THE MAN WHO WASN'T THERE

INVESTIGATIONS INTO
THE STRANGE NEW SCIENCE
OF THE SELF

Anil Ananthaswamy

DUTTON
est. 1852

4

TELL ME I'M HERE

WHEN YOUR ACTIONS DON'T FEEL LIKE YOUR OWN AND WHAT IT DOES TO THE SELF

What gives me the right to speak of an "I," and even of an "I" as cause, and finally of an "I" as cause of thought? . . . A thought comes when "it" wants, not when "I" want.

—Friedrich Nietzsche

For any true grasp of delusion, it is most important to free ourselves from this prejudice that there has to be some poverty of intelligence at the root of it.

—Karl Jaspers

March 10, 2013. It was a bitterly cold day in Bristol, England, much colder than it was in London, which is a two-hour train ride due east and from where I had just arrived. I met Laurie and her husband, Peter, at the Bristol train station. We were to go and see the parking garage where Laurie had tried to jump and end her life on a similarly cold day in November 2008.

Peter drove us to the garage and up the ramp that spiraled steeply to the terrace of the eight-story building. "You are not going anywhere near the edge," Peter said to Laurie. "You are not going to tempt fate." Laurie seemed far less concerned. She exclaimed, "Wheeeeee!" like a kid on a roller coaster as Peter climbed the ramp at a fair clip.

We parked on the seventh floor and climbed up to the terrace. The wind stung. For a few minutes, Laurie struggled to find the spot she had intended to leap off of. Nothing looked familiar. Even the parapet was too high. "This is impossible for me to climb," she said. "I think they changed it, to make it less easy to climb." But the concrete parapet looked uniformly old, nothing seemed added on. We kept searching.

We found the place. It was near the very top of the same spiral ramp we had driven up. The ramp had inner and outer parapet walls. That fateful November day, Laurie had first peered into the inside of the ramp. The ground below had been muddy (it was filled with gravel today) and she had decided it would be too soft to kill her. She then walked over to the chest-high, foot-wide outer parapet and somehow climbed onto it. Had she jumped, she would have landed on concrete.

Today, when you stand at the wall, you see a modernistic fifty-foot-high sculpture in front, a column clad in slate, with an umbrella-like disk of solar panels near the top, above which are twin, twisting vertical blades of a wind turbine. "I remember looking at that," Laurie told me. "They were building that in 2008."

The sculpture stands in the middle of a long traffic island. On the far side are multistory brick buildings, beyond which you can see the tiered tower of St. Paul's Church, known in Bristol as the Wedding Cake Church. Even with suicide on her mind, Laurie had stood admiring the view. It had also given her pause to ponder the jump. Would it kill her or just paralyze her? As she contemplated the outcome, a man

saw her from below and called out: "Are you all right?" Laurie did not answer. "I guess he called the police," she told me. The police came up and rescued her. They took her to the nearby police station, where she was sectioned under the UK's Mental Health Act—in a holding cell for twenty-four hours.

To this day, Laurie thinks it wasn't her decision to attempt suicide. "I was under the influence . . . of some force," she said. "I wasn't the one making that decision. Someone was trying to push me off the edge."

Soon after that incident, Laurie was diagnosed as suffering from schizophrenia. But the knowledge hasn't changed her sense of how she felt the day she tried to jump. Sitting in a Starbucks inside the shopping center next to the parking garage, she continued to voice skepticism that the thoughts that told her to jump were her own. "I still wonder if it is outside of me," she said.

● ● ○

About a month later, I was attending a conference on "Hearing Voices" at Stanford University. The first speaker had finished her talk on musical hallucinations, and was taking questions. An audience member read out a question that someone named Sophie had posted on Twitter (the talk was being streamed over the Internet). Suddenly, a woman sitting near the front put up her hand. As the puzzled speaker looked at her, the woman said, "Sorry, I'm Sophie." The audience dissolved into laughter.

I had a more complicated reaction than that of the audience. I had come to the conference to meet Sophie (who is from Chicago), so the fact that she was posting on Twitter had dismayed me. Was she watching the talks remotely? Hadn't she turned up at Stanford? Seeing her sitting in the room was a big relief.

I first learned about Sophie from Louis Sass, a professor of clinical psychology and a schizophrenia expert at Rutgers University in New Jersey. "She's the most articulate person with schizophrenia I have ever met," Sass told me. Years ago, before her own tryst with schizophrenia, Sophie contacted Sass because she had found his work interesting. Sass has been arguing for decades that schizophrenia should be viewed as a complex disturbance of the self and self-consciousness, and the view resonated with Sophie, whose mother had suffered from schizophrenia. Then, one day, Sass received an email from Sophie, which he recollects as saying, "Gee, funny thing happened . . ." Sophie, it turned out, had had a psychotic breakdown herself.

Sophie grew up with a mother who suffered from psychosis (a condition in which one's sense of reality is profoundly altered). With the hindsight of maturity and training in psychology and philosophy, Sophie can see her mother's paranoia and erotomania ("she was convinced people were in love with her") for what it was: the outcome of severe schizophrenia. But as a four-year-old, Sophie knew no better. Her mother would drive Sophie and her brother to grocery stores but would refuse to go in herself. Instead, she would send the children to get the groceries and even pay for them. "When you are a four- or five-year-old child, getting a whole cartful of groceries and paying for them with a check that your parent has pre-signed was very strange," Sophie told me. "But at the same time, I thought, Oh, that's just how she is."

Her mother's paranoia manifested in other ways. For instance, when strangers, or even the postal carrier, came to their house, the family would shut all the windows and hide. "I thought it was very normal," said Sophie.

It was around the time that Sophie entered junior high that she realized her mother, and their family life, wasn't normal. Her mother's

paranoia had been exacerbated. She thought a recording device had been implanted in her uterus, and even in their dog, and that the whole house was wired. She would ask her kids to walk down a block, away from the house, before she would talk to them.

