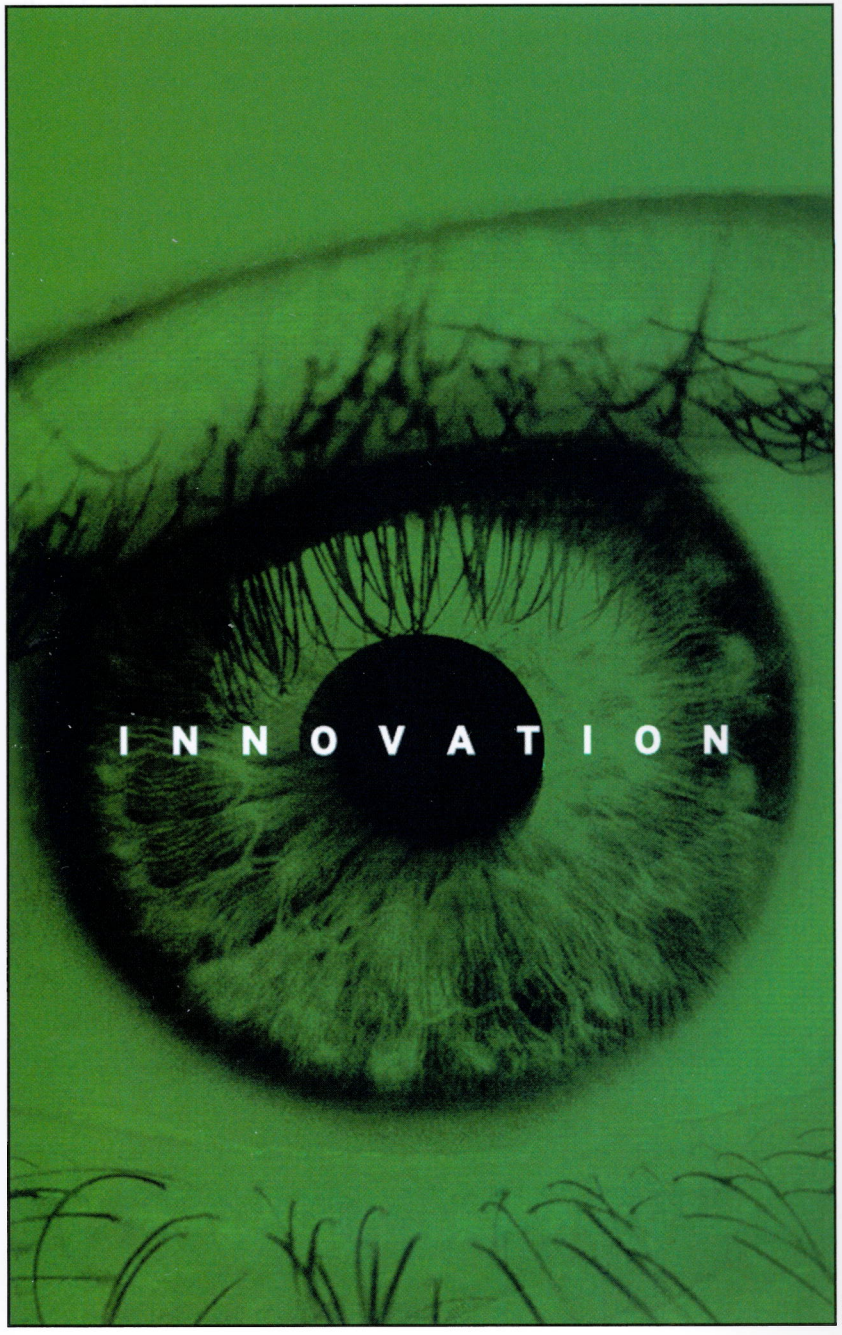
INNOVATION BEGINS WITH AN EYE



IDEO

What do stand-up toothpaste tubes, all-in-one fishing kits, high-tech blood analyzers, flexible office shelves, and self-sealing sports bottles have in common? Nothing actually, except that they're all IDEO-designed products that were inspired by watching real people.

We're not big fans of focus groups. We don't much care for traditional market research either. We go to the source. Not the "experts" inside a company, but the actual people who use the product or something similar to what we're hoping to create.

Plenty of well-meaning clients duly inform us what a new product needs to do. They already "know" how people use their products. They're so familiar with their customers and existing product line that they can rattle off half a dozen good reasons why an innovation is impractical. Of course, we listen to these concerns. Then we get in the operating room, so to speak, and see for ourselves.

A few years back, for example, Silicon Valley–based Advanced Cardiovascular Systems asked us to help it redesign a critical medical instrument used on heart patients during balloon angioplasty. The company sold an inflation device for the tiny balloon that the doctor inserts with a catheter through the femoral artery in a patient's leg. The balloon is guided up into the obstructed coronary artery and inflated, compressing the plaque and stretching the artery. ACS told us that the new inflation device—like the existing one—had to be suitable for one-handed use.

But when we went into the operating room—literally—that's not what we saw. Although the current product could theoretically be used with one hand, it really worked that way only if you had a hand the size of Michael Jordan's. In actual practice, medical technicians almost always used *both* hands with the device, since, as we observed, they weren't doing anything else with their "spare" hand. So why not design

the new "Indeflator," we thought, for a two-handed technician? Why fight human instinct?

It's precisely this sort of observation-fueled insight that makes innovation possible. Uncovering what comes naturally to people. And having the strength to change the rules. From the simple observation that technicians used *both* hands flowed distinct improvements. We added ribs to the base of the pumplike device so that technicians could hold it steady in one hand while they inflated the balloon with the other hand. We tilted the pressure gauge upward so that it was easy to read during inflation. We increased control and precision. We made it easier to deflate the balloon too. And we made one other big change.

