A Lifetime of PUZZLES

HONORING MARTIN GARDNER

EDITED BY

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A Collection of Puzzles in Honor of Martin Gardner's 90th Birthday

Edited by
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Preface

This book celebrates Martin Gardner's 90th birthday with a series of 25 articles about some of Martin's favorite topics.

Martin Gardner is the father of recreational mathematics, an avid puzzler, a lifelong magician, and a debunker of pseudoscience. He has written more than 65 books throughout science, mathematics, philosophy, literature, and conjuring. He has deeply influenced countless readers of his "Mathematical Games" column in *Scientific American*, which ran for 25 years from 1957 to 1982. This column popularized recreational mathematics and introduced many connections between mathematics, puzzles, and magic. Together with Gardner's amazing ability to correspond with his many readers, the columns gave the general public the opportunity to enjoy mathematics and to participate in mathematical research. Many of today's mathematicians entered this field through Gardner's influence. A whole body of research into recreational mathematics has also emerged, solving problems that Gardner posed years ago and introducing new problems in the same spirit.

Given the retrospective nature of this book, many of the articles have a historical slant. The first two articles, for example, are specifically about Martin Gardner and his influence on the world of magic. Part II is entirely "In Hindsight," describing the world's first puzzle "craze" of the *Tangram* and detailing the oldest book on recreational mathematics (circa 1500) including both puzzles and magic tricks. Several articles consider historical puzzles; for example, Roger Penrose reminds us of a kind of maze he developed with his son back in 1958. (Incidentally, the present book was also edited by a father-son team.)

The articles in this book are organized into six parts. Part I, "Cast a Spell," is about mathematical magic tricks. Part II, "In Hindsight," makes the historical discoveries described above. Part III, "Move It," is about puzzles involving motion, from mazes to *Instant Insanity* to Peter Winkler's walking ants. Part IV, "Fitting In," is about puzzles involving packing or entanglement, from Stewart Coffin's work to burr puzzles, and the related art of mosaics. Part V, "Speak to Me," is about word puzzles, from Smullyan's logic puzzles to recreational linguistics on graphs and grids. Part VI, "Making Arrangements," is about puzzles and games that arrange pieces into particular structures, from the classic Gardner topics of ticktacktoe and magic squares to new developments inspired by Gardner (or Dr. Matrix) like pandigital numbers.

We feel honored to gather this collection of exciting and fun material in honor of a man who has touched so many: Martin Gardner.

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Part I

Cast a Spell

Warning: Martin Gardner has turned hundreds of mathematicians into magicians and hundreds of magicians into mathematicians! ~Persi Diaconis

Martin Gardner and His Influence on Magic

Christopher Morgan

Persi Diaconis thinks the good-natured "warning" noted above should appear on many of Martin Gardner's books. A distinguished Stanford mathematician, magician, and long-time friend of Martin Gardner, Persi has written several technical treatises on the mathematics of card shuffling, among his many other accomplishments. He has tremendous admiration for Martin Gardner: "Martin elevates magic in our eyes and in the public's eyes. He's such a visible center that people from all over the world have written to him. He picks the best ideas and amplifies them."

Many magicians who know and love Martin Gardner's magical writings would agree. This short essay discusses Martin's accomplishments in magic and their connections to mathematics, mostly through the voices of those many "mathemagicians" who have been influenced by him.

A Focal Point

Martin Gardner stands at the intersection between magic and mathematics. "Mathematical magic, like chess, has its own curious charms," he says. "[It] combines the beauty of mathematical

structure with the entertainment value of a trick" [7]. Persi Diaconis understands this synthesis:

> The way I do magic is very similar to mathematics. Inventing a magic trick and inventing a theorem are very, very similar activities in the following sense. In both subjects you have a problem you're trying to solve with constraints. One difference between magic and mathematics is the competition. The competition in mathematics is a lot stiffer than in magic. [3]

Many of Martin Gardner's fans may not know the extent of his lifelong involvement in magic, or how many contributions he has made to the art. Indeed, many future magicians began reading Martin Gardner for the mathematics, only later becoming fascinated by the magical content. Magician Dan Garrett [8], for example, grew up with an interest in mathematics and science rather than magic (other than as a hobby). In high school, he says, "I read Martin's 'Mathematical Games' column in *Scientific American* and his book *The Numerology of Dr. Matrix*. I never even knew he was a magician until much later." (He notes that Gardner's

Figure 1. Martin Gardner showing Joe Berg's improved version of the Hunter rope trick.

Encyclopedia of Impromptu Magic [5] is a tremendously significant contribution to the vast world of magic literature.)

Martin has always been generous with his magical ideas. Colm Mulcahy, a professor in the Department of Mathematics at Spelman College and creator of an excellent website devoted to mathematical card tricks [11], told me that over a period he gradually became fascinated by mathematical card tricks and ultimately started corresponding with Martin Gardner, who graciously allowed him to recycle any of the card tricks in his mathematics popularization publications and even suggested that Colm write a book on the subject of mathematical card tricks, which he is now doing.

Magic has always been Martin's main hobby, and he pursues it actively to this day. In *Martin Gardner Presents* [6, p. 374], a comprehensive 1993 collection of Martin's magical creations, Stephen Minch (magician, author, and founder of Hermetic Press) notes that "card magic, and magic in general, owe a far greater debt to Martin Gardner than most conjurors realize." Martin was recognized for these contributions in 1999, when he was named one of *MAGIC Magazine's* 100 most influential magicians of the twentieth century [1].

