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Leading the BLIND

>> by Mark Athitakis

Engineer Bill Gerrey builds devices to help other sightless people navigate the world. He's not looking for miracles, just a few small victories.

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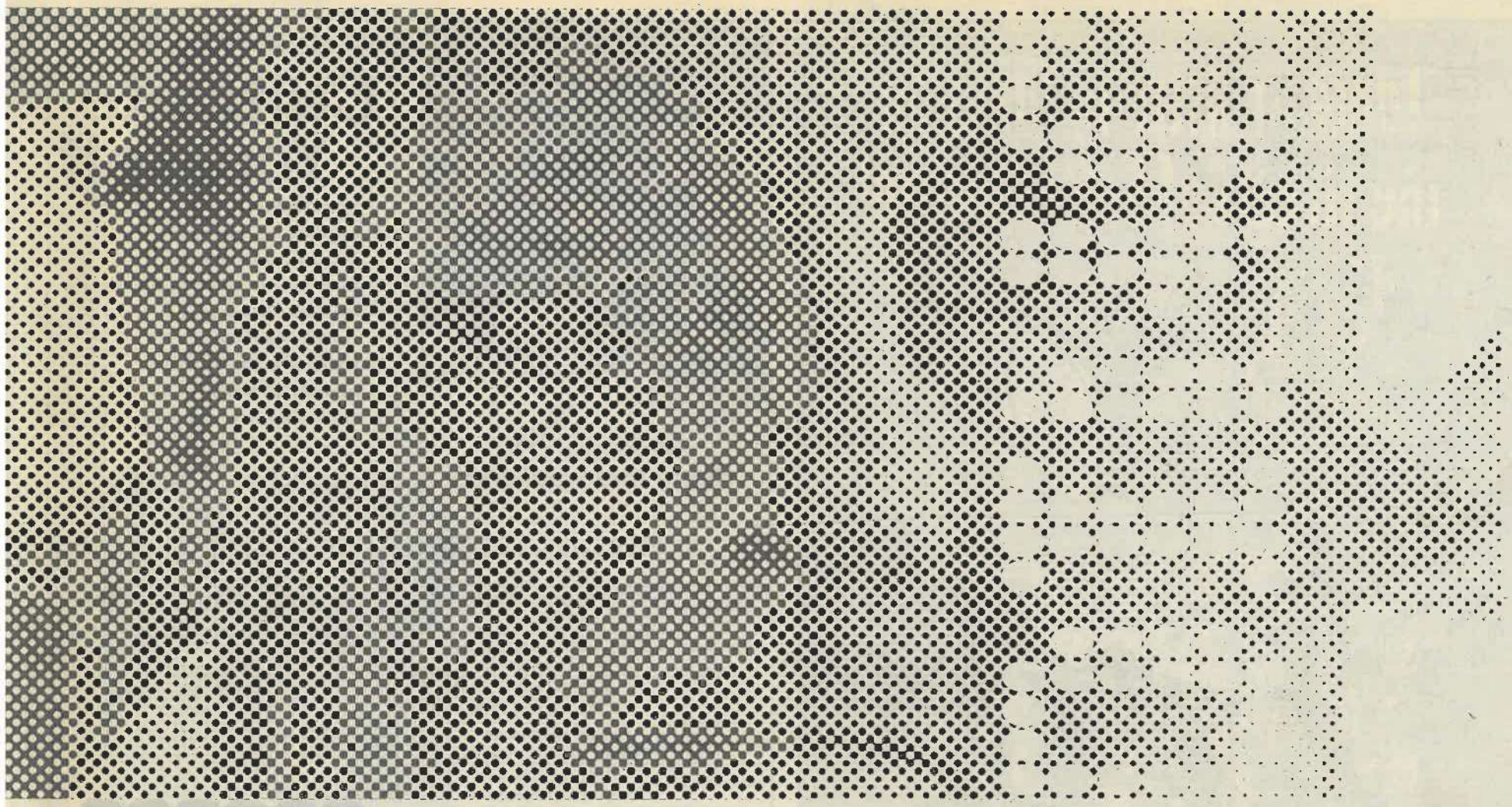
Cover: Photograph by Anthony Pidgeon

leading the BLIND

Engineer Bill Gerrey builds devices to help other sightless people navigate the world. He's not looking for miracles, just a few small victories.

