Undiluted Hocus-Pocus

Reviewed by Andy Magid

Undiluted Hocus-Pocus: The Autobiography of Martin Gardner
Martin Gardner
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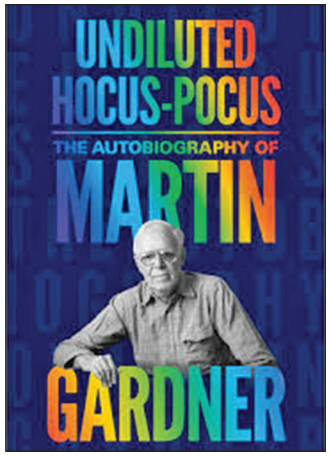
At one time, algebraists used to entertain themselves with the pseudotrivia question: who is the most important ring theorist from Alabama? "Pseudo" because the point was not to test the interrogee's knowledge of Cotton State mathematics, but to surprise them with the answer, namely, Nathan Jacobson. That it should be a surprise carried more than a whiff of Yankee chauvinism; anyone familiar with the Midwestern U.S. small town merchants of the 1940s and 1950s who were born in Poland and raised in the American South would have instantly recognized from Professor Jacobson's speech patterns that he shared that biography. And the algebra community being the size it is, anyone who could have been surprised by the answer was surprised long ago, although there is a similar question still making the rounds—who is the best group theorist from Arkansas?—that reeks of the same chauvinism.

Algebraists annoyed at being asked the Jacobson question too many times began to respond with the question, who is the second most important ring theorist from Alabama? which is a cute riposte but finesses a more fundamental point. Is there any reason we should care to know that Jacobson was from Alabama? Or, for that matter, know any biographical trivia about any mathematical figure?

Martin Gardner, the author and mathematics columnist who died in 2010, was educated in Tulsa, Oklahoma, where he was born in 1914, thereby becoming one of two possible answers to the trivia question, who is the most important nonfiction writer from Tulsa? The other possible answer is the historian Daniel Boorstin, who was also born in 1914 but arrived in Tulsa as an infant. Both men graduated from Tulsa Central High School, although Boorstin, something of a prodigy, seems to have graduated at age fifteen before Gardner entered. I do not know if they ever met. Incidentally, even though I met these men only briefly and then near the end of their lives, I spoke to them enough to know that you couldn't detect anything in their speech patterns suggesting a Tulsa biography, not even in the telltale second person plural.



There's also the academic historian John Hope Franklin, who graduated from Tulsa's Booker T. Washington High School. Franklin was known more as a scholar than as a writer, although his 1947 book *From Slavery to Freedom* has sold millions of copies. He was born two days after the end of 1914, which makes him almost a coeval of Gardner and Boorstin; again, I don't know if Franklin ever met Gardner or Boorstin.

Gardner's impact on mathematics in America was profound, especially in the 1960s and 1970s, when he wrote his widely popular column "Mathematical Games" for *Scientific American*. I was a fan, beginning as a teenager, and loved reading the columns, especially those in narrative form featuring the Dr. Matrix character. I also remember with pleasure reading in Gardner's first collection of those columns, *The* Scientific American *Book of Mathematical Puzzles and Diversions*, the

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dedication to Gardner's teacher at Tulsa Central High School, being an Oklahoma high school student myself at the time. I also have to say that, with the possible exception of some word ladders, I can't recall ever solving any of the problems in Gardner's column. This is no insult to Gardner—I also never built any of the apparati described in "The Amateur Scientist", the wonderful *Scientific American* companion column by C. L. Strong—but rather a testimony to his skills as a writer and the pleasure his writing gave the reader. I suppose, between the ends of the spectrum of readers like me, who never solved any problems and readers, if any, for whom only the problems and not Gardner's writing mattered fell the vast majority of readers who made Gardner's column the most popular feature of *Scientific American* in its day.

