Memories of Martin Gardner

Steven G. Krantz

Martin Gardner (1914–2010) took no mathematics courses after high school. He attempted to learn calculus in college but failed. He graduated from the University of Chicago with a bachelor's degree in philosophy. He did a year of graduate study, but earned no advanced degree.

Gardner was the ultimate polymath. His passion for mathematics stayed with him his entire life. He wrote seventy books on mathematics and related topics. His column in *Scientific American*, which ran for more than twenty-five years, was read worldwide and had an enormous influence over popular interest in mathematical topics.

Perhaps Gardner's most successful book was one of his first. *The Annotated Alice* was greatly popular, and is still in print today. He got his start in publishing as the editor of *Humpty Dumpty* magazine, a children's periodical. The paper-folding puzzles that Gardner designed for *Humpty Dumpty* led to his first contact with *Scientific American*. Gardner began his *Mathematical Games* column in the latter magazine in 1956 and continued it until 1981.

Gardner is remembered for introducing his reading public to

- Flexagons
- John Horton Conway's Game of Life
- Polyominoes
- Paradoxes such as the unexpected hanging
- Fractals
- The work of M. C. Escher
- Penrose tiling
- Piet Hein's superellipse
- Random walks
- Graceful graphs
- Worm paths
- Minimula sculpture
- Newcomb's paradox
- Nontransitive dice
- The board game *Hex*
- Public key cryptography
- The Kakeya needle problem

And there are dozens more.

Gardner had many interests. He was an expert magician. He was a noted skeptic and took great interest in debunking pseudoscience and fraudulent psychic phenomena. He had a great interest in religion. His friends and professional acquaintances ranged from John Nash to Douglas Hofstadter to John Milnor to magician James Randi to Ron Graham and Donald Knuth.

Martin Gardner thought he had an advantage as a mathematical writer not to have any background in mathematics. He said that, if he could not understand an idea, then his readers would not understand it either. Gardner prepared each of his columns in a painstaking and scholarly fashion and conducted copious correspondence to be sure that he got all the ideas straight. He was humble and straightforward and was at ease approaching even great minds with his questions.

Every few years there is a gathering to celebrate Martin Gardner and his contributions to our intellectual culture. The last such meeting was attended by 1,400 people. Clearly Gardner will be remembered for many years to come.

Persi W. Diaconis

A blurb on the dust jacket of Martin Gardner's recent *The Colossal Book of Mathematics* says:

> *Warning:* Martin Gardner has turned dozens of innocent youngsters into math professors and thousands of math professors into innocent youngsters.

And it's true.

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I met Martin when I was thirteen. He helped get me into mathematics. His books and columns made mathematical ideas accessible and elevated mathematics. More directly, he sometimes helped me do my homework and wrote letters of recommendation for my graduate school admissions. I'm a grown-up mathematician now, and paging through the book mentioned above constantly opens my eyes to lovely things.

Martin was a great explainer and debunker of various fads and fallacies. He left us with a mystery: How did he do it? How does a man with an undergraduate degree in philosophy touch youngsters and professionals? By clarity. By content: the ratio of examples and theorems to filler is high. By harnessing the best contributions of millions of readers. By hard work: Martin told me that he spent about twenty-five days a month on his *Scientific American* column. By his enthusiasm for what he explained.

Yet there is something more. Martin's work stands up to multiple readings. Go take a look.

Ronald L. Graham

Martin Gardner was a gem. There is absolutely no question that he, more than anyone else in the world, was responsible for turning people of all ages on to the pleasures of mathematical recreations. His infectious enthusiasm, brilliant topic selection, and seductive prose in this activity are unrivaled. Many have tried to emulate him—nobody has succeeded. What is more remarkable is how little formal mathematical training Martin actually had. In fact, he felt that this was to his great advantage, since if something wasn't clear to him, then it would probably also be unclear to many of his readers.