There's a critical moment in an angioplasty procedure when the surgeon instructs a technician to inflate the balloon. During the next sixty seconds or so, the balloon obstructs the artery, creating, in effect, a heart attack. At that point, with the patient still awake, the old device would make a loud clicking noise as it ratcheted into place.

Our new design lost that scary ratcheting sound.

TIME IN THE JUNGLE

Clicks-and-mortar brokerage founder Charles Schwab has talked about his effort to assume the perspective of his customers. "I am like a chef. I like to taste the food. If it tastes bad, I don't serve it. I'm constantly monitoring what we do, and I'm always looking for better ways we can provide financial services, ways that would make me happy if I were a client."

Noble aspirations, and you can't argue with Schwab's track record, but we believe you have to go beyond putting yourself in your customers' shoes. Indeed, we believe it's not even enough to *ask* people what they think about a product or idea.

One reason is the same factor that prevents you from learning that your meat loaf tastes like sawdust. Your dinner guests are too polite to tell you the unvarnished truth, too wrapped up in trying to give you the expected answer. How's the meat loaf? "Fine," they say. ("Delicious," if they care about you or think it will make you happy.) How many people volunteer that they're having a lousy day? It's human nature to put a bright face on a dismal situation. Because there's no information, no value, no content to the "fine" response, we sometimes say, "Fine is a four-letter word."

A second reason for the "fine" response is that your guests don't know or can't articulate the "true" answer. Maybe the meat loaf needs more salt or less onion. The problem is that your guests may like to eat, but they're probably not food critics. In business, too, your customers may lack the vocabulary or the palate to explain what's wrong, and especially what's *missing*.

Companies shouldn't ask them to.

This is particularly true of new-to-the-world products or services. A user of a new type of remote control may not be able to recognize that it has too many buttons. Inexperienced computer users may not be able to explain that your Website lacks navigational clues. And they shouldn't have to. We saw this firsthand when a software company asked us to find out how users would react to one of their new applications. We set up a few computers and observed people struggling with the program. More than a couple were having a terrible time, grimacing and sighing audibly as they fumbled with the keyboard and mouse. But in exit interviews, the software company was given a different story. Those same people swore that they'd had no trouble with the new application and couldn't imagine a single improvement.

Customers mean well—and they're trying to be helpful—but it's not their job to be visionaries. Indeed, former 3Com CEO Bob Metcalfe tells the story of how, in the early eighties, his customers and salespeople practically *demanded* that he dedicate their R&D efforts to making a new version of its networking card for multibus-compatible computers. Metcalfe balked, and some of his salespeople quit in protest, disgusted that the company seemed to be ignoring the re-

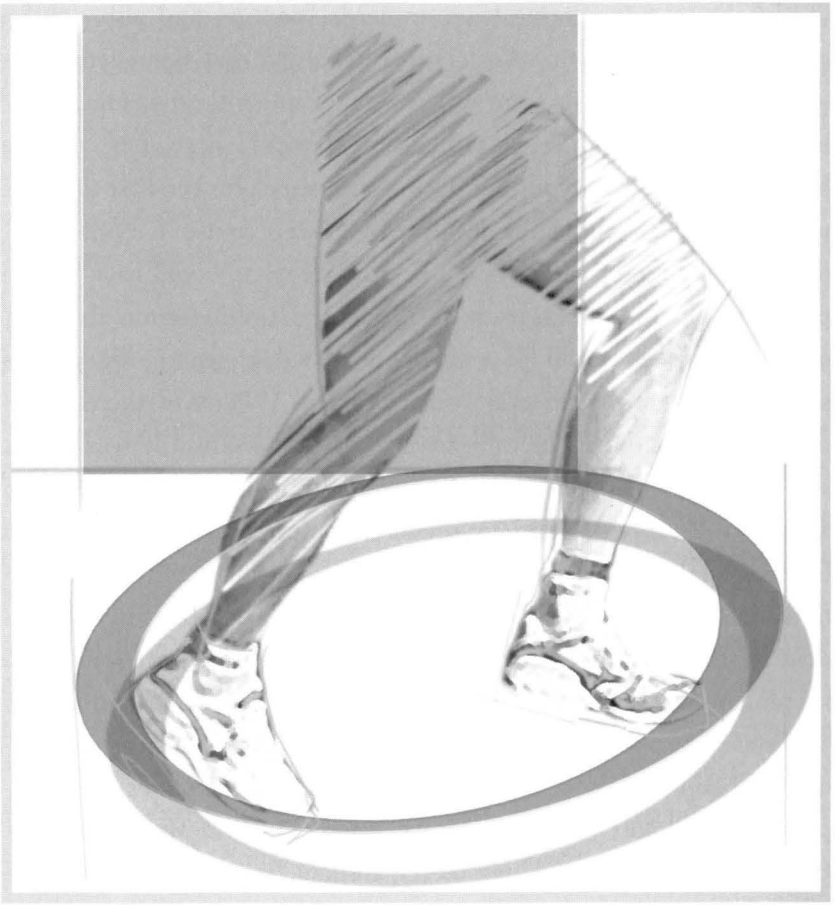
quests of its own customers. Instead, 3Com chose to develop an EtherLink card that worked with the new IBM PC. Today there are *no* multibus computers left in the world, but 3Com ships more than 20 million EtherLink cards a year.

Seeing and hearing things with your own eyes and ears is a critical first step in improving or creating a breakthrough product. We typically call this process "human factors." I prefer "human inspiration" or, as IDEO human factors expert Leon Segal says, "Innovation begins with an eye." It's a general principle of humankind. Scientists, industrialists, anthropologists, artists, and writers have understood this for centuries, and many entrepreneurs understand it intuitively.