If that wasn't difficult enough, Sophie's family history of schizophrenia went further. Her mother's first husband had had a schizophrenic breakdown when studying philosophy, and was institutionalized at a state hospital in California. "We grew up in fear of him," recollected Sophie. "[My mother] thought that he was going to get out of the hospital that he had been committed to, and come and find us, and that he wanted to kill her. I have no idea if that was in any way grounded in reality. So we grew up in fear of him, but at the same she very strongly romanticized his brilliance, his genius. Our house was full of his philosophy books."

Kant, Hegel, Heidegger, and Karl Jaspers filled the shelves. Sophie even got to read this man's diaries, which documented his descent into madness.

Through all of this, Sophie negotiated her childhood just fine, developing an intellectual and academic bent of mind. She turned down a Cornell scholarship and went to Nepal to work with an NGO, and then spent a year and a half in Japan. She returned to the United States and went to the University of Oregon in Eugene to study continental philosophy. One of her advisers was John Lysaker, who has written extensively on schizophrenia, psychosis, and the self. During her senior year, still blissfully absent of any symptoms of psychosis herself, Sophie wrote to Louis Sass. She was intrigued by his ideas on schizophrenia, the attendant "madness," and the parallels he saw in modernism.

● ◍ ○

"If you want to find a good analogy for many schizophrenic experiences and symptoms, an excellent place to look is in the avant-garde modernist and postmodernist art of the twentieth century," Louis Sass told me. "That is not to say anything as silly as modernism is schizophrenic or that schizophrenia is modernist necessarily, but there's a structural parallel which offers quite a different way of understanding, often in great detail, a lot of what is really going on in schizophrenia."

An unusual confluence of life events led Sass to this view of schizophrenia and to his 1992 book *Madness and Modernism.* One was his training in modernist literature. As an English major at Harvard in the late '60s, he was drawn to modernism, wrote his thesis on Nabokov ("who was kind of a modernist"), and keenly studied the poetry of T. S. Eliot and Wallace Stevens. Schizophrenia was also a hot topic then. Scottish psychiatrist R. D. Laing had written a provocative book on the subject, *The Divided Self.* Sass took a course at Harvard for which Laing's book was required reading. And around that time a close friend of his developed schizophrenia.

Almost four decades later, sitting at the kitchen table in his Brooklyn brownstone apartment, Sass recounted his friend's descent into the cauldron of schizophrenia. There were signs even in high school that his friend was unusual. Those who develop schizophrenia typically go from being premorbid (before there are any clear indications of impending psychosis) to prodromal (at the cusp of psychosis) to full-blown psychosis. "His premorbid personality, to use the technical term—I certainly didn't think of him that way, he was my friend—was in retrospect typical of a certain kind of person with schizophrenia," said Sass.

His friend was unconventional and fiercely autonomous (an attribute that would prime Sass to question the standard view that mental

disorder always involves lessened autonomy). "We 'normals' were so incredibly conventional from his point of view," said Sass. "So cowardly, in a way. . . . You wouldn't dare stand on your head here in my house, for example. He would have, if he felt like it, as a manner of speaking. He would do things that were outrageous. He wasn't afraid of anything."

Once, in a school cafeteria, his friend picked up the fish from his plate and lobbed it high into the air and clear across the hall toward the teachers' table. All this could be described as behavior "motivated by a certain kind of oppositionality, contrarianism, insistence on autonomy, contempt for the normal," said Sass. Not entirely unusual for adolescent boys of his age, perhaps. But "there was something different about my friend's way of manifesting it . . . so extreme that one has to call it, whatever the word means, 'insane' in a way."

His friend eventually became psychotic. "My sense of what it was from knowing him and knowing him very well, from before he became psychotic and after, didn't fit with the common images [of schizophrenia]," said Sass.

Schizophrenia was originally called dementia praecox, a term coined in the 1890s by the German psychiatrist Emil Kraepelin. It was Swiss psychiatrist Eugen Bleuler who renamed it schizophrenia in 1908. Dementia praecox, or premature dementia, posits, among other things, intellectual disability. Another now out-of-favor psychoanalytic view of schizophrenia was one in which the person regressed to an infantile state, robbed of the maturity of an adult. Yet another stereotype, popularized by the antipsychiatry movement and some of the literary avant-garde, was of the schizophrenic as a romanticized wild man, in touch with his deepest desires and instincts.

Sass and his friend went to different colleges. Sass went to Har-

vard, and would go on to do his PhD in psychology at the University of California, Berkeley, and his internship in clinical psychology at the Cornell University Medical Center–New York Hospital. Meanwhile, his friend's schizophrenia worsened. He dropped out of college, and eventually committed suicide. The experience marked Sass.

Back in his apartment, Sass cast his mind back to when he had gone to see his friend after he had had psychotic breakdowns. On one occasion, Sass found him obsessed with dancing on one foot—something he had been working on for many weeks—now demonstrating his talent inside his mother's garage. But there seemed to be no further purpose to his endeavor, no desire to impress anyone, no desire for personal gain or any usual sort of narcissistic satisfaction.

"He was an extreme, and from any normal point of view insane, devotee of autonomy. I'm not trying to say it's a better way to live, obviously, but it offends me deeply at some ethical level, and at some aesthetic, intellectual level as well, that these things would not be recognized for what they are," said Sass. "Scientifically, it's a failure to recognize the true nature of the phenomenon, in all its sometimes paradoxical complexity."

What Sass, then, is arguing for—and he's not the only one—is for psychiatry to move away from describing schizophrenia so exclusively in terms of deficits—lacking this, lacking that—and to think of it positively. By "positive," he does not mean good. He means to recognize what it feels like to be schizophrenic, to understand its phenomenology, not just to note the failure to conform to cultural standards.

One way to understand schizophrenia, Sass argues, is to look toward modernism in art (the cubism of Picasso, the dadaism of Marcel Duchamp, and the surrealism of Giorgio de Chirico and Yves Tanguy, for example) and literature (Franz Kafka and Robert Musil, T. S. Eliot

and James Joyce, to name a few). Such art can give us a sense of what the schizophrenic experience might entail. In the various traits of modernism, as well as postmodernism, Sass sees threads of what he termed "hyperreflexivity" (a kind of exaggerated self-consciousness that takes what would normally be the implicit medium of our experience and turns it into an explicit target of excessive focus and attention) and also of alienation. "Instead of a spontaneous and naïve involvement—an unquestioning acceptance of the external world . . . and other human beings, and one's own feelings, both modernism and postmodernism are imbued with hesitation and detachment, a division or doubling in which the ego disengages from normal forms of involvement with nature and society, often taking itself, or its own experiences, as its own object," he wrote.

