

She was a scientist, a workaholic, and an expert in the human mind. Then one morning her own brain turned against her. **KATHERINE RUSSELL RICH** reports on the extraordinary spiritual and medical metamorphosis of Jill Bolte Taylor.

## In a Single Stroke

Dr. Jill Taylor, July 2002, in a cornfield near her home in Bloomington, Indiana

SEVERAL WEEKS BEFORE CHRISTMAS, 1996, JILL BOLTE Taylor, PhD, was squeezing a plastic orange brain at her desk and trying to get off the phone. The brain, a Nerf ball, was one of several that had accumulated around the offices of the Harvard Brain Bank, where she worked as a researcher. Behind her was a blown-up photograph of cerebral tissue; in front of her, a stack of urgent phone messages she was rushing to get through. Her office was up for an award, and if she didn't want to miss the limo to the ceremony at Massachusetts General Hospital, she'd better get going.

At the ceremony, the crew sat on metal chairs in an atrium. ▶

A man stood and praised their work, and she got a little giddy, wondered vaguely if the rest of the day would be a wipe. It was. She put in a couple of hours at the office, stopped by the gym, went home, messed around, was in bed by ten. Felt fine.

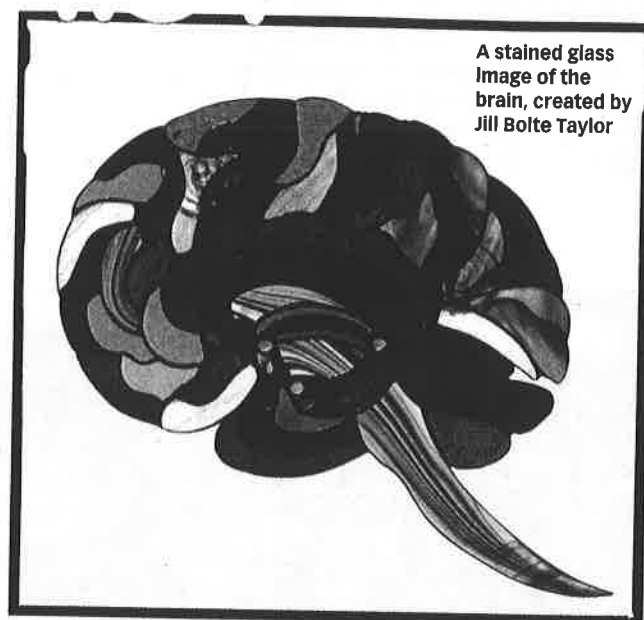
So it made no sense when, the next morning, she woke around seven with a pulsing pain behind her left eye, a sharp ache, like biting into ice cream. She never had headaches. She was 37, "healthy as an ox," she says. Each morning, no excuse, she did 25 minutes on the cardio glider to Shania Twain. Come to think of it, that's probably just what she needed—get some oxygen to the poor old gray matter, get cracking, haul the body in to work. She climbed on the machine and grabbed the bar, then stared, fascinated, at her fingers. Had they always looked that chunky?

Each swing of motion pumped pain to her head. She ignored this fact, pressed harder to break a sweat. But then instinct slowed her. The room was different. A shimmer was rising off the floor, like blacktop in summer, blurring the edges behind it. *Something's wrong*, she thought with detachment, shifting to keep her balance. She gave one more push—and slid into the blur.

The silence here was remarkable. Noise from the street had disappeared. Even the chatter in her head was dying, but the pulsing was getting worse. Light was a burning flood, a caustic stream of vibration. She got up, stumbled, turned off the lights, and as she did she noticed her whole hand looked weird, as though it belonged to someone else. She had no idea what was going on.