Once you start observing carefully, all kinds of insights and opportunities can open up. For example, the hugely popular elliptical cross-trainer exercise machines in your local health club got started from a simple human observation. Larry Miller, a human-factors-savvy person working at General Motors, was videotaping his daughter running one day and noticed the elliptical path traced by her feet as she went through her exercise. From that observation-based spark, Miller set about building a prototype of a device that would mimic his daughter's elliptical movement—without the jarring impact of feet hitting the ground. He sold his idea to Seattle-based fitness equipment maker Precor, Inc., which developed it into its EFX line of elliptical trainers. Thanks in part to Miller's epiphany, Precor is now the fastest-growing equipment company in the health club industry.

NETTING A BUG LIST

Sometimes—if you're lucky—you can find inspiration for innovation by observing yourself. In many parts of your life, you go through steps so mechanically, so unconsciously, that this is not possible. When you're off your own beaten path, however, you are more open to discovery: when you travel, especially overseas; when you rent an unfamiliar car; when you try a new sport or experience a new activity. At those times, you are more open to ask the childlike "Why?" and "Why not?" questions that lead to innovation. Whenever you are in that new-to-the-experience mode, I would urge you to pay close attention and even take notes about your impressions, reactions, and questions. Especially the problems, the things that bug you. We call these mental and jotted-down observations "bug lists," and they can change your life. That's what happened one day to twenty-six-year-old Perry Klebahn on a visit to a Lake Tahoe ski resort.



Daniels & Daniels

Larry Miller got the inspiration for his elliptical trainer by watching his daughter run.

Klebahn was recovering from an ankle fracture, and although he could walk without pain, his doctor had warned that skiing was inadvisable. Still wanting to meet his friends for lunch on the slopes, Klebahn discovered that the resort had some snowshoes available to help him traverse the snowy terrain. Using snowshoes for the first time, he was struck by how incredibly awkward they were to use. For one thing, they weighed more than ten pounds, turning what would have been a pleasant walk into serious exercise. On level or uphill terrain, the front of the snowshoes would fill up with snow, making them even heavier and causing you to trip over your own feet. Whenever there was a downhill slope, the shoes were hard to control and would sometimes slip out from under you. All in all, a pretty unpleasant experience, and a product category that had not seen much innovation since Lewis and Clark. A fatalist would have just written off snowshoes as awkward, antiquated equipment, but Klebahn was a Stanford product design student at the time, learning how to sharpen his observation skills, keeping bug lists, and asking a lot of "why?/why not?" questions.

Inspired by observing his own difficulties with the existing technology, Klebahn—while still a student—formed Atlas Snowshoe Company, which almost single-handedly created today's snowshoe industry. Using a clever design and high-tech materials, he cut the weight of the snowshoes by 70 percent and made them easy to use on any terrain. That left the small task of creating an industry around his new product, but within a few years, Atlas had partnered with ski resorts from Vancouver to Sun Valley in creating snowshoeing areas. Resorts initially worried "if we build one, will they come?" but a single snowshoe area at Vail boasted more than 100,000 visitors by its second season. Perry Klebahn, starting with a single observation, then following up with a lot of creativity and hard work, grew Atlas Snowshoe Company to more than $10 million in sales and then sold the company.

Anecdotal? Yes, but hardly an isolated case. Ask around, and you'll find that many entrepreneurs got started by observing humans struggling with tired routines and asking themselves what they could do about it. Scott Cook, cofounder of Intuit, got the idea for the company's first product by observing his wife paying the bills in the slightly tedious manual way. He wondered whether there wasn't a way to "quicken" that process. Intuit had sales of almost a billion dollars in 1999, and Quicken is still the company's most successful product.

KEEPING CLOSE TO THE ACTION

Whether it's art, science, technology, or business, inspiration often comes from being close to the action. That's part of why geography, even in the Internet age, counts. And why so many high-tech companies have emerged from Silicon Valley—and not Connecticut or even New York. New ideas come from seeing, smelling, hearing—being there.

This sensory immersion is why people still fly to other parts of the country for face-to-face meetings with clients, customers, and colleagues, even in the information age; why phone or videoconferencing often doesn't do it. It's also why people still go to museums, to be inspired in the presence of original artwork, though a digital image may be easily available on their home computer screen.

Asking questions of people who were there, who should know, often isn't enough. It doesn't matter how smart they are, how well they know the product or the opportunities. It doesn't matter how many astute questions you ask. If you're not in the jungle, you're not going to know the tiger.

NO DUMB QUESTIONS

"She has a good eye for business" is a cliché.

But clichés usually have a grain of truth. The reason people talk about the importance of having "a good eye for business" is that you

need to be aware of the world around you, ready to spot trends—and act. You can't wait for a report or rely on reading it in the paper or on the Web.

Good companies and good consultants are astute observers, of people, teams, organizations, technologies—and trends. They see quirks and patterns. Lots of folks try to do this. What makes IDEO different is that we put a lot of steam and spark behind our observations. And we have come up with some pretty good methods that increase the quality of our observations.

It's a funny paradox. Though we're pretty confident in our ability to observe people and draw insights out of them, we pride ourselves on starting every project humbly—and a little dumb. We don't want to peek at the answers before we know the questions. Steelcase, the world's leading manufacturer of office furnishings and an IDEO investor, asked Sean Corcorran's team at IDEO to dream up some concepts for "active storage" as part of a new modular system of interior architecture called Pathways. Sean was enthusiastic but wasn't sure where the exploration would lead. He asked a few questions, and the discussion moved toward "new and emerging work processes."

Of course, Steelcase would seem to know everything there is to know about office environments. But even after the company gave us some direction and shared some of its knowledge, we didn't feel like we had enough intuitive understanding of the issue to start designing. The problem, as Sean recalls, was "still a little too fuzzy." We encounter that a lot: the fuzzy problem versus the well-defined problem. So Sean started with the basics, sending a team of people into offices to take photographs, watch, and ask questions.

