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H. M., an Unforgettable Amnesiac, Dies at 82

By [BENEDICT CAREY](#)

He knew his name. That much he could remember.

He knew that his father's family came from Thibodaux, La., and his mother was from Ireland, and he knew about the 1929 stock market crash and World War II and life in the 1940s.

But he could remember almost nothing after that.

In 1953, he underwent an experimental brain operation in Hartford to correct a [seizure disorder](#), only to emerge from it fundamentally and irreparably changed. He developed a syndrome neurologists call profound [amnesia](#). He had lost the ability to form new memories.

For the next 55 years, each time he met a friend, each time he ate a meal, each time he walked in the woods, it was as if for the first time.

And for those five decades, he was recognized as the most important patient in the history of brain science. As a participant in hundreds of studies, he helped scientists understand the biology of learning, [memory](#) and physical dexterity, as well as the fragile nature of human identity.

On Tuesday evening at 5:05, Henry Gustav Molaison — known worldwide only as H. M., to protect his privacy — died of [respiratory failure](#) at a nursing home in Windsor Locks, Conn. His death was confirmed by Suzanne Corkin, a neuroscientist at the [Massachusetts Institute of Technology](#), who had worked closely with him for decades. Henry Molaison was 82.

From the age of 27, when he embarked on a life as an object of intensive study, he lived with his parents, then with a relative and finally in an institution. His amnesia did not damage his intellect or radically change his personality. But he could not hold a job and lived, more so than any mystic, in the moment.

“Say it however you want,” said Dr. Thomas Carew, a neuroscientist at the University of California, Irvine, and president of the Society for Neuroscience. “What H. M. lost, we now know, was a critical part of his identity.”

At a time when neuroscience is growing exponentially, when students and money are pouring into laboratories around the world and researchers are mounting large-scale studies with powerful

brain-imaging technology, it is easy to forget how rudimentary neuroscience was in the middle of the 20th century.

When Mr. Molaison, at 9 years old, banged his head hard after being hit by a bicycle rider in his neighborhood near Hartford, scientists had no way to see inside his brain. They had no rigorous understanding of how complex functions like memory or learning functioned biologically. They could not explain why the boy had developed severe [seizures](#) after the accident, or even whether the blow to the head had anything to do with it.

Eighteen years after that bicycle accident, Mr. Molaison arrived at the office of Dr. William Beecher Scoville, a neurosurgeon at Hartford Hospital. Mr. Molaison was blacking out frequently, had devastating [convulsions](#) and could no longer repair motors to earn a living.

After exhausting other treatments, Dr. Scoville decided to surgically remove two finger-shaped slivers of tissue from Mr. Molaison's brain. The seizures abated, but the procedure — especially cutting into the hippocampus, an area deep in the brain, about level with the ears — left the patient radically changed.

Alarmed, Dr. Scoville consulted with a leading surgeon in Montreal, Dr. Wilder Penfield of [McGill University](#), who with Dr. Brenda Milner, a psychologist, had reported on two other patients' memory deficits.

Soon Dr. Milner began taking the night train down from Canada to visit Mr. Molaison in Hartford, giving him a variety of memory tests. It was a collaboration that would forever alter scientists' understanding of learning and memory.

“He was a very gracious man, very patient, always willing to try these tasks I would give him,” Dr. Milner, a professor of cognitive neuroscience at the Montreal Neurological Institute and McGill University, said in a recent interview. “And yet every time I walked in the room, it was like we'd never met.”

At the time, many scientists believed that memory was widely distributed throughout the brain and not dependent on any one neural organ or region. Brain lesions, either from surgery or accidents, altered people's memory in ways that were not easily predictable. Even as Dr. Milner published her results, many researchers attributed H. M.'s deficits to other factors, like general trauma from his seizures or some unrecognized damage.

“It was hard for people to believe that it was all due” to the excisions from the surgery, Dr. Milner said.

That began to change in 1962, when Dr. Milner presented a landmark study in which she and H.