● ● ○

Laurie can recall the feeling of her first major encounter with schizophrenia. It was Bonfire Night, during the fall of 2005. Across the country, fireworks were being lit to celebrate events of November 5, 1605, when the police thwarted a plot to blow up the parliament building in London. Laurie was seventeen, in boarding school in Canterbury, England. She watched the fireworks display and then came back to her room and sat down in her chair. She felt strange. As if something were controlling her, possessing her, an outside force. She sat for a couple of hours, doing nothing, just preoccupied with the strangeness. Then she picked up an art knife and cut her left hand. And she went to sleep. She woke the next morning and cut herself again, this time a lot deeper. The bleeding wouldn't stop. "Somehow I just snapped back to reality, and realized, Oh, gosh, I have cut myself," she told me. She and a friend rushed to seek medical help.

That incident was the first serious realization that something was amiss. The Bonfire Night incident brought into focus something she had begun to feel a few months earlier: paranoia that she would be deported from the UK back to her home country, though there was no cause for concern in real life. Until then, she had dismissed those fears. But the thoughts became more frequent and insistent. They had an almost acoustic quality, an "external physical quality," as they crowded her head. They were linked to deportation. Their refrain was unfailingly familiar. "'Nobody will miss you if you go, you are useless, you are a failure,' that kind of thing," she told me.

By March 2008, Laurie had cut herself more than a dozen times. That was when she and Peter, then her boyfriend, took a trip abroad to meet her parents. One night, when everyone else had gone upstairs to bed, Laurie showed Peter the scars on her hand.

"'Oh, dear,' I think were my precise words," Peter told me while we all sat down for dinner at the Hole in the Wall pub in Bristol.

"You said, 'Oh, Jesus,'" Laurie corrected him.

"Fair enough," said Peter.

Soon after her talk with Peter, Laurie began hearing voices. She remembered the month: May 2008. It was unclear whether it was the voice of one person or three, for the voices seemed to echo inside her head. But it was a middle-aged voice speaking in a British accent. The woman or women spoke directly to her, telling her to cut deeper, to kill herself. These voices, speaking in the second person, as it happened, delayed Laurie's diagnosis of schizophrenia, for which she blamed Kurt Schneider, an early-to-mid-twentieth-century German psychiatrist. Schneider had cataloged a set of what he called first-rank symptoms for diagnosing schizophrenia. Among these are third-person auditory hallucinations, in which the voices talk to one another

about the patient. Though Laurie displayed some other first-rank symptoms (thought insertion, or the feeling of alien thoughts in her head, and primary delusion, a delusion that appears unbidden and without precursors, which in Laurie's case was the feeling that her surroundings had an inexplicable strangeness), her psychiatrist, idiosyncratically and mistakenly sticking to Schneider's old ideas, regarded the presence of second-person voices as uncharacteristic of schizophrenia, and more an indication of psychotic depression (even though we now know that many people with schizophrenia do hear voices speaking to them directly).

The staggering array of symptoms in schizophrenia complicates diagnosis. The symptoms are usually classified as positive (delusions, hallucinations), negative (apathy, emotional flatness), and disorganized (such as jumbled-up speech). Diagnosis often involves ruling out other disorders before settling upon schizophrenia. In Laurie's case, it meant being diagnosed first as suffering from depression, then from borderline personality disorder. Meanwhile, her attempts at suicide got more serious. She once overdosed on eighty tablets of acetaminophen, and suffered two weeks of vomiting. Soon afterward she tried to jump off the eight-story parking garage. And around that time, a psychiatrist diagnosed her with schizophrenia.

Sometime in early 2009, her condition worsened. She tried to kill herself again, this time with an overdose of her antipsychotic medication. Even her very sense of being a person was threatened. "During that period of intense symptoms, I thought my whole self disintegrated and dissolved; I didn't have one," she said. For instance, if she held out her hand, she would feel it going farther and farther away. "My sense of self, bodily self or psychological self, or a combination of the two, was just permeating outwards," she said. "Even when I was

just sitting, I'd think I was just transparent, almost. Not physically, obviously, metaphorically."

● ● ○

Sass and his colleague Josef Parnas, a psychiatrist at the University of Copenhagen, Denmark, think that the answer to the conundrum that is schizophrenia lies in the self. Scientists have long struggled to come up with a unifying hypothesis for schizophrenia. What possible common mechanism could underlie the diversity of positive, negative, and disorganized symptoms? Could it be a disturbance of the very underpinning of our being, a disturbance of our sense of self?

To explain schizophrenia, German psychiatrist Karl Jaspers coined the term *Ich Störungen*, which literally translates to "ego disturbances." Jaspers used the term to signify how the core symptoms of schizophrenia all have something to do with a disturbance of the boundary between the self and the other, the self and the outside world.

Sass and Parnas think that schizophrenia is the result of an even more basic disturbance of the self. The duo's thinking owes much to a long tradition of mostly European phenomenologists—phenomenology being "the study of 'lived experience.'" These phenomenologists include, notably, Edmund Husserl, Martin Heidegger, Maurice Merleau-Ponty, and Jean-Paul Sartre. It's through the analysis of the lived experiences of patients that Sass and Parnas arrived at their thesis: schizophrenia involves the disruption of a basic form of selfhood. To understand their point of view, we need to treat the self as a layered entity. There is the by-now-familiar narrative self—the stories we tell ourselves (and others) about ourselves, an identity that spans time, from the past to the future. But even before the emergence of the temporal storyteller within us, there's the self-as-subject that

is able to reflect upon aspects of itself, these aspects constituting the self-as-object (our narrative would be one such aspect, or object, for the self-as-subject). Sass and Parnas are targeting the self-as-subject: it's "the fact that I feel that I exist now in this moment, that I feel a sense of being a [subject], a sense of being the thing to which things are happening, and from which acts emanate," said Sass. They call this *ipseity* (*ipse* is Latin for "self" or "itself").

