

Do Loops Explain Consciousness? Review of *I Am a Strange Loop*

Martin Gardner

I Am a Strange Loop

Douglas Hofstadter

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Barmaid: "Would you like some wine?"

Descartes: "I think not."

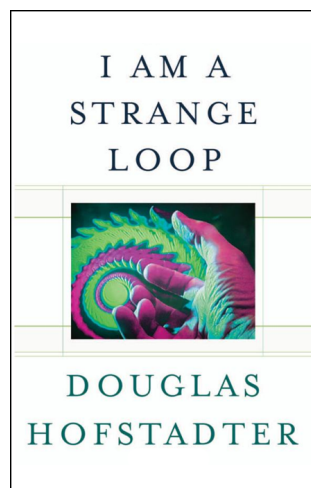
Then he vanishes.

—Anonymous joke

Our brain is a small lump of organic molecules. It contains some hundred billion neurons, each more complex than a galaxy. They are connected in over a million billion ways. By what incredible hocus-pocus does this tangle of twisted filaments become aware of itself as a living thing, capable of love and hate, of writing novels and symphonies, feeling pleasure and pain, with a will free to do good and evil?

David Chalmers, an Australian philosopher, has called the problem of explaining consciousness the "hard problem". The easy problem is understanding unconscious behavior, such as breathing, digestion, walking, perceiving, and a thousand other things. Grappling with the hard problem has become one of the hottest topics facing philosophers, psychologists, and neuroscientists. According to philosopher John Searle, reviewing Nicholas Humphrey's *Red: A Study of Consciousness* (*New York Review of Books*, November 2005), Amazon lists 3,865 books on consciousness. The most recent, published this year by Basic, is Douglas Hofstadter's *I Am a Strange Loop*.

Martin Gardner wrote Scientific American's Mathematical Games column for 25 years. His most recent books are The Annotated Hunting of the Snark and Are Universes Thicker Than Blackberries?



Hofstadter, a professor of cognitive science at Indiana University, is best known for his Pulitzer prize-winning *Gödel, Escher, Bach*, or *GEB* as he likes to call it. His new book, as brilliant and provocative as earlier ones, is a colorful mix of speculations with passages of autobiography. An entire chapter is devoted to a terrible tragedy

that Hofstadter is still trying to cope with. His wife Carol, at age 42, died suddenly of a brain tumor. The preceding chapter links his love for Carol to a fantasy he once conceived about a mythical land he called Twinwird. Its inhabitants are identical twins, so nearly alike that they think and act like single individuals.

I suspect Hofstadter will be surprised to know that L. Frank Baum, in his non-Oz fantasy *The Enchanted Island of Yew* (you?) imagined a similar land he called Twi. Everything in Twi is duplicated, like seeing the world through glasses that produce double images. Residents of Twi, like those of Twinwird, are identical twins. The rulers of Twi are two beautiful girls who think and speak as a single entity.

In his heart-rending chapter on Carol, Hofstadter makes clear why he preceded it with a description of Twinwird. He and Carol were so much alike they they resembled a pair of Twinwirders. Unable to find consolation in hope for an afterlife, Hofstadter's only solace is knowing that for at least

a time Carol will in a way live on in the memories of those who knew and loved her.

I Am a Strange Loop swarms with happy memories. One vivid recollection, not so happy, concerns a time when Hofstadter was fifteen and asked to select two guinea-pigs to be killed for a laboratory experiment. Faced with the task, he fainted. This aversion to animal killing led to his becoming a vegetarian. For a while he allowed himself eggs and fish, but later became a vegan, avoiding all food of animal origin. He refuses to buy leather shoes and belts. Like Baum's Tin Woodman, to whom the Wizard gave a fine velvet heart, Hofstadter has twinges of guilt when he swats a fly. One of his heroes is Albert Schweitzer, who whenever possible avoided killing an insect.

Many pages in *I Am a Strange Loop* express the author's great love of music. Hofstadter plays a classical piano. Bach, Chopin, and Prokofiev are among his favorite composers, Bartok among those he dislikes. Another passion is for poetry. He has translated from the Russian Pushkin's great poem *Eugene Onegin*, as well as the work of other foreign bards.

On page 94 Hofstadter offers a clever six-stanza poem by a friend that commemorates an event he later considered symbolic. One day he grabbed a batch of empty envelopes and was puzzled by what seemed to be a marble wedged between them. The marble turned out to be a spot where a thickness of paper felt like a marble. In a similar way, he believes, we imagine a self wedged somewhere between the neurons of our brain.

The marble provides the central theme of *I Am a Strange Loop*. The soul, the self, the I, is an illusion. It is a strange loop generated by a myriad of lesser loops. It is a minute portion of the universe, a glob of dead matter within our skull, not only observing itself, but aware it is observing itself.

Hofstadter has long been fascinated by self-reference loops. He sees them everywhere. They are at the heart of Gödel's famous undecidability proof. They lurk within Russell and Whitehead's *Principia Mathematica*. They are modeled by such logic paradoxes as "This sentence is false." and by the card that says on one side "The sentence on the other side is true," and on the flip side says "The sentence on the other side is false." Similar loops are such lowly mechanisms as flywheels, thermostats, and flush toilets. He reproduces Escher's famous lithograph of two hands, each drawing the other, and suggests modifying it by having one hand *erase* the other.

Many photographs in the book depict recursive loops. One shows a carton closed by four flaps, A on top of B, B on top of C, C on D, and D on A. In another picture Doug and Carol are each touching the other's nose. An amusing photo shows a grinning Doug with nine friends, each sitting on the lap of a person behind.

