

Mathematician, Magician, Mysterian

Nonmathematicians, by definition, do not know mathematics. They also don't know, say, invertebrate paleontology. But we mathematicians can at least hope that the public is aware of the impact of mathematics on their everyday life. Presumably paleontologists have the same ambitions for their subject. Actually, they have it easier: the examination of sedimentary rock samples for invertebrate fossils is a standard part of assessing if the strata from which the samples came are likely to yield oil and gas. Probably the nonpaleontologists among *Notices* readers have a pretty good sense from that one-sentence description of what it means to use paleontology in fossil fuel exploration.

Contrast that with what we would have to explain to give nonmathematicians a sense of the mathematics used in modeling global warming caused by human consumption of fossil fuels, or of searching for patterns of activity in large databases of communications records, or of calculating the monetary value of financial derivatives like credit default swaps. Or imagine explaining the Weil Conjectures. The mathematics that nonmathematicians don't know is only part of the difficulty.

The mathematics they do know—usually the algorithmic techniques of arithmetic and some algebra—leads them to deep misunderstanding of what mathematicians actually do. The arithmetic paradigm—namely, that all problems have routine solutions—causes much of the public to believe that research in mathematics is an oxymoron; the algebra paradigm causes them to believe that mathematical problems are contrived artifices. The latter misapprehension is wonderfully satirized by the lyric “When it's noon on the moon then what time is it here?” in Tom Lehrer's song *That's Mathematics*, a clever account of the ubiquity of mathematics in everyday life. It is safe to say that all mathematicians at one time or another yearn for a way to share with nonmathematicians what it's really like to do mathematics.

Every year JPBM, a joint activity of the mathematics societies, promotes Mathematics Awareness Month to “communicate the power and intrigue in mathematics to a larger audience.” Often the theme stresses the power of major applications, for example, the mathematical analysis of climate change. This year, perhaps emphasizing the intrigue, the theme is “Mathematics, Magic, and Mystery”.

Some readers may recognize that as the title of a 1956 Dover original by Martin Gardner, late “Mathematical Games” columnist for *Scientific American* and prolific popularizer of mathematics. This is no coincidence: 2014 marks the centennial of Gardner's birth, and Mathematics Awareness Month explicitly intends to celebrate the occasion with “activities that engage a new generation, leading

people to their own magical and mysterious [mathematical] moments.” Some of this new generation may become mathematicians themselves. But one can also hope that these mathematical moments will allow a broad public to get a feeling for what mathematical thinking really is.

Andy Magid makes this point, I think correctly, about how mathematical thinking in recreational mathematics is analogous to mathematical thinking in mathematical research in his March 2014 *Notices* review of Gardner's autobiography *Undiluted Hocus-Pocus*, although the review seems to be more about Gardner the Oklahoman than Gardner the mathematician. Gardner, by the way, did not call himself a mathematician, but he may well qualify as “the best friend mathematics ever had,” as the Mathematics Awareness Month 2014 theme essay has it. That is, he led a wide public to experience mathematics in the way mathematicians do through his presentations of puzzles, games, and mathematical magic tricks. This probably qualifies him to the title of mathematician after all.

Martin Gardner thought and wrote about much more than mathematics. He was also a noted amateur magician, who carefully observed the magician's code of silence vis-à-vis outsiders, although he did publish (pseudonymously) exposés of tricks being passed off as genuine extrasensory perception. Similarly, Gardner also playfully used a pseudonym to publish a tongue-in-cheek negative review of his major work of philosophy, *The Whys of a Philosophical Scrivener*, in the “New York Review of Books” (he later felt that too many readers missed the joke, depressing sales). He even used an anagrammatic pseudonym to include some of his own work in his anthology *Martin Gardner's Favorite Poetic Parodies*; many readers consider those to be some of the highlights of that book.

As Persi Diaconis has pointed out, Gardner towards the end of his life began to describe himself as a mysterian, one who holds a certain scientific/philosophical position about human consciousness. Gardner described this position in his 2007 *Notices* review of Douglas Hofstadter's *I Am a Strange Loop*—thus the third word in the title of this essay, my title being a slight variant of Diaconis's foreword to Gardner's autobiography.

Readers wanting to celebrate Mathematics Awareness Month by entertaining students, colleagues, and friends with a little mathematical magic could do worse than consult Gardner's *Mathematics, Magic, and Mystery*, which is still in print and priced at US\$8.06, which is fifty cents less than its inflation-adjusted cost of one dollar in 1956. Or for some more elaborate and up-to-date material, take a look at Colm Mulcahy's *Mathematical Card Magic: Fifty-Two New Effects*, published in 2013.

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