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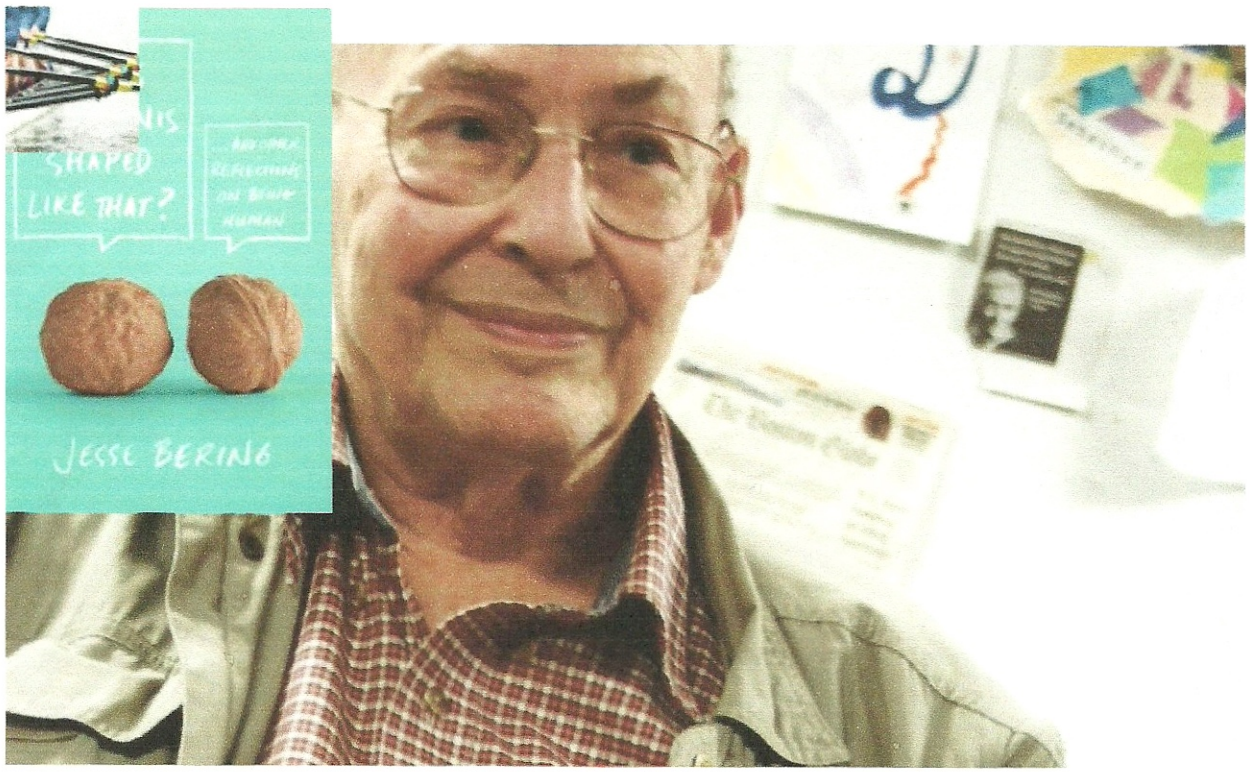
The Many Minds of Marvin Minsky (R.I.P.)

The late Marvin Minsky, a pioneer of artificial intelligence, was a paradoxical figure, who once said Freud was his favorite theorist of mind.

By John Horgan on January 26, 2016



Although he sometimes pretended to be a hard-core reductionist, AI visionary Marvin Minsky was actually a scientific romantic, for whom the *quest* for knowledge mattered more than the knowledge itself. Photo: Wikimedia Commons.

Marvin Minsky, a pioneer of artificial intelligence, died on Sunday, January 24, in Boston, according to The New York Times. He was 88. Minsky contributed two important articles to Scientific American: Artificial Intelligence, on his theories of multiple minds, and Will Robots Inherit The Earth?, on the future of AI. I profiled Minsky for Scientific American in 1993, after spending an afternoon with him at MIT's Artificial Intelligence Laboratory, and again in The End of Science. Below is an edited version of the latter profile. --John Horgan

Before I visited Marvin Minsky at MIT, colleagues warned me that he might be defensive, even hostile. If I did not want the interview cut short, I should not ask him too bluntly about the falling fortunes of artificial intelligence or of his own particular theories of the mind. A former associate pleaded with me not to take advantage of Minsky's penchant for outrageous utterances. "Ask him if he means it, and if he doesn't say it three times you shouldn't use it."