By Mark Athitakis
Photographs by Anthony Pidgeon



Bill Gerrey is going home, but first he's going shopping. He tells the cabbie to drop him off near a produce stand a few blocks from his Lower Haight home. The cabbie, eager to assist a blind fare, helps Gerrey out of the back seat and leads him to the sidewalk. From there, Gerrey begins the slow process of getting around, as his cane feels out some steps leading into an apartment building. Almost there. He guides himself a few more feet forward, and his right side collides with a dumpster. Closer. Finally, his hands feel a basket of cantaloupes. There.

The cabbie doesn't notice this small trek; he's already in the car, turned around and tearing toward downtown. But he's thinking about this blindness thing, and at a stoplight he muses out loud, "I can't imagine what it would be like, living with that."

Bill Gerrey lives with it constantly. He has been blind since infancy, but blindness is also his job: For more than 30 years, he has worked as an engineer at the Smith-Kettlewell Eye Research Institute, which studies vision-related issues. Gerrey's work concentrates on mobility and independent living, and over the years he has created and built dozens of devices to help blind people get around or to assist them in their jobs. In theory, engineers like Bill Gerrey shouldn't be necessary today. Between the Americans With Disabilities Act, private industry, and charitable organizations, blind people are better supported than ever. In theory. But there are lots of holes to be filled, small groups of underserved people — which is where Gerrey comes in. And, simply put, nobody is going to understand what a blind person needs better than a blind man.

The impact of what he does, however, can be wide-ranging. Gerrey played a leading role in the creation of Talking Signs, a hand-held technology that announces information — such as room numbers or street names — so that blind users can better navigate buildings and intersections. Today it is used on street corners, buses, and buildings throughout San Francisco and around the world, and that fact has a lot to do with what happened to Gerrey one night 22 years ago, when he lost his cane and wandered the city for four hours in the middle of the night.

In more shameless moments, some people will refer to Gerrey with that hoary cliché "miracle worker." But in truth, Gerrey prefers working on the small stuff. None of the dozens of things he has helped design — stuff that beeps and squawks and chirps and vibrates, sometimes built for just one person — has saved lives, or cured blindness. "Saving lives" and "cures" are tiny prayers people say when they wish the problem would go away. For Gerrey, there's just an understanding that blind people want to do *something*, not a Pollyanna conviction that they can do *anything*.

The cab driver, however, can't get his head around it all — the idea of living in a blind world, let alone creating in it. "Maybe someday they'll invent something," he says, gesturing toward his head as if inserting a magical device into his eye socket.

Maybe. Someday. But sitting around waiting for miracles to happen is no way to live, for a blind man or anybody else.

The elevator door opens at the fourth floor of the Smith-Kettlewell Eye Research Institute, and right away, there is Bill Gerrey. He is holding a Talking Signs receiver, a palm-size box with a button and a speaker. He's a tall, 54-year-old man, stout and balding. His voice has a deep lilt to it. He has a tendency to break into song on occasion; saying "Hi" takes about five seconds and three syllables.

Gerrey doesn't actually need the receiver; he just wants to show it off. Walking down the hall-