It is extraordinary how little Martin seemed to change over the forty-five years that I knew him. He was inevitably curious and excited about some new mathematical teaser, a neat card trick, or a subtle logical puzzle. Of course Martin's interests spanned much more than mathematical recreations and included magic, philosophy, and debunking pseudo-science, among others. He was modest, self-effacing, and always careful to give full credit to any reader who made a contribution to what he was writing about. Thousands of them did over the twenty-plus-year period he wrote his celebrated column in *Scientific American*.

I personally owe Martin a lot. But I think that this is true for many of us as well.

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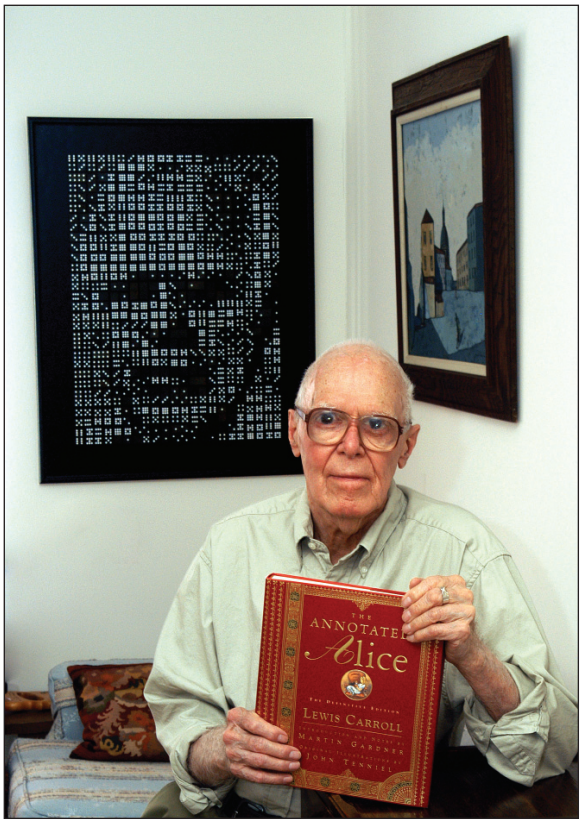

Photograph by Gilbert Jain Photography.

Martin Gardner at home in Norman, OK, 2005, holding his book, *The Annotated Alice*.

Donald E. Knuth

Most Americans over sixty remember the moment that they first learned that President Kennedy had been shot. I shall always remember the moment that I first learned of Martin Gardner's death.

I was staying for two weeks with one of my cousins in Ohio, using spare time to put the finishing touches on parts of a book that I was dedicating to Martin. At dinner one night I had explained to my hosts how I was preparing a special part of the preface in his honor, and why I was thankful for his ongoing inspiration. Then, at dinner two nights later, my cousin said that she'd just heard an obituary notice for him, while listening to NPR on her way home. Alas! Martin had told me how much he was looking forward to seeing this book, and I had been writing much of it especially for his personal pleasure.

But I believe in celebrating the joyous experiences of life, rather than mourning what might have been. Martin brought me and countless others a steady stream of intellectual stimulation and delight, over a period of many decades. A piece of writing from him often caused me to drop everything else for several days so that I could work on

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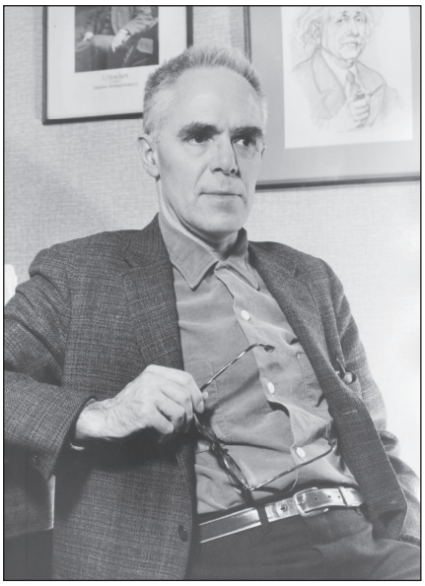

Photograph by David Eisendrath, courtesy of Jim Gardner.

