



The Man Who Wasn't There: Investigations into the Strange New Science of the Self

By Anil Ananthaswamy

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A Book of the Month for *Brain HQ/Posit Science*

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On *Life Changes Network*'s list of the Top 10 Books That Could Change Your Life of 2015

In the tradition of Oliver Sacks, a tour of the latest neuroscience of schizophrenia, autism, Alzheimer's disease, ecstatic epilepsy, Cotard's syndrome, out-of-body experiences, and other disorders—revealing the awesome power of the human sense of self from a master of science journalism.

Anil Ananthaswamy's extensive in-depth interviews venture into the lives of individuals who offer perspectives that will change how you think about who you are. These individuals all lost some part of what we think of as our self, but they then offer remarkable, sometimes heart-wrenching insights into what remains. One man cut off his own leg. Another became one with the universe.

We are learning about the self at a level of detail that Descartes ("I think therefore I am") could never have imagined. Recent research into Alzheimer's illuminates how memory creates your narrative self by using the same part of your brain for your past as for your future. But wait, those afflicted with Cotard's syndrome think they are *already* dead; in a way, they believe that "I think therefore I am not." Who—or what—can say that? Neuroscience has identified specific regions of the brain that, when they misfire, can cause the self to move back and forth between the body and a doppelgänger, or to leave the body entirely. So where in the brain, or mind, or body, is the self actually located? As Ananthaswamy elegantly reports, neuroscientists themselves now see that the elusive sense of self is both everywhere and nowhere in the human brain.

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The Man Who Wasn't There: Investigations into the Strange New Science of the Self By Anil Ananthaswamy **Bibliography**

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Editorial Review

Review

Praise for *The Man Who Wasn't There*

"If you simply want to read a great science book, I can't recommend any more highly than this one."
—*Forbes*

"An agreeably written travelogue through this mysterious landscape at the frontiers of knowledge."
—*The Wall Street Journal*

"You'll never see yourself—or others—the same way again."
—*People*

"The gallery of personal, often tender, portraits of patients is impressive and reminiscent of the writings of Oliver Sacks... A skilled science journalist, Ananthaswamy excels at making theoretical concepts and experimental procedures both comprehensible and compelling."
—*Science*

"In *The Man Who Wasn't There*, science writer Anil Ananthaswamy smartly explores the nature of the self by way of several mental conditions that eat away at patients' identities... Following in the steps of Oliver Sacks's "The Man Who Mistook His Wife for a Hat" (1985) and V. S. Ramachandran and Sandra Blakeslee's "Phantoms in the Brain" (1999), Ananthaswamy uses neuropsychology and narrative to take us inside the heads of people experiencing realities very different from our own."
—*Washington Post*

"Anil Ananthaswamy's exploration of the human 'self' is a blazingly original excursion through the brain—as well as a fascinating catalog of bizarre disorders."
—*Entertainment Weekly*

"Autobiographies hinging on conditions such as Asperger's syndrome and schizophrenia are proliferating, but there is little to fill the void between such accounts and the scientific literature. Linking experiences with experiments, and individuals with numbers, Ananthaswamy bridges that gap convincingly."
—*Nature*

"When you think 'beach read,' you probably don't think "neuroscience." But science journalist Ananthaswamy has a knack for making difficult topics accessible to everyone."
—*Men's Journal*

"It is an astonishing journey and an ambitious book, bringing together cutting-edge science and philosophy from West and East. You will not be quite the same self after reading it."
—*New Scientist*

"An excellent if unnerving book: 'you' turn out to be more fluid than 'you' thought."
—*New Scientist, CultureLab*

“A thought-provoking read... Ananthaswamy relays many interesting advances and, at the same time, challenges us to contemplate who we really are.”

—*Scientific American Mind*

“[*The Man Who Wasn’t There*] illuminates some of the most provocative questions at the boundary of science and philosophy.”

—*Columbus Dispatch*

“Sophisticated science, sensitive storytelling and Nancy Drew-like curiosity are at the heart of science author and journalist Anil Ananthaswamy’s *The Man Who Wasn’t There*.”

—*San Jose Mercury News*

“Science journalist Ananthaswamy skillfully inspects the bewildering connections among brain, body, mind, self, and society... Readers will be fascinated by Ananthaswamy’s chronicles as he explores, with kindness and keen intelligence, the uncomfortable aberrations that reveal what it is to be human.”

—*Publishers Weekly* (starred review)

“A provocative examination of deep questions.”

—*Kirkus*

“If you like Oliver Sacks, you’ll love this new work by Ananthaswamy....”

—*Library Journal*

“A faint-of-heart hypochondriac might wish to give Ananthaswamy’s book a wide berth, but others should find it quite fascinating. From the man who insisted that he was brain dead (despite walking, talking, eating, and taking the bus) to autism, Alzheimer’s, something called body integrity identity disorder (read the book), and more, Ananthaswamy demonstrates how what is perceived as the self can wiggle all over the map.”

—*Booklist*

“Despite the depth of scientific knowledge plumbbed in the book, the language is simple and accessible in the tradition of the late, great neuroscientist Oliver Sacks (*The Man Who Mistook His Wife for a Hat*). The series of stories that illustrate the complexity of the brain and its creation of selfhood are imbued with emotion and compassion for the sufferers, even as their conditions are explained in scientific terms.”

—*India Currents*

“A compelling and entertaining look at the last untapped mystery, the true final frontier: the nature of our selves. Science journalism at its best.”

—Daniel J. Levitin, author of *The Organized Mind* and *This Is Your Brain on Music*

“Stunning... poetic and incisive. Each of the patients is unique, special and incredible in revealing something special about the mind, whether healthy or fragile. Ananthaswamy discovers the elusive nature of the very idea of self and makes sense out of it. It is a remarkable achievement.”

—Michael Gazzaniga, author of *Who’s in Charge?* and *Tales from Both Sides of the Brain*

“Ananthaswamy’s remarkable achievement is to make sense of these unhappy individuals’ otherness, while holding on to their human sameness. You’ll come away enlightened and chastened, asking searching questions about who you are.”