When I met Minsky, he was rather edgy, but the condition seemed congenital rather than acquired. He fidgeted ceaselessly, blinking,

waggling his foot, pushing things about his desk. Unlike most scientific celebrities, he gave the impression of conceiving ideas and tropes from scratch rather than retrieving them whole from memory. He was often but not always incisive. "I'm rambling here," he muttered after a riff on verifying mind-models collapsed in a heap of sentence fragments.

Even his physical appearance had an improvisational air. His large, round head seemed entirely bald but was actually fringed by hairs as transparent as optical fibers. He wore a braided belt that supported, in addition to his pants, a belly pack and a tiny holster containing pliers with retractable jaws. With his paunch and vaguely Asian features, he resembled Buddha--Buddha reincarnated as a hyperactive hacker.

Minsky seemed unable--or unwilling--to inhabit any emotion for long. Early on, he lived up to his reputation as a curmudgeon and arch-reductionist. He expressed contempt for those who doubt computers can be conscious. Consciousness is a "trivial" issue, he said. "I've solved it, and I don't understand why people don't listen." Consciousness is merely a type of short-term memory, a "low-grade system for keeping records." In fact, computer programs such as LISP, which allow their processing steps to be retraced, are "extremely conscious," more so than we humans, with our pitifully shallow memory banks.

The only theorist of mind other than himself who truly grasped the mind's complexity was dead. "Freud has the best theories so far, next to mine, of what it takes to make a mind," Minsky said.

Minsky derided Gerald Edelman's re-entrant-loops hypothesis as

warmed-over feedback theory. Minsky even snubbed MIT's Artificial Intelligence Laboratory, which he had founded and where we happened to be meeting. "I don't consider this to be a serious research institution at the moment," he announced.

But as we wandered through the lab looking for a lecture on a chess-playing computer, a metamorphosis occurred. "Isn't the chess meeting supposed to be here?" Minsky asked a group of researchers chatting in a lounge. "That was yesterday," someone replied.

After asking about the chess talk, Minsky spun tales about the history of chess-playing programs. This mini-lecture evolved into a reminiscence of Minsky's late friend Isaac Asimov. Minsky said Asimov--who popularized the term "robot" and explored its metaphysical implications in his science fiction—declined to see robots at MIT, fearing that his imagination "would be weighed down by this boring realism."

One lounger, noticing that he and Minsky wore the same pliers, yanked his instrument from its holster and flicked its retractable jaws into place. "*En garde*," he said. Grinning, Minsky drew his pliers, and he and his challenger jabbed the tools at each other like punks in a knife fight.

Minsky expounded on the versatility and--an important point for him--drawbacks of the pliers; his pair pinched him during certain maneuvers. "Can you take it apart with itself?" someone asked. Everyone laughed at this allusion to a fundamental problem in robotics.

Returning to Minsky's office, we encountered a young, extremely pregnant Korean woman. She was a doctoral candidate scheduled for an oral exam the next day. "Are you nervous?" asked Minsky. "A little," she replied. "You shouldn't be," he said, and gently pressed his forehead against hers, as if seeking to infuse her with his strength.

I realized, watching this scene, that there are many Minskys.

But of course there would be. Multiplicity is central to Minsky's view of the mind. In his book *The Society of Mind* he contends that brains contain many different, highly specialized structures that evolved to solve different problems.

"We have many layers of networks of learning machines," he explained to me, "each of which has evolved to correct bugs or to adapt the other agencies to the problems of thinking." It is thus unlikely that the brain can be reduced to a particular set of principles or axioms, "because we're dealing with a real world instead of a mathematical one that is defined by axioms."

AI has not fulfilled its early promise because modern researchers have succumbed to "physics envy"--the desire to reduce the intricacies of the brain to simple formulae. "They are defining smaller and smaller subspecialties that they examine in more detail, but they're not open to doing things in a different way."

AI researchers have failed to heed Minsky's message that the mind has many methods for coping with even a single, simple problem. For example, someone whose television set fails to work will probably first consider it to be a purely physical problem. He will check to see

whether the television is properly programmed or whether the cord is plugged in. If that fails, the person may call a repairman, thus turning the problem from a physical one to a social one--how to find a repairman who can do the job quickly and cheaply.

