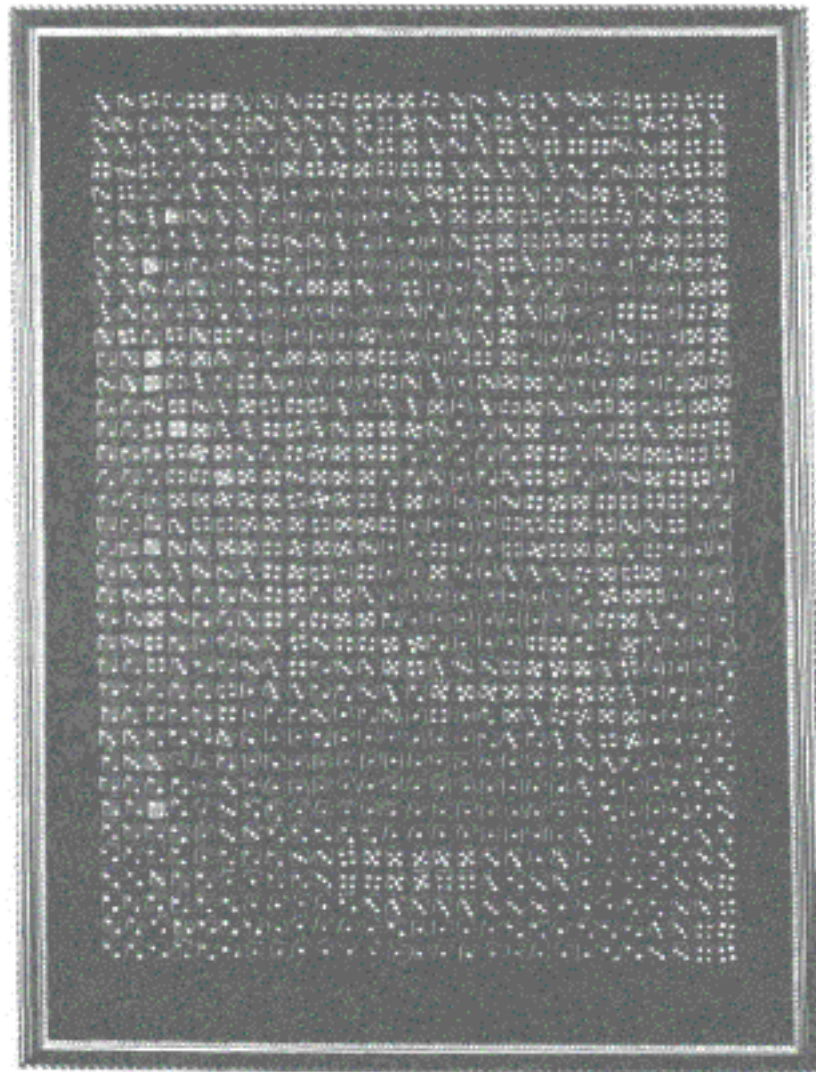

Puzzlers' Tribute



"I shall never believe that God plays dice with the world." — Albert Einstein

Ken Knowlton is widely known for his development of computer graphics languages and techniques, and for his computer-assisted artwork. All rights reserved. Used with permission of the artist.

Puzzlers' Tribute

A Feast for the Mind

Edited by
David Wolfe and Tom Rodgers



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Natick, Massachusetts

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Preface

Mathematicians, magicians, and puzzlists are masters of the unsolvable, the unbelievable and the unobtainable. Their currency is paradox. They reach enlightenment through bewilderment.

Members of these three communities meet every two or three years to honor the man at the forefront and nexus of all three, Martin Gardner. At this remarkable Gathering for Gardner (the four so far are dubbed G4G1 through G4G4), participants share talks and performances; problems and puzzles; knowledge and ideas. We invite you to read this compendium of contributions so that you too can be bewildered and enlightened.

The Mathematician and Pied Puzzler was published in 1999 as a tribute to Martin Gardner based on contributions to G4G1. Many of the Gatherings' participants and other fans of Martin Gardner expressed the wish for a second volume. We were glad to have another opportunity to share some of group's favorite paradoxes, problems and puzzles. The articles enthusiastically proffered by G4G participants honoring Gardner have led to the creation of a website and the start of a third volume. Emily DeWitt Rodgers set up and maintains the dedicated website, <http://www.g4g4.com>, which includes the full text of the first tribute book and a maze of puzzles, illusions, and problems. Many contributions and materials are placed there with the permission of the authors along with links to homepages of G4G participants.

All of the things that we said in the introduction to *The Mathematician and Pied Puzzler* remain true and relevant for this book so we have included words from its preface here:

Martin Gardner has had no formal education in mathematics, but he has had an enormous influence on the subject. His writings exhibit

an extraordinary ability to convey the essence of many mathematically sophisticated topics to a very wide audience. In the words first uttered by the mathematician John Conway, Gardner has brought "more mathematics, to more millions, than anyone else." It is a moving testimony that many professional mathematicians feel that Martin Gardner sparked and guided their early interest in mathematics.