—Nicholas Humphrey, Cambridge University, author of *A History of the Mind*

“Like Oliver Sacks, Ananthaswamy brings both erudition and sensitivity to his narrative so that we learn as much, and maybe more, from his subjects as we do from the scientists we meet along the way.... You’ll emerge with renewed wonder about the simple experience of being you.”

—Anil Seth, University of Sussex, Editor-in-Chief, Neuroscience of Consciousness

“A wide range of engrossing (and many just plain weird) stories elegantly weaving together insights from psychology, psychiatry, and neuroscience. An informative, exciting, and slightly creepy tour of some profound questions about human nature.”

—David Poeppel, Director, Max-Planck Institute and Professor of Psychology and Neural Science, NYU

“In this lucid and personable analysis by Ananthaswamy, the self appears an illusion, which nevertheless feels very real to most of us. Since no organism can do without this mental anchor, nature has found a way to concoct one for us.”

—Frans de Waal, author of *The Bonobo and The Atheist*

“It is an astonishing journey and an ambitious book, bringing together cutting-edge science and philosophy from West and East. You will not be quite the same self after reading it.”

—Alun Anderson, *New Scientist*

Praise of Anil Ananthaswamy's *The Edge of Physics*:

“A thrilling ride!” —Sean Carroll, author of *The Particle at the End of the Universe*

“Displays a writer’s touch for fascinating detail.” —*The Washington Post*

“A wonder-steeped page-turner.” —*Seed*

About the Author

ANIL ANANTHASWAMY is former deputy news editor and current consultant for *New Scientist*. He is a guest editor at UC Santa Cruz’s renowned science-writing program and teaches an annual science journalism workshop at the National Centre for Biological Sciences in Bangalore, India. He is a freelance feature editor for the Proceedings of the National Academy of Science’s “Front Matter” and has written for *National Geographic News*, *Discover*, and *Matter*. He has been a columnist for PBS NOVA’s *The Nature of Reality* blog. He won the UK Institute of Physics’ Physics Journalism award and the British Association of Science Writers’ award for Best Investigative Journalism. His first book, *The Edge of Physics*, was voted book of the year in 2010 by *Physics World*. He lives in Bangalore, India, and Berkeley, California.

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An allegory about a man who was devoured by ogres first appears in an ancient Indian Buddhist text of the *Madhyamika* (the middle-way) tradition. It dates from sometime between 150 and 250 CE and is a somewhat gruesome illustration of the Buddhist notion of the true nature of the self.

A man on a long journey to a distant land finds a deserted house and decides to rest for the night. At midnight, an ogre turns up carrying a corpse. He sets the corpse down next to the man. Soon, another ogre in

pursuit of the first arrives at the deserted house. The two ogres begin bickering over the corpse. Each claims to have brought the dead man to the house and wants ownership of it. Unable to resolve their dispute, they turn to the man who saw them come in, and ask him to adjudicate. They want an answer. Who brought the corpse to the house?

The man, realizing the futility of lying to the ogres—for if one won’t kill him, the other one will—tells the truth: the first ogre came with the corpse, he says. The angry second ogre retaliates by ripping off the man’s arm. What ensues gives the allegory its macabre twist. The first ogre immediately detaches an arm from the corpse and attaches it to the man. And so it goes: the second ogre rips a body part off the man; the first ogre replaces it by taking the same body part from the corpse and attaching it to the man. They end up swapping everything—arms, legs, the torso, and even the head. Finally, the two ogres make a meal of the corpse, wipe their mouths clean, and leave.

The man, whom the ogres have left behind, is extremely disturbed. He is left pondering what he has witnessed. The body that he was born in has been eaten by the ogres. His body now is made up of body parts of someone else entirely. Does he now have a body or doesn’t he? If the answer is yes, is it his body or someone else’s? If the answer is no, then what is he to make of the body that he can see?

The next morning, the man sets off on the road, in a state of utter confusion. He finally meets a group of Buddhist monks. He has a burning question for them: does he exist or does he not? The monks throw the question back at him: who are you? The man is not sure how to answer the question. He’s not sure he’s even a person, he says—and tells the monks of his harrowing encounter with the ogres.

What would modern neuroscientists tell the man if he were to ask them *Who am I?* While some would likely point out the near-biological implausibility of what the ogres did, they would nonetheless have some tantalizing answers. These answers, which strive to illuminate the “I,” are the focus of this book.

1

WHO IS THE ONE WHO SAYS, “I DON’T EXIST”?

Men ought to know that from the brain, and from the brain only, arise our pleasures, joys, laughters and jests, as well as our sorrows, pains, griefs and tears. . . . These things that we suffer all come from the brain. . . . Madness comes from its moistness.

—Hippocrates

If I try to seize this self of which I feel sure, if I try to define and to summarize it, it is nothing but water slipping through my fingers.

—Albert Camus

Adam Zeman will never forget the phone call. It was, as he called it, a “*Monty Python*—esque” summons from a psychiatrist, asking him to come urgently to the psychiatric ward. There was a patient who was claiming to be brain dead. Zeman felt as if he were being called to the intensive care unit, not the psychiatric ward. Yet, “this was very unlike the kind of call you normally receive from the ICU,” Zeman told me.

The patient, Graham, was a forty-eight-year-old man. Following a separation from his second wife, Graham had become deeply depressed and had tried to kill himself. He got into his bath and pulled an electric heater into the bathwater, wanting to electrocute himself. Fortunately, the fuse blew and Graham was spared. “It

didn't seem to have done any physical damage to him, but some weeks later he formed the belief that his brain had died," said Zeman, a neurologist at the University of Exeter in the UK.

It was a rather specific belief. And one that led Zeman to have some very strange conversations. "Look, Graham, you are able to hear me, see me, and understand what I'm saying, remember your past, and express yourself, surely your brain must be working," Zeman would say to Graham.

Graham would say, "No, no, my brain's dead. My mind is alive but my brain is dead."

Worse yet, Graham was distraught at his unsuccessful attempt at suicide. "He was one of the undead or half-dead," Zeman told me. "He in fact went and spent quite a bit of his time, for a while, in graveyards, because he felt he was with his own when he was there."