Seven Decades of Magic

Martin has been writing about magic and contributing new effects for nearly seventy years. His magical friends past and present have included Dai Vernon ("The man who fooled Houdini"), Persi Diaconis, Jerry Andrus, Stewart James, Wesley James, Ed Marlo, Doctor Daley, Mel Stover, Ted Annemann, Ken Krenzel, Max Maven, Howie Schwarzman, Jay Marshall, Richard Kaufman, Herb Zarrow, Karl Fulves, and many, many others. Now, in his nineties, he keeps in contact with magicians like Penn and Teller by phone and receives occasional visits from magicians who come to trade notes with him.

I visited Martin recently to discuss his career in magic—which we did, though we actually spent more time trading magic tricks! His enthusiasm for new magical ideas remains as infectious as ever.

The spriest of nonagenarians, Martin showed me Joe Berg's improved Hunter knot trick [6, p. 36], two false deck cuts, a revolving card effect, some topological knot tricks, some rubber band tricks, and several mathematical card tricks. Many of these tricks have appeared in his writings over the years. Next, he demonstrated the Wink Change, an elegant card effect he created years ago. "Of all the moves I have invented," he said, "the Wink Change is the one

Figure 2. Martin Gardner demonstrating his original card effect, the Wink Change.

I'm most proud of" [6, p. 315]. The Wink Change instantly transforms one card into another, and he performed it with the kind of effortless technique that comes only from years of practice. Before we knew it, the afternoon had flown by.

Martin prefers the intimate approach to magic:

> I'm not a performer. I just do close up stuff for friends. The only time I got paid for doing any magic was when I was a student at the University of Chicago. I used to sell magic sets at Marshall Fields during the Christmas season. One of the Gilbert magic sets had some pretty nice apparatus in it, and I worked out several routines. That's the only time I had to do magic in front of a crowd.

Early Work and a Meeting with Annemann

Martin's first published magic manuscript, *Match-ic*, appeared in 1935. It was a booklet of tricks featuring matches. Many more pamphlets would follow. Several of them, including *12 Tricks with*

a Borrowed Deck and *Cut the Cards,* are highly regarded by magicians.

One standout trick from *12 Tricks with a Borrowed Deck* is Martin's "Lie Speller" trick [4, 6, p. 172]. In this effect, a spectator secretly picks a card, replaces it in the deck, and ultimately spells the name of the card, one card per letter. Amazingly, the last card dealt is the spectator's card. This works even if the spectator lies about the name and/or suit of the card! Variations on this seminal trick have been created by such magicians as Jack Avis, Bruce Cervon, Milt Tropp, Harvey Rosenthal, Larry Jennings, Ed Marlo, Jon Racherbaumer, Max Maven (a.k.a. Phil Goldstein), Bob Somerfeld, Allan Slaight, Stewart James, and J. C. Wagner, among others.

A turning point for Martin was his first meeting with Ted Annemann in the late 1930s. Annemann, editor of the influential magic magazine *The Jinx*, was one of the most fertile minds in magic and mentalism during the first half of the twentieth century. Magician Steve Beam, author of the excellent *Semiautomatic Card Tricks* book series, notes that Annemann was an important early pioneer in mathematically based magic tricks. "Annemann hid many mathematical principles in his card tricks," he says. Many of these mathematical tricks appeared in *The Jinx* during the 1930s and 1940s, and Martin's original effects were among them.

Martin recalls his first meeting with Annemann in New York in 1937:

> I had just recently moved from Chicago to New York. I walked into a bar restaurant on Broadway and 42nd Street and recognized Annemann sitting at a table with Doc Daley. I recognized him from his photo. I had just published a book of card tricks, and I told Annemann I had a manuscript for a new book of original ideas I had in magic. He invited me to come to his apartment and demonstrate some of the tricks. He had a little stage at one end of his apartment [laughs]. I stood up there and did a series of tricks. He asked if he could borrow the manuscript, and he devoted an issue to the tricks that were in that manuscript. So, my Lie Speller trick first appeared in *The Jinx.*

Annemann historian Max Abrams says:

> *The Jinx 1937–1938 Winter Extra* consisted of 24-year-old Martin Gardner's "Manuscript," an eight-page bonanza containing seventeen tricks by the prolific and profound Martin Gardner. The collection of tricks presented in the *Extra* was an auspicious occasion in a redoubtable career. [2, p. 364]

Mathematics, Magic and Mystery

Ask Gardner magical aficionados to name their favorite Gardner book, and you'll often hear *Mathematics, Magic and Mystery* [7]. Martin's first published book, it appeared in 1956 and remains in print a half century later. This seminal work has been a bible for magicians interested in mathematically based tricks.

Max Maven, one of the most creative mentalists and magicians in the field, wrote the introduction to *Martin Gardner Presents*. He keeps two copies of *Mathematics, Magic and Mystery* in his library. That's because over the years he has referred to his first copy so often that it has begun to fall apart. (He holds on to that first copy "for sentimental reasons." Thus far, the later reprint is holding up to frequent handling.) He told me:

> Martin is one of the great teachers, not only of magic, but of science and mathematics. Although Martin's work in magic is not primarily invention, he has in fact devised some excellent material, and several of his creations (most notably the Lie Speller, both for plot and method) have become standards. But his great gift is gathering really good information, separating the wheat from the chaff, then explaining those ideas with writing skills that make them engaging and understandable. He has been a conduit—perhaps a better word is "synthesizer"—for a great deal of magical information that has filtered out into the larger magic world.
>
> A lot of his influence has been secondary and tertiary, simply because many people who've come up in magic more recently have not realized that they were being influenced by him. That's because a lot of his ideas, or the ideas he was conveying, had already passed through other people. In my case, I had the benefit of having a father who was a physicist, and therefore I was reading Martin's [*Scientific American* "Mathematical Games"] column from a very early age. I owe a lot to Martin Gardner, for expanding my intellectual horizons.