During our meeting, Sass displayed extemporaneous literary eloquence as he described the concept further. "Ipseity is that from which the fiats of the will emanate, and toward which perceptions come. It is the implicit sense of feeling that you are here. But of course, you don't think about that directly. It's a feeling, and it's of its essence that it *not* be the object of awareness," he said. "You might say that it's the nowhere from which will emanates, the nowhere to which perceptions arrive; that's more or less how William James described it."

"That it *not* be the object of awareness . . ." It's this assertion that holds the clue to Sass and Parnas's idea of what happens during schizophrenia. The disorder, they argue, involves a kind of hyperreflexivity, an undue amount of attention paid to aspects of oneself that otherwise just exist without being the focus of attention. "It's a subtle but crucial phenomenological difference between moving your arm and taking the movement of your arm as the object of your attention," said Sass. "Those are very different things."

Sass and Parnas posit another seemingly contradictory disturbance of ipseity that they think is present in schizophrenia. It's what they call "diminished self-affection": a reduced sense of being an entity to which things happen, of being an entity that is the subject of awareness. Sass writes, "This experience of one's *own* presence as a conscious, embodied subject is so fundamental that any description

risks sounding empty or tautological; yet its absence can be acutely felt."

Laurie could attest to that. In the days leading up to her suicide attempt from the top floor of the garage, she felt an intense emptiness. "When I was in that state, I just thought there was so much nothingness around me, inside of me, I couldn't function," she told me. "I thought if I couldn't function, what's my worth? I might as well be dead."

Sass and Parnas argue that when ipseity is disturbed, the basis of our very being is eroded, making it fertile ground for psychosis and releasing all sorts of strange experiential possibilities.

● ◉ ○

During the early phase of her psychotic break, Sophie remembered noticing subtle changes too. Sophie told a friend, who was French, about how she was seeing the world as particles, and how it felt as if the mere act of blowing on a building would disperse it into thin air. "To this day, I don't know where the mistranslation occurred, whether it was on her end, or her expressing that in her French-English to a professor, but somehow they decided that I was planning to blow up a building," Sophie told me. She was banned from the philosophy department where she was a student, and threatened with arrest if she showed up on campus. Sophie went to the campus anyway to see her adviser, who refused to meet her and slammed the door in Sophie's face. Sophie was initially temporarily suspended, but a year and a half later she was permanently expelled from the department.

Even before that happened, Sophie was struggling as a student. She would find herself unable to talk, sometimes for hours on end, despite being perfectly capable of formulating thoughts and sentences in her mind. The words just wouldn't come out. That was incredibly inconvenient, given she had office hours as a teaching assistant, or had to attend classes as a doctoral student. Unable to afford good psychiatric care, Sophie went to a psychiatric hospital in Chicago meant to help poor and low-income patients. The experience was scarring. The intake nurse told the friend who had accompanied Sophie, "I'm not the one doing the official assessment, but from what you have told me it seems as plain as day that she's a schizo." The comment stung. "I was right there," Sophie told me, indignation rife in her voice even years later.

The hospital locked her up, in a spartan room, surrounded by others who were suffering from various mental-health problems, including substance abuse. Sitting among patients who were walking around screaming and yelling, Sophie was unnerved at where she found herself. "It was disturbing to me, from that perspective, although I had grown up with my mother and was used to dealing with her," she said. Her friend, horrified at the way Sophie was being treated, helped her escape from the lockup.

Fortuitously, Sophie discovered a well-funded program that focused on first episodes of psychosis. She called the clinical director. The response was immediate. "She said, 'I want to see you at seven a.m. in the morning,'" recalled Sophie. "She was incredibly reassuring and nice, and it was just night and day." Sophie enrolled at the program for intensive treatment. But despite talking with the clinical director a number of times during the week and taking antipsychotic medication, Sophie wasn't convinced of her psychosis, partly because she thought her altered view of the world made sense, thanks ironically to her training in philosophy. While her mother's madness had been "profoundly irrational, conspiracies, plots, and things going on," Sophie's own perception of the world as insubstantial, where solid boundaries melted away into an amorphous whole, did not seem un-

realistic. Solid objects were illusions. Even the reality of people existing as individuals was tenuous. "That felt entirely in line with the types of questions that philosophers have been asking for centuries," said Sophie.

Meanwhile, her schizophrenia was having profound effects on her being. Her sense of a barrier between her internal and external worlds had dissolved. "Suddenly, it was as if my entire interior life was exposed to everyone," she said. During her sessions with a psychiatrist, she was constantly being asked if she was getting messages from, say, the radio, or whether she was hearing voices. While she wasn't getting messages or hearing voices, Sophie felt compelled to know whether she was psychotic or not. She began fixating on objects to see if they were communicating with her, and started focusing on her own thoughts. "This is what Louis [Sass] would call hyperreflexivity in the most self-conscious sense—the more I concentrated on my thoughts, the more objectified they became, the more I started to hear auditory elements to things," said Sophie.

Schizophrenia has also changed Sophie's relationship to her own body. "My hands never look like my own hands," she said. "There must be some sort of split-second gap between the movement of my hand and me registering that as my own action, or a self-initiated action."

What Sophie experienced and continues to experience is a disruption of what is called our sense of agency. It's that part of our sense of self that makes us feel that we are the owners of our actions. If I lift a glass of water, I know that I'm doing the lifting. Can something we take so much for granted go awry? And could it cause psychosis—the perception of a distorted, nonexistent reality? The answers have their roots in experiments with fish, flies, and eyeballs that began in the early nineteenth century.

● ● ○

Move your eyes left to right, back and forth. What happens to the scene that you are looking at? If all's well with your visual system, then you should see what's to your left or right, but the scene you are looking at should hold steady despite the fact that your eyeballs are moving. But think about this for a moment. As far as the brain is concerned, the signals falling on your retinas could be due to either the motion of your eyeballs or something moving in your visual field. How does it know which?