Zeman quizzed Graham to understand the grounds for this belief. It became clear that something very fundamental had shifted. Graham's subjective experience of himself and his world had changed. He no longer felt he needed to eat or drink. Things that once used to give him pleasure no longer did. "When he pulled on a cigarette, nothing happened," Zeman told me. Graham claimed that he never needed to sleep, that he did not feel sleepy. Of course, he was doing all of these things—eating, drinking, sleeping—but his desire for these and the intensity of his feelings had damped down dramatically.

Graham had lost something we all have: a keen sense of our own appetites and emotions. Patients suffering from depersonalization often report this emotional dulling or flatness. Depression too can bring about similar states of being, where emotions lose their edge. But these patients don't go on to develop such stark delusions of nonexistence. In Graham's case, the loss of emotional vividness was so extreme that "he had come to the conclusion, on the basis of that alteration in experience, that his brain must have died," said Zeman.

Zeman thinks that two key factors play a role in such robust delusions. One is a profound alteration in the quality of one's sense of oneself and the world—in Graham's case, the emotional rug had been pulled from under his feet. The second is an alteration in one's ability to reason about that experience. "Both things seemed to be true in Graham's case," said Zeman.

Graham's delusion was immune to evidence to the contrary. Zeman, in his conversations, would bring Graham to the point of surrender—to make him see the falseness of his delusion. Graham would acknowledge that a whole range of his mental faculties was intact, that he could see, hear, speak, think, remember, and so on.

So Zeman would say to him, "Clearly, Graham, your mind is alive."

He'd say, "Yeah, yeah, the mind is alive."

"The mind has a lot to do with the brain; surely your brain is alive," Zeman would prod him.

But Graham would not take the bait. "He'd say, 'No, my mind is alive, but my brain is dead. It died in that bath,'" Zeman told me. "You could get quite close to producing what you would think was knock-down evidence, but he wouldn't accept it." It was intriguing that Graham had developed such an explicit delusion—that of being dead because his brain was dead. Would his delusion have been different in an era when the legal definition of death did not include brain death?

Over the course of his medical practice, Zeman had only ever seen one other case of someone claiming to be dead. In the mid-1980s, working as a junior doctor in Bath, England, Zeman had to treat a woman who had

undergone protracted bowel surgery and was suffering from severe malnourishment. Her body had been ravaged by repeated surgery. “She became very depressed as a result of that and formed a belief that she had died,” Zeman said. “Which in a strange way seemed understandable to me, because the kind of trauma she was undergoing was so awful. She thought she was dead.”

Zeman recognized the symptoms in Graham, and diagnosed him as suffering from Cotard’s syndrome, which was first identified as a distinct disorder by the nineteenth-century French neurologist and psychiatrist Jules Cotard.

Walk down the rue de l’École-de-Médecine in the Sixth Arrondissement in Paris, and you’ll see a formidable colonnade. A striking example of French neoclassical architecture, the colonnade forms a portico for the Université René Descartes. Designed in the late eighteenth century by architect Jacques Gondouin, the façade, as the architect intended, demands attention and yet feels open and inviting.

I entered the building to visit the rare manuscript section of the Library of the School of Medicine, to look at a document on the life of Jules Cotard. The document is the text of a eulogy delivered by his friend and colleague Antoine Ritti in 1894, almost five years after Cotard’s death. Cotard had been devotedly nursing his daughter, who was suffering from diphtheria, but then fell ill himself with the disease and died in 1889. Much of what we know of Cotard comes from Ritti’s eulogy, a copy of which exists amid the pages of an old leather-bound volume, whose spine simply reads *MÉLANGES BIOGRAPHIQUES*—a mixture of biographies. I turned the pages to Ritti’s eulogy. Handwritten on the first page was a note to the then head of the faculty of medicine of the university: “*Hommage de profond respect*,” the note read. It was signed *Ant. Ritti*.

Cotard is best known for describing what are called nihilistic delusions, or *délire des négations*. But before he came up with that phrase, Cotard first talked of “delirium in a severely melancholic hypochondriac” at a meeting of the Société Médico-Psychologique on June 28, 1880, using as an example the case of a forty-three-year-old woman who claimed “she had ‘no brain, nerves, chest, or entrails, and was just skin and bone,’ that ‘neither God or the devil existed,’ and that she did not need food, for ‘she was eternal and would live forever.’ She had asked to be burned alive and had made various suicidal attempts.”

Soon afterward, Cotard coined the phrase *délire des négations*, and after his death, other doctors named the syndrome after him. Over time, “Cotard’s delusion” has come to refer to the most striking symptom of the syndrome—the belief that one is dead. However, the syndrome itself refers to a constellation of symptoms, and does not have to include the delusion of being dead or not existing. The other symptoms include the belief that various body parts or organs are missing or putrefying, feelings of guilt, feelings of being damned or condemned, and paradoxically, even feelings of immortality.

But it’s the delusion that one does not exist that poses an interesting philosophical challenge. Until recently, the seventeenth-century French philosopher René Descartes’s assertion *Cogito ergo sum* (I think, therefore I am) was the bedrock of Western philosophy. Descartes established a clear dualism of mind and body: the body was of the physical world, something that takes up space and exists in time, while the mind’s essence was thought and it did not extend into space. For Descartes, *cogito* did not mean thinking as much as “clear and distinct intellectual perception, independent of the senses.” An implication of Descartes’s philosophy, according to philosopher Thomas Metzinger, was that “one cannot be wrong about the contents of one’s own mind.”

This Cartesian idea has been falsified in many disorders, including Alzheimer’s, where patients are often unaware of their own condition. Cotard’s syndrome is also a puzzle. Metzinger argues that we should be paying attention to what it feels like to be suffering from Cotard’s—what philosophers call the

phenomenology of a disorder. “Patients may explicitly state not only that they are dead, but also that they don’t exist at all.” While this seems logically impossible—an obviously alive individual claiming not to exist—it *is* part of the phenomenology of Cotard’s.

I left the library, and stepped back out onto the rue de l’École-de-Médecine, and turned around to take another look at the name “Université René Descartes” etched into the stone above the colonnade. There was something intriguing about researching Jules Cotard in a university named after Descartes. What does Cotard’s eponymous delusion say about Cartesian ideas? Is the Cotard’s syndrome patient saying, “I think, therefore *I’m not*”?