"That's one lesson I can't get across" to AI researchers, Minsky said. "It seems to me that the problem the brain has more or less solved is how to organize different methods into working when the individual methods fail pretty often."

As Minsky continued speaking, his emphasis on multiplicity took on a metaphysical and even moral cast. He blamed the problems of his field--and of science in general--on what he called "the investment principle," which he defined as the tendency of humans to keep doing something that they have learned to do well rather than seeking new solutions.

Repetition, or, rather, single-mindedness, seemed to hold a kind of horror for Minsky. "If there's something you like very much," he asserted, "then you should regard this not as you feeling good but as a kind of brain cancer, because it means that some small part of your mind has figured out how to turn off all the other things."

Minsky has mastered many skills during his career--he is adept in mathematics, philosophy, physics, neuroscience, robotics and computer science and has even written several science-fiction novels —because he loves the "feeling of awkwardness" triggered by learning something hard. "It's so thrilling not to be able to do something. It's such a rare experience to treasure."

Minsky was a musical child prodigy until he decided that music is a soporific. "I think the reason people like music is to suppress thought--the wrong kinds of thought--not to produce it." Minsky occasionally composes "Bach-like things" on an electric piano in his office, but he tries to resist the impulse. "I had to kill the musician at some point," he said. "It comes back every now and then, and I hit it."

Minsky had no patience for those who claim the mind can never be fully understood. "Look, before Pasteur people said, 'Life is different. You can't explain it mechanically.' It's just the same thing." But a final theory of the mind, Minsky emphasized, will probably be extremely complex; after all, consider how long it would take to describe precisely all the components and workings of an automobile.

The truth of a final mind-model could be demonstrated in several ways. First, a machine based on the model's principles should be able to mimic human development. "The machine ought to be able to start as a baby and grow up by seeing movies and playing with things," Minsky said. Moreover, as brain-imaging technology improves, scientists should be able to determine whether the neural processes in living humans corroborate the model.

"Once you get a [brain] scanner that has one angstrom resolution, then you could see every neuron in someone's brain. You watch this for 1,000 years and you say, Well, we know exactly what happens whenever this person says 'blue.' And people check this out for generations and the theory is sound. Nothing goes wrong, and that's the end of it."

If scientists achieve a final theory of mind, I asked, what frontiers will

be left to explore?

"Why are you asking me this question?" Minsky growled. The concern that scientists will run out of things to do is "pitiful," he said. "There's *plenty* to do." We humans may well be approaching our limits as scientists, but we will soon create machines much smarter than us that can continue doing science.

But that would be machine science, not human science, I said.

"You're a racist, in other words," Minsky said, his great domed forehead purpling. I scanned his face for signs of irony, but found none. "I think the important thing for us is to *grow*," Minsky continued, "not to remain in our own present stupid state." We humans, he added, are just "dressed up chimpanzees." Our task is not to preserve present conditions but to evolve, and create beings smarter than us.

When I asked what super-intelligent machines might be interested in, Minsky suggested, half-heartedly, that they might try to comprehend themselves as they kept evolving. He was more enthusiastic discussing the conversion of human psyches into digital avatars.

This technological advance would allow Minsky to indulge in dangerous pursuits, such as taking LSD or converting to a religious faith. "I regard religious experience as a very risky thing to do because it can destroy your brain in a rapid way. But if I had a backup copy..."

Minsky also wanted to know what Yo-Yo Ma, the great cellist, feels like when playing a concerto. But to my surprise, Minsky doubted whether

such an experience is possible. To feel what Yo-Yo Ma feels as he plays, Minsky explained, he would have to possess all Yo-Yo Ma's memories. He would have to *become* Yo-Yo Ma. But in becoming Yo-Yo Ma, Minsky would cease to be Minsky.

This was an extraordinary admission for Minsky to make, because it implied that the essence of each individual human might be irreducible and unknowable.

In spite of his reputation as a rabid reductionist, Minsky was an *anti*-reductionist. His revulsion toward single-mindedness, his fondness for Freud, his passion for learning and novelty--all these traits were those of a scientific romantic, for whom the *quest* mattered more than mere knowledge.