Let's agree that, whether he was a mathematician or not, Martin Gardner wrote about mathematical puzzles in an entertaining way that entranced a wide audience well beyond professional mathematicians and advanced students of mathematics. Even when mathematics is admired by the general public, as it was in post-Sputnik America, the gap between what the public thinks mathematics is and what mathematicians understand mathematics to be is vast. What Martin Gardner accomplished was to bridge that gap.

Here's an illustration. The following two problems are, in my judgment, about equal in intellectual content. The first comes from Gardner's first collection of columns mentioned above. The second is an exercise in commutative algebra.

1. A young man lives in Manhattan near a subway express station. He has two girlfriends, one in Brooklyn, one in the Bronx. To visit the girl in Brooklyn, he takes a train on the downtown side of the platform; to visit the girl in the Bronx he takes a train on the uptown side of the same platform. Since he likes both girls equally well, he simply takes the first train that comes along. In this way he lets chance determine whether he rides to the Bronx or to Brooklyn. The young man reaches the subway platform at a random moment each Saturday afternoon. Brooklyn and Bronx trains arrive at the station equally often—every ten minutes. Yet he finds himself spending most of his time with the girl in Brooklyn; in fact, on the average he goes there nine times out of ten. Can you think of a good reason why the odds so heavily favor Brooklyn?

2. The commutative ring S is an algebra over the commutative ring R. The ring R has no nontrivial idempotents, and S is finitely generated as an R module. Can S have infinitely many idempotents?

One needs to understand some basic arithmetic and have some notion of random and average to solve problem one, but beyond that no special knowledge is required. I suspect that even the one specialized detail that Gardner puts in (the uptown/downtown choice from the same central platform is apparently a feature of express stops; hence the protagonist is said to live near such a station) was unnecessary for most of his readers. On the other hand, almost all the words in problem 2 are used in a specialized mathematical sense. Even if it were possible to present definition chains of all the terminology involved, we would expect years of study before a typical layperson would be comfortable tackling that problem. I hope those readers familiar with the terminology will agree with me, and I invite the rest to take my word for it, that the two problems are roughly the same sort of intellectual, or mathematical, challenge.

Month after month Martin Gardner's column presented and discussed intellectual recreations that were on the level of what mathematicians thought about and yet were accessible to people without advanced mathematical training. He called these recreations—properly—mathematics. The discipline has had no finer exponent.

To further establish my Gardner fan credentials before we turn to Gardner's new book, I also recall reading in high school with much satisfaction two other excellent Gardner books of the period, *Logic Machines and Diagrams* and *Fads and Fallacies in the Name of Science*. Both of these, by the way, could well have been collections of articles, although they were in fact unified projects; Gardner just seems to write that way naturally. His other great style is being the annotator, as he is in his most popular book, *The Annotated Alice in Wonderland*. To illustrate its popularity and to keep Gardner's mathematician fan base in perspective, it's well to recall that since its initial release in 1960, the number of copies of *The Annotated Alice* sold is about twenty times the number of mathematicians in or joining the profession from then until now.

So how did Tulsa schoolboy Martin Gardner become the popular and admired writer on mathematics and other topics? *Undiluted Hocus-Pocus: The Autobiography of Martin Gardner* tells the story. Like everything Gardner ever wrote, it is entertaining, informative, witty, deft, and a joy to read, or so this fan assesses. Mathematicians need to be aware that the role that mathematics, or the writing of the "Mathematical Games" columns, plays in Gardner's story of his life is brief. Readers also need to be aware that Gardner is concerned with philosophical ideas, including theological ones. In his preface, quoting Lenny Bruce, Gardner identifies himself with people leaving churches and going back to God. In his prologue, quoting himself from his 2007 *Notices* book review ["Do loops explain consciousness?: Review of *I Am a Strange Loop"*, August 2007], Gardner identifies himself as a mysterian, i.e., one who is convinced that "no philosopher or scientist living today has the foggiest notion of how consciousness, and its

inseparable companion free will, emerge, as they surely do, from a material brain."