“Who is the I that knows the bodily me, who has an image of myself and a sense of identity over time, who knows that I have proprieate strivings? I know all these things, and what is more, I know that I know them. But who is it who has this perspectival grasp?”

Who, indeed. The American psychologist Gordon Allport’s lyrical musings above capture the central conundrum of being human. We instinctively and intimately know what he’s referring to. It is there when we wake up and slips away when we fall asleep, maybe to reappear in our dreams. It is that feeling we have of being anchored in a body we own and control, and from within which we perceive the world. It is the feeling of personal identity that stretches across time, from our first memories to some imagined future. It is all of these tied into a coherent whole. It is our sense of self. Yet, despite this personal intimacy we have with ourselves, elucidating the nature of the self remains our greatest challenge.

All through recorded history, it is clear that humans have been fascinated and confounded by the self. Pausanias, a Greek traveler during Roman rule, wrote about the maxims inscribed at the fore-temple at Delphi by seven wise sages. One maxim said, “Know thyself.” The Kena Upanishad, among the most analytical and metaphysical of Hindu scriptures, begins with these words: “By whom commanded and directed does the mind go towards its objects? . . . At whose will do men utter speech? What power directs the eye and the ear?”

Saint Augustine said this of the notion of time, but he might as well have been speaking about the self: “If no one asks of me, I know; if I wish to explain to one who asks, I know not.”

And so it is that from the Buddha to the modern neuroscientist and philosopher, humans have pondered the nature of the self. Is it real or an illusion? Is the self in the brain, and if so, where in the brain is it? Neuroscience is telling us that our sense of self is an outcome of complex interactions between brain and body, of neural processes that update the self moment by moment, the moments strung together to give us a seamless feeling of personhood. We often hear of how the self is an illusion, that it is nature’s most sophisticated sleight of hand. But all this talk of tricks and illusions obfuscates a basic truth: remove the self and there is no “I” on whom a trick is being played, no one who is the subject of an illusion.

From the Université René Descartes, it’s a thirty-minute walk down rue des Écoles, past the national museum of natural history, to reach the Pitié-Salpêtrière Hospital, where Jules Cotard started his medical career as an intern in 1864. I went there to see David Cohen, the head of the hospital’s infant and adolescent psychiatry unit.

Over the course of his medical residency and practice, Cohen has seen a few handfuls of patients who have suffered from Cotard’s syndrome. Given the rarity of this disorder, this relatively large sample has given Cohen an intimate look at Cotard’s. We talked of one particular patient, fifteen-year-old May—one of the youngest recorded cases of Cotard’s. Cohen treated her and had extensive discussions with her after she recovered, enabling him to link her delusions with her personal history. He got a peek into how the self, even in a delusional state like Cotard’s, is influenced by one’s personal narrative and even dominant cultural

norms.

About a month before May came to Cohen's clinic, she had started feeling extremely sad and depressed, and eventually began exhibiting delusions about her own existence. By the time she was admitted, she had become severely catatonic—mute and unmoving. “Even the nurses were terrified by her,” Cohen told me. But with a few days of inpatient psychiatric care, May recovered somewhat, just enough to say a few words each day, which the nurses would write down diligently. Between these sporadic intimations from May and discussions with her parents, Cohen pieced together May’s story.

Her family was middle-class Catholic. May had two siblings, a brother and a sister. The sister, who was ten years older, had married a dentist. The family had a history of depression: their mother had suffered from severe depression before May was born, and one of May’s aunts had undergone electroconvulsive therapy (ECT), which involves delivering mild pulses of electricity to the brain to induce seizures, and is often an effective treatment for severe depression—though almost always of last resort.

May’s delusions were classic Cotard’s. “She was telling us that she had no teeth, no uterus, and that she had this feeling of being already dead,” Cohen said. He struggled to describe May’s condition in English. “I don’t know the word in English . . . *morts vivants!*” he said. I looked it up later: the literal translation is *the living dead*.

“She was waiting to be buried . . . in a coffin,” said Cohen.

When her condition didn’t improve even after six weeks of therapy and medication, Cohen suggested ECT. Given the family’s experience with depression, her parents immediately agreed. After six treatments, May appeared to recover, so Cohen stopped the ECT—but she relapsed immediately, prompting Cohen to resume the treatment. This time she did recover, except for some headache, mild confusion, and slightly disturbed memory. When she began talking, it was as if she had awakened from a nightmare.

Cohen’s discussions with her—in which he asked May to talk freely of any associations that came to mind when he mentioned her delusions—shed surprising light. For instance, the delusion that she had no teeth seemed to have something to do with her sister’s husband, the dentist. Cohen discerned that she may have had feelings for her brother-in-law. She spoke of never wanting to be treated by him. Again, Cohen struggled for the correct word in English to describe the way she expressed herself. *Pudique*, he said in French. “Modest.” She spoke of her brother-in-law in “such a way that you understood that she’ll never be naked in front of him.”

Her delusions about missing her uterus seemed to be tied to episodes of masturbation. “She felt very guilty about that and she thought that maybe she would be sterile.”

Cohen was making the point that the specificity of the delusions is related to one’s autobiography and the cultural context. To make his case for the latter, he recalled a fifty-five-year-old man who had come to see him in the 1990s. Cohen diagnosed him with Cotard’s. One of his delusions was that he had AIDS—which he didn’t. Cohen figured his delusion was linked to guilt over his hypersexuality during the manic phase of his bipolar disorder, from which he also suffered. Before the 1970s, hypochondriac delusions in Cotard’s patients, if they involved sexually transmitted diseases, were almost always related to syphilis—the cultural scourge of the times. Interestingly, this man had actually contracted syphilis while serving in the military as a young man (Cohen tested him for antibodies to confirm). But his delusions during his Cotard’s episode, which happened decades later, were not about syphilis but HIV/AIDS—which had supplanted syphilis in the broader culture as “God’s punishment for sins of the flesh” (syphilis almost never shows up anymore during hypochondriac delusions in Cotard’s). “It’s only one case, [but] I think this case is very informative,” Cohen said.

For Cohen, Cotard's syndrome is revealing of the workings of the self. The disorder is a deeply felt disturbance of one's being, and shows that the self is linked to one's body, one's story, and one's social and cultural milieu. Brain, body, mind, self, and society are inextricably linked.