If you ask them, most people will insist that they file in filing cabinets or on their computer (remember the promise of the paperless office?). But observe people at work, and you'll find something less idealized. Sean found that people stored paper on the floor, on chairs, on top of binders, and, of course, on their desks or other work surfaces. "Filing by piling" was the phrase that came to mind. Sean's team was on the brink of a valuable insight. If you clutter your desk, where do you work?

The proverbial light switched on. People store on their desks anyway, so why not just create a little desk above the desk? They can still file by piling, but the desk and work space would be less cluttered. And consistent with the Pathways emphasis on mobility, the desk surface itself could be wheeled wherever a worker needed it.

The resulting "Datum shelf" helped shrink the footprint of an office. Steelcase patented the idea and built on it, introducing complementary shelves for office corners or other unused spaces, bringing a deeper three-dimensional geometry to the workplace. Best of all, the Datum shelf celebrated human behavior. Instead of trying to change the primal need to file by piling, we channeled that urge into a more productive pattern.

A CHILD'S EYE

We're big advocates of a principle we call "being left-handed," developing empathy for consumers' needs, even if those consumers are very different from yourself. By studying people of all ages, shapes, cultures, and sizes we've learned that the best products embrace people's differences.

Take kids, for instance. Today the best companies recognize the value of talking—and listening—to kids. More and more companies are putting their products into the hands of teenagers, asking them to give them a test drive and report back. But we look at this secondhand data collection as better for marketing than for inspiration. We prefer getting kids down on the test track and watching them take prototypes out for a spin.

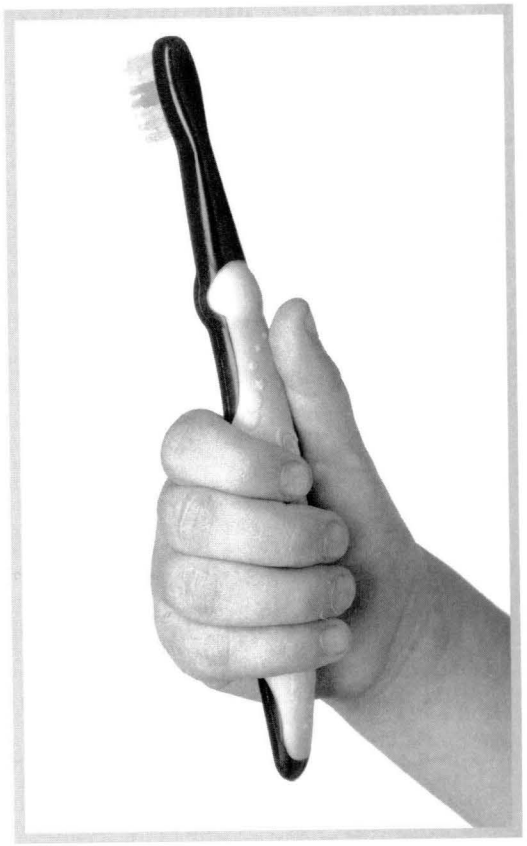
An interactive media group at Philips asked us several years ago to come up with a new computer input device for three-to-five-year-olds. Having had home-run successes with computer mice for Apple, Microsoft, and Logitech, we worked up some mouse prototypes and let

the kids at them. Trouble is, they drove the mice like cars. It was hard enough for them to understand that moving the mouse forward translated to moving the cursor upward on the screen. Worse yet, the kids wanted to turn the mouse ninety degrees and "drive" it left, which, unfortunately, does not move the cursor left at all. Finally, no young child that I have seen using a mouse for the first time can grasp the idea that if you run out of "mousing" space at the edge of the table, you just pick up the mouse and move it a little the other direction.

Insights like these led us to leave the mouse behind and prototype a softball-sized trackball. Big enough to accommodate kids' less developed dexterity, better suited to survive the abuse kids dish out, and easier for youngsters to make that big conceptual leap—if you move the ball, that little whatchamacallit on the screen moves too. All too often, companies overlook this critical step of watching real people. To make better products and services, you've got to care about the person actually using it.

Take something as basic as a toothbrush. The most important time to learn to brush thoroughly and regularly is as a child, yet for decades kids' toothbrushes were pretty much just smaller versions of adult brushes. On a project for Oral-B, we put brushes in the hands of young kids and quickly noticed the "fist phenomenon." Little kids grip the brush with their whole fist, unlike older kids, who use their fingertips. At first, it seems almost paradoxical that kids' toothbrushes would be fatter than adults', but not when you see them in use. So we made a fat, soft, squishy grip that would be easy for them to handle. Oral-B's new Squish Grip brushes looked and felt like toys, a good thing when you consider that the longer kids brush, the better.

This concept of "being left-handed" can apply to all aspects of diversity in your customer base. Kids are obviously different in size, mental development, and attention span. Other groups have subtler differences you need to understand, observe, and develop empathy for if you want to anticipate their interests and needs.



Steven Moeder

Observations helped us discover that smaller hands actually need fatter toothbrushes.

INSPIRATION BY OBSERVATION

Open your eyes and you'll be awakened to opportunities to improve products and services without even leaving your office. Walking around Bank of America's corporate headquarters in 1989 on a project called Objects for a Better Day at Work, we saw something we hadn't expected. Desks, computers, monitors, and keyboards were state-of-the-art but still didn't allow much leeway for physical differences. If

you weren't the "ideal user," you usually had to jury-rig your setup to fit your body. But in the heart of corporate America, we hadn't expected piles of phone books. We first thought it was another storage problem but soon determined that some workers at the bank were placing phone books under their desks because they couldn't comfortably rest their feet on the floor when seated. To achieve the right height for their keyboard and monitor, their legs were left dangling. It seems like a minor insight. But seeing those phone books firsthand helped inspire a range of products, the most obvious, of course, being a simple adjustable footrest.

That's another example of "being left-handed." Not everybody's like you. Not everybody reads the manual or follows directions. Not everybody is a thirty-year-old six-foot-tall white male. Awaken your antenna to the endless variety of human nature, and you're bound to make customers happier and find new markets.