Mathematics, Magic and Mystery is particularly valued because it records some of the best mathematical tricks of the eccentric magical genius Bob Hummer, whose parity-based card tricks inspire magicians to create interesting variations to this day. The Hummer effects are just a few of the riches to be found there. Martin's elegant "Curry Triangle" (a deceptive geometrical vanish effect) also appears there, for example [7, p. 145].

Patterns and Principles

Ken Krenzel, another respected name in the field of magic, is an old friend of Martin's. Ken told me:

> Martin is brilliant. He has always been one of my magical heroes. He's a very quiet, almost shy person. When I first met him in New York [in 1956], I saw him in the New York Public Library on 42nd Street. He was always up in the reference room, collecting material. That was back when he published his first book, *Mathematics, Magic and Mystery.* The depth and breadth of Martin's writing is just incredible. If you look in Hugard's *Encyclopedia of Card Tricks* [9, p. 167], for example, you'll see a magnificent, little-known subtlety under his name, called "Gardner's Unique Principle." It involves one-way backs. His subtlety is that you can have the cards mixed every which way, with the backs facing randomly in both directions. When you spread the cards face down in a ribbon spread on the table, you look for patterns, such as four cards going in one direction followed by three going in the other, then perhaps five in the other, and so on. That gives you your key as to where a card is taken or replaced.

Magical Secrets and "Elevating Magic"

The aforementioned Steve Beam says that he's always been a big fan of Martin Gardner, and that reading him also got him hooked on math. Over the years, Steve has used a highlighter on so many passages in books like Gardner's *Mathematical Magic Show* that the pages are completely yellow. For magicians, he notes, one of the most attractive aspects of Martin's writing is the emphasis on elegant principles rather than finished effects. Martin encourages the readers to embellish the ideas: "There's a lot of great raw material in Gardner's writings," he notes. "People can run with his material because he doesn't work it to death." This emphasis on theory may be one reason, says Persi Diaconis, that magicians are seldom bothered when Martin reveals elegant "mathemagical" ideas in his columns and books:

> In magic, secrets are sacrosanct, yet Martin has routinely put wonderful secrets into his columns, and somehow the world forgives him. Part of the reason is that having magic presented in his *Scientific American* column or in his books—in the glow of so many other important ideas—glorifies magic. People are proud to have a trick in one of Martin's books. In fact, my first

published magic trick appeared in Martin's column years ago. And, because he is able to elicit magic from unlikely sources, often outside of the magic world, many unexpected new math-emagical ideas have come to light.

A good example of this is the Kruskal principle [10], invented by Princeton physics professor Martin Kruskal, and used in many card effects. It is based on—of all things—Markov chains!

Colm Mulcahy adds, "Other ideas with far-reaching consequences that Martin has introduced to the reading world at large are faro (perfect) card shuffles and the Gilbreath principle." The Gilbreath principle is named after its inventor, Norman Gilbreath. In its simplest form, if you arrange a deck of cards so that the colors alternate, cut the deck into two halves so that the bottom cards are different colors, then riffle shuffle the halves together once, each pair of cards will contain one red card and one black card. Colm Mulcahy tells me that early in the twentieth century, O. C. Williams published the basic fact that a single irregular riffle shuffle falls far short of randomizing a deck of cards. This was later expanded on by Charles Jordan. In the late 1950s, Norman Gilbreath and others rediscovered the principle and took it to new heights. Karl Fulves also says that Gene Finnell independently discovered the principle.

Dignity for Our Little Mysteries

Gordon Bean, well-known magician and magical author, says:

> As the son of a physicist, I lived in a house visited regularly by Martin Gardner's column in *Scientific American*. After my interest in magic kindled, I can remember few satisfactions greater than the tantalizingly infrequent times "Mathematical Recreations" would veer into the realm of magic. Apart from the actual principles and effects explored, I've never escaped the reverberations of visiting a place where being able to magically predict the position of red and black cards after a legitimate shuffle seemed only a little less important than being able to predict the rotation of planets.

> English-speaking magicians have long been frustrated by the inadequacy of the word "trick" to describe what they do. This is a lack that we'll most likely never fill, but Martin Gardner has gone a long way in bringing our little mysteries a sense of dignity without ever losing a sense of fun.
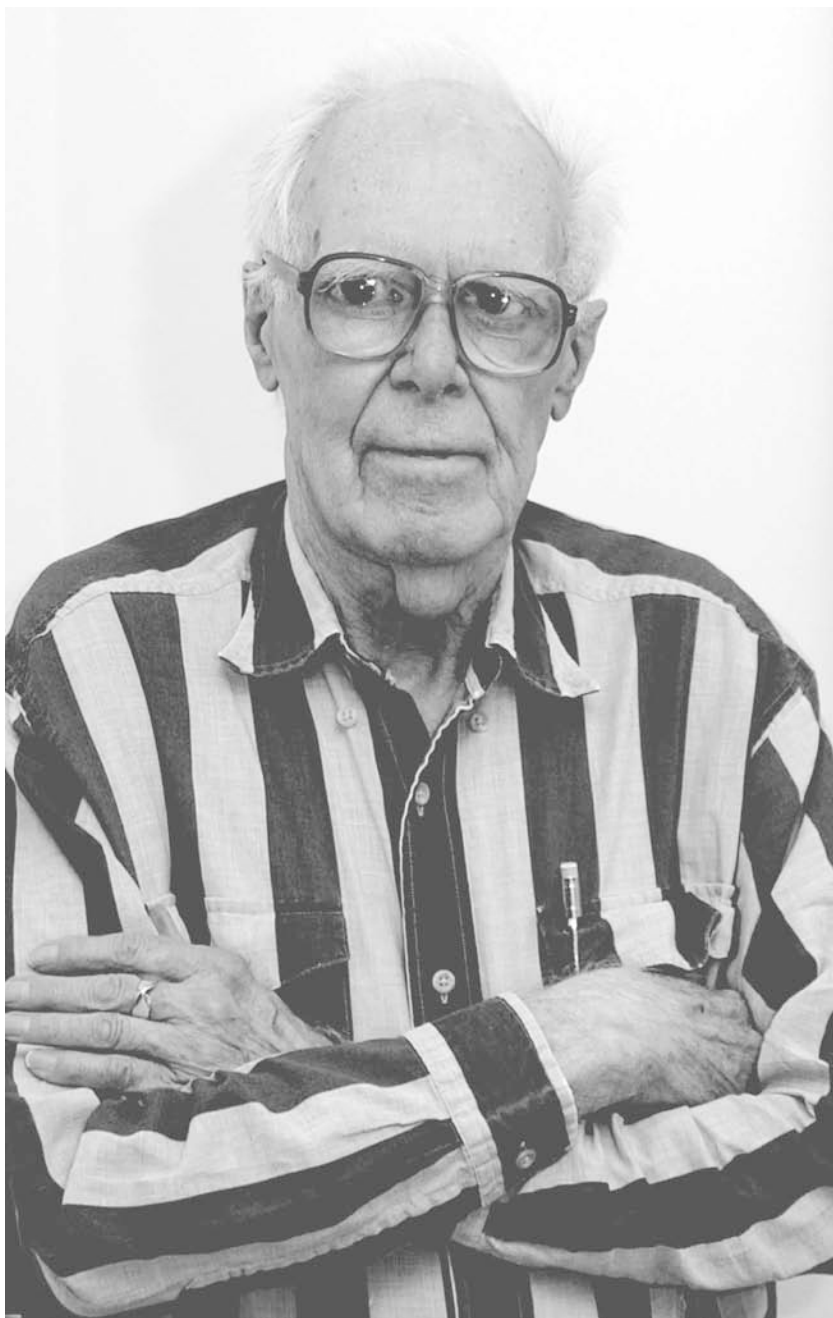
Figure 3. A portrait of Martin Gardner.