Back in Exeter, Adam Zeman had encountered something similar with Graham. The delusion in Graham's case was that his mind was alive but his brain was dead. "It was an updated, contemporary version of the Cotard's delusion. To come to the conclusion that your brain has died in isolation, . . . [you need] a concept of brain death, which is a relatively recent medical development."

What Zeman found even more intriguing was the inherent dualism in Graham's delusion—that an "immaterial" mind can exist independent of the brain and the body. "I thought it rather beautifully illustrated the dualism to which most of us are prone," Zeman told me. "The idea that your mind could be alive while your brain is dead is a rather extreme expression of dualism."

Philosophical musings aside, Zeman found Graham's situation sad. "He was slow and flat, with very little emotional modulation in his voice. [I] occasionally got a flicker of a smile, but there was rather little facial expression," said Zeman. "You had the sense of someone for whom existence was extremely bleak, and for whom thought was something of an effort."

A patient suffering from Cotard's syndrome is often extremely depressed. A depression far more serious than most of us can understand. I was given an insight into this by yet another French psychiatrist, William de Carvalho, whom I also met in Paris—at his office on avenue Victor-Hugo. He drew me a line diagram to illustrate where Cotard's stands on the depression scale. He started with "normal" on the left, then added "sad," "depressed," "very depressed," "melancholic" at equal intervals on the right. Then he added a series of dots—the progression was not linear anymore—and at the end of those dots he wrote, "Cotard's." "With Cotard's there is like a great black wall that goes from Earth to Saturn. You can't look over it," said de Carvalho, a dapper man of French-Senegalese descent with a way with words.

He had a private practice but also worked at the renowned Sainte Anne Hospital in Paris. He remembered one Cotard's patient that he treated in the early 1990s who showed classic signs of "melancholic omega." The phrase has its origins in Charles Darwin's descriptions of melancholia in his book *The Expression of Emotions in Man and Animals*: "a facial expression involving a wrinkling of the skin above the nose and between the eyebrows that resembles the Greek letter omega." While Darwin wrote about these "grief muscles" on the face, it was German psychiatrist Heinrich Schiile who coined the term "melancholic omega" in 1878, based on Darwin's vivid descriptions.

Dr. de Carvalho's patient was a fifty-year-old engineer and poet. The man had faked trying to kill his wife—he put his hands around her neck, then stopped, and told her to call the police. When the police came, they saw a very disturbed, even bizarre, man. So they took him directly to Sainte Anne Hospital rather than the police station (the man's act had a copycat quality to it: in 1980, the French philosopher Louis Althusser, who had been suffering from depression, strangled his wife, and was taken to a mental hospital first instead of being sent to jail).

The day after the incident, de Carvalho met the man at Sainte Anne Hospital. "I asked him, 'Why are you trying to kill your wife?' He said, 'Well, it's such a crime that I deserve to [have] my head cut.' He was hoping that he would be killed, even [though] there was no death penalty in France."

The man was exhibiting an extreme form of another symptom characteristic of Cotard's syndrome: guilt. "He told me at the time that he was worse than Hitler. And he asked us to help him to be killed, because he was so bad for humanity," said de Carvalho.

The patient had lost weight, his beard was unkempt and overgrown, and he had stopped bathing because he felt he had no right to take showers and use up too much water. The hospital decided to make a film about him (for their archives) while he was still in the throes of Cotard's. At one point in the filming, the patient pulled a white sheet over his head. "I'm so bad, I don't want people looking at that film to be touched by such badness," he told de Carvalho, who was behind the camera. Dr. de Carvalho pointed out that it was just a film, he couldn't possibly affect anyone through it. "And he said, 'I know, but it's like that; I am so bad,'" de Carvalho told me. Also, the broader culture had again influenced the man's delusion. He was convinced he was responsible for the AIDS epidemic and that people would get AIDS just by watching the film.

Many months later, after the man had recovered (the treatment included ECT), de Carvalho watched the film with his former patient. At the end of the twelve-minute film, the man turned to de Carvalho and said, "Well, this is very interesting. But who is it?" De Carvalho thought the man was joking.

"That's you," de Carvalho told the man.

"No, it's not me," the man replied.

Soon, de Carvalho realized that there was no point trying to convince him. He was not the same man as the one who had descended into the darkness that is Cotard's.

Given such extreme depression during Cotard's, psychiatrists have wondered why most sufferers don't attempt suicide. Partly, it's because the patients are unable to act, like deer caught in headlights. But de Carvalho thinks they don't attempt suicide because they feel they are already dead. "And you can't be more dead than dead."

When Zeman began talking with Graham and realized the extent of his depression and delusion, he suspected an underlying neurological cause. Something had altered Graham's sense of self and perception of his environment. There was one neurologist who would know what to look for: Steven Laureys at the University of Liège in Belgium. Zeman took Graham's consent and sent him to Liège with a community psychiatric nurse in tow. Graham reached the university hospital in Liège and asked for Dr. Laureys.

The secretary called. Laureys, like Zeman, will never forget the phone call: "Doctor, I have a patient here who is telling me he is dead. Please come over."

Many of the patients Laureys sees are in a bad way. Some are comatose, some in a state of unresponsive wakefulness (previously called vegetative), others are minimally conscious, and yet others are people suffering from locked-in syndrome (those who are conscious but completely paralyzed, and are sometimes able to move only their eyes).

After more than a decade of work with such patients as well as healthy subjects, Laureys's team has identified a network of key brain regions in the frontal lobe (the part of the cortex beneath the forehead) and the parietal lobe (which is behind the frontal lobe). He considers activity in this network to be the signature of conscious awareness. This awareness can be analyzed in two dimensions, he told me. One is awareness of the external world: everything you perceive through your senses, whether it's vision, touch, smell, sound, or taste. The other dimension is internal awareness, something more closely related to the self, which includes the internal perception of one's body, thoughts that are triggered regardless of external stimuli, mental imagery and daydreaming, much of which is self-referential. "It's an oversimplification to reduce this very rich complexity we call consciousness, but I think it's meaningful to take those two dimensions," he emphasized.

