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A Tribute to "The Mathemagician"

Scot Morris

A few years ago the NASA scientists at Goddard Institute in New York City had a computer that was maintained by an outside firm. Occasionally the programmers took the computer "down" for a day or so to make sure it was running properly. Carl Frederick, who worked at the Goddard Space Flight Center at the time, tells me that it gradually became apparent that these maintenance checks had a strange periodicity: The computer was being regularly removed from NASA's hands around the first of every month, for no apparent reason. Finally an explanation surfaced: The first of the month was when *Scientific American* came out. The computer experts were borrowing NASA's machine in order to work out the puzzles in Martin Gardner's popular Mathematical Games column.

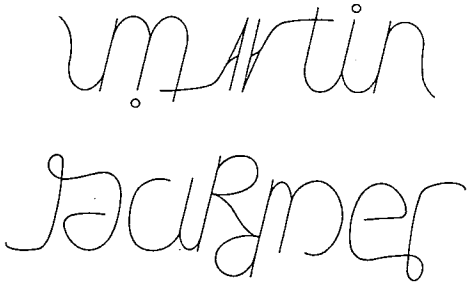
Gardner first started delighting scientists with his mathematical diversions in 1957. He resigned 25 years later, in 1982, in order to devote more time to other projects. In celebration of his sixty-fifth birthday, October 21, 1979, I devoted my column in *Omni* that month to Martin Gardner, the man *Time* magazine once called "The Mathemagician."

Gardner has approximately 35 books in print, not counting numerous children's books and volumes sold only in magic stores. His most successful work is *The Annotated Alice,* a personal loving look at Lewis Carroll's classic *Wonderland* tales. It was first published in 1960 by Clarkson Potter, Inc., and still sells over 30,000 copies a year. The jacket photo on that book shows a crew-cut Gardner atop the bronze Alice statue in New York's Central Park. Over 20 years later Gardner again climbed onto Alice's lap and allowed me to update the scene.

Martin Gardner is not a public man. He consistently declines all offers to make public appearances, give speeches, or accept awards. This, combined with his productivity and versatility, at one time gave rise to the rumor that he didn't exist, and that the name "Martin Gardner" was a pseudonym used jointly by Carl Sagan and Isaac Asimov.

Gardner is indeed real. I first corresponded with him in 1964, calling his attention to an alternate answer I had found to one of his *Scientific American* puzzles. How surprised and delighted I was that he actually wrote me back!

Gardner's generosity continues to this day. He has selflessly shared ideas, contacts, and files, and many subjects he introduced me to eventually appeared in my column. It was Gardner who first showed me the invertible signatures designed by Scott Kim. Kim's own tribute to Gardner is shown below. Both names, "Martin" and "Gardner" read exactly the same upside-down!



After this design appeared in *Omni,* he bettered himself by producing a new signature in which both names are incorporated into a single design.

(For more of Kim's remarkable work, see his book *Inversions,* published in 1981 by McGraw-Hill.)

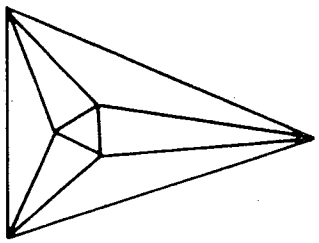
Gardner and his wife Charlotte have since moved to North Carolina, but at the time of my 1979 *festschrift* they lived in Hastings-on-Hudson, New York, appropriately enough on Euclid Avenue. His home was filled with mathematical curiosities, models, and illusions. His third-floor office was overflowing with shelves of rare books and stacks of files. Gardner's files are a treasure trove. He even has a file for *numbers.* If there is anything interesting to say about the number 32, for example, it's there in the file: An object falling to Earth accelerates at 32 feet per second per second; water freezes at 32°F; there are 32 crystal classes; a human has 32 teeth; water can be pumped by a vacuum to 32 feet under normal atmospheric pressure; there are

32 electrons in the filled fourth energy level of atoms; there are 32 fundamental long-lived particles; Eddington's fine-structure constant, 137, is the thirty-second odd prime; and, of course, 32 is 2 raised to the power obtained by adding the digits 3 and 2.

James Randi, working as a consultant to IBM and preparing a promotion for IBM's series 370 computer, once called Gardner to see whether he had any esoterica about the number. Gardner checked his files, then said, "Yes, three hundred seventy is a very interesting number. It is the sum of the cubes of each of its digits. There are only three other numbers with this property (not counting zero and one). The lowest is one hundred fifty-three and the highest is four hundred and seven. Between them is another cube-sum number, in addition to three hundred seventy. Can you guess what it is? When you do, it will be an 'aha! experience.'" (Randi couldn't guess on first hearing this, and neither could we. Can you?)

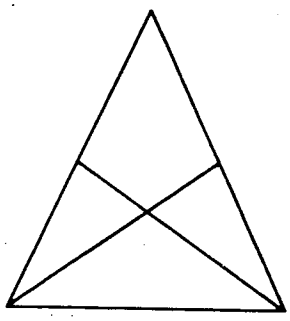
"Another thing," said Gardner, "if they'll be selling computers in Mexico or Spain, you might turn the number upside-down for an interesting surprise."

Gardner's files overflow with mathematical surprises. Under "triangles" you might find Morley's Triangle, which hides unassumingly inside every triangle, no matter what its shape. Trisect the three angles of any triangle and the lines always meet at three points to form an equilateral triangle. The appearance of that perfect little equilateral triangle is totally unexpected. Euclid could have



found it with his own theorems, but he didn't, probably because trisections with a ruler and compass were proved impossible; so nobody explored trisection problems. This geometrical gem wasn't discovered until the turn of the century, by Johns Hopkins mathematician Frank Morley, the father of writer Christopher Morley.

Another triangle curiosity is this: If the internal bisectors of the two base angles of a triangle are of equal length (below), it is intuitively obvious to any geometry student that the triangle is isosceles. But in fact most geometry teachers would have difficulty constructing a formal proof. Gardner calls this the most insidiously deceptive problem in all of elementary geometry—a full Euclidean proof may take ten pages or more. He refers interested readers to the 1937 paper by Archibald Henderson, a 40-page paper



Henderson calls "an essay on the internal bisector problem to end all essays on the internal bisector problem."

Gardner has been a lifelong student of magic, and once made his living by demonstrating magic tricks for Marshall Field's of Chicago. He enjoys amusing his friends with whatever is at hand. At a dinner table he might:

1. Put an invisible cigarette in his mouth and blow out a tiny puff of smoke
2. Let a real lit cigarette rest on a tablecloth without burning the cloth
3. Shake pepper into a glass of water until the surface is covered; then with the end of a paper match, draw an *X* on the pepper, which separates where it has been touched, leaving the shape of a cross on the water's surface

Later he might reveal such esoterica as:

4. How to use a dollar bill as a ruler
5. How to use a watch as a compass

If you are a sufficiently appreciative audience, he might:

6. Drive a paper straw through a raw potato
7. Remove his vest without removing his coat

Try to imagine how *you* would perform each of these seven miracles; then compare your methods with those given in the Answer section.

Gardner's last *Scientific American* column appeared in December, 1981, and was a parody of the mathematical speculations behind supply-side "Reaganomics." The next month, Douglas R. Hofstadter, author of the Pulitzer prize-winning *Gödel, Escher, Bach: An Eternal Golden Braid,* took over the column, which he entitled, "Metamagical Themas." Hofstadter's title is a tribute to Gardner: can you imagine why he chose it?