In Chapter 21 Hofstadter introduces a disturbing thought experiment, involving human identity, that has been central in dozens of science-fiction tales. A man is teleported by a process made famous by Star Trek. Officers of the Enterprise are beamed down to a planet, later beamed up again. This is done by apparatus that scans a person molecule by molecule, then transmits the information to a distant spot where it creates an exact duplicate



Photograph by Pete Kimbey.

Carol and Doug Hofstadter touching one another's noses.

of the person. If this destroys the original body there is no philosophical difficulty. But suppose the original is not destroyed. The result is a pair of identical twins with identical memories. Is the teleported person the *same* person or someone else?

The dilemma goes back to Plutarch. He imagines a ship that is slowly replaced, piece by piece, until the entire ship is reconstituted. The original parts are then reassembled. Each ship can claim to be the original.

Baum introduces the same problem in his history of the Tin Woodman. As all Oz buffs know, a cruel witch enchants Nick Chopper's ax, causing it to slice off parts of Nick's meat body. Each part is replaced by Ku-Klip, a master tinsmith, until Nick is made entirely of tin. In *The Tin Woodman of Oz* the tin man visits Ku-Klip's workshop where he converses with his former head. Ku-Klip has preserved it in a cupboard. Who is the real Nick Chopper? The tin man or his former head?

Hofstadter has little interest in such conundrums. Another topic that infuriates him is free will. Unlike his good friend philosopher Daniel Dennet, Hofstadter denies that free will exists. It is another mirage, like the marble in the envelopes.

Other topics drive Hofstadter up a wall. One is the "inverted spectrum" paradox. How can we be certain that our sensation of, say, red is the same as that of another person? What we experience

as red could be what she experiences as what we call blue.

Another topic Hofstadter considers frivolous is the concept of a zombie. Zombies are persons who think, talk, and behave exactly like ordinary people but are entirely lacking in all human feelings and emotions. The concept arises in relation to computerized robots. Baum's wind-up robot Tik-Tok, who Dorothy rescues in *Ozma of Oz*, has a metal plate on his back that says, "Thinks, Speaks, Acts, and Does Everything but Live." It is hard to believe, but entire books have been written about zombies

Consciousness for Hofstadter is an illusion, along with free will, although both are unavoidable, powerful mirages. We feel as if a self is hiding inside our skull, but it is an illusion made up of millions of little loops. In a footnote on page 374 he likens the soul to a "swarm of colored butterflies fluttering in an orchard."

Like his friend Dennet, who wrote a book brazenly titled *Consciousness Explained*, Hofstadter believes that he too has explained it. Alas, like Dennet, he has merely described it. It is easy to describe a rainbow. It is not so easy to explain a rainbow. It is easy to describe consciousness. It is not so easy to explain the magic by which a batch of molecules produce it. To quote a quip by Alfred North Whitehead, Hofstadter and Dennet "leave the darkness of the subject unobserved."

Let me spread my cards on the table. I belong to a small group of thinkers called the "mysterians". It includes such philosophers as Searle (he is the scoundrel of Hofstadter's book), Thomas Nagel, Colin McGinn, Jerry Fodor, also Noam Chomsky, Roger Penrose, and a few others.

We share a conviction that no philosopher or scientist living today has the foggiest notion of how consciousness, and its inseparable companion free will, emerge, as they surely do, from a material brain. It is impossible to imagine being aware we exist without having some free will, if only the ability to blink or to decide what to think about next. It is equally impossible to imagine having free will without being at least partly conscious.

In dreams one is dimly conscious but usually without free will. Vivid out-of-body dreams are exceptions. Many decades ago, when I was for a short time taking tranquilizers, I was fully aware in out-of-body dreams that I was dreaming, but could make genuine decisions. In one dream, when I was in a strange house, I wondered if I could produce a loud noise. I picked up a heavy object and flung it against a mirror. The glass shattered with a crash that woke me. In another OOB dream I lifted a burning cigar from an ashtray, and held it to my nose to see if I could smell it. I could.

We mysterians are persuaded that no computer of the sort we know how to build—that is, one made with wires and switches—will ever cross a

threshold to become aware of what it is doing. No chess program, however advanced, will know it is playing chess anymore than a washing machine knows it is washing clothes. Today's most powerful computers differ from an abacus only in their power to obey more complicated algorithms, to twiddle ones and zeroes at incredible speeds.

A few mysterians believe that science, some glorious day, will discover the secret of consciousness. Penrose, for example, thinks the mystery may yield to a deeper understanding of quantum mechanics. I belong to a more radical wing. We believe it is the height of hubris to suppose that evolution has stopped improving brains. Although our DNA is almost identical to a chimpanzee's, there is no way to teach calculus to a chimp, or even to make it understand the square root of 2. Surely there are truths as far beyond our grasp as our grasp is beyond that of a cow.

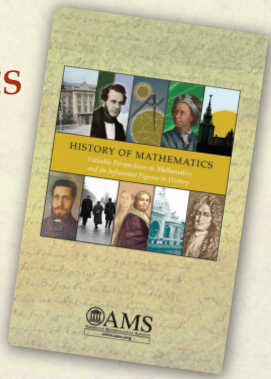
Why is our universe mathematically structured? Why does it, as Hawking recently put it, bother to exist? Why is there something rather than nothing? How do the butterflies in our brain—or should I say bats in our belfry—manage to produce the strange loops of consciousness?

There may be advanced life forms in Andromeda who know the answers. I sure don't. Nor do Hofstadter and Dennet. And neither do you.


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