And indeed, Laureys's team has shown that the frontoparietal network associated with conscious awareness

is actually two different networks. Activity in one correlates with awareness of the external: a network of lateral frontoparietal brain areas—the regions on the outer side of the frontal and parietal lobes. The other correlates with awareness of the internal and is potentially related to aspects of the self: a network of areas along the brain’s midline—the inner parts of the frontal and parietal lobes, near the cleft that separates the two hemispheres of the brain.

Studies in healthy patients showed that these two dimensions of awareness are inversely correlated: if you are paying attention to the external world, then activity in the network associated with external awareness goes up while the regions associated with internal awareness dampen down. And vice versa.

Besides this frontoparietal network, there’s another key region of the brain that’s involved in conscious awareness: the thalamus. There are long-distance two-way connections between the thalamus and the frontoparietal network, and Laureys’s work suggests that it’s the dynamics of information exchange and processing in these regions that takes us from being merely aroused to being consciously aware.

However, throughout our discussion, Laureys repeatedly insisted, “We should not be neo-phrenologists.” He was referring to the dubious field of phrenology pioneered by German doctor Franz Joseph Gall (1758–1828), who argued that each and every mental faculty was the product of a specific brain region, and that these regions created characteristic bumps on the skull. So you could, in theory, run your fingers over someone’s skull and figure out the relative strength of these “organs” inside their brain.

The self, said Laureys, is not something that can be localized to one brain area.

When Laureys met Graham, he too found Graham a very depressed man. Laureys noticed Graham’s blackened teeth; he had stopped brushing. Graham repeated the same story that he told Adam Zeman—that he was brain dead. “He was not faking anything,” Laureys told me. “So we scanned him.”

Did he object to being scanned? I asked.

“He said ‘I don’t care,’” said Laureys.

Despite his condition, Graham was still using the first-person pronoun, “I,” to refer to himself.

Laureys’s team produced both magnetic resonance imaging (MRI) and positron emission tomography (PET) scans of Graham’s brain. The MRI scans showed no structural brain damage. But the PET images revealed something very interesting: the frontoparietal network associated with external and internal conscious awareness had very low metabolic activity. Part of the internal awareness network is the so-called default mode network (DMN), which has been shown to be active during self-referential activity. A key hub in this network is a brain region called the precuneus—one of the most connected regions in the brain. In Graham’s case, the default mode network and the precuneus were far too quiet—almost down to levels Laureys had seen in patients in a state of unresponsive wakefulness. It’s true that Graham was on medication, but Laureys thinks that medication alone could not explain the extent of the lowered metabolism.

The lowered metabolism had also spread to the lateral surface of the frontal lobes—specifically some regions that are known to be involved in rational thought.

Though both Laureys and Zeman cautioned against making too much out of one case, the results are suggestive. It’s likely that the impaired metabolic activity in the midline regions had caused Graham to have an altered self-experience—maybe a greatly reduced sense of self. But because that lowered metabolic activity had spread to other regions of the frontal lobes, he was unable to talk himself out of that altered experience, as he otherwise might have. He became convinced he was brain dead.

A more recent case study, published in November 2014, also supports this hypothesis. Two Indian doctors were treating a sixty-five-year-old woman with dementia, when she began to show signs of classic Cotard's. "Our patient presented to us with beliefs like 'I think I am dead and what I am is not me,' 'I do not exist,' 'there is nothing in my brain, just vacuum,' and 'it is infectious and I'm infecting my close relatives and I am responsible for all their suffering,'" Sayantanava Mitra of the Sarojini Naidu Medical College, Agra, India, wrote to me in an email.

Mitra's team scanned her and the MRI scan revealed that the frontotemporal brain regions had atrophied. They noted, in particular, that a deep-brain region called the insula was heavily damaged in both hemispheres. There's growing evidence that the insula is responsible for the subjective perception of our body states, a crucial aspect of our conscious experience of selfhood. So, a damaged insula was likely hampering the woman's sense of her own body, and her dementia made it difficult for her to correct false perceptions, leading to claims of being dead.

The doctors started her on mild doses of antipsychotic and antidepressant medications. She recovered enough to take part in psychotherapy, with the therapist using her MRI scans as "evidence against her belief that her head was rotten," Mitra said. The therapist was able to shake her out of her false beliefs. She was eventually discharged, and continues to get better on her medication.

Graham, too, eventually recovered. Cotard's syndrome is, thankfully, transient in most people, even though the treatment at times might involve electroconvulsive therapy.

"I think Cotard's delusion is a victory of metaphor over simile," Zeman told me. "There are mornings when most of us get up and feel as if we are half-dead. So alterations of your experience which you might express using that kind of simile are not so uncommon. But the bizarre thing about Cotard's is that people begin to treat this simile as if it were literally true. And for that to happen, there surely has to be some disturbance of reason."

The paucity of patients with Cotard's syndrome means that the neural underpinnings of their delusions are yet to be fully understood, but it's clear that Cotard's syndrome is giving us a glimpse into the nature of the self.

Take, for instance, something philosopher Shaun Gallagher calls the immunity principle, an idea that goes back to Austrian philosopher Ludwig Wittgenstein. It refers to the fact that when we make a statement like "I think the Earth is flat," we can be wrong about Earth's flatness, but we cannot be wrong about the "I," the subjective self that is making the assertion. When we use the pronoun "I," the word refers to the one who is the subject of an experience, not someone else. I cannot be wrong about that. Or can I?

Cotard's delusion certainly gets philosophers thinking (if they need any further enticement), as do various other conditions, such as schizophrenia. In Cotard's delusion, the firm belief that "I don't exist" seemingly challenges the immunity principle. But even though the delusional person is wrong about the nature of his existence (which is analogous to Earth's flatness), the immunity principle holds because there is still an "I" making the claim, and that "I" cannot refer to anyone else but the person experiencing nonexistence.

What or who is that "I"? The question permeates this book. Whoever or whatever the "I," it manifests itself as a subject of experiences.

But how does the brain, with its physical, material processes, give rise to a seemingly immaterial, private mental life (at the core of which seems to be the "I," the subjectivity)? This is the so-called hard problem of consciousness. Neuroscience doesn't have an answer so far. Philosophers disagree vehemently on whether science can ever solve this problem, or whether this problem is illusory, one that might disappear as we

understand the brain in more and more detail. This book does not offer neuroscientific solutions to the hard problem of consciousness—there are none, yet.