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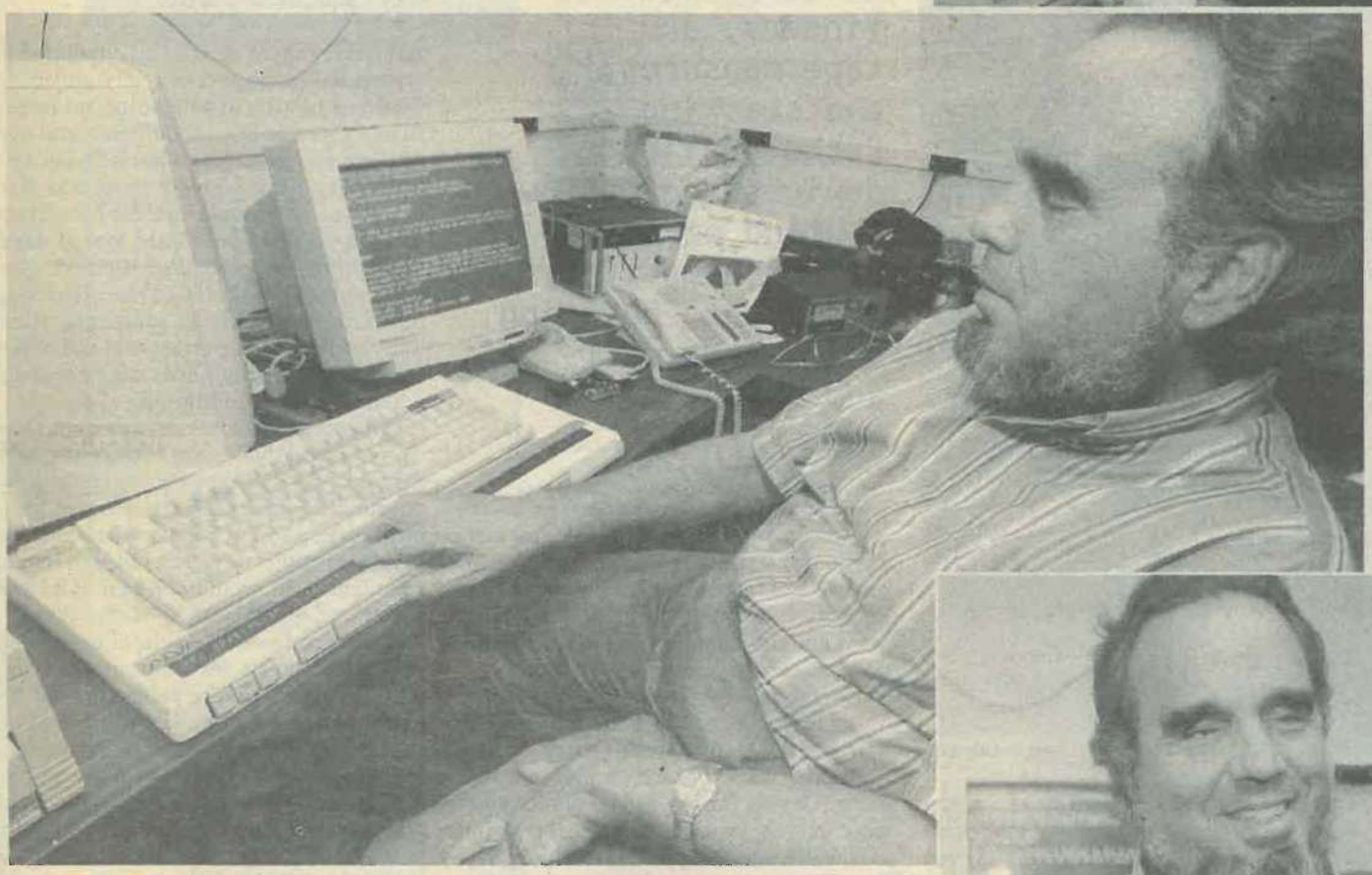
way, a push of the button announces what's on your left or right, depending on which way you're pointing. Eventually, in a tinny voice with a vague Southern accent, the receiver announces, "Room 425. Vocational Rehabilitation Engineering Laboratory. William Gerrey. Thomas Fowle."