Baxter Healthcare, for instance, asked us to help create a user-centered design for a very special system that helps patients with heart disease. Known as a left ventricular assist system, it's a life-critical device that keeps your heart pumping while you're waiting for a transplant. Although the external unit weighs only a few pounds, that can still be a burden when you consider that the patient using it may be in a weakened state. So we prototyped and observed, looking for a better way to carry the unit. We tried backpacks and vests. In the end, we discovered that a strap around the waist made it easier for the user to interact with the device. And we designed some simple audible tones that would let people know if the battery was running low.

There's an urgency to medical products. Sometimes the right design can be a matter of life or death.

EMBRACING YOUR CRAZY USER

Focused observation can be a powerful source of innovation. As you observe people in their natural settings, you should not only look for the nuances of human behavior but also strive to infer *motivation* and *emotion*. Good, insightful observation combines careful watching with occasional well-chosen "why?" questions to get at the underlying psychology of a person's interactions with products and services.

When it comes to observation, Jane Fulton Suri of IDEO may be a natural. A British transplant who works out of our San Francisco office, Jane heads many of our human-factors investigations.

Jane is a bird-watcher with an attitude, except the birds she specializes in are humans. As a student of psychology at the University of Manchester, Jane became fascinated with how the physical layout of space around the university influenced the quality of human exchange. Puzzled at how an awkwardly designed building seemed to create intersection points where people ran into one another, Jane launched her first formal human-factors study. She began tracking where and when people congregated, creating maps and snapping photos.

It wasn't long before she turned her college fascination into a budding career consulting in traditional ergonomics for British government agencies and corporations. She studied why rail workers fail to hear the train's siren, why drivers don't spot motorcycles until it's too late, and why circular saws occasionally slice into fingers. The solutions she proposed were critical, but it was always about avoiding catastrophe, about eliminating a negative, never about creating a positive. Requiring motorcycle drivers to turn on their headlights did make a small dent in the number of accidents, but in general, bureaucratic regulations to control the design and usage of things didn't seem to be the answer.

Today at IDEO, Jane works on fixing a lot of product problems *before* they get into consumers' hands. She helps companies plumb people's latent needs and wishes, in order to redesign existing products or find inspiration for entirely new ones. She's part anthropologist and

seer, as well as a good old-fashioned foreign correspondent—just the sort of skills that businesses need to help them discover how their products and services can better be used by their customers.

Jane's work is a mixture of hyperobservation and synthesis. We have no time for detailed scientific studies at IDEO, nor does most of the rest of the business world. We aren't interested in hundreds of carefully qualified users filling out detailed forms or sitting in focus groups. Instead, we usually track down several interesting people to observe and talk to. E-mail is often a good source for finding people. We'll blast out a query to see if anyone knows friends who fit a certain profile or who might let us watch them using an existing product or service.

Jane tries to get under people's skin to figure out *what* they think and do, as well as *why.* It was Jane who analyzed the human factors of a major undertaking by Japanese electronics giant NEC to explore fresh possibilities in its computer line.

NEC did fabulously well in Japan with desktop machines, but for some reason hadn't enjoyed the same success with notebook computers. The company decided to throw its weight behind a new notebook effort and hired us to help. Jane went to Tokyo to shadow NEC computer salespeople. Several facts became immediately apparent. First, Japanese businesspeople loved notebooks partly because space was precious. A family's home computer, for example, was often a notebook machine. And salespeople rarely had a desk, let alone an office. They were always juggling competing needs, and since they usually lacked a desktop computer, the notebook had to do it all. At the office, they expected their notebook computer to include a floppy drive; on the road, battery life was critical. But the objective—making a successful presentation to a client via their laptops—wasn't easy. As a salesperson would pull up a chart, he'd have to awkwardly turn the machine (while still trying to hit the right keys) to show the screen to the customer.

From these critical observations came the inspiration for NEC's design of the Versa product line. The floppy drive could be swapped out for another battery when the salesperson took to the road. The salesperson could pull up a chart and deftly swivel the screen so the client could see. In the end, the Versa won international awards, was prominently featured in *BusinessWeek,* and, most important, doubled NEC's U.S. market share in its first six months.

The Versa was the first of several successful NEC projects inspired by a collaborative process we called "Greenhouse." One reason it was so successful was that NEC took a holistic multidisciplinary approach to designing its new products.

What does this mean? Many companies rigidly separate functions such as research, design, marketing, and manufacturing, creating walls between groups that have much to teach one another. NEC set out to integrate the whole process, inviting the marketing and manufacturing departments to inform the design and broaden communication. As Jane puts it, "You don't just send your researchers out to do research and your designers to do design. You send your designers with researchers to do design and vice versa."

Jane has spearheaded numerous IDEO efforts to ensure that both designers and clients are part of the observation process—that the discovery process is organic—because it's not enough to see or hear what people say. You have to interpret and intuit shades of meaning to divine their underlying motivations or needs.

FINDING RULE BREAKERS

Finding the right people to observe helps. People who follow directions perfectly and can't imagine a different course aren't much help. You learn more from the woman who takes a shortcut, who forces the product to do something the manual says it can't, who imagines what it might do if only . . . You learn from people who break the rules. We're often asked to do "futures" projects, a twist on the old "concept car" tradition. Companies frequently want to explore products or services or ways of doing things years into the future, and they often give us leeway to explore the product landscape. AT&T, for example, once

asked us to help it develop some new interaction strategies for business telecommunications. The objective was to help the company figure out how to make common phone tasks, such as three-way conference calls, more intuitive and easy to use.

So Jane and a few other team members paid a visit to one of our travel agents, a woman named Sally. While Sally's phone had a flash button for conference calls, she found it confusing. Like most of us, she had no interest in trying to decipher the complicated instruction booklet in order to figure out what "flash" meant or how to use it.