A Clarity of Perception

Atlanta-based magician Joe M. Turner [12] offers a fitting conclusion to this essay by putting things in a larger context:

> Martin Gardner's long and continuing influence in magic is—if you'll pardon the pun—puzzling. After all, some of the most common advice we magicians give ourselves is to "perform magic" and not just to "do tricks." We are encouraged to enchant and mystify our audiences by creating a theatrical experience, and to lift them above the perception of magic as a "mere puzzle."

> And yet, Martin Gardner remains one of the most cited and revered names in our field. Martin Gardner! His *Encyclopedia of Impromptu Magic* is guaranteed to show up in any poll of magicians' favorite magic books. His magazine columns are the source of endless fascination among magicians as well as actual human beings. Throughout his work we find items which bear frighteningly close resemblance to (gasp!) puzzles. Why does a mathematician with a predilection for impromptu tricks and puzzles command so much attention that magicians jockey to get invited to a convention named in his honor? It must be more than simply the prestige of telling other magicians you were there.

> Perhaps Martin Gardner, for all the perception-twisting puzzles and tricks he has created, has a clarity of perception with regard to magic that transcends even what magicians understand our art to be. Magic is more than the special effects we see on a stage or in the practiced hands of a trickster, however talented. Martin Gardner shows us that magic, like mathematics, may in fact be an intrinsic and often surprising part of how the universe is put together. Just when we think we've got something figured out, he shows up with a different way of looking at it and we are surprised by the very thing we thought we knew—whether it's a mathematical principle, a deck of cards, or a piece of string. Martin Gardner reveals the surprising in the familiar, which—if one wishes to create the illusion of magical powers—is a skill devoutly to be wished.

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Martin Gardner—Encore!

Prof. M. O'Snart

What is this eminent scholar and philosopher doing in the pages of *MAGIC*?[1] He is following his lifetime passion—sharing the mystery, the surprise, and the joy of Magic!

The Challenge Set

The most mysterious figure in the realm of magical literature, whose one contribution to the subject is still, after 25 years, one of the classics, is S. W. Erdnase, author of *The Expert at the Card Table.* Who was S. W. Erdnase? It has been said that his real name was E. S. Andrews, which in reverse order produces the pen name under which he wrote.

This challenge was laid down by Leo Rullman in *The Sphinx* for February 1929 and was not met in his lifetime. But the puzzling wordplay and the darker mystery of authorship would have struck one very inquisitive 14-year-old student of magic very deeply: Martin Gardner's subconscious stored the challenge away, biding its time.

Rullman was soliciting lists of "The Ten, or Twenty, Best Books on Magic" in his column, and Erdnase appeared in most; as a

book dealer, he listed a "scarce original edition" for $2.25; Dariel Fitzkee's new book, *Jumbo Card Manipulation*, was hailed as "The Erdnase of Jumbo Cards"—Erdnase was hot! Martin was well immersed in the jog shuffles and fancy cuts, the ruse and subterfuge of Erdnase. He read his 25¢ copy "with passionate interest." And the next year, he would be writing in *The Sphinx* himself!

Tulsa, Oklahoma

Martin was born October 21, 1914 in Tulsa, Oklahoma. His father, Dr. James H. Gardner, geologist and oilman, taught Martin his first trick, "Papers on the Knife Blade." Encouraged by Roy "Wabash" Hughes, Roger Montandon, and Logan Wait, he advanced rapidly in the art. Much later, Montandon and Wait would include two items from Martin in their 1942 booklet, *Not Primigenial*, commenting, "We've always enjoyed Martin Gardner's quick tricks." In 1978, Martin dedicated his massive *Encyclopedia of Impromptu Magic* "For Logan and Roger."