"Bill" and "Tom" are just fine, though, and "vocational rehabilitation engineering" is a fancy way of saying they build things that help blind people get around and do the sort of jobs they want to do. They're both eager to show off what they've produced, though it takes a while. That's partially because things simply move at a slower pace with blind folks; Bill and Tom spend a lot of time feeling around for things. If you need to run into something to know where it is in the future, so be it. But the main reason things take a while is that the place is a mess. The floor is cluttered with chairs. A desk in the center of the lab is piled high with manuals and the beginnings of a vibrating alarm clock gadget for a deaf-blind user. Oscilloscopes, voltage testers, soldering guns, and a row of solid-state measuring devices fill two workbenches on opposite sides of the room; there's a talking Braille cash register taking up a corner that Gerrey will have to get to at some point. The place looks like a Radio Shack supply closet, and not a particularly well-maintained one at that.

> The lab looks like a Radio Shack supply closet, and not a particularly well-maintained one at that. "We destroy myths here," says Fowle. "And one of those myths is that blind people are organized."

Bill Gerrey, in the clutter of his laboratory.



Tom Fowle at his office desk at the Smith-Kettlewell Eye Research Institute.

"We destroy myths here," says Fowle, feeling in his office for a talking tape measure he has worked on. "And one of those myths is that blind people are organized."

The Smith-Kettlewell Eye Research Institute is housed in a four-story building in Pacific Heights. It has studied vision since the '60s, and since the '70s has been a government facility. In 1973, federal mandates created research hubs devoted to various disabilities. Today there are 15 Rehabilitation Education Research Centers, or RERCs; each is devoted to a specific issue such as aging, prosthetics, hearing, telecommunications, and, at Smith-Kettlewell, vision.

Gerrey and Fowle are two of a handful of engineers who work on devices for the blind. Over the course of an afternoon, they show off several of their inventions: beeping carpenter's levels, stud finders, and tape measures; and clacking "echolocation" devices that allow a blind person to orient himself by the sounds bouncing off nearby walls and objects.

At any given time, they are both working on about half a dozen projects, together or separately. Some are demanded by the grants Smith-Kettlewell has received; some are requested by people who write or call; and some are just pet projects they've been tinkering with for a while. Their relationship is built on a competitive interest in outdoing each other, and it stretches back to their childhood. Gerrey first met Fowle at a Berkeley school for the blind, and one of the first things Fowle said was a boast about his ability to tune pianos.

Dr. Arthur Jampolsky, the co-founder and co-executive director of Smith-Kettlewell, points out a subtle but essential difference between the two. "Bill is the person who says anything is possible, and Tom is the counter. They balance each other."

Fowle doesn't quite like that reputation. "It's just that I don't jump up and down every time somebody has a new whiz-bang to push," he says. "I'm not a pushover. I'm hard to sell. I have a right to be that, and a *responsibility* to be that."

It's hard not to notice that Gerrey and Fowle don't face each other much. They'll talk to each other from their adjacent offices, and they're attuned enough to the sonic "feel" of the lab that they know when the other has stepped out for a moment. And while they've spent 20 years in a lab teasing each other, Fowle has to confess that Gerrey has pulled off some pretty amazing tricks in his time, not the least of which is teaching himself how to solder. Soldering is an essential skill for anybody working in electronics. It's also a dangerous undertaking; tips of soldering irons can reach temperatures of 750 degrees. Gerrey does it through what you might call precision guesstimation: He feels around the circuit he's working on, identifies the parts involved, and mentally locks in their location. From there, knowing the "landmarks" around the device, he can trust himself enough with the hot iron to make an educated guess about how far he's moving it, or where. It's slow going, but it's fumble-free. Working on a radio power supply he's opened up, Gerrey feels out the wires he wants connected with his left hand and feels for the soldering iron with his right. Holding the tip against the metal corner of the power supply for a moment, he considers the distance, and eventually fuses the wires together.

In the annals of great achievements of blind persons, it may not be as sexy as piloting a boat or doing stunts in an airplane. But it's one less thing you need to rely on someone else for. And when Fowle heard Gerrey could do it, he was incredulous — and seduced enough to come work at Smith-Kettlewell.

As it happens, Fowle can pilot a boat — he is an avid sailor — and has done stunts in an airplane. With the assistance of a sighted person, he can take the controls and orient himself. Once, Gerrey joined him on a boating trip a few years ago, but that won't be happening again; that day, Fowle was turning extremely tight circles with a motorboat in the bay, and Gerrey was praying he'd get back to solid ground in one piece.