Gardner has previously spoken to the mathematical community about how he came to write "Mathematical Games" in an interview with Allyn Jackson in the *Notices* (June/July 2005) and in an interview with Donald Albers of the Mathematical Association of America, which is included in the MAA's CD *Martin Gardner's Mathematical Games: The entire collection of his* Scientific American *columns* (the disc also includes a biographical essay on Gardner by Peter Renz). As Gardner recounts in *Undiluted Hocus-Pocus*, a friend of his showed him a hexaflexagon, he decided to do an article on it that he sold to *Scientific American*, the response to the article was such that the publisher asked Gardner to do a monthly column, and "Mathematical Games" was born. This account, by the way, occupies the first two pages of Gardner's chapter 15 (of twenty-one), which is entitled "Scientific American". Gardner tells us that writing the column for twenty-five years "was one of the greatest joys of [Gardner's] life," and that "one of the pleasures in writing the column is that it introduced [Gardner] to so many top mathematicians," among whom he mentions Solomon Golomb, John Conway, Raymond Smullyan, Roger Penrose, and Donald Knuth (in chapter 15), and Ron Graham and Persi Diaconis in chapter 17, which is entitled "Math and Magic Friends". These chapter titles are not rigid boundaries. Chapter 15 includes an account of Gardner's relationship with Isaac Asimov, and chapter 17 recounts his relationships with Salvador Dali and Vladimir Nabokov. As this last bit of name-dropping makes clear, Gardner's long career as a Chicago- (where he attended the University of Chicago) and New York-based writer brought him in contact with a smorgasbord of top-tier intellectual celebrities. Of course he was one himself—or would have been had his proverbial public shyness not kept him from certain spotlights. Here is an example (not mentioned in *Undiluted Hocus-Pocus*): according to Gardner's son James, Gardner declined an invitation from Stanley Kubrick to attend the premiere of *2001: A Space Odyssey* on the grounds that he didn't have a tuxedo. On the other hand, Gardner must have been a wonderful small group social companion, as the heartfelt Foreword by Persi Diaconis and Afterword by James Randi for this book make clear.

Except for the sections noted in the preceding paragraph, however, most of Gardner's autobiography, and life, was not about mathematics. The reader will learn about Tulsa in the 1920s from the perspective of a bright and athletic schoolboy. And, it must be said, a privileged one: the family home on South Owasso Street was in a pretty tony area (it's still tony). Gardner tells that the third floor of the house was servants' quarters. Although Gardner doesn't mention household staff, the house my late mother-in-law grew up in a mile north on Owasso, in a less ritzy area, also had servants' quarters in the rear. However, by the 1920s their domestic help were commuters, not live-in. (Although I never heard them mention him, my mother-in-law and her sisters were the right age to have passed Gardner in the halls of Horace Mann Junior High and Tulsa Central High.) The reader will also learn about the University of Chicago of the 1930s from the perspective of an intelligent undergraduate with a deep interest in philosophy and the philosophy of religion, about Navy life in World War II aboard a destroyer escort, and about living the life of a writer in the Greenwich Village of the 1950s.

What the reader will also hear about, but not enough, is the role that performing magic tricks played in Gardner's life. Anyone who has ever traveled with, say, mothers of small children or people who keep kosher know how these folks can make contact with others of their kind almost instantly in strange venues while the rest of us are still struggling to meet the local population. Gardner hints that the same type of radar connects magicians, and many of the pivotal events of his life seem to hinge on a connection made by magicians. (The friend who showed Gardner the hexaflexagon, for example, was a fellow magic enthusiast. So are Diaconis and Randi.) Like followers of twelve-step programs (another group who make instant connections in new places), magicians apparently also gather regularly to trade tricks and gossip. Gardner seems to have spent many hours in such gatherings, presumably with pleasure and involvement, but he doesn't share much of this with his readers.