While 15, Martin contributed nine effects to *The Sphinx*: "New Color Divination" (of gum balls) in May 1930, to "The Travelling Stick of Gum" and "Vanishing Pack of Life Savers" in October 1930. Fellow contributors and dealers that year were Stewart James, with a new card effect, "Gnikool," for 50¢ and John Booth, introducing his original "Three Shell Monte," also for 50¢. Beneath Martin's second contribution, "Borrowed Ring Off String," Charles "Baffles" Brush in his "Current Magic" department for July 1930, commented, "This is the right way to do magic, take one trick and use if for an entirely different one. Give him a little encouragement and he will send in another good one." Did Baffles hit the old prophetic nailhead right in the bull's eye, or what? Since that first display of creativity in 1930, every single year has seen some published work of Martin's!

In the August 1930 issue of *The Sphinx*, Martin described his own subtle and effective changes in handling for the "Papers on the Knife." In 1978, he devoted six pages to this classic in his *Encyclopedia*. Martin's name appeared for the first time on the front cover of *The Sphinx* as a contributor (along with ten others) in the February 1931 issue. Of course, he was now 16!

The March 1931 issue of *The Sphinx* was a special issue, marking the magazine's 30th year with "the first rotogravure section ever found in a magic periodical" of eight pages of portraits. Martin contributed "An Impromptu Trick" in which a borrowed and marked

coin travelled from pocket to opposite pant leg cuff twice. This title must have amused Martin, since it required adding a secret pocket and a two-foot-long cloth coin slide to your trousers! I suspect this was a put-on, since this elaborate method was used by Martin as the mock explanation for a similar effect done by simple sleight-of-hand in the 1937–38 *The Jinx Winter Extra*. This contribution also marked Martin's debut as a dealer. For ten cents postage, he offered, "a pair of black elastic shoelaces for use in seance work where it is necessary to remove foot from shoe. They cannot be told from the genuine article and save lots of time in taking shoe on and off." Baffles kindly let this blatant commercial message slip by—after all, those were Depression days!

Chicago, Illinois

Martin left Tulsa for Chicago in 1932, expecting to spend two years at the University of Chicago, then shift to Caltech and complete his education as a physicist. However, he found the philosophy of science and philosophy in general so attractive that he remained to graduate Phi Beta Kappa in philosophy from the University of Chicago in 1936. Fiction, poetry, philosophy, and politics engaged Martin's flowering writing talents, but chess engaged his spare time to an extent so alarming that he decided to quit playing completely rather than become compulsive.

In November 1935, the Ireland Magic Company of Chicago published Martin's first booklet, *Match-ic*, "More Than Seventy Impromptu Tricks With Matches."

Martin returned to Tulsa in 1936 for a stint as a reporter for the *Tulsa Tribune*, did not like it, and returned quickly to Chicago and the action at Joe Berg's and Laurie Ireland's magic shops. His day job was public relations writing for the University of Chicago, but Martin fondly recalls that he was "a charter member of the old Round Table gang that used to meet every night at the Nankin Chinese restaurant on Randolph Street. Werner 'Dorny' Dornfield was the group's central figure, and I count my friendship with him as one of the great privileges of my youth."

Ed Marlo, or Eddie "Bottom Deal" Marlo back then, was another good friend of Martin's from the 1930s. Their joint effort, the "Gardner-Marlo Poker Routine" in Marlo's 1942 booklet *Let's See The Deck*, became the classic automated model. Another classic card plot created by Martin, "The Lie Card Speller," wherein the spectator may lie or tell the truth to every question, first appeared

in *Here's New Magic*, published in 1937 by Joe Berg, ghosted by Martin Gardner.

L. L. Ireland published Martin's *12 Tricks with a Borrowed Deck* in 1940, full of remarkably durable material. Martin published (that is, mimeographed) his own manuscript, *After The Dessert*, in 1940. Its quick success justified a printed edition, expanded from 24 to 30 impromptu tricks, which Max Holden published in 1942, dedicated to "Dorny." The title page is graced by a quote from William Shakespeare: "After the Dessert … 'Tis a Goodly Time for Pleasantry." Martin finally admitted it was just another of his spoofs—he made up the quotation after he made up the title! The *Genii* ad of December 1940 has the name of the author/dealer as "Matt Gardner," possibly to distinguish orders generated from the ad in *The Sphinx* of November 1940?

In the late 1930s, Martin became known as an idea man, always ready to generate fresh material for novelty houses, stories or articles for publishers, and ideas for cereal box inserts or merchandising premiums. For 1938, 1939, and 1940, Martin worked at Marshall Field's department store, demonstrating and selling "Mysto Magic Sets" through the Christmas season. Martin says he learned there that you don't know a trick until you have performed it 50 times. Martin invented a transposition effect using two large sponge balls in 1940, which Ireland marketed as "Gardner's Passe Passe Sponge Trick," four pages plus two sponges for 50. Martin must know this effect extremely well. At the Chicago 1940 SAM Convention, he performed the moves "a few thousand times," pitching the package in the dealers' room. No report as to the number of sales made.

The North Atlantic

Martin enlisted in the Navy in 1941 and served four years on a destroyer escort, the USS Pope, with the North Atlantic Fleet. He spent much of his night-watch time thinking up plots for stories, much like Stewart James in the Canadian Army, who volunteered for night-guard duty so that he could work out his magical methods without interruption. The year 1942 saw Max Holden publish Martin's second booklet on cards, *Cut the Cards*. In the introduction, Martin worried that "tricks will continue to be forgotten and later reinvented, or to be buried permanently in some remote corner of an old magazine or out-of-print booklet." It is ironic that Martin's other booklets were all reprinted many times, but *Cut the*

Cards went out of print for 50 years. It may now be found, eccentrically displayed, in *Martin Gardner Presents*, 1993. To solve the problem, Martin envisaged "a mammoth card encyclopedia" wherein "thousands of sleights, principles, and effects will be described, classified and cross-indexed . . . Additions to the book will appear annually as pamphlets, and at intervals, the entire work will be revised and reissued."