Charles Bell and Johannes Purkinje, back in the 1820s, independently figured out that the answer to this question was telling us something very important. When you move your eyes normally, the brain cancels out the expected movement of the image—because it knows it initiated the eye movements, thus keeping the image steady. But when something is moving in the visual field, there is no such cancellation, and we perceive motion.

Then, in 1950, Erich von Holst and Horst Mittelstaedt carried out an experiment that illustrated this rather more bizarrely. They twisted the neck of the blowfly *Eristalis*, turning its head upside down: "Eristalis has a slender and flexible neck which can be rotated through 180° about its longitudinal axis. If this is done, and the head glued to the thorax, the positions of the two eyes are reversed," they wrote. The fly demonstrated truly strange behavior: in darkness, it acted as if nothing was wrong and moved normally, but under lights, it started going around and around, either clockwise or counterclockwise, choosing the direction at random once the lights came on and sticking with it. The same year, and independently, neurobiologist Roger Sperry did something similar. He surgically rotated the left eye by 180° in south-

ern swellfish (*Sphoeroides spengleri*), and blinded the right eye ("Its small size, loose, scaleless integument, and general hardiness make this fish suitable for experiments involving surgery," wrote Sperry). Once the fish recovered from surgery, it too would circle either to the left or the right.

Von Holst and Mittelstaedt came up with the term *Efferenzkopie*, or *efference copy*, to explain what was going on. Sperry used the term *corollary discharge*. The essence of the idea was the same in both cases. The animal's brain generated a command to move. A duplicate of this signal was sent to the visual center. The nervous system would use the copy to compare the expected movement with the signal of the actual movement and use this comparison to stabilize the animal's motion—a kind of feedback mechanism to ensure that it was moving accurately in the intended direction. But if the head or eyes were twisted around, the feedback reinforced errors instead of correcting them, causing the animal to move in circles.

What could this possibly have to do with schizophrenia, psychosis, and the self?

In 1978, Irwin Feinberg of the VA Hospital in San Francisco tackled this question head on. Experiments until then had shown that motor actions could produce a corollary signal or copy, at least in simple animal models. Could such signals be used to distinguish self from non-self? Say your arm moved. Could the brain use the corollary signal to tell whether the arm moved because *you* tried to move it, or whether it moved due to an external cause?

The question is not as weird as it sounds. Before Feinberg published his paper, the Canadian neurosurgeon Wilder Penfield had written about experiments in which he would stimulate the motor cortex of patients who were undergoing exploratory surgery for treatment of epilepsy. The stimulation would cause the arm to move. But the patient insisted that he had not moved the arm, rather that Penfield had caused the arm to move. Because the patient had not willed the motion, no motor commands were willfully initiated and there would have been no corollary signal; so, the hypothesis goes, the brain attributed the movement not to the self but to an external agency. Feinberg eloquently argued: "The subjective experience of these discharges [or signals] should correspond to nothing less than the experience of will or intention."

And Feinberg went further. What if corollary signals were not limited to motor actions but also to thoughts? Could this be the mechanism for making a thought seem as if it belonged to oneself, rather than to someone else? Feinberg suggested this might be the case. He even attributed auditory hallucinations to malfunctions of this "corollary discharge" mechanism. Indeed, he posited that such malfunctions lay behind some of the strange symptoms of schizophrenia, even the blurring of boundaries between self and non-self, the kind experienced by Laurie and Sophie and countless other sufferers of schizophrenia. "Thus, if corollary discharge, in permitting the distinction of self-generated from environmental movement, thereby contributes to the distinction of self and other, its impairment might produce the extraordinary distortions of body boundaries reported by schizophrenic patients," wrote Feinberg.

● ◎ ○

During the depths of her psychosis, Laurie would hear voices a few times a week, women telling her that she was useless, a failure. Her husband, Peter, could tell when she was hearing voices. "She would look vacant and gaze off into space. Or she'd respond to the voices;

she'd say something completely out of the blue," said Peter. "You would instantly [know] she was responding to the voices."

Peter would actually engage with the voices through Laurie. She'd tell him that the voices were saying she was a failure. "Why do they think that?" Peter would ask. The voices would respond, "Because you failed to get your degree." And Peter and the voices would argue back and forth, with Peter pointing out to the voices that Laurie hadn't failed her degree, she had merely taken a year off from university (which she had, to cope with her illness). These episodes would last for half an hour, sometimes an hour, and eventually the voices would subside.

Laurie comes across as deeply introspective and analytical. These are traits that forced her to question her condition. She wanted answers. Was she crazy? Her inward journey resulted in two papers that she wrote when she was still a student struggling with schizophrenia. In one of the papers, she ends with a plea to psychiatrists to pay heed to what the patient is saying. Her experience with the psychiatrist whom she saw immediately after her attempted jump off the eight-story garage is illuminating. She explained to him that she had watched herself from a detached, third-person perspective as she tried to commit suicide. She had not been herself. Her psychiatrist dismissed her observations by saying, "You certainly communicate your distress clearly." It's in response to such indifference that Laurie implored psychiatrists to recognize the "unwanted new reality" that schizophrenia foists on people, which could help "rescue the sufferer from his [or her] isolation."

● ● ○

A mainstream psychiatric idea for why schizophrenics have to confront this painful reality relies on the notions of self-checking corollary discharges. The idea that an animal might distinguish aspects of

self from non-self via this mechanism has been tested even at the level of single neurons. Singing crickets (*Gryllus bimaculatus*) chirp at an astounding 100 dB SPL. Their chirps are synchronized with their wing movements, with the crickets generating pulses of sound as they close their wings. Amid this cacophony of sound, how does a cricket—whose ears remain sensitive at all times—distinguish between its own chirps and external sounds? It turns out that there's a single interneuron that manages this task. This corollary discharge interneuron (CDI) fires in synchrony with the motor neuron that's controlling wing movement; it fires as the wings close. The CDI's firing then inhibits the auditory neurons responsible for processing sound—so the cricket is deaf to the sounds it generates on the wings' downbeat. When the CDI doesn't fire, and there is no corollary discharge, incoming sounds are deemed external or non-self, and the cricket tunes in.