She was a brain scientist trained to watch the brain, so she did. And even as her brain was starting to deteriorate for a reason she couldn't gauge, it was reporting back. Entire areas appeared to be shutting down. Through the haze of pain, she could chart them. Noise distortion meant something was wrong with her auditory cortex, light sensitivity indicated a problem with the visual area, and she noted all of this as if she were observing a

clinical case. She wasn't the least bit afraid. Later she'd learn that the connection between the amygdala (the fear center) and whatever registers that emotion in the conscious mind was gone. Only ten minutes had elapsed since she woke with the



A stained glass image of the brain, created by Jill Bolte Taylor

A voice said: *If you lie down now, you will never get up.*

headache. She could no longer feel fear.

It wasn't until 20 minutes had passed—after she got into the shower and, reeling from the buckshot explosion of water, leaned against the wall and felt herself blending in; after she began to fade in and out of a place of bliss where no boundaries existed and she was one with everything—that she figured out what was wrong. As she was wondering how she'd be able to drive to work, her right arm went dead and she knew: *Oh my God*, she thought. *I'm having a stroke.* Then a clattery hum distracted her, the sound, she's convinced, of her own cells working. Her cells were audible to her—that's how slowed she'd become. A while later, drifting back into awareness, she dimly thought: *Isn't this cool? How many brain scientists get to see this up close?*

From her training, she knew it was crucial to get help fast. "Although I felt no sense of urgency," she later noted, "I understood that the prognosis of stroke is often

determined by how quickly a patient gets to the hospital." A blood vessel had burst in her head and she needed anti-inflammatory steroids; pressure was building. She was having a hemorrhage in the brain.

Arteriovenous malformation, or AVM (a tangle of weakened blood vessels), accounts for a small percentage of strokes, most often in the young: 20- to 40-year-olds. It's a condition people are born with, as opposed to strokes brought on by blood clots. Both types have been called bombs in the brain. Strokes caused by AVM kill approximately 10 percent of victims immediately. Between 50 and 80 percent are left impaired. A small percentage do recover fully—but only those, for the most part, who can get to a doctor, and soon.

Jill had minutes, maybe an hour, not much more, and already she was so tired and confused. Her waterbed was

right there, visible through the doorway. She ached to climb back in, but a voice said: *If you lie down now, you will never get up.* It was the voice she'd always called her "wise woman," the one we all have that says *Guy's lying* or *Forgot the keys*, quickening now to try to save her.

*Must get help*—but blood was thickening over pieces of her life, matting them out. The landlady downstairs who'd have called the hospital no longer existed; 911 had disappeared. Colors were indeterminate, a noisy whirl that was taking her out. *Get help.* On her desk she found a colleague's card. The numbers were scratch marks, but she recognized the lab's insignia, a crimson brain. *Help*—in the compressing time, she matched the squiggles on the card to the ones on the phone, covering each as she went so she wouldn't punch it twice. She made the phone ring. Her coworker answered. She began to say, "This is Jill and I'm having a stroke," but what came out was "Jhhhhiiiiihhhiiii." She tried again, only grunted and roared, and though his words back were gibberish, she could tell from his tone he'd send help.

*Tired.* She fumbled through one more call, to her doctor, who repeated the name of a hospital till she understood. More ▶

than an hour had now gone by, light was horrid, searing. Hanging up, she crawled onto the sofa, pulled a parka over her head to block the light, and hoped it wouldn't be too long before someone came.

IT WAS WHEN JILL TAYLOR WAS young, a kid, that she first began to wonder about the brain because of what happened with her brother. She grew up in Terre Haute, Indiana, in a redbrick colonial with a maple and lilacs out back, lots of birds. By the time she was 4 and he was 5, she knew Chris (a pseudonym) was smart enough to convince adults of anything. John, the oldest, was intelligent, too, but Chris was sly and charming, a golden boy. He was beautiful, won awards in swimming and art, and "no one had a clue how dark he was," she says. "The Chris I knew was a completely different human being from the one he presented to adults." Something was off, though she couldn't say what, and after a while she thought it might be her, not him.

By high school his brilliance turned jagged. His paintings were spiky, full of eyes and beasts, his poetry unsettling, but it was easy to see him still as golden: He was made valedictorian of his class. Both parents were well educated—PhDs (her mother is a retired math professor, her father an Episcopal minister)—but quirky. "We were a family of eccentrics," Jill says. "We weren't sure what normal eccentricity was. We were in absolute denial that this kid had a brain problem, that this was a physical disorder, till we couldn't deny it anymore."