The Challenge Met

In 1945, Martin returned to civilian life, freelance writer style, in Chicago. The next year, provoked perhaps by news of the death of Leo Rullman or by some chance remark, an urge grew to take up that long-ignored challenge, "Who was S. W. Erdnase?" Fortune smiled on Martin and his oily old pea-jacket! In December 1946, Martin found and met Marshall D. Smith, the actual illustrator of *The Expert at the Card Table*, who had drawn the very hands of Erdnase demonstrating his sleights! An elated Martin arranged a guest appearance of M. Smith at the 1947 SAM Convention in Chicago, where he met Erdnase enthusiasts and autographed their copies. Alas! None of the leads to Erdnase so hoped for came from the artist.

But Martin soon had a new lead. In the August 1949 *Conjuror's Magazine*, he proffered new evidence—an article by James Andrews from the June 26, 1909 *Harper's Weekly* entitled "The Confessions of a Fakir." Martin wrote that he could not prove it, but he thought Andrews was Erdnase. But again, no real ties were found.

Fortunately, Walter Gibson supplied Martin with a lead to an old gambler, Ed Pratt, who had known Erdnase! His recollections provided the needed clues for the identification of Erdnase as Milton F. Andrews, achieved October 29, 1949! By November, Martin had found and interviewed Milton's older brother, Alvin E. Andrews. In *The Phoenix* #190, November 18, 1949, Bruce Elliott announced that Martin had solved the case:

> A really exciting thing has happened—Martin Gardner's lone, long quest for the truth about the mysterious author of *The Expert at the Card Table* has been crowned by success. Photostats being airmailed to New York will show once and for all who the strange Mr. Erdnase really was, what his life was like, and how and when he died.
>
> We're hoping to be able to bring you the highlights of the story in the next issue. If we were able to tell you the story, you'll

agree that it is one of the most remarkable ever told. Even if we can't, we must doff our dusty lid to Martin and his stick-to-itiveness against seemingly insurmountable odds. Many have tried to find out about Erdnase. Only Martin, working from vague hints and even vaguer clues and hunches, has seen his way through the web of misinformation.

Pictures, news stories, a confession all iron clad evidence provide that Martin has solved the case. When we saw Martin, he had just come from interviewing a blood relative of Mr. Erdnase. In the excitement of the chase, Martin hadn't had a chance to change his clothes for three days. Even a literary detective case can have its wild moments. This was the culmination for Martin of years of work, of probing the libraries, checking city directories, of adding two and two and getting fourteen.

We envy him.

In the next issue Elliott could only say, "Still haven't received clearance on the Erdnase story. Maybe in next issue." Five years would go by before another word on the strange Mr. Erdnase saw print. Martin preferred to spend more time gathering data and verifying details with Pratt, Smith, and others. Even the cemetery where Erdnase lay buried was checked. Finally, on December 24, 1954, Jay Marshall in *The New Phoenix* #321 announced the true identity of Erdnase:

Martin Gardner brought with him a briefcase and a sheaf of photostats. It was a complete newspaper account of the exciting life and the dramatic suicide of Milton Franklin Andrews. He had the correspondence and the notes made during the last decade in his successful search for the true identity of the elusive idol of the card sharps: S. W. Erdnase. It's a story of crime, murder, and adventure that is stranger than fiction. You'll find it all in these pages during the coming Summer.

In *The New Phoenix* #339, September 1956, Jay Marshall noted, "We are still at work on the Erdnase story and hope to publish it in full sometime this fall." By the following issue #340, January 10, 1957, plans had changed. "Martin Gardner is going to write the Erdnase story for *True* magazine."

When *True* published Martin's account of Erdnase in January, 1958, entitled "The Murdering Cardshark," it had been heavily rewritten, sensationalized in fact, by John Conrad, who shared the byline. Martin the scholar was not happy with the tabloid conclusion to his investigations: no documentation, no referencing,

no acknowledgments, and considerable groundless embellishment. However, Leo Rullman's challenge had been met, his ghost could rest, and Martin was very busy.

Some decades later, Martin was happy to share his documents, letters, and interview notes with Jeff Busby and Bart Whaley, who tracked down much more material, written, printed, and pictorial. Their book, *The Man Who Was Erdnase* [11], stands as a unique monument. Martin wrote in the Foreword:

> Bart Whaley, encouraged and assisted by Jeff Busby, has done a truly magnificent job of pulling together everything known today about Andrews and his masterpiece. He has set it all down in such loving detail, with such clarity, brilliance, and impeccable documentation, as to elevate him to the ranks of our country's top writers about true crime. I believe that this amazing book will become as famous in the literature of magic as Andrews' own classic. And what a sad, bitter, violent fantastic story it tells!

Martin contributed two articles, "The Mystery of Erdnase" (from the Program Book of the 1947 SAM Chicago Conference) and "The Man Who Was Erdnase," to *The Annotated Erdnase* by Darwin Ortiz [10], who added his comments—in all 11 pages of pertinent additional information.[2]

Returning to the year 1946, we find fortune smiled on Martin twice more. He began the first monthly column of his career, "Puzzles – Tricks – Fun," in *Uncle Ray's Magazine* for September 1946. Every year since, except 1982, when the Gardners moved from New York to North Carolina, Martin has been engaged in at least one monthly column. In the dizzy year of 1953, he ran six columns simultaneously: in *Hugard's Monthly*, *Polly Pigtails*, *PigglyWiggly*, *Humpty Dumpty's*, *Parents' Magazine*, and *Children's Digest*.