"You scared the hell out of me," Gerrey says, calling out from his office.

"Oh, drink a little of your own blood sometime," Fowle calls out from his. "It won't hurt you."

It's true that the continued on page 30

Ken Rossi in his Santa Rosa home. Gerrey has observed Rossi for his wheelchair research.

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projects Gerrey and Fowle have worked on are small things — how many blind carpenters are there anyway? But that's precisely the point. What blind people need most are simple ways to negotiate the everyday world. As one of Smith-Kettlewell's clients points out, being blind in America is easier today than it was even 10 years ago, thanks to such things as the Americans With Disabilities Act and medical advances that can improve the sight of some blind people. Yet of the approximately 1 million Americans who are legally blind, 70 percent are unemployed, according to the U.S. Department of Labor. And 30 percent of those who *are* working consider themselves underemployed, often performing clerical jobs at disability agencies.

"There's a lot of things I would like to outlive, and one of them is the concept of the 'super-blind' person," Gerrey says. "I'm accused of this all the time. 'Oh, you're different, Bill. What you do doesn't have anything to do with other blind people.' As if my blindness made me smarter, or some such poppycock. As if others' blindness made them *dumber*. If a blind person says, 'I want to be a mechanic on a merchant ship,' everybody says, 'Well, how many other blind mechanics on merchant ships are there?' I would love for people to stop asking how many other ones there are. In a sense, that's how blind folks get entrapped in these traditional occupations."

Gerrey and Fowle show off several of their inventions: beeping carpenter's levels, stud finders, and tape measures; and clacking "echolocation" devices that allow a blind person to orient himself by the sounds bouncing off nearby walls and objects.

Gerrey and Fowle's emphasis is often on groups too small to be financially worthwhile to private industry. In one case, their work focused on precisely one person: Randy Brooks, refrigerator repairman. In 1985, Brooks was losing his vision to diabetes, and he appealed to Smith-Kettlewell for help in making gauges so that he could keep working in his own repair shop. Gerrey and Fowle collaborated on a device ("My magic silver cube," Brooks calls it) that announces various pressure levels and weights. Brooks still uses it today, both with his own repairs and to teach the repairmen working under him. "It's enabled me to remain employed and be successful," Brooks says. "People are usually amazed, but if they were a prospective employer, because of their own level of discomfort, they wouldn't have hired me."

And that's success in the Vocational Rehabilitation Engineering Laboratory. "To me, that's technology transfer," Gerrey says. "If it gets any better than that, fine. But that's enough. I just pat myself on some sensitive area and let it go at that."

That's why neither Gerrey nor Fowle likes to use the word "breakthrough" in the lab. "Media people always come in and ask, 'What's the latest breakthrough?'" says Fowle a bit sneeringly. "Which I interpret as meaning, 'When are blind people going to see?'"

Gerrey can't resist a wisecrack. "*God* makes me see," he says, feeling for a door jamb on his way out of the office. "That's why I don't believe in God."

Bill Gerrey spent most of his childhood in Castro Valley, as part of a very musically inclined family; at one point, no fewer than six pianos filled their home, and one of them sits in Gerrey's home today. His father, who ran a music shop, was also blind, due to retinal cancer, a hereditary disease. In the post–World War II days, few options were available. Gerrey's parents could choose between their son living blind his entire life or subjecting their baby to highly experimental radiation treatments. Gerrey's eyes were removed when he was 10 months old.

Thanks to life in his father's shop, Gerrey took an early interest in tinkering with instruments and tape recorders, and he devoured a journal called the *Braille Technical Press*, a sort of *Popular Mechanics* for blind electronics devotees. "In high school I thought, 'God, wouldn't it be neat if I had a job just doing this stuff?'" Gerrey says.