But this book does address the nature of the self. One way to think of the self is to consider its many facets. We are not just one thing to others or even to ourselves; we present many faces. The great American psychologist William James identified at least three such facets: the material self, which includes everything I consider as me or mine; the social self, which depends on my interactions with others (“a man has as many social selves as there are individuals who recognize him and carry an image of him in their mind”); and the spiritual self (“a man’s inner or subjective being, his psychic faculties or dispositions”).

The search for the self is also well served by thinking of it in terms of two categories: the “self-as-object” and the “self-as-subject.” It turns out that some aspects of the self are objects to itself. For instance, if you were to say, “I am happy”—the feeling of happiness, which is part of your sense of self at that moment, belongs to the self-as-object category. You are aware of it as a state of your being. But the “I” that feels happy—the one that is aware of its own happiness—that’s the more slippery, elusive self-as-subject. The same “I” could also be depressed, ecstatic, and anything in between.

With this distinction in mind, if you take Laureys’s studies, which show that in healthy subjects the frontoparietal network activity constantly switches back and forth from internal to external awareness, what seems to be changing is the content of one’s consciousness: from awareness of external stimuli to awareness of aspects of one’s self. When you are self-aware, in that you are conscious of your own body, your memories, and your life story, aspects of the self become the contents of consciousness. These comprise the self-as-object.

It’s possible that parts of this self-as-object are not being experienced vividly in Cotard’s syndrome. Whatever it is that tags objects in our consciousness as mine or not-mine, self or not-self, may be malfunctioning (we’ll see in coming chapters some mechanisms that could be behind such tagging). In Graham’s case, the *mineness* or vividness that is usually attributed to, say, one’s body and/or emotions was maybe lacking. And the resulting untenable belief that he was brain dead entered his conscious awareness unchallenged, given his underactive, low-functioning lateral frontal lobes.

But regardless of what one is aware of, isn’t there someone who is always the subject of the experience? Even if you are completely absorbed in something external, say, a melancholic violin solo—and the contents of your consciousness are devoid any self-related information, whether of your body or worries about your job—does the feeling that *you* are having that experience ever go away?

To help us get closer to some answers, we can turn to insights of people suffering from various perturbations of the self, which serve as windows to the self. Each such neuropsychological disorder illuminates some sliver of the self, one that has been disturbed by the disorder, resulting at times in a devastating illness.

These words from Lara Jefferson’s *These Are My Sisters: A Journal from the Inside of Insanity* leave us in no doubt of the damage wrought to the self in a schizophrenic person: “Something has happened to me—I do not know what. All that was my former self has crumbled and fallen together and a creature has emerged of whom I know nothing. She is a stranger to me. . . . She is not real—she is not I . . . she is I—and because I still have myself on my hands, even if I am a maniac, I must deal with me somehow.”

But in the devastation are clues to what makes us who we are. These maladies are to the study of the self what brain lesions are to study of the brain: They are cracks in the façade of the self that let us examine an otherwise almost impenetrable, ongoing, unceasing neural process. And while what follows in the coming chapters is not an exhaustive list of all neuropsychological conditions that disturb the self, I have chosen conditions that satisfied at least two criteria: first, they were amenable to studying some distinct aspect of the

self, and second, there is significant ongoing science that specifically addresses these conditions from the perspective of the self.

In Alzheimer's we get a sense of one's story unraveling. If you can't answer the question "Who am I?" with declarative statements ("I am Richard," "I am a retired professor," and so on), either because your memory is failing you or the brain regions that let you reflect upon these characteristics are damaged, have you lost your sense of self? If so, have you lost all of it, or part of it? What if, despite the cognitive disintegration of your coherent story—what some call the narrative or autobiographical self—other aspects of you still functioned?

Ralph Waldo Emerson is thought to have suffered from Alzheimer's. He also wrote eloquently about memory and its role in making us who we are. But Emerson was curiously indifferent about his own dementia. It's one of the characteristics of Alzheimer's disease that sufferers are sometimes unaware of their own condition. Alzheimer's was the unmaking of his identity, including identifying himself as diseased.

The next chapter examines Alzheimer's and its role in the undoing of a person, while asking: is some essence of selfhood—despite a ravaged brain in the late stages of disease—preserved in the body? The celebrated American composer Aaron Copland (1900–1990) also suffered from Alzheimer's disease. At times he wouldn't know where he was, but he could still conduct his signature orchestral suite *Appalachian Spring*. Who or what swung the conductor's baton?

Body integrity identity disorder—a curious condition in which people feel that some part of their body, usually limbs, is not their own, often leading them to the horrific act of severing the body part—gives us a glimpse into how the brain constructs a sense of one's own body, the bodily self.

Schizophrenia can fragment a person—and part of this fragmentation is due to a compromised sense of agency, the feeling we all have that we are the agents of our actions. What if this feeling—a crucial aspect of the self—goes awry? Could it lead to psychosis?

Then there is depersonalization disorder, which robs the self of its emotional substrate, making us strangers to ourselves, thus highlighting the role of emotions and feelings in creating the self.

Autism sheds light on the developing self. Children with autism are usually unable to instinctively "read" others' minds, which then leads to problems relating socially to others, but is this ability also tied to reading one's own mind and hence self-awareness? There's tantalizing new work suggesting that the roots of this impairment lie in an autistic brain's inability to make sense of the body and its interactions with the environment, leading first to an uncertain bodily self and then to behavioral problems.

Out-of-body experiences and the more complex doppelgänger effect (in which people perceive and interact with a duplicate of their own body) reveal that even the most basic things we take for granted—being grounded in a body, identifying with it, and viewing the world from behind our eyes—can be disrupted, thus giving us a glimpse of the components necessary for a low-level self that potentially precedes all else.

Ecstatic epilepsy begets a condition that borders on the mystical, when we are truly here and now, fully aware of our own being, yet paradoxically bereft of boundaries, leading to a feeling of transcendental oneness. Is this condition bringing us closer to the essence of the self—a self that maybe endures for just moments and is at the heart of the debate about whether there is or there isn't a self?