Camera in hand, Jane asked Sally to make a conference call. The travel agent went around the room, grabbing phones and placing them in a circle on her desk. One by one, she'd phone the people she wanted to talk to, putting them all on speakerphone so she could talk to them together. Sally loved the versatility of the system she'd cobbled together. If she needed to privately confer with one of the parties, she'd take him off the speakerphone and cup the handset to her ear. Or if she wanted just two of the parties to talk, she'd take them off speaker and hold the handsets next to one another.

Sally knew her system was out of the ordinary. "I know this is crazy," she confessed. "But this is what I do. It works for me." Jane understood why Sally had concocted this elaborate procedure. Sally was creating physical references. By giving each caller a separate phone and location on her desk, Sally could "see" and hear who was speaking at any point in the conference call. This was her mental model, a concrete routine she'd devised to make physical connections between people she couldn't see.

The extremes Sally went to in creating this physical and mental map dramatized the limitations of her phone. What if her phone provided more clues to let people "see" what's going on in a conference call? What if her phone could offer a natural, intuitive way of visualizing a conference call?

Sally's actions had a lot to say. It's a simple lesson that we often miss. Look at the Sallys of your business. The women and men who do things a little differently. The people who might teach you something you didn't know.

YES, PEOPLE ARE HUMAN

There was a time when companies wrote off people like Sally as "stupid customers." A Big Three auto executive in the 1930s once lamented, "It's not that we build such bad cars; it's that they are such lousy customers."

The annals of business are chock-full of executives who didn't understand why people couldn't use their products correctly. For example, Iridium's ill-fated satellite phone system required customers to have what they called "user dexterity." Iridium expected callers to position themselves so that nothing blocked the line of sight between their phone and the orbiting satellites—an unfathomable geometry problem for some customers. Sooner or later, many of these companies lost market share or—like Iridium—went bust. Unless you wield monopoly power, such arrogance is generally not a good customer strategy.

Nor is treating customers like statistics. In these days of click-through demographics and detailed buying patterns, too many companies assume that the answers will be electronic, that everything worth knowing will be assigned scientifically determined percentages. But this assumes you know the right questions to ask. And it forgets that outrageous new products and ideas recognize that people are human.

Empathy is about finding and listening to the Sallys of the world. It's about rediscovering why you're actually in business, whom you're actually trying to serve, what needs you're trying to fulfill. Companies periodically need an empathy check. Often they fall into the trap of responding to what seems to be market needs: introducing new features simply because other companies are introducing new features.

Long-term market leaders especially face this pressure. A few years back, Kodak asked us to help investigate the future of digital imaging. As with many projects, there was a tension between quickly getting a product out and laying the groundwork for future strategies. One of the first things we did was to remind team members about the underlying emotions associated with collecting, sharing, and viewing images. Jane asked each of them to write a half-page essay about picture-related experiences they'd had in the past six months, anything from snapping family photos to sorting their album or mailing photos. Jane shared the personal insights with the rest of the team and published them in a little booklet, which we gave to each member.

Though only a few Kodak employees wrote essays, word spread to Kodak's advanced technology lab. Upon hearing one of these family photo-taking tales, one of the lab members said he realized for the first time how important photos can be to families. Clearly touched, the man had a newfound desire to make his project relevant to real people.

Inspirations like these don't always immediately spawn new products or services, but they can refresh and reinvigorate workers. Jane's work has had a similar effect on employees at IDEO. We don't always have the time or budget to extensively research all the human factors that may be at play. But because of Jane's example, we've all learned to consider more carefully the human component.

OBSERVATION EXERCISES

Observation and inspiration don't have to be formal. Each one of us can learn to be a better observer simply by taking stock of our environment. Try this simple exercise. The next time you visit another company—or even your own—watch and listen carefully. Is it clear where you're supposed to go? Does a receptionist greet you and ask you to go somewhere else? Is it a comfortable place to wait, or do you feel like you're at the dentist's office? Which parts of the process welcome you like a special guest, and which parts leave you feeling like a drone in the hive of industry?

What about meetings? Who arrives late? Where do people sit? Who runs the show? Next time at the airport, think how you might reorganize the whole experience if you were running the show, everything from baggage check-in and finding your gate, to waiting for information on seat upgrades.

If you're like most of us, you'll probably find many of these human systems lacking. The office waiting room feels like a presentencing chamber, the meeting may be chaotic or overly hierarchical, and, let's face it, kindergarten classes are run more efficiently than some airline check-ins.

Pop psychology books say, "Listen to your inner child." But watch how the world works and you become hyperaware: Who treats you like a person—and not a transaction? Who values your time over their system—how many times have you spent extra time waiting in line to buy something because the store's computer register stumped the clerk or because phone calls got higher priority than waiting customers? Who is watching and thinking about what could be done better?

Somebody in the hospitality industry finally listened to their customers' needs. Notice how good business hotels now include an iron and ironing board? If someone had bothered to follow business travelers around, long ago they'd have noticed salespeople grimacing at wrinkled clothes, turning on hot showers to try to steam out the wrinkles, and, of course, calling down to housekeeping to get hold of one of the few irons in the hotel.

Athletes must stretch before competing. Similarly, our observation muscles could use a little stretching. Keep your "bug list" handy, and use it to turn minor failings into improvements for your organization. Even the best companies could better design some of what they do. FedEx, for example, is a great company. But why can't it give you a proper envelope with its monthly invoice? Everyone in the organization and many outside of it see the beautifully designed FedEx Letter envelope the company provides to customers for free, but the person who

pays the bill also sees the "Rube Goldberg does origami" envelope for the payment check. Is it really optimal to make customers tear, fold, and lick this quirky envelope? And if FedEx is "Absolutely, Positively" the best way to send business documents, why is the envelope prepaid for sending via the *U.S. mail,* when the FedEx person already comes to your office twice a day?