Gardner makes clear in this book, as he did in his MAA and *Notices* interviews mentioned earlier, that he considers his book *The Whys of a Philosophical Scrivener* his deepest work. It is an important book, which unfortunately seems not to have reached the audience he sought for it. Perhaps the format (each chapter is framed as a question "Why I am not a …", where the blank is replaced by various philosophical systems) makes it look like a collection of discrete pieces in the style used for *Fads and Fallacies* or *Logic Machines and Diagrams*. It is not: it is a sustained account of Gardner's thinking leading up to his "mysterian" position.

Although various chapters of *Undiluted Hocus-Pocus* could be read in isolation, the book is a sustained account of Martin Gardner's eventful life. Despite the caveats noted above about the role magic played in that life, it is a remarkably open account for the publicly shy Gardner, perhaps that being one of the reasons it is posthumous. Gardner believed in God and an afterlife. He tells us in his last pages that this is not grounded in the "head", which he is using as a metonym for rational inference, but in the "heart", which he

uses as a metonym for direct emotional perception. Gardner says:

> As for God and an afterlife, our head tells us both are illusions. An Old Testament psalm (14:1), Unamuno reminds us, does not say "The fool hath said in his *head* there is not God." God is a hope only of the heart.

In the King James translation of Psalm 14 that Unamuno is referencing, the italicized word is rendered heart, which is indeed the literal translation of the Hebrew word in question. On the other hand, the biblical writers understood that organ to be the location of the intellect, not the emotions, which is why a modern translation, such as the Jewish Publication Society's of 1982, renders the verse "The benighted man thinks…." Could Martin Gardner, the master annotator and occasional pseudonymous prankster, not know this? This reviewer, an afterlife skeptic, is willing to suspend disbelief long enough to wonder if in some form or other Gardner is watching to see how many readers catch this "glitch". Plus of course I wonder if there are other glitches Gardner has planted that I've missed. For example, about that express subway station: are there any stops in New York where trains go in two directions from a central platform?

In keeping with the prankster tradition, I confess that the Arkansas group theorists' query above is also a trick question. There's a three-way tie for first (some say two-way).

Donoho Awarded 2013 Shaw Prize

David L. Donoho

The Shaw Foundation has awarded the 2013 Shaw Prize in Mathematical Sciences to DAVID L. DONOHO of Stanford University "for his profound contributions to modern mathematical statistics and in particular the development of optimal algorithms for statistical estimation in the presence of noise and of efficient techniques for sparse representation and recovery in large data sets." The prize carries a cash award of US$1 million.

The Shaw Prize in Mathematical Sciences Selection Committee released the following statement about Donoho's work.

"For more than two decades David Donoho has been a leading figure in mathematical statistics. His introduction of novel mathematical tools and ideas has helped shape both the theoretical and applied sides of modern statistics. His work is characterized by the development of fast computational algorithms together with rigorous mathematical analysis for a wide range of statistical and engineering problems.

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"A central problem in statistics is to devise optimal and efficient methods for estimating (possibly nonsmooth) functions based on observed data which has been polluted by (often unknown) noise. Optimality here means that, as the sample size increases, the error in the estimation should decrease as fast as that for an optimal interpolation of the underlying function. The widely used least square regression method is known to be nonoptimal for many classes of functions and noise that are encountered in important applications, for example, nonsmooth functions and non-Gaussian noise. Together with Iain Johnstone, Donoho developed provably almost optimal (that is, up to a factor of a power of the logarithm of the sample size) algorithms for function estimation in wavelet bases. Their 'soft thresholding' algorithm is now one of the most widely used algorithms in statistical applications.

"A key theme in Donoho's research is the recognition and exploitation of the fundamental role of sparsity in function estimation from high-dimensional noisy data. Sparsity here refers to a special property of functions that can be represented by only a small number of appropriately chosen basis vectors. One way to characterize such sparsity is to minimize the L^0-norm of the coefficients in such representations. Unfortunately, the L^0-norm is not convex and is highly nonsmooth, making it difficult to develop fast algorithms for