No one understood that as he enrolled in college and then got married, he was descending further and further into a world where he saw himself as Prince Michael, the future bride of Christ. One year after his sister entered a doctoral program in neuroanatomy at Indiana State University, he was diagnosed with schizophrenia. "Here I was committing my academic career to the brain," she says, "and my brother was presenting with a defined problem."

The diagnosis flattened her. She'd never untangled who was different, him or her, and once the decision was in, she was relieved but also profoundly sad, and hell-bent to understand. Her academic life took on an intense focus. She decided



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to specialize in schizophrenia, to investigate what possible alterations could cause such a severe thought disorder, could produce the level of torment she'd seen in her brother.

When she got her PhD and took a job as a brain researcher at Harvard Medical School, however, she was immediately stymied. There were hardly any brains of schizophrenics in the lab, mainly because

hardly anyone donated them. The lab received maybe five brains a year in all, out of 300 donations. She approached her boss. What if she were to go on the road and plead the case to families of schizophrenics at National Alliance for the Mentally Ill (NAMI) meetings? These families were all aware of how far treatments had come. She could make them understand how much further they could go, but only with research. And research, as they say around the lab, takes brains.

With her boss's blessing, she began attending NAMI meetings as the Singing Scientist, kicking out the jams with a guitar and the "I-800-Brain-Bank" song: *Oh, I'm a brain banker, yes, banking brains is what I do / Oh, I'm a brain banker, asking for a deposit from you / But don't worry, I'm in no hurry.* The families loved her. She knew what she was talking about. She was a white-coat scientist and she was one of them. Pledges for donations quadrupled.

She'd never been happier. At the lab, her research was getting awards. On the road, she was galvanizing people who'd been leveled by an illness that's often not even recognized as one. She was giving them hope, a concrete way to help. She didn't have a clue, of course, that within several years, these same people would be helping her stay alive.

IN THE ROOM, IN THE BLUR, SHE was no longer alone. Her colleague had arrived; he supported her down the stairs. As he drove, he gently touched her knee and she wept, from sorrow and some measure of relief. At the hospital she slumped in a wheelchair while he filled out papers. Her hands were dead weight. Someone was insisting this wasn't an emergency. Someone else was shouting. Someone wheeled her down for a CAT scan, and before she passed out she heard the word *stroke*. Then they were jostling her again, though she desperately needed to sleep. They had to get her to Mass General, a neurological trauma center, immediately.

"In the ambulance I curled up into a little fetal ball," she recalls in the quiet of her sunroom. "We went whooshing across town, and I felt my spirit surrender, the last energy deflate. I'd done what I had to do." Her voice, level till now, starts to crack. For the first time telling the story, she's crying. ▶

When she woke, she was surprised to be alive. She'd been in an oceanic place with no boundaries. "The absence of experience is bliss. It was peaceful and beautiful there. I was with God," she believes. "I could see that my spirit was huge. I didn't see how I would be able to squeeze myself back into this tiny little body." Describing this state, she sounds like a mystic. "All details of my life and language were gone. Language is a kind of code, and things were no longer reduced to coding. I was looking at the big picture and could see how everything is related. Everything is in motion, connected in a dance of grace. The brain is what imposes boundaries, and boundaries convey a perception of separation, but that's a delusion. Everything is one."

"I got to sit in the space of silence gurus meditate toward for years," she says. She didn't want to leave. The world she periodically awoke to was painful: all strident vibration, raw data, and chaos. A blood clot the size of a fist had lodged between her two language centers, in the left half of the brain. She was processing the world through the right side, which perceives underlying meaning. "The good MDs touched me," she says. "If they had the peace inside that said 'I'm here to help you heal,' I could feel that."