It's not just crickets. Similar single-neuron recordings of the mechanism of corollary discharge can be seen in nematode worms, songbirds, and even marmoset monkeys.

Within a decade of Irwin Feinberg's 1978 proposal that a fault in the brain's corollary-discharge mechanism might underlie the varied symptoms of schizophrenia, Chris Frith, a clinical psychologist who was then at the Northwick Park Hospital in Harrow, UK, developed his "comparator model" for how our sense of agency arises—the sense that makes us *feel* we are responsible for our actions. At the time, Frith argued that the disruption of this very basic aspect of our sense of self was behind the first-rank symptoms of schizophrenia: auditory verbal hallucinations, thought insertion, and delusions of control (the delusion that someone else is controlling one's actions).

While the model has morphed somewhat over the years, its essence remains the same. Say you want to move your arm. The motor

cortex sends commands to the muscles in the arm. The motor cortex copies the command to other brain regions, which then use the copy to predict the sensory consequences of the arm movement. Meanwhile, the arm moves, which results in certain sensations (such as tactile, proprioceptive, or visual sensations). The "comparator" matches actual sensations with predicted sensations. If there is no mismatch, we feel that we performed the action—we *own* the action, giving us a sense of agency. A mismatch makes us feel that someone else, an external agency, is responsible.

It's easy to see the appeal of this model. It allows the brain to dampen its response to self-generated sensations (for instance, the cricket's deafness to its own chirps). It provides a mechanistic explanation for how the brain might distinguish between self and non-self, at least for motor actions. And there's evidence that this ability is hampered in people with schizophrenia.

Take tickling. It's near impossible to tickle yourself. Frith, along with Sarah-Jayne Blakemore and Daniel Wolpert, showed why. In studies of healthy people, the researchers found that a couple of brain regions were far less active when people touched their left hands themselves compared with when the experimenter touched their left hands. The brain was stifling its response to self-generated touch sensations (explaining why we can't tickle ourselves). Also, the brain region that is likely doing the stifling is the cerebellum, possibly by predicting the effects of self-generated movements.

Blakemore, Frith, and colleagues further showed that people experiencing auditory hallucinations and delusions of control felt a touch on their left hand as equally intense, ticklish, and pleasant regardless of whether they themselves or the experimenter did the touching. In other words, many people with schizophrenia can tickle

themselves. This suggests an inability to tell apart self-generated actions from non-self actions.

There's more evidence. Judith Ford and Daniel Mathalon, at the San Francisco VA Medical Center and the University of California, San Francisco, have shown that healthy people, just like crickets, can dampen down their response to self-generated sounds. Brain EEG signals in healthy people, just prior to them uttering a sound, show a synchrony that is suggestive of a copy of the command to move the vocal cords being sent to the auditory cortex. And then, an EEG signal called N1, indicative of auditory cortex activity, is damped down about 100 milliseconds after the healthy person makes the sound. This is possible evidence that the predicted sound has been compared with the actual sound, causing the external sound to be tagged as self-generated and thus ignored. N1, however, is not suppressed when the sound is external, which indicates that the person can hear it.

But this mechanism seems to be impaired in people with schizophrenia. This is evidence of a possible disruption of the copy mechanism. For them the N1 signal is not suppressed to self-generated sounds, which means that the patients are hearing their own vocalizations in the same way they would hear external sounds (Sass suggests that this is a kind of hyperreflexivity—a propensity to take as an external object that which would usually be only tacitly experienced, and therefore be the very medium of selfhood). It is no great leap to think such disruptions of the comparator mechanism could blur the boundaries between self and non-self in schizophrenia.

● ● ○

At this point it's worth getting subtler about what exactly might be going awry in schizophrenia. When I move my hands, I have two feel-

ings: a sense of owning my hands and a sense of agency that makes me feel that *I* am moving my hands. We saw in the previous chapter how BIID can be attributed to the loss of sense of ownership of body parts. While there is some evidence that schizophrenia results in somewhat perturbed feelings of body ownership, stronger evidence implicates an impaired sense of agency.

In 2008, cognitive neurologist Matthis Synofzik of the University of Tübingen, Germany; philosopher Gottfried Vosgerau of the Heinrich-Heine University in Düsseldorf, Germany; and their colleagues got even more picky. They argued that one's sense of agency should be subdivided into a nonconceptual (nonthinking and instinctive) *feeling* of agency and a more cognitive *judgment* of agency. Synofzik's team says that while the *feeling* of agency relies on copies of motor signals and comparators that match predictions with actual sensory feedback, the *judgment* of agency depends on a cognitive analysis of the environment and our beliefs about it, which is called postdiction. "If you are alone in a room and something falls down from the table, your world knowledge will tell you that things do not fall by themselves, so you conclude that it must have been you, even if you don't have a sensory motor feeling of having done anything," Vosgerau told me during a phone conversation.

Of course, it's all happening in the blink of an eye, so to speak. Nonetheless, it's possible to tease apart these mechanisms. Researchers have shown that people with schizophrenia have a disturbed *feeling* of agency, and to compensate they tend to rely more on their *judgment* of agency, which depends on external factors such as visual feedback. This means that, on the experiential level, they are likely to experience themselves almost as if from outside themselves, again manifesting a kind of hyperreflexivity and an absence of a more basic sense of existing. This

could also explain the split-second delay Sophie said she experiences between moving her hands and feeling that she initiated the action—a delay that makes her question whether her hands are her own.

None of this negates the comparator model. In fact, Synofzik and colleagues acknowledge that their results "support the notion of a dysfunction of the comparator mechanism in schizophrenia." Indeed, it's because of this dysfunction that people with schizophrenia have to rely more heavily on their judgments about the external environment to augment their sense of agency.

So, if a person with schizophrenia picks up a television remote and switches on the TV, he might not feel that he initiated that action. The television nonetheless comes on, so the patient infers someone else made him do it. In Laurie's case, she didn't feel like she cut herself after an evening of watching fireworks on Bonfire Night. "Although it appears to be my decision, it was not my decision, or my volition, to do such a thing," she told me. "So [there is a] loss of agency, yes."