The year 1946 also marked Martin's first sale as a professional fiction writer. "The Horse on the Escalator" appeared in the October *Esquire*. Martin modeled the story's narrator after his early mentor and good friend, Dorny. In Martin's 1987 anthology, *The No-Sided Professor and Other Tales of Fantasy, Humor, Mystery, and Philosophy*, he wrote, "it was the sale of this story to *Esquire* that gave me the courage to decline an offer to have back my pre-

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[2]The Erdnase mystery remains somewhat of a mystery. In an interview by Richard Hatch appearing in the April 2000 issue of *MAGIC*, Martin Gardner said, "you've convinced me now that there is good reason for doubt that Milton Franklin Andrews was Erdnase. I still think it was Milton Franklin, but my conviction rate is lowered ... to 60%."

war job in the press relations office of the University of Chicago. I wanted to see if I could earn a living as a writer."

New York, New York

Martin moved to New York in 1947 and rapidly entered the magic whirl: Saturdays at Lou Tannen's, then on to the restaurant or to Bruce Elliott's with Dai Vernon, Paul Curry, Clayton Rawson, Persi Diaconis, Bill Simon, Dr. Jaks, and/or other like-minded friends. Elliott's "The Back Room" column in *The Phoenix* provides a running account of New York activity: a line from #189 says, "managed to keep [Bill Woodfield] and Martin Gardner up till six A.M. which is considered par for the course in these parts."

During 1948, Martin initiated his ten-year run of monthly contributions to *Hugard's Monthly*, which became the basis of his mammoth *Encyclopedia of Impromptu Magic* (574 pages, 894 illustrations) [3]. Together with much new material, ideas, and references, there are about 2,000 items in 161 categories, from "Apples" to "Zipper," of unpredictable length: "Horn" has a paragraph, "Muscle Reading" has four pages, "Coins" has 138 entries, "Hands" has 96 entries. And, there are no card tricks and no rope tricks included! In his introduction, Martin continued to worry about the ideal format:

> I hoped that someday I might find time for extensive revisions and additions. I would obtain entry to a collector's library and plow through all his books, page by page. I would spend at least a few months on major periodicals. After that, I would attempt a comprehensive cross index.
>
> A trick, for instance, that uses a glass, handkerchief, and coin can be described only once, under one heading, but it should be cross referenced under other headings. Many tricks can be done with a variety of different objects. A trick with, say, a pencil may be equally effective with a table knife or a cane or a fountain pen. These, too, should be cross referenced as fully as possible; otherwise a reader searching the "Encyclopedia" for tricks with a certain object would be forced to go through the entire work if he wanted to run down all tricks applicable to that object. Also there should be cross indexing under such categories as "Practical Jokes," "Betchas," "Mental Effects," and so on, that would cut across listings by objects used.

In 1948, Martin also commenced writing on fringe science, cranks, impostors, cultists, and hoaxers. His first book for the

public appeared in 1952, *In the Name of Science* [5]. A second edition, expanded to 363 pages, was issued by Dover in 1957 with the new name *Fads and Fallacies in the Name of Science*. Said Martin, "Don't care for the title myself, but the publisher wouldn't budge on it."

Karl Fulves published two booklets for the magic trade by Martin, under the name Uriah Fuller: *Confessions of a Psychic*, 1975, and *Further Confessions of a Psychic*, 1980. For general trade, Prometheus issued Martin's *How Not to Test a Psychic* in 1989. They also issued a companion volume to *Fads and Fallacies* in 1981, *Science: Good, Bad, and Bogus*, collecting Martin's articles and book reviews on pseudoscience and parapsychology up to 1981. Martin has been criticized for employing ridicule at times rather than reason, but he answers, "one horse laugh may be worth a thousand syllogisms."

The Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) was formed in 1976 with a journal, *The Skeptical Inquirer*. Martin's contributions are gathered by Prometheus in *The New Age: Notes of a Fringe-Watcher*, 1988, and *On the Wild Side*, 1992.

Martin burst out writing on several fronts in 1948: magic, philosophy, fiction, science. Only a few significant titles will be mentioned from his widening fields of endeavor. Returning to the strand of magic, in 1949 Martin linked his three homes neatly. His introduction to *Over the Coffee Cups* was dated, "New York, 1949" and was dedicated "To The Chicago Round Table Gang" and published by Montandan Magic in Tulsa. Friends gave Martin good leads on stories. In an article, "It Happened Even to Houdini," printed in *Argosy* for October 1950, for instance, he said:

> Dai Vernon, one of the greatest card magicians of all times, was performing his club act last summer on the Brazil, a steamship en route to Buenos Aires. Dai had a card selected, then placed it back in the deck. "When I throw this pack into the air," Dai said, "the chosen card will stick to the ceiling." Dai gave the deck a vigorous toss. To his great astonishment, the pack vanished completely! It had gone through a small ceiling air vent which he hadn't noticed because he'd been working under a spotlight.

In 1952, Martin entered two longterm relationships. Bill Simon had introduced Martin to Charlotte Greenwald, and now he served as best man at their wedding, performed by Judge George Starke, another magic friend. Also, Martin sold an article, "Logic

Machines," to *Scientific American*. Typically, Martin had a special page provided for the readers to cut up into logic window cards.

The year 1955 saw the birth of the Gardner's first son, Jim, and also the birth of a new book. "Fresh! Original! ... scores of new tricks, new insights, new demonstrations." For once, the blurbs were quite correct. Martin's *Mathematics, Magic and Mystery*, 1956, was loaded with great ideas! (The preface was dated 1955, but publication was delayed.) It contained 115 actions describing over 500 tricks—still in print and still inspiring [7]. Even sleight-of-hand experts Ed Marlo and Dai Vernon contributed, among a host of Martin's friends. The Gardners' son, Tom, was born in 1958.

Unknowingly, Martin reached a turning point in his career with the sale to *Scientific American* of a fascinating article on "Flexagons" for the December 1956 issue. These endlessly transforming paper foldovers were an immediate success. Could Martin produce a monthly column on mathematical games? Of course! Martin was off and running and didn't look back for 25 years!

