

Two Heads Are Better Than One

The brain is organized as modules and circuits for specialized actions. The scientist who figured that out reflects on his discovery.

By

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In the early 1960s, Michael S. Gazzaniga, then a graduate student at the California Institute of Technology, was one of a team of researchers who opened the minds of fellow scientists to a new view of how the brain functions. In “Tales From Both Sides of the Brain,” he tells the story of the seminal discoveries in which he was involved and chronicles the lifetime of exploration that has flowed from them.

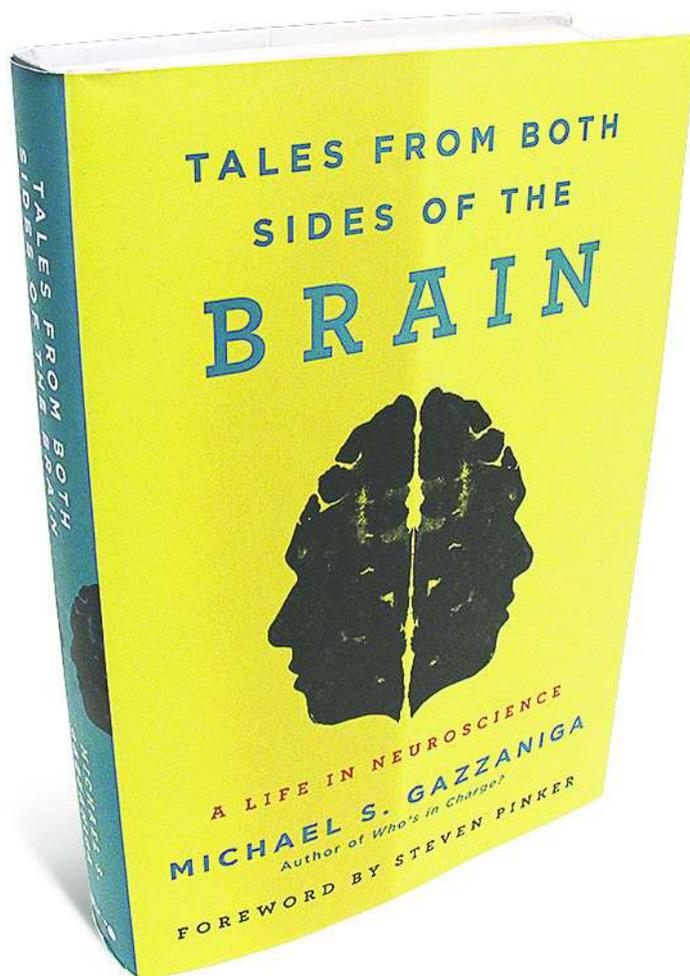
Mr. Gazzaniga’s signature area of research is called “split brain” studies. They were pioneered by his Caltech mentor, Roger W. Sperry, who won a Nobel Prize in 1981. Surgically separating the two cerebral hemispheres by cutting the sheath of nerves that connects them—as was once done to treat intractable epilepsy or remove certain tumors—permitted researchers to observe “two mental systems,” as the author puts it, “each with its own sense of purpose and quite independent of the other.”

The left hemisphere, as Sperry and his fellow researchers discovered, is primarily responsible for speech and language capacities, and the right for visual-spatial processing and facial recognition. A split-brain patient cannot say the word “cat” when it is flashed on a screen that shows the word only to his right hemisphere. Yet he can select a cat image from various animal pictures. The right hemisphere, as such experiments showed, “understood” cat even if it could not produce the word as speech.

Studying a more complex paradigm, Mr. Gazzaniga (when he was himself a member of Caltech’s faculty) and his co-researchers flashed a picture of a snowy scene to a split-brain patient’s right hemisphere and a picture of a chicken claw to the left. They then asked the patient to point to a card that matched the pictures. The patient pointed to a chicken with his left hand,

explaining that the claw was from a chicken. With the right hand he pointed to a shovel because, he reasoned, you need it to clean up the chicken droppings.

What did this finding mean? In part, that the left brain had furnished an explanation for the right hand's choice and thus had "made sense of the behaviors initiated by the right brain." The capacity to instantly reconcile the two images, Mr. Gazzaniga speculated, was the work of "the interpreter," a special device in the left hemisphere that gives our actions one narrative and enables us to feel like a unified being.



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TALES FROM BOTH SIDES OF THE BRAIN

By Michael S. Gazzaniga
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Such split-brain research was a revelation. The brain was not, as had once been thought, homogeneous in its capacity to process information. Rather it was organized as modules and circuits for specialized actions. The research also veered into philosophical territory. “Our most precious sense of life is our very own private subjective experience—that feeling of my mind,” Mr. Gazzaniga writes. “To suddenly think it can be divided, that two minds are coexisting in one cranium, is almost not comprehensible.”

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Split-brain work began at a time when psychologists were skeptical that the content of the mind could be studied scientifically. Behaviorism was in the ascendancy, with its view of action being shaped solely by a calculation of reward and punishment and its practitioners regarding the mind as a mysterious black box. The work of Mr. Gazzaniga, who is now regarded as the father of cognitive neuroscience, and of others have helped illuminate the black box, making way for many of the neuroscientific wonders we are familiar with today.

Those who have read Mr. Gazzaniga’s other books aimed at a general audience—such as “Who’s in Charge? Free Will and the Science of the Brain” (2011)—will be familiar with his ponderings about the mind and the “hard problem” of consciousness. He believes that consciousness, while produced solely by the brain and no other nonmaterial force, is an irreducible “emergent property” of the brain. This means that it cannot be explained fully at the neural or molecular level. But “Tales From Both Sides of the Brain” offers charming personal vignettes as well.

There is the story of how Mr. Gazzaniga met William F. Buckley Jr. Weary of the liberalism on campus in the mid-1960s, he organized Caltech’s Graduate Committee for Political Education and invited Buckley to debate Steve Allen, the comedian and then a liberal committed to antinuclear activism. Despite Mr. Gazzaniga’s worries that no one would show up, 3,000 people packed the Hollywood Palladium. Groucho Marx was in the front row. Mr. Gazzaniga “discovered that there was a bit of Sol Hurok in me” and put together other such debates whose participants included Barry Goldwater, the historian James MacGregor Burns and the legal scholar Willmoore Kendall.

The author emerges from his memoir as a generous and playful colleague who is still starry-eyed about neuroscientific progress. He describes his early days at Caltech with a whiff of nostalgia for a time when grant money was plentiful, needless regulation was scarce and overbearing institutional review boards had not yet become a reality for researchers. “You could just do it,” he says.

But you did not do it alone. As Mr. Gazzaniga writes, science is “carried out in friendship, where discoveries are deeply embedded in . . . social relations.” True, the work is collaborative, yet as famed cancer researcher Harold Varmus has said, nearly all great ideas first start in individual minds.

“Tales From Both Sides of the Brain” will be cataloged as scientific autobiography, and that it surely is. But it is as much a book about gratitude—for the chance to study a subject as endlessly fascinating as the brain, for the author’s brilliant colleagues and, mostly, for the patients who taught him, and the world, so much.

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