M. demonstrated that a part of his memory was fully intact. In a series of trials, she had Mr. Molaison try to trace a line between two outlines of a five-point star, one inside the other, while watching his hand and the star in a mirror. The task is difficult for anyone to master at first.

Every time H. M. performed the task, it struck him as an entirely new experience. He had no memory of doing it before. Yet with practice he became proficient. “At one point he said to me, after many of these trials, ‘Huh, this was easier than I thought it would be,’ ” Dr. Milner said.

The implications were enormous. Scientists saw that there were at least two systems in the brain for creating new memories. One, known as declarative memory, records names, faces and new experiences and stores them until they are consciously retrieved. This system depends on the function of medial temporal areas, particularly an organ called the hippocampus, now the object of intense study.

Another system, commonly known as motor learning, is subconscious and depends on other brain systems. This explains why people can jump on a bike after years away from one and take the thing for a ride, or why they can pick up a guitar that they have not played in years and still remember how to strum it.

Soon “everyone wanted an amnesic to study,” Dr. Milner said, and researchers began to map out still other dimensions of memory. They saw that H. M.’s short-term memory was fine; he could hold thoughts in his head for about 20 seconds. It was holding onto them without the hippocampus that was impossible.

“The study of H. M. by Brenda Milner stands as one of the great milestones in the history of modern neuroscience,” said Dr. Eric Kandel, a neuroscientist at [Columbia University](#). “It opened the way for the study of the two memory systems in the brain, explicit and implicit, and provided the basis for everything that came later — the study of human memory and its disorders.”

Living at his parents’ house, and later with a relative through the 1970s, Mr. Molaison helped with the shopping, mowed the lawn, raked leaves and relaxed in front of the television. He could navigate through a day attending to mundane details — fixing a lunch, making his bed — by drawing on what he could remember from his first 27 years.

He also somehow sensed from all the scientists, students and researchers parading through his life that he was contributing to a larger endeavor, though he was uncertain about the details, said Dr. Corkin, who met Mr. Molaison while studying in Dr. Milner’s laboratory and who continued to work with him until his death.

By the time he moved into a nursing home in 1980, at age 54, he had become known to Dr. Corkin’s M.I.T. team in the way that Polaroid snapshots in a photo album might sketch out a life

but not reveal it whole.

H. M. could recount childhood scenes: Hiking the Mohawk Trail. A road trip with his parents. Target shooting in the woods near his house.

“Gist memories, we call them,” Dr. Corkin said. “He had the memories, but he couldn’t place them in time exactly; he couldn’t give you a narrative.”

He was nonetheless a self-conscious presence, as open to a good joke and as sensitive as anyone in the room. Once, a researcher visiting with Dr. Milner and H. M. turned to her and remarked how interesting a case this patient was.

“H. M. was standing right there,” Dr. Milner said, “and he kind of colored — blushed, you know — and mumbled how he didn’t think he was that interesting, and moved away.”

In the last years of his life, Mr. Molaison was, as always, open to visits from researchers, and Dr. Corkin said she checked on his health weekly. She also arranged for one last research program. On Tuesday, hours after Mr. Molaison’s death, scientists worked through the night taking exhaustive [M.R.I.](#) scans of his brain, data that will help tease apart precisely which areas of his temporal lobes were still intact and which were damaged, and how this pattern related to his memory.

Dr. Corkin arranged, too, to have his brain preserved for future study, in the same spirit that Einstein’s was, as an irreplaceable artifact of scientific history.

“He was like a family member,” said Dr. Corkin, who is at work on a book on H. M., titled “A Lifetime Without Memory.” “You’d think it would be impossible to have a relationship with someone who didn’t recognize you, but I did.”

In his way, Mr. Molaison did know his frequent visitor, she added: “He thought he knew me from high school.”

Henry Gustav Molaison, born on Feb. 26, 1926, left no survivors. He left a legacy in science that cannot be erased.

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