Going to technical school presented problems, but no insurmountable ones. Sure, he'd have to hire people to read his textbooks or set them in Braille, and he couldn't read information from devices. But people in laboratories (or garages or repair shops) help one another; he could take notes, set up experiments, suggest ideas. Hold his own. But the first school he applied to, Cooper Union, disagreed, telling Gerrey that it didn't feel it could provide the support he needed. The letter Gerrey fired off in response made no difference, but he's hung onto it. "Every blind

person — or person who works with the blind — should flat memorize it," Tom Fowle says. Here's how it ended:

Blindness is a darn nuisance. It forces us to do things in different ways, and we are never "completely independent" in the strict sense of the word. Yet the inability to see is often outweighed by the trials by fire to which we are sometimes put, to gain acceptance in pursuing our natural inclinations. ... I urge you to let this blind student test his mettle in the school of engineering. No matter how it turns out, his future career decisions will be based on a legitimate investigation of his strengths and weaknesses. In the meantime, you and I have burdens of our own. Let us not don someone else's unnecessarily.

Gerrey eventually earned his electrical engineering degree in 1971 from Cal Poly San Luis Obispo, and he went to work at Smith-Kettlewell shortly after. He doesn't rant about the Cooper Union incident much; it's something that happened, yet another case of prejudice, and after a while you learn to have a sense of humor about it. Gerrey and Fowle have collected a sort of "greatest hits" of snappy comebacks. Gerrey learned early from his father, who was once asked if what he saw was all black. "Oh, sure," he responded. "I wake up in the morning, and it's so black I hardly know I'm awake. I put on my black clothes, kiss my black wife, drink my black coffee, and eat my toast, which is always black." Gerrey and his blind-school classmates would get condescending compliments about how nicely they dressed, and they'd respond with a lengthy fiction about the three-hour ordeal they went through just to get a shirt on. Fowle recalls a friend's response to the man who was impudent enough not only to ask if a blind man had sex, but how: "What do *you* do? Use a flashlight?"

That attitude spills over into the laboratory; both admit that a certain lack of tact is usually mentioned in their annual reviews. "Every year they say I'm getting better, though," Gerrey laughs. "After 30 years, you'd think I'd be so good they wouldn't have to mention it, right?"

But the two play an important role at Smith-Kettlewell. "Here's how it goes," says Bill Crandall, a Smith-Kettlewell scientist. "An engineer will spend days and days laying in bed, dreaming and designing a great system that's going to have revolutionary implications for blind people. He comes and talks to Bill and Tom, and they tell him that in 1967 they evaluated such a device and they found the following shortcomings." About three times a year somebody comes to them with a brilliant idea involving sonar, and three times a year they have to say, once again, that there are a lot of reasons why sonar devices won't work for blind people, but here's a big one: *Blind people aren't bats.* Also, sonar requires interpreting a variety of beeping tones, and that means teaching blind users to essentially learn another language. It's not worth it.

That's not to say they haven't made their own mistakes. For every talking carpenter's level there's a cane prototype that was supposed to expand like a pocket telescope but didn't work; for every refrigerator repair gadget there's a Dexter, which was supposed to be a portable robotic hand that could perform finger-spelling to communicate with deaf-blind people. In reality, the prototype weighed 70 pounds and required three fans to cool it.

"And God help you if one of those fans broke down," recalls Fowle. "Flame city."

People tend to look at a blind man a certain way. You can almost see the motors turning in their brains as they glance furtively at Bill Gerrey walking down Fillmore Street. *I shouldn't look, it's not polite. But I'm curious. Besides, it's not like he can tell. Oh, that's mean. OK, now I've looked. Don't look. Look. Don't look.*

It's true that the projects Gerrey and Fowle have worked on are small things — how many blind carpenters are there anyway? But that's precisely the point. What blind people need most are simple ways to negotiate the everyday world.

Rossi at home with his friend Jesse Encinas. Rossi's paintings hang on the walls.

And, so, in the course of three blocks from Smith-Kettlewell to a sub shop where he's picking up lunch, Bill Gerrey induces a dozen or so private moments of anxious looking-not-looking. Along the way he points out some of the local scenery. The cafe on the corner of Fillmore and Clay where he and a few other Smith-Kettlewell engineers first created the Talking Signs technology back in 1979. One block farther, the folks at the restaurant La Méditerranée have seen Gerrey walk by so often that they've installed a Talking Signs transmitter in the window.