Gardner in the early 1960s, Dobbs Ferry, NY.

a fascinating puzzle. His fifteen precious volumes, in which twenty-five years' worth of monthly columns for *Scientific American* have been collected and amplified, sit prominently on a shelf next to the chair in which I read and write every day. For me, those volumes are the Canon.

Indeed, more people have probably learned more good mathematical ideas from Martin Gardner than from any other person in the history of the world, in spite of (or perhaps because of) the fact that he claimed not to be a mathematician himself. He was the consummate master of the art of teaching by storytelling. Yet he didn't stick to the easy aspects of the subjects that he treated; he dug deeply into the origins of every idea that he was explaining, with superb scholarship. (On dozens of occasions when it turned out that he and I had independently researched the history of some topic, he had invariably located some aspects of the story that had escaped my notice.) Most amazingly, he did all this while faced with relentless monthly deadlines—spending two weeks per month on *Scientific American* while devoting the remaining two weeks to a wide variety of other pursuits.

I first had the opportunity to meet him in person at his home on Euclid Avenue, Hastings-on-Hudson, in December 1968. I was especially impressed by his efficient filing system using tiny cards, and by the fact that he did all of his writing while *standing up*, at a typewriter on a raised pedestal. I eventually followed his lead by getting my own stand-up computer desk.

In 1994, after many years of continued friendship, he invited me to spend two unforgettable weeks at the condominium in Hendersonville, North Carolina, where all of the notes and correspondence from his days of writing for *Scientific American* were currently stored. I systematically went through about fifty large boxes of material, barely able to sleep at night because of all the exciting things I was finding among those letters. He had carried on incredibly interesting exchanges with hundreds of mathematicians, as well as with artists and polymaths such as Maurits Escher and Piet Hein, all recorded in these files, mixed in of course with a fair amount of forgettable trivia. Already when he began his monthly series in 1956 and 1957, he was corresponding with the likes of Claude Shannon, John Nash, John Milnor, and David Gale. Later he would receive mail from budding mathematicians John Conway, Persi Diaconis, Jeffrey Shallit, Ron Rivest, et al. These files of correspondence now have a permanent home at Stanford University Archives, where I continue to consult them frequently.

While writing the present note, I took the opportunity to reread dozens of the letters that Martin had sent to me over the years, most recently a month or so before his death. In one of those letters he remarked that he regularly devoted one full day each week to answering mail. Thus I know that thousands of people like me have been able to benefit in a direct and personal way from his wisdom and generosity, in addition to the millions who have been edified by his publications. Countless more will surely benefit from his classic works, because those beautifully written volumes continue to remain in print, and someday they will be online.

James Randi

I knew Martin Gardner for some sixty-plus years, I'm proud to say, and at our just-held annual conference of the James Randi Educational Foundation in Las Vegas, we held a celebration of his marvelous career, with his son Jim and his grandson Martin present. I say "celebration", you'll note, not "memorial". We all agreed that Martin would have been quite embarrassed to know that almost 1,400 of our members joined in the celebration. I'd wanted balloons and dancing girls, as well, but I was out-voted on that point.

This exceedingly modest man could never quite understand why so much fuss was made over him. I had no problem understanding this, and as I traveled around the world and occasionally mentioned that I knew the genius, I was immediately pestered with inquiries about him. He seemed almost a mythical character, this man who never took a course in mathematics after leaving high school, yet remains an icon to mathematicians all over this planet who quote him and flaunt their collection of his insightful books. I'm proud to say that my own copy of *Fads & Fallacies in the Name of Science* bears the inscription "To Randi—The Amazing Non-Gulliblist, from Martin." How good can life get…?