Given she *knew* she didn't decide to cut herself, the alternative was obvious: somebody else must be responsible. "I think it's a natural search for meaning. This is happening to me, so I want an explanation, just like any other human being would do," she said. "So, then you have an enemy, a conspiracy." Paranoia is often the outcome.

In a way, the comparator model and its variants help us understand why a person with schizophrenia may feel like his actions are controlled by an external agency and how it might lead to paranoia. Or why the sounds one utters may seem like they were spoken by someone else. But what if no one is speaking, not even you, and yet you hear voices?

● ◍ ○

Judith Ford has spent the past decade and a half thinking about auditory verbal hallucinations (AVHs), science-speak for hearing voices. In the late 1990s, Ford made the switch from studying aging and Alzheimer's to studying these voices. In the beginning, she'd analyze data collected by other researchers and write papers. "I was raising small children, and it worked for me," she said. But soon she realized she had to talk to her patients, pay attention to their individual experiences. It's these discussions that highlighted the nuances of what she was trying to study. For example, one of her patients told her that before he started taking an antipsychotic drug called Zyprexa, the devil talked to him. Once he was on Zyprexa, God began talking to him. He was still hearing voices, but they had gone from being negative to positive.

Such insights have informed Ford's work. Healthy people hear voices too, but they tend largely to be positive, and the individuals have some semblance of control over the voices. Not so for people with schizophrenia, about 75 percent of whom hear voices. The voices sound real and are often spoken by "specific non-self voices." They are usually negative, inciting violence toward oneself (as in Laurie's case) or others, at times leading to suicide or even homicide.

This phenomenon of voices inciting violence against others is captured vividly by Anne Deveson, an Australian writer and documentary filmmaker, in her book *Tell Me I'm Here*, in which she chronicles her teenage son Jonathan's devastating schizophrenia and the toll it took on Jonathan, Deveson, and her family. Suffering severely, Jonathan had long taken to disappearing from home, and reappearing suddenly. He could become violent. In one harrowing section of her book, Deveson describes the scene when she and Jonathan's probation officer, Brenda (who had just been summoned), confront him:

When Brenda arrived Jonathan was lying on the big couch that faced the sea. He was nodding to himself as if he were listening to voices, but he did not speak aloud. We asked if he were hearing voices. Jonathan looked suspiciously at both of us, then said, "No voices." He said something else but his voice trailed away. Brenda leaned forward and said she could not hear him.

"I said only Anne's voice," he shouted.

"Where's Anne's voice?"

"Plotting against me. Inside my head."

"Jonathan, I'm not plotting against you. And I'm not inside your head. I'm here."

He looked at me, his eyes darting everywhere, and still that racing energy which seemed to fill the whole room, bouncing off the ceiling and the walls, jangling my own energy, so that I felt I was receiving an electric shock.

"God has said that I should kill you Anne, and Brenda too if she doesn't shut up."

He stalked out of the room, waving his arms. A few seconds later he returned, looked at us both, muttered something and left again. This time he didn't return.

There is something deeply unsatisfactory about trying to find mechanistic explanations for Jonathan's complex auditory hallucinations. But science has to begin somewhere. One theory tries to explain such auditory verbal hallucinations as misperceived inner speech or inner speech that somehow is not tagged as belonging to the self. We are all familiar with inner speech—it's our internal monologue, externally inaudible, sometimes clear enough to ourselves, even if it does

not have an auditory quality, and at other times experienced in a more implicit manner (in all likelihood, you are experiencing it as you read this sentence). But Ford argues that auditory verbal hallucinations are not like the willed kind of inner speech, they are more like unbidden thoughts (the stuff of daydreaming or mind wandering). The question then is: how can mind wandering turn into AVHs?

Ralph Hoffman of Yale University and his team have found that in people with schizophrenia, there is hyperconnectivity between language areas of the brain and the putamen, a deep-brain region that has been linked to the conscious perception of sound. Hoffman argues that this hyperconnectivity is what allows activity in the language areas to enter one's consciousness as voices.

To dig deeper into this problem, Ford and her colleagues looked at a network of brain regions in 186 patients with schizophrenia who heard voices, each of whom was scanned while resting inside an fMRI scanner for six minutes. This data was compared with data from 176 healthy volunteers. In the case of healthy volunteers, mind wandering while at rest showed activity in a network of the following brain regions: *the medial prefrontal cortex (MPFC)*, which is the most active region when your brain is at rest and is part of the default mode network, and is also strongly correlated to self-referential mental activity (it lights up, so to speak, when you detach from focusing on an external task and are thinking about yourself); *Broca's area*, in the frontal part of the left hemisphere, which is implicated in speech production; *the putamen*, which as we just saw is involved in the conscious perception of speech; *the amygdala*, which is deep inside the temporal lobe and is involved in the fear and threat response; *the parahippocampal gyrus*, which is known to be more active when someone becomes suspicious; and *the auditory cortex*, which, as the name suggests, is involved in hearing.

But in patients who hear voices, the scans showed that all these brain regions are hyperconnected: the MPFC is hyperconnected to Broca's area, the putamen, and the auditory cortex; and the putamen is hyperconnected to the auditory cortex. All of this, Ford and colleagues speculate, could be turning the idle thoughts of healthy mind wandering into the pathological, audible voices of schizophrenia. And what about the negative tone of these voices? It could be that the hyperconnected amygdala and parahippocampal gyrus—both of which are normally involved in the fear response—increase the levels of fear, uncertainty, and suspicion associated with these voices.

There's one final piece to this puzzle. Why do these voices feel as if they belong to someone else? As we saw earlier, Ford's work with EEG signals has shown that the efference copy/corollary discharge mechanism is disrupted in people with schizophrenia. And in these fMRI studies, the researchers found that in patients who hear voices, Broca's area and the auditory cortex are less well connected—possibly corroding the pathway for the efference copy to reach the auditory cortex. So the voices, which for healthy people would at least seem to be their own, sound foreign in schizophrenia.