That proverbial blister in your shoe just might be tomorrow's innovation. Remember those ultrastiff "mountain climber" hiking boots twenty years ago? The salesperson would advise you with a straight face that you shouldn't take them on a hike until they were properly broken in, and routinely sold you moleskin to ease your pain. A good observer of that exchange would have sensed an opportunity in the making—a hiking boot that didn't draw blood.

LITTLE INNOVATIONS

Sometimes even the best innovations fail because of simple, preventable miscalculations. Nothing can make a design team more humble than seeing its "great" idea scuttled because the team didn't take the human factor into account. A few years back, Procter & Gamble asked us to help with its intensely clever new delivery system for Crest toothpaste. We worked with them a little on the stand-up tube, but IDEO's biggest challenge was the cap. You know how the threads on a regular toothpaste tube often get caked with old paste? Caps don't screw on easily after that, so they often get lost or simply aren't used. There's nothing less attractive than a half-used toothpaste tube with dried paste all over the tip. As a Procter & Gamble executive said in our first meeting, "We're going to save marriages with this product."

Why not a pop-on, pop-off cap? we wondered. Drop the screw threads entirely. Make a smooth cone around the top that cleans easily.

IDEO worked up some prototypes and then we began observing. And what we saw completely surprised us. People kept trying to *screw off* our pop-off cap, even after they realized it had no screws. Decades of screwing caps on and off—thousands of times for most people—had created an ingrained perception and habit: The cap on a toothpaste tube must screw on and off.

We first thought that people would get used to the pop-off cap. But we were fighting a very hard-to-break habit. So we worked up another solution. A hybrid. A one-twist cap. It still boasted a smooth, easy-to-clean cone at the top. But now there was a short thread below.

The people we observed preferred the hybrid, and Procter & Gamble, a company with some experience in consumer packaged goods, liked it too. So we went with *half* our innovation. And the public immediately embraced the Crest Neat Squeeze tube, buying up over $50 million worth of the product in the first year alone. Nine years and more than 1 *billion* units later, the package—with its one-twist cap—is still selling well with the same design.

Successful innovations recognize that people don't always do the "right" thing or make the necessary leaps to bridge the gap between familiar and genuinely new ideas. Widespread adoption often takes time. Astute observation is one way to shorten that cycle and make tradeoffs that users will accept.

We once worked on a portable electronic device for use in hospitals, essentially an oversized mobile computer. When we realized it was going to weigh nearly twenty pounds, we knew we had a problem. Obviously, you could put it on a rolling cart, but in actual practice, we knew that nurses would be lugging these machines around the hospital. Since we were unable to further shrink the size or weight, a member of the team suggested that we shape it like a doctor's satchel from the 1930s, adding a generous handle to make it easy to carry with both hands if necessary. The handle had a bonus—it created a positive, visual icon that reverberated with the medical staff. Observations showed that nurses placed the machines at many different levels, sometimes even on shelves above their heads, so the team designed a

screen that could be tilted to view from nearly any position. Reaching out to the actual ways professionals use the product helped to make it popular among nurses and technicians and smoothed its adoption.

SEEING PRODUCTS IN MOTION

Sometimes you can see a new path toward innovation by starting with a relatively static object and thinking of it as a blur of motion. Take cell phones, for example. When Motorola first came out with its "brick" models in the 1980s, the phones were bulky, difficult to carry, and awkward to use. Advances in microchip technology and batteries gradually shrank phones. Now that phones have become fashion accessories, they're easy to carry, and we talk as we walk. They often fit in the palm of one's hand—or become invisible through the use of an earpiece.

We sometimes find it useful to think of products in terms of *verbs* rather than *nouns*—not cell *phones,* but cell *phoning*. We try to create products that are made for motion, like the Palm V and the Handspring Visor. See products as *verbs*—as animated devices that people integrate into their lives—and you'll become more attuned to how people use products, spaces, services—whatever you're trying to improve.

Several years ago, while working on the design of a cordless office phone for Dancall of Denmark, we watched people using phones around the office. We saw two things very clearly. First, people often struggle to stick their cordless phones into their shirt pocket. Second, colleagues are frequently irritated when someone's phone rings during a meeting. Our observations helped us to solve these problems. We tapered the phone in two directions to make it easier to slip into and out of a shirt pocket.

The irritation factor was trickier. We could include a ring that sounded more like a buzz, but not everybody likes his phone to buzz like a pager. Someone suggested a tiny flashing red light on the antenna, visible out of the corner of your eye when the phone's in your shirt pocket. To complement that feature, we placed a large button on top of the phone that helped minimize the interruption. When a call came in, you could simply push the button which would answer the phone with a quick recorded message: "Please hold on, I'll be with you in a moment." You could then move quietly away from the meeting before taking the call. Small observations leading to small improvements, but if you keep that process up continuously, you can find yourself at the head of the pack.

Working on sports products has helped us to see things as verbs. Athletes are constantly in motion battling to gain precious seconds, and—not surprisingly—manufacturers must race to develop new products to help them keep ahead. Specialized Bicycle Components, an innovative firm that was among the first to mass-produce mountain bikes, came to us looking for new ideas on its ubiquitous water bottle. Though the company had helped popularize the bike water bottle and developed a huge market share, competitors were starting to nip at Specialized's heels.

To begin our search for new ideas, we watched bike racers and serious bikers using water bottles. This was particularly easy for us, since for years IDEO has had a pretty serious Wednesday night bike ride into the foothills above Stanford. Soon it was clear that there was a problem with water bottles, a problem similar to what we'd faced with the Danish phone. Eyes on the road, bikers often looked like relay racers missing the hand-off as they struggled to stick their bottles back into their bottle cage. That insight helped us to design an improved bottle with a tapered bottom—and a rubber friction ring to make the bottle easier to grip.