Gerrey has found San Francisco to be one of the better cities to get around in ("Washington, D.C., is *hell*," he says. "All those traffic circles"). Talking Signs has helped with some of that, and if Gerrey wanted to he could be a little boastful about it. There was a time when he used to feel arrogant about his accomplishments. But not anymore.

"I didn't like him at all when I first met him," Monica Schaaf, his wife of 23 years, explained one recent evening sitting in their spacious kitchen. "I thought he was a loudmouth and a jerk. He thought he was *so* funny." Gerrey, sitting across the table, didn't protest the claim. Schaaf is blind as well, and they both knew that having a relationship would be difficult.

Gerrey's self-image has a lot to do with the technology of Talking Signs, and Talking Signs has a lot to do with what happened to Gerrey late one night in 1979. Leaving a jazz club in the Fillmore, his cane quickly got "swallowed up" in a row of construction barriers. Disoriented, he began wandering up and down hills, listening for the sound of cars going both ways — a sign of a main thoroughfare and the likelihood of a pay phone, or somebody to ask directions of. After running into a few creepily disjointed people, he eventually found somebody to tell him he was on the corner of Polk and California.

He'd gone 25 blocks in four hours.

Gerrey and people who know him pull that story out of their hip pockets every so often to explain the importance of Talking Signs technology. If Gerrey had had it at the time, he could have pulled out his receiver, pushed a button, and an infrared transmitter on the intersection signs would have told him where he was, what direction he was going, and whether it was safe to cross the street. The technology has slowly been introduced around the world; over a thousand transmitters are installed in San Francisco, which was the first city to take a serious interest in the idea. Walter Park, director of the Mayor's Office on Disability, says he hopes to have transmitters placed from Civic Center to Yerba Buena Gardens, and already has them installed in BART stations and newer Muni buses.

Ward Bond, president of Baton Rouge–based Talking Signs Inc., which distributes the technology commercially, wants to expand it into hotels and airports. And unprovoked, he tells the story of it all beginning with Bill Gerrey, who got lost one night in San Francisco.

It's a poignant story, but it's not a complete one. For one thing, Gerrey was already working on Talking Signs before the incident. It was a collective effort discussed over dinner one night at a Fillmore Street restaurant and prototyped by midnight. But another **continued on page 32**

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part of the story that rarely gets mentioned is that Gerry was, as he puts it, "stinking drunk" that night, which was not an uncommon occurrence.

There's no poignant story about Bill Gerrey drinking to escape the misery of blindness. "People say you don't drink for a reason, you just drink," says Gerrey. "I think I have a very chronic self-destructive streak. I don't know where I got it from. It was just a way for me to say ... 'I'm not here. Knock on the door, but Bill Gerrey's not here.'" He began to slow down his drinking after 1991, when he suffered from a knee infection and was diagnosed with Type 2 diabetes — "The kind you get when you're old, fat, and drunk," as Gerrey puts it. The incident threatened to place him in a wheelchair.

Gerrey says he's been "in recovery" for the past 2 1/2 years. "We have the ability to talk ourselves into the damnedest things," he says. "I was able to persevere through years of, if not failure, then modest success. Soldering in order to use that fun part of my brain to adapt, messing with tools that are 750 degrees without burning myself, and making things that are rather neatly put together. It's a neat brain. I can't go around being sorry about what I did to it."

Bill Gerrey is starting a project to improve mobility for blind people in wheelchairs, so he pays a lot of attention to Ken Rossi these days. Rossi is 38, blind, uses a wheelchair, and is pretty handy with a computer-generated machine gun.