"The raw material of auditory verbal hallucinations, I maintain, is not [willed] inner speech, but unbidden thoughts," said Ford. And later, in an email, she expressed it more personally, referring to her deceased mother. "In fact, when my mind is wandering and unbidden thoughts are becoming conscious, I can hear the tonality, prosody, and affect of my mother's voice telling me 'you are trying to do too much, dear'. I do not think she is speaking to me from her grave," she wrote. "But, if I were psychotic, I might."

In a psychotic person, then, a hyperconnected network might be turning unbidden thoughts into audible voices, voices that have a dark

tone about them. A disturbed sense of agency makes these voices seem to belong to others.

At the heart of this malfunctioning system is what's increasingly being referred to as the "predictive brain." Generating the sense of agency is one example of how the brain's predictive mechanisms work to create our sense of self. This idea is gaining ground. Could the entire brain be a prediction machine, generating not just the sense of agency but even emotional feeling states that give us our sense of being embodied? As we'll see in the coming chapters, neuroscientists are applying such ideas to explain depersonalization disorder and even something as complex as autism.

● ◉ ○

It is one thing to experimentally study the disturbed feeling of agency, and another thing to explain the full panoply of symptoms that this supposedly begets in schizophrenia. This baffling and often terrifying diversity is captured by psychologist and therapist Lauren Slater in her book *Welcome to My Country*. This is how she describes her first meeting with a group of six chronic schizophrenia patients:

> There is Tran, nicknamed Moxi, a small, cocoa-colored Vietnamese who came to this country after the war, and who bows to invisible Buddhas all day in the corridors. There is Joseph, with a mangy beard, a green-and-khaki combat helmet he puts on the pillow next to him when he sleeps. Charles is forty-two years old and dying of AIDS. Lenny once stood naked in Harvard Yard and recited poetry. Robert believes fruits none of us can see are exploding all around him. And then there is Oscar, 366 pounds,

> and claiming constant blow jobs from such diverse females as the Queen of England and Chrissy, the Shih Tzu dog next door.

When confronted with such patients, many find it hard to accept that a mere disturbance of the sense of agency could be responsible for all the devastating symptoms of schizophrenia, as Chris Frith hypothesized when he first put forth his comparator model. Soon after Frith's proposal, it became clear that the feeling of having others' thoughts in your own head was hard to explain using his model. Today, even he admits that his model fails to account for thought insertion. Synofzik, Vosgerau, and colleagues think that their model, which splits the sense of agency into a feeling and a judgment, does a better job of explaining thought insertion; in their view, an impaired judgment of agency leads to the feeling of having alien thoughts in one's head.

Others are not convinced either way. Louis Sass, for instance, while he agrees that the neurobiology of a disturbed sense of agency is consistent with the idea that schizophrenia is a basic disturbance of the self, questions whether the impaired brain mechanisms are the *cause* of schizophrenia. He calls that a "materialist" assumption. What if you could alter the way healthy people relate to their own experience—maybe through intense introspection or meditation—and show that their brains also undergo the same kinds of neurobiological changes as those seen in people with schizophrenia? That would show that such changes are correlated, not causative.

Ralph Hoffman has similar things to say about schizophrenia. Yes, scientists (including him) have found neural-system dysfunction and gross anatomical changes in the brains of many schizophrenic patients. But are these changes the *cause* of schizophrenia, or are the observed

changes the result of "oftentimes profound withdrawal from social interactions, work and school" that can pre-date the onset of schizophrenia? "So, if you take somebody during their late adolescence and early adulthood and have them go into that stage of withdrawal and have them continue that way for years . . . what's going to happen to brain systems in the absence of cognitive enrichment and task engagement?" says Hoffman. "I hypothesize that at least some of what we end up crediting to 'neurodegenerative processes' may be the downstream consequences of the state of withdrawal that these people go into."

Hoffman is struck by the fact that psychotic symptoms are a form of interaction of the self with others. He hypothesizes that in individuals deprived of meaningful social interaction, psychotic experiences flood in to fill the void. "What happens is that in the absence of being linked into a set of real-world meanings and role specifications and places to really engage, the person becomes increasingly preoccupied with the psychotic experience that then causes further withdrawal," says Hoffman. "The internally generated experience becomes more and more prominent and it can happen relatively quickly. It kind of challenges the old breakdowns of mind, body, and brain."

It also challenges any notion of there being only a one-way interaction between the extended narrative self and the more basic self-as-subject (Sass and Parnas's *ipseity*, or Zahavi's *minimal self*): it's not necessary that only the perturbations of the self-as-subject lead to disturbances of the narrative self; the effects could flow the other way too. Also, schizophrenia is telling us that the sense of agency—which goes unquestioned when it's working well—is an aspect of the self, a constituent of the self-as-object. Even in the direst cases of schizophrenia, there is a self-as-subject that is experiencing psychosis. Who or what is that "I"?

For someone with schizophrenia, all of this philosophizing is cold comfort. And for insightful, high-functioning adults like Laurie and Sophie, an awareness of their condition can be a burden. For instance, if you are able to sometimes see through your psychosis, but not at other times, how do you tell when you are being psychotic? "One doesn't lose all the biographical, semantic, perceptual, and body memory of the past, of what the world should feel like," said Sophie. "It's that disconnect between what things are like now and what your entire life before [psychosis] was like."

There's even an official term for this quandary: "double bookkeeping"—a concept from early-twentieth-century psychiatry that has been elaborated in recent years by Sass, often in dialogue with Sophie and other persons who have experienced schizophrenic psychosis. Patients are forced to deal with two, even multiple, versions of reality. "You are almost constantly forced to make decisions that other people aren't going to make. What are you going to prioritize, which possible version of reality are you going to privilege?" said Sophie. "What are you going to act on?" Confronted with such dilemmas, patients often lapse into total inaction. This phenomenon hints at the power of the narrative self: without a coherent story about oneself, one seems unable to act; it seems that we need our narrative to function.

Laurie, too, is well aware that the voices in her head, her paranoia, the messages she thinks she's receiving from outside, are all, in some sense, a product of her altered self. "But that insight is a paradox. Without the insight you fear the external; with the insight you fear yourself," she told me. "Without insight, you think everybody else is after you, or someone else is [responsible for your actions], but with insight, you realize it's all in your head. That's also scary, so you can't win."