A second issue was trickier. Watching riders, we saw that taking a drink from a water bottle is a clumsy two-step dance—you have to draw the nozzle out with your teeth before you can squirt the water. This process is even more awkward when the bottle gets covered with dirt or mud from the trail.

The solution, as is so often the case, came from looking at products

Daniels & Daniels

Watching mountain bikers inspired a water bottle that keeps mud out of their mouths.

used for entirely different purposes. Our creative team members perused a range of innovations, including one of nature's clever designs, the tricuspid heart valve. Three triangular patches of tissue open and close the valves of the heart. Could a heart valve inspire a sports bottle? we wondered. What if you sealed the top of the bottle with a rubber septum that opens like a heart valve? Asking that question led the team to design a simple self-sealing valve at the mouth of the bottle. A rubber septum cut with an "X" let the water flow more rapidly than in

previous bottles. When you stopped squeezing, the septum would reseal, not letting anything in. The bottle was always ready for a quick drink, but its contents would not spill. Or get overly dirty. All you'd need to do to get a drink was grab the bottle and squeeze—a simple one-step dance. And you'd never have to stick your mouth around the muddy spout.

I think the Racer's Edge water bottle is a great example of how even what seems like a static product can be improved if you see it in motion. Remember the idea of thinking in terms of verbs rather than nouns? One way to think of the improvements in the new Specialized bike bottle is through verbs—opens simpler, pours faster, and stores smoothly. Try it yourself. Watch your products and services on the run. You might find a problem or opportunity you didn't expect.

CROSS-POLLINATE

As you can see, it's critical to watch people in motion to fully understand a problem. It's a great way to look for ideas that leap traditional boundaries. We think this "cross-pollination" approach is a kind of alchemy of innovation. I'll be talking about it in depth a little later in this book, but I'd like to briefly give you a sense of how it often works at IDEO. Think back to that heavy medical device we talked about earlier. Before it was set to go to manufacturing, we spent some time observing nurses. They'd control the electronic device with a computer stylus tethered to the machine. When a nurse was ready to change into a monitoring mode, she'd gather up the cord and snap the stylus back inside an enclosure. But sometimes after the nurses used the stylus, they'd look for somewhere convenient to temporarily store it, rather than put it back properly inside the enclosure.

We suddenly realized the stylus was like an old fountain pen looking for a holder. A team member wondered aloud whether the rubber sep-

tum we used in the Specialized water bottle might offer a better answer for temporarily storing the stylus as well. We had only a few days left before the final design was to be sent to manufacturing, so we tried a quick fix. The team punched a small hole in the screen's lower border and inserted a rubber septum. Sure enough, the septum made an ideal pen holder. So we ran with it. A minor improvement, you might think, but the kind of improvement that can only come about from watching people in action.

So many products and services have flaws that we start to assume that's just the way things are. But if people are frustrated or confused by a product or service you offer, eventually they may be wooed away when a better product or service becomes available. At the very least, rather than creating positive buzz about your product, they will say nothing at all or complain about it. That's why it's critical that you continue to innovate and improve. And the best way to do that is to watch people use your products.

Think about how frustrating and embarrassing the experience of buying a new or used car can be. For decades we—and the car companies—assumed there was no alternative. No one imagined you could buy a car without creeping anxiety that you were being cheated by fast-talking salespeople. When the Saturn came along with fixed pricing and a low-stress no-haggling approach, GM was obviously offering a completely different buying experience. People liked it. And with the advent of the Internet, the way cars are bought is changing once again.

The same is true of rental cars. Returning a rental car used to be an unpleasant and time-consuming task. Racing to get to the airport, you often worried whether a line at the rental counter would cause you to miss your plane. Now the process takes seconds. The mobile agent waves you down, enters your mileage into a handheld portable, and away you go. You might say that this innovation wasn't possible until portable computing devices reached a "wearable" size, but that's not completely true. The rental car companies could have set up portable stations in the parking lot decades ago. The fact that it was easier to do as technology got smaller and more portable is only part of the story. What it really took was a change in *mind-set*. Rental companies had to recognize that they'd save money and build loyalty if they moved their services closer to their customers.

MAKING HEROES

Pay attention to how your customers might like to interact with your products or services, and a remarkable change takes place. You can do more than simply satisfy their immediate needs. You might actually make your customers feel like heroes.

Breakthrough products generally don't come to you in a flash of light. Usually, it's a gray day with no forecast of sun. Berkley Outdoor Products, for example, came to us with what seemed a waning ritual. Kids weren't fishing as much as they used to, and sales were down.

We went to stores and were struck with the frustrating complexity of fishing. Everything was sold separately: rods, reels, tackle, and line. Next, we went out to the fishing piers and suburban lakes to see the state of kid fishing, and found plenty of struggling dads.

In the old days, Dad could ask the old-timer behind the counter in the fishing store for help or information, but that won't work today at Wal-Mart. Dads often don't remember much about fishing and don't want to look stupid. So we decided to change gears. Make it all-in-one, playful, and toylike. Rod and reel incorporated in one piece, with all the essential gear in its own compartment—lures here and bobbers there. A complete set of instructions, including how to tie a hook on the line, laminated on the back of the plastic case. My favorite touch was the smallest, but it fit with the all-in-one concept: Even *bait* was included, in the form of a magical worm-shaped mixture Berkley calls Power Bait.

As a father, I especially like the way Berkley's new approach redesigned the fishing experience from Dad's point of view. Dad went from looking a little foolish in front of the kids to becoming the knowl-

Rick English

By watching how dads struggled with their kids' fishing gear, we came up with an all-in-one fishing kit.

edgeable hero. And this wonderful ritual pastime became easier to learn and pass along to the next generation.

If something's broken, it *can* be fixed. Just keep your eyes open for inspiration.

Everybody wants to be a hero.

THE PERFECT BRAINSTORM

Roberto Carra