Rossi lives in a sleepy section of Santa Rosa, in an apartment graced with a few of his paintings, mostly of mountain vistas and cityscapes. The centerpiece of his living room is his computer, and he's a fan of shoot-'em-up games like Duke Nukem and Unreal, whose stereo sound quality is so good he can effectively maneuver through the screen's cavernous sci-fi mazes just by listening. Trial and error helps too. "I've played it so many times I just know where to shoot," he says, firing at some giant dragonflies.

Rossi was blinded at an early age by glaucoma; in his senior year of high school, a sensory motor disorder in his legs required the wheelchair. What's interesting to Gerrey about Rossi is how easily he gets around with two disabilities. Offering a tour of his neighborhood, Rossi grabs his cane, wheels himself out the door, and rolls down the driveway of his apartment complex onto the sidewalk. His cane is alternately a scanning device swiping across the path ahead of him and a pole pushing him forward.

Rossi is part of a small but growing population; according to the U.S. Center for Health Statistics, about 12 percent of the U.S. blind population has a second disability requiring a wheelchair. If every one of those people were like Ken Rossi, Bill Gerrey wouldn't worry about it so much. But wheelchairs make mobility even more difficult for the blind, and obstacles more treacherous. "Wheelchairs have to be driven very carefully by their riders," Gerrey says. "You can't just run at [a driveway] and hope."

Gerrey has enlisted the assistance of Sandra Rosen, director of the orientation and mobility department at San Francisco State University. Over the next four years, they'll be working on a method to improve mobility as part of Smith-Kettlewell's RERC grant. Ideally the result will use as few gizmos as possible. The worst-case scenario is a chair outfitted with "gimcracks from hell to breakfast," as Gerrey puts it. "This is the only effort I know of of its kind," says Rosen. "Traveling safely is the hottest issue right now, and the field is desperate for some kind of answer."

The enormity of the task scares Gerrey a bit — it's the biggest project he's ever taken on. But then, he's usually scared. "I've always been completely unsure and insecure about everything. It's not as bad as a sick feeling, waking up in the morning and saying, 'Jesus, what am I gonna do?' But I never had a solid idea of what I should be doing. In a way, that's worked to my advantage. I have a blank enough slate that if something looks interesting, I can take a swing at it."

Sure, blind people dream. "Old Freud would have a field day with me," Bill Gerrey says.

Gerrey doesn't usually relax much; for all the jokes and tale-telling, he's never far from a phone call he needs to make, a device he needs to tweak, and a possibility he needs to ponder. He dreams about fixing things like broken circuits or something on the workbench he can't quite figure out. Nothing he can see — like everything else, his dream world is a tactile and auditory place.

He used to have nightmares, based on the things he had growing up: pianos, tape recorders, phonographs. "There were sinister characters in closets and backgrounds," he recalls. "My main nemesis was a character I call the Fire Lady. She lived in a walk-in closet I really liked because there were shelves and stuff on the shelves I really liked. My favorite things were radios and phonographs, and those were the devices related to me that she used to torment me." His dreams today aren't nearly so painful. "I've been having some lovely ones about player pianos recently," he says.

Gerrey can't drag a player piano into Smith-Kettlewell's offices, but he will play a few bars on his cornet if it's early enough and he knows he's not bothering anybody. And every Wednesday afternoon, when Smith-Kettlewell shuts down for snacks in the kitchen and pingpong games in the rec room, Gerrey is called on to bring the entertainment. That usually means his phonograph player and a stack of 78s, handed down from his father. Last week it was the '50s doo-wop quartet the Ink Spots; this week it's selections from Fats Waller, the great early jazz pianist.

Gerrey makes a beeline for a corner of the kitchen and begins setting up. It takes a while, since people are coming by to say hello and ask him what he's working on. But eventually he gets the phonograph ready. It's not a great one, one of those plastic, single-speaker portables used in classrooms, but it works fine. Opening the record album, he pulls out a disc and lays it on the turntable. Feeling for the tonearm, he cues it up, and Fats Waller dives into his "Yacht Club Theme."

And with that, Bill Gerrey eases himself into the chair next to the phonograph, leans his head back, and lets out a sigh as if he were emptying himself out.

"All is right with the world," he says, listening. ●