His column became immensely popular as his topics broadened to include everything from art, through carnival swindles and computer games, to literature. Martin could not only explain abstruse scientific topics in ways intriguing to high school beginners, but he could also reveal unexpected depths in simple games and tricks, sufficient to challenge the professionals. In September 1977, Martin's "Mathematical Games" was moved from the back section to the first position in the front of *Scientific American*—a signal honor!

After 24 years of meeting monthly deadlines, Martin wrote only six columns in 1981, alternating months with his successor, D. R. Hofstadter. Martin finished with the December column, while Hofstadter kept the pace for 19 more columns, bowing out in July 1983.

Happily, Martin periodically gathered his columns into books, made even more interesting by added material and comments from readers. The first was *The Scientific American Book of Mathematical Puzzles and Diversions*, 1959 [9]. They grew in size over the years, with the 14th, *Fractal Music, Hypercards, and More*, 1992, having 327 pages [4]. These 14 volumes, totaling 3,829 pages, with a 15th forthcoming to complete the series, form an unparalleled source of classic concepts, current principles, and inspiration for new developments in magical and mathematical recreations.

Martin contributed three further "Mathematical Games" columns to *Scientific American*—August and September 1983, and June 1986—marking 35 years of association with the magazine.

Martin's most successful book (over 500,000 sold!) was published in 1960, *The Annotated Alice* (including both of Lewis Carroll's books *Alice's Adventures in Wonderland* and *Through the Looking Glass*) [2]. Many annotated works of all kinds had been produced in the past, but only for the scholarly community, with cramped footnotes, little grace, and no illustrations. Martin's book was large format with legible type, delightful style, and profuse illustrations. It was accepted by the general public, who are still buying and enjoying it. Thirty years later, Martin followed up with *More Annotated Alice* [8]. Martin annotated several other works, including *The Rhyme of the Ancient Mariner*, 1965; *Casey at the Bat*, 1967; and *The Night Before Christmas*, 1991. Other authors soon began "annotating" anything they could find in the public domain.

Martin had some fun in 1975! He wrote a straight-faced column (though scattered with clues) of fictitious "science developments" for the April issue (read: April Fool issue) of *Scientific American*. Material that would have drawn a good laugh in *Mad* magazine was treated with great respect! Some of the topics, complete with illustrations, were: Leonardi da Vinci's invention of the flush toilet, a fatal flaw in Einstein's theory of relativity, a map that required more than the usual four colors to complete, and a simple motor that ran on psychic energy. Martin received several thousand letters, most patiently pointing out the *one* error Martin had made in an otherwise excellent column!

Hendersonville, North Carolina

Martin's retirement from *Scientific American* at the end of 1981 prompted national attention and congratulations, with articles in *Newsweek*, *Omni*, and *Science 81*, among others. *Time* had written Martin up in 1975—the Mathemagician! He was credited with interesting more people in mathematics and science than anyone else alive. The quieter days in Hendersonville, North Carolina, allowed Martin to wrestle with the larger, intractable puzzles of life and the universe, of religion and society. Two books were soon readied.

In 1993, Martin gathered his separately marketed tricks and novelties and his original contributions scattered through dozens of books and magazine since 1930, revised and updated them, and added new material to form *Martin Gardner Presents* (424 pages, 230 tricks, 450 illustrations) [6]. To the wealth of material covering all small objects including cards and rope, Dana Richards,

Martin's official bibliographer, added an extremely useful "Bibliography of Martin Gardner in Magic" through the end of 1992, but including *Martin Gardner Presents*. This adds another member to Russell's self-inclusive class! Aside from books and pamphlets, Richard Kaufman records information very hard to find: book introductions, book reviews, articles not in magic magazines, marketed effects and puzzles, and 235 individual effects contributed to 28 different books and 28 (!) different magazines, from *Abracadabra* to *The Swindle Sheet.* The hundreds of tricks from Martin's series in Hugard's *Encyclopedia of Card Tricks* are not listed, since they are compiled in the *Encyclopedia of Impromptu Magic.*

In January 1993, a three-month puzzle exhibition opened in the Atlanta Museum of Art. Martin and Charlotte Gardner were honored guests at special "Gathering for Gardner" festivities, including the unveiling of the incredible portrait of Martin in dominoes.[3] A book was presented to each person there, *Martin, Articles in Tribute to Martin Gardner*, edited by Scott Kim. Of many good things therein, Dana Richards' "A Martin Gardner Bibliography" is outstanding. Sixty-eight pages of entries!

First, what it does not list: the *Scientific American* columns; magic tricks in magic periodicals; British editions and foreign translations; the individual stories, poems, and stunts in children's magazines.

Now, let us sample what is listed: 63 books and pamphlets; 19 books edited or annotated; 53 book introductions; 153 book reviews; 105 letters published; 210 columns and articles and anthologized material! Even 46 articles about Martin are listed! Dana Richards classified Martin's writing under 14 subject headings: Mathematics and Puzzles, Science, Fringe Science, Philosophy of Science, Philosophy and Theology, Political, Fiction, Poetry, Literature, Oziana, Juvenile Literature, Magic, Journalism, and Unclassified!

How to account for this amazing breadth of topics? How to sound the depths of Martin's creative talent? Truly, another "mysterious figure" is abroad, threading through our outposts, mugging a psychic here, skewering a charlatan there, spreading antiirrational propaganda everywhere, then lightly dancing backward and away, confounding sober citizens with his laughter. When they ask, "Who are you, Nitram Rendrag?" he answers with G. K. Chesterton's riddle:

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[3]An image of this domino portrait appeared on the cover of the April 1994 issue of *MAGIC* and can also be found on page ii of *The Mathemagician and Pied Puzzler*. [1]