No, I don't mourn Martin's passing. I celebrate the fact that he was with us for .9559 of a century. He lived a rich, full life and enjoyed every discovery that he made about the world that he so improved with his wit and perception. His massive

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files featured a section that simply listed numbers from 0000 all the way up into the "alephs" that so fascinated him, and when I needed to know everything that he knew about the number 370, he told me that it was one of only four possible numbers that is the sum of the cubes of each of its digits. He then asked me what one of the others was (0 and 1 being ineligible), and I was stymied. When he told me, I experienced an "Aha!"[1]—which Martin designated to describe a very obvious fact that should be sobering to anyone who missed it. I was quite sobered….

Martin Gardner was number three on my automatic phone dialer. He's not available that way now, but more than two feet of my library shelves bear his books. No, it's not quite enough, but it will have to do.

Peter Renz

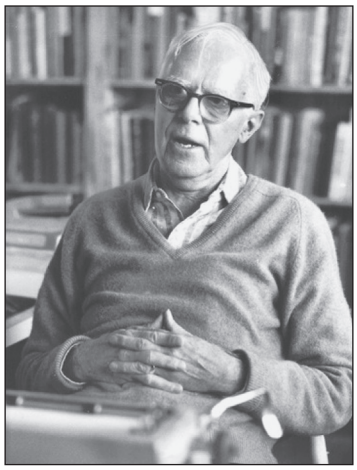
I worked with Martin Gardner as his editor. We met in 1974, when I joined W. H. Freeman and Company. Freeman was a subsidiary of *Scientific American*, and Gerard Piel, the magazine's publisher, sent me off to meet Martin. We worked together on Freeman projects for ten years and on projects at the MAA and elsewhere until his death.

The View from *Scientific American*. Dennis Flanagan, editor of the magazine, told me that columns like Martin's freed him for other work. Reviewing Martin's *Colossal Book of Mathematics* in *American Scientist* (2002), Dennis wrote that the column "was a big hit with the readers and contributed substantially to the magazine's success." Dennis Flanagan and Gerry Piel protected Martin's interests. When Morris Kline put together his reader *Mathematics in the Modern World* (1968), he wanted to draw on Martin's columns. Gerry Piel ruled this out, saying Martin controlled the rights. In 1976 Morris was working on a second reader, *Mathematics: Introduction to its Spirit and Use*. He wanted Martin's coverage and exposition and chafed at Gerry's prohibition. Knowing Martin to be generous about permissions, I asked him. He said, "Yes," and fourteen of the articles that Kline used were Martin's.

How Did He Do It? What were the keys to Martin's success? A powerful mind, superb memory, writing skill, and great energy. His *Scientific American* audience devoured his columns and showered him with ideas. Many of you contributed.

How did Martin work? Partly as a reporter, starting from a primary source and working outward: John Conway on the Game of Life, Benoit Mandelbrot on fractals, Ron Rivest on public-key cryptography. Sometimes he drew a column from a book, for example, his April 1961 column on H. S. M. Coxeter's *Invitation to Geometry*. Some columns he drew from many sources: for example, his February 1963 column, "Curves of Constant Width", draws on *The Enjoyment of Mathematics* by Rademacher and Toeplitz and on papers by Michael Goldberg on "rotors" from the *Monthly*.

This "Curves" column winds up with the Kakeya problem and Besicovitch's result that there is no minimal-area solution. Martin uses an asteroidal shape from Ogilvy's *Through the Mathescope* to suggest how a needle can be turned in smaller and smaller areas using overlapping turns.



Photograph courtesy of Jim Gardner.

Gardner, probably around 1994.

Lasting Impact, Long Tail. Recreational problems often tie in to deeper mathematics, as the Kakeya example shows. Looking at Martin's columns, I am struck by their lasting interest.

Flexagons, the Game of Googol (Secretary Problem), and the Unexpected Hanging launched small industries. We will be chewing on new forms of his puzzles for decades. His trapdoor cipher column jolted cryptography. His Game of Life columns energized cellular automata. His *Gödel, Escher, Bach* and *Planiverse* columns popularized the work of Doug Hofstadter and Kee Dewdney—both of whom became *Scientific American* columnists.

