

sired consequences. There may be perverse outcomes, similar to the results from some national mitigation policies under which further degradation of “undisturbed” wetlands is often justified by ecosystem restoration that usually delivers a less diverse and less functional state (8). And the term might lead to imprudent management, such as the relaxation of early detection and effective controls on biological invasions, with unpredictable outcomes.

Conservation biology and restoration ecology are changing rapidly, providing new conceptual foundations and tools for preserv-

ing or restoring biodiversity and ecosystem functionality, both of which are now considered global priorities (9). The disciplines need more time to mature and produce optimal solutions to our growing concerns. Although the authors’ new terminology does not seem a step forward, *Novel Ecosystems* provides relevant and stimulating ideas for discussion and integration into conservation and restoration methods, strategies, and goals.

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NEUROSCIENCE

A Lifetime Without Memory

Nicholette Zeliadt

Henry Molaison had a poor memory; that much he knew. He could recognize family members and recall information he had learned in school, but he was unable to remember any new experiences, from the people he met to the places he visited and conversations he had. Any new information he encountered simply slipped from his mind within 30 seconds, the result of an experimental brain operation that arguably saved his life but robbed him of the ability to form long-term memories. Undoubtedly devastating to his daily life, his memory loss proved to be a priceless gift to neuroscience, facilitating a number of important discoveries that form the basis for much of what we now know about the biological underpinnings of learning and memory.

Known publicly only by his initials “H.M.” until his death at age 82 in 2008, Molaison famously underwent surgery in 1953 in an attempt to alleviate the debilitating epileptic seizures he had experienced since childhood. The procedure (which involved removing much of his hippocampus, amygdala, and surrounding structures) dramatically curtailed his seizures but left his mind forever stranded in time. In *Permanent Present Tense*, Suzanne Corkin takes readers inside the life and mind of the man behind the initials. She provides a touching yet unsentimental glimpse of her 46-year connection to this “pleasant, engaging, docile man” and his tragedy, interests, and experience of everyday life. At the same time, Corkin skillfully uses stories about his experiences and capabilities to illustrate

some of the scientific principles underlying memory. She also offers a comprehensible historical sketch of the study of memory and the burgeoning field of neuroscience—from the dubious and gruesome practice of prefrontal lobotomy to the development of powerful brain-imaging techniques.

Corkin, a behavioral neuroscientist at the Massachusetts Institute of Technology, began studying Molaison in 1962 while she was a psychology graduate student at McGill University. Corkin and other researchers devised clever cognitive tests to assess his memory and other intellectual abilities, and they subsequently used brain-imaging tools to precisely determine what structures were missing from his brain. Molaison’s case helped to reveal that something as abstract as converting a thought or experience into a memory could be localized to a discrete part of the brain—the hippocampus.



Happy to participate. Henry Molaison at a 1986 testing session at MIT.

Permanent Present Tense

The Unforgettable Life of the Amnesic Patient, H.M.

by Suzanne Corkin

Basic Books, New York, 2013. 400 pp. \$28.99, C\$32. ISBN 9780465031597.
Allen Lane, London. £20. ISBN 9781846142710.

Yet to everyone’s surprise, Molaison sometimes was able to remember things, exquisitely described by Corkin as appearing “from time to time like driftwood washing up from an empty sea.” For instance, he could learn

the instructions for some of the cognitive tests that he took repeatedly and sketch the floor plan of a house that he moved into years after the onset of his amnesia. In old age, he learned to use a walker, although he had no memory of having done so. Molaison’s case aided the recognition that memory is not a single process and that some skills and information could be acquired without conscious awareness.

Molaison remained a good-natured and cooperative research participant throughout his life, his keen sense of humor ever-present. For example, when asked whether he had slept well one night during a visit to the research facility, Molaison responded, “I didn’t stay awake to find out.” He seemed to live relatively free of the stresses and anxieties of daily life, “unencumbered by recollections from the past and speculations about the future” that prevent many of us from experiencing life in the here and now. After his death, Molaison’s brain was preserved and shaved into 2401 slices for further study, and in this form, he will continue to advance our understanding of memory and the brain.

Sadly, Molaison’s condition prevented him from ever fully grasping the importance of his contributions to science and humanity. Corkin’s compelling account in *Permanent Present Tense* should help ensure that he will remain an unforgettable figure in the continuing saga of our quest to understand the workings of the mind.

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