She began to find her way out of the near vegetative state, she says, when one day she heard the internal voice of pure thought again, her wise woman. She was being given a choice, she understood. She could remain where she was: still, but in grace. Or she could come back and resume her life. But that would mean detaching from God, and she was anguished by the prospect.

And then the letters began to pour in. News of her stroke had burned through the NAMI grapevine. Family members she'd exhorted into hope were returning the favor. At this point, she understood only glimmers, but "day after day," she says, "there was just all this love coming at me. I was so wounded, and they were telling me how much I meant. I had to come back, because of the love. They loved me back to health."

Two and a half weeks after the brain hemorrhage, she had an operation to remove the clot. It relieved the pressure, but her memory stayed sketchy and she

still couldn't speak. "Can they take away my PhD?" she worried. Her mother flew in; her best friend, Kelly, took time off; and with eight months' paid leave—a gift of coworkers' vacation time—she began the fight to reclaim herself. They had their work cut out for them, all three of them.

In crucial ways, she was like an infant. She couldn't talk, had forgotten how to walk. Math and reading were gone. Someone gave her the pieces of a baby's puzzle and she stared at them dully, perplexed. But her mother had struggled in vain to pull one child from the vortex and

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says Jill.

she wasn't going to let this one go. Words had been wiped out? She'd help her relearn them. "When she'd feed me, my mom would never ask a yes or no question. She'd say, 'You can have soup, or you can have grilled cheese, or you can have tuna. Which do you want?' I would go, *Soup? Soup?* then remember *Soup!* She opened mental files for me." Slowly, word by hard-fought word, they brought her vocabulary back.

With Kelly, she worked on relearning to walk. At first she could only totter, but they practiced at a nearby old people's home over and over till she was ready for a wooded park she loved, a place where she'd felt her spirit soar. Going slowly, they'd walk the lake, admiring the trees and rocks. Then one day, Kelly helped her up on the rocks and "I knew I was going to be okay," Jill says. "I was back. My spirit was strong enough. I could face whatever came."

The first choice she had to make was whether to leave the Boston area. For a long time she'd hated being so far from her family. Now she realized she didn't have to be. She found a house in Bloomington, took a job teaching college anatomy in order to relearn anatomy, and waited to see who she'd become.

**F**IVE YEARS AFTER THE STROKE, she can say for sure who she's not anymore: a workaholic. Afternoons she knocks off to walk ten miles, past sun-dappled cornfields near her house. At night she sleeps as much as she needs to, which is a lot—9 to 11 hours, one of the few indications her body's still slightly fragile. If she gets tired, part of her face droops. She can confuse words.

Physically, the stroke's lasting changes weren't extreme. Her math isn't as fast. She has some trouble with sensory stimulation: "I don't like crowds. You can't get me to a movie. When I sit in an airport, I put on sunglasses." Spiritually, the changes were profound. Every day she prays, "just to stay hooked to God. When I go to sleep, I wrap one hand around the other to feel like I'm holding God's, and say thank you for all the blessings of my life."

She's become "a right brain, converted left"—less overanalytical, less intellectually inhibited. "I got a rich new world," she says. "My art and my music have flourished."

Her time now is spent writing and lecturing. She's at work on a book about her experience, has published several articles. Recently, she recorded some Singing Scientist radio spots for the American Heart Association on the warning signs of stroke: sudden loss of vision or speech; sudden headache; weakness or tingling in the face, arms, or legs; sudden or unusual falls. She still addresses families of schizophrenics, and lately she's added a second audience: school kids, who are usually rapt, not just because she brings specimens but because she's exhilarating on complexities—of the brain and of life.

"I tell them how when we are born, 50 percent of the nerve cells die almost immediately. Fifty percent of 'em! I say that at puberty, 40 to 60 percent of dendritic connections disappear. The connections are pruned. I tell them whatever they like to do now they need to do a lot of, because pathways are getting laid down. I say, 'Tell your brain, I like football, I like art, I want to do music. Encourage yourself. Don't be mean to yourself. And don't let other people be mean to you. They don't have the right. They can't take you away from you. You are here to show up. Show up! It's your life.'" •