Many, Diverse, and Continuing Contributions. Martin could not rest from writing. After his wife died in 2000 he mentioned he probably wouldn't write any more books. What is his record? From 2001 on he published twenty-two books and seventy-eight articles, reviews, or magic tricks.

Martin's columns became books and the books became a CD—*Martin Gardner's Mathematical Games*. In 2006 he began working on second editions. Three of these Games books have appeared; the rest should follow, based on Martin's files and pending resolution of issues with *Scientific American*. The Gatherings 4 Gardner will carry forward Martin's tradition. See the downloadable proceedings of G4G1—*The Mathemagician and the Pied Puzzler*.

Many a book carries a preface or blurb of Martin's. He defended reason and attacked folly. He had to expose fraud or injustice. See his "False Memory Wars" in *The Skeptical Inquirer*. He was my source for the latest on wild ideas and hypocrisy.

As a hard-nosed Platonist, Martin wrote critical reviews of *The Mathematical Experience* and New New Math textbooks in *The New York Review of Books*. We disagreed about Platonism, but his

[1] *The "obvious" number is 371. Aha!*

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Gathering organized by Neil Patterson in 1983, to work on development of educational material. Front row: left to right: Neil Patterson, Martin Gardner, Herbert Kohl.

barbs were aimed at my positions, not me. Martin had no animosity against those whose positions he attacked.

His delight in intellectual play, his regard for reason, his interest in and sympathy for human foibles, and his skill and productivity enriched us greatly. It was a pleasure to have worked with him.

Raymond M. Smullyan

I first knew Martin when we were students at the University of Chicago. He has been a most wonderful friend, and to him I owe a good deal of my success as a puzzle writer. At the expense of appearing immodest (which unfortunately I am) I must tell you that he once paid me the supreme compliment of telling me: "Your puzzles have charm."

Unexpected as they were, I found the religious writings of Martin Gardner to be of extreme interest. Some have criticized them as being too mystical, but I don't believe they are mystical in the least! Martin was indeed devoutly religious, but that is something very different. His religious novel *The Flight of Peter Fromm* is a superb gem and shows profound psychological insight. Less impressive, in my opinion, are the religious chapters of his book *The Whys of a Philosophical Scrivener*. I had several objections to parts of it, all of which I wrote to Martin. He graciously wrote me back that he could not imagine a more fair review. Among my objections, Martin tended to identify belief in God with belief in an afterlife, which I believe to be a complete mistake, since I know so many people who believe in God but firmly disbelieve in an afterlife. Secondly, Martin wrote: "Is there any significant difference between not believing in God and believing there is no God, or not believing in an afterlife and believing there is no afterlife?" I pointed out that there is an enormous difference, because, for one thing, one who does not believe in an afterlife but also doesn't disbelieve can at least have hopes that there may be one, whereas one who disbelieves can have no such hope. As the famous agnostic Robert Ingersoll said: "We agnostics also have our creed, 'help for the living; hope for the dead'." After much thought, Martin wrote me that he subsequently realized that there was much merit in what I said.

Two cute incidents: Martin was great on making April fool jokes, but I once pulled one off on him, which he fell for for a while. On the phone I said: "What do you think of that fantastic article in today's *New York Times* about Leonardo da Vinci? There is now incontrovertible evidence that da Vinci was really a woman. Isn't that remarkable?"At first, Martin believed there was really such an article, until he suddenly realized it was April 1. On another occasion I phoned him about his book *Confessions of a Psychic*, written under the pseudonym "Uriah Fuller", in which he so cleverly exposed psychic fraudulence, and in a terribly threatening voice said: "LOOK, THIS IS URIAH FULLER AND I WANT YOU TO KEEP OUT OF MY TERRITORY, SEE!!" In his sweet gentle voice he said, "Oh hi, Raymond."

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