We conclude with a journey to Sarnath, India, where the Buddha, nearly 2,500 years ago, gave his first sermon. Buddhist ideas of no-self seem to resonate with what some modern philosophers are saying about the self—that it's illusory. But is it really? Does empirical evidence support the idea that the self is a made-up entity? Insights gleaned from the maladies of the self will help us make sense of age-old questions and

maybe even ask a few of our own.

While visiting David Cohen in Paris, I asked him about May, his fifteen-year-old Cotard's syndrome patient. "Who is it that is saying she doesn't exist?"

"This is the mystery of psychiatry," Cohen said. "We always say that there is something . . . that can still relate to the real world, even in the most crazy state."

In Liège, Steven Laureys's PhD student Athena Demertzi, who helped Laureys scan and study Graham, told me something about Graham that also reminded me that despite his delusion of being brain dead, there was an essence that remained. Graham had just come out of the scanner when Demertzi asked him, "Are you OK?"

"I'm OK," replied Graham.

"Alive and kicking?" she asked.

"Kicking," said Graham, pointedly.

The self is both remarkably robust and frighteningly fragile. This book, I hope, brings to life this essential paradox of who we are.

2

MEMORIES, A PERSON, A NARRATIVE—AND ITS UNRAVELING

Memory, connecting inconceivable mystery to inconceivable mystery, performs the impossible by the strength of her divine arms; holds together past and present,—beholding both,—existing in both . . . and gives continuity and dignity to human life. It holds us to our family, to our friends. Hereby a home is possible.

—Ralph Waldo Emerson

All those moments will be lost in time, like tears in rain.

—Replicant Roy Batty in Blade Runner

Allan, Michaele, and I are sitting in the living room of their home in California. Allan is settled into a large, high-backed, brown leather sofa, looking distinguished with his white beard and mustache and balding pate, and surprisingly dark eyebrows. At first glance I'm unable to tell anything's amiss. Michaele sits on a chair next to him. I ask Allan if he has any brothers or sisters. He says no, and then corrects himself immediately. "Oh, I had a brother who was demented," he says.

"Retarded," Michaele gently corrects him.

"Retarded," Allan agrees. "No one knew he was retarded until he was [about] four. I was eighteen. I didn't understand a lot."

"But you were ten when he was four," Michaele says.

“OK,” says Allan.

“Allan, do you remember much about your brother?” I ask.

“A sadness about him,” says Allan. “Because he couldn’t talk and stuff like that. I’d take him for a walk or something like that. He never said a word.”

After a small pause, he adds, “I don’t even know if he’s still alive.”

“No, honey, he died,” says Michaele. “He died the year you and I met.”

Allan and Michaele met nearly thirty years ago. Allan had been a philosophy professor at a community college, Michaele a forty-year-old working as a midwife, back at school after finding herself at a cusp in her life.

“Do you remember how he died?” asks Michaele.

“I thought he died in his sleep or something,” says Allan.

Actually, Allan’s brother had been hospitalized for a blood clot, and while at the hospital he fell out of an upper-floor window and died. At the time, thirty years ago, Allan had told Michaele that his brother, given his diminished mental capacities, would not have had the wherewithal to jump; he had probably wanted to get home and likely stepped out of the window thinking he was on the ground floor.

When Michaele reminds Allan of this during our conversation, he says, “Oh, that’s something I wanted to forget, but no . . . fell out of the window . . .” He mumbles; his words meander.

“What did they say at the hospital?” asks Michaele.

“I was too sad and too young to take it in,” says Allan.

Michaele turns to me and points out that Allan was fifty years old when his brother died.

On December 21, 1995, researchers in Germany found a blue cardboard file that had been missing for nearly ninety years. The file contained the case report for a patient named Auguste D, a fifty-one-year-old woman from Frankfurt. A handwritten note in the file, dated November 26, 1901, captured an exchange between Auguste and her doctor, Aloysius “Alois” Alzheimer, which the German researchers published in the journal *Lancet* in 1997 (with Auguste’s answers italicized):

She sits on the bed with a helpless expression. What is your name? *Auguste*. Last name? *Auguste*. What is your husband’s name? *Auguste, I think*. Your husband? *Ah, my husband*. She looks as if she didn’t understand the question. Are you married? *To Auguste*. Mrs D? Yes, yes, *Auguste D*. How long have you been here? She seems to be trying to remember. *Three weeks*. What is this? I show her a pencil. *A pen*. A purse and key, diary, cigar are identified correctly. At lunch she eats cauliflower and pork. Asked what she is eating she answers *spinach*. When she was chewing meat and asked what she was doing, she answered *potatoes* and then *horseradish*. When objects are shown to her, she does not remember after a short time which objects have been shown. In between she always speaks about twins.

Three days later, Alzheimer made further notes:

On what street do you live? *I can tell you, I must wait a bit*. What did I ask you? *Well, this is Frankfurt am Main*. On what street do you live? *Waldemarstreet, not, no. . . .* When did you marry? *I don’t know at*

present. The woman lives on the same floor. Which woman? *The woman where we are living.* The patient calls *Mrs G, Mrs G, here a step deeper, she lives. . . .* I show her a key, a pencil and a book and she names them correctly. What did I show you? *I don't know I don't know.* It's difficult isn't it? *So anxious, so anxious.* I show her 3 fingers; how many fingers? 3. Are you still anxious *Yes.* How many fingers did I show you? *Well this is Frankfurt am Main.*

Auguste died on April 8, 1906. By then, Alzheimer had moved from Frankfurt to the Royal Psychiatric Clinic in Munich, so he had Auguste's brain sent there, where he "sampled thin slices of this brain tissue, [and] stained them with silver salts." After affixing these slices between glass slides, "Alzheimer put down his habitual cigar, removed his pince-nez, and peered into his state-of-the-art Zeiss microscope. Then, at a magnification of several hundred times, he finally saw her disease."

Summer passed and in the fall, on November 4, Alzheimer presented his findings at the 37th Conference of South-West German Psychiatrists in Tübingen. Auguste, he said, had "progressive cognitive impairment, focal symptoms, hallucinations, delusions, and psychosocial incompetence." More to the point, the cells in her cerebral cortex showed weird abnormalities.

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