In January 1957, Martin Gardner began writing a monthly column called "Mathematical Games" in *Scientific American*. He soon became the influential center of a large network of research mathematicians with whom he corresponded frequently. On browsing through Gardner's old columns, one is struck by the large number of now-prominent names that appear therein. Some of these people wrote Gardner to suggest topics for future articles; others wrote to suggest novel twists on his previous articles. Gardner personally answered all of their correspondence.

Gardner's interests extend well beyond the traditional realm of mathematics. His writings have featured mechanical puzzles as well as mathematical ones, Lewis Carroll, and Sherlock Holmes. He has had a life-long interest in magic, including tricks based on mathematics, on sleight of hand, and on ingenious props. He has played an important role in exposing charlatans who have tried to use their skills not for entertainment but to assert supernatural claims. Although he nominally retired as a regular columnist at *Scientific American* in 1982, Gardner's prolific output has continued.

Martin Gardner's influence has been so broad that a large percentage of his fans had only infrequent contacts with each other, until Tom Rodgers conceived of the idea of hosting a weekend gathering in honor of Gardner to bring some of these people together. The first "Gathering for Gardner" (G4G1) was held in January 1993. Elwyn Berlekamp helped publicize the idea to mathematicians. Mark Setteducati took the lead in reaching the magicians. Tom Rodgers contacted the puzzle community. Out of this first gathering grew a series of events, a second gathering, G4G2, was held in January 1994, G4G3 in January 1998, and G4G4 in February 2000.

The success of these gatherings has depended on the generous donations of time and talents of many people. The organizers, Elwyn Berlekamp, Tom Rodgers, Mark Setteducati would like to acknowledge the work of many people who have helped make the Gatherings for Gardner successful, including Scott Kim, Jeremiah Farrell, Karen Farrell, Emily DeWitt Rodgers, David Singmaster, and many others.

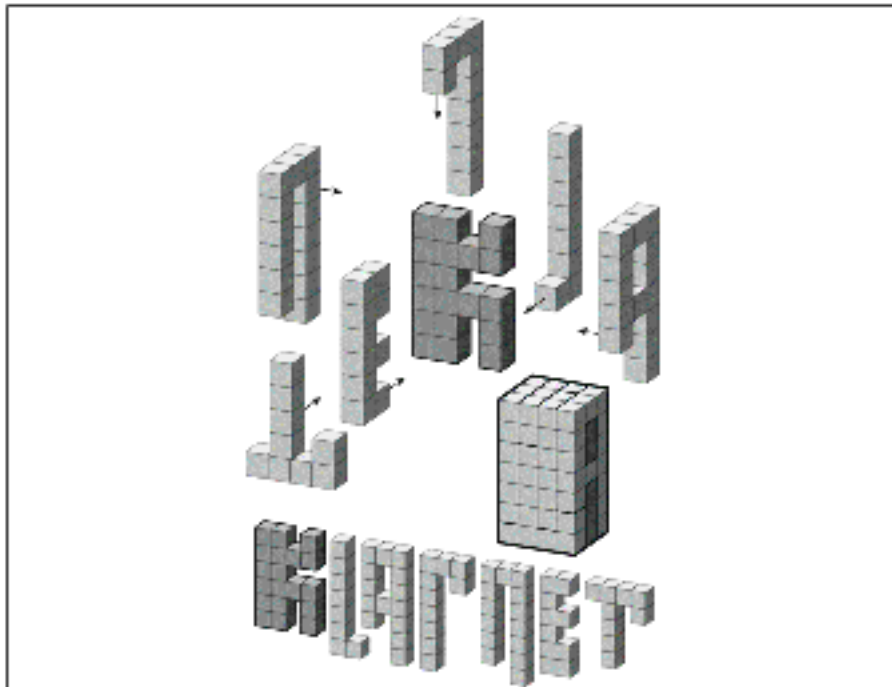
Of course, this book could not exist without the efforts of a large group of contributors. Scott Kim conceived of and assembled the first

tribute volume, and created the graphically spectacular cover in this second volume; Scott's generous contribution will remain engraved in our memories. Emily DeWitt Rodgers has done an excellent job of designing and maintaining the gig1.com website. In addition, we owe thanks as well to a number of anonymous reviewers for reviewing articles outside the realms of expertise of the editors. David Wolfe is indebted to his wife, Susan Hirschberg, for her incredible support and writing expertise, even while he neglected wedding and honeymoon plans to work on this book. As with any book, only the competence and professionalism of our publisher, A K Peters, Ltd., has allowed this project to overcome the difficult transition from an idea spoken of over wine to a real book which is now in your hands.

All of us feel honored by this opportunity to join together in tribute to the man in whose name we gathered, Martin Gardner.

David Wolfe
St. Peter, Minnesota

Tim Rodgers
Atlanta, Georgia



David Klarner



Harry Eng



Mel Stover

A Playful Tribute—Scott Kim

In Memoriam

Even mathematicians are mortal. This book is dedicated to the memory of three participants in *The Gathering for Gardner*, Mel Stover, Harry Eng, and David Klarner. Each was an admirer of Gardner and has gathered into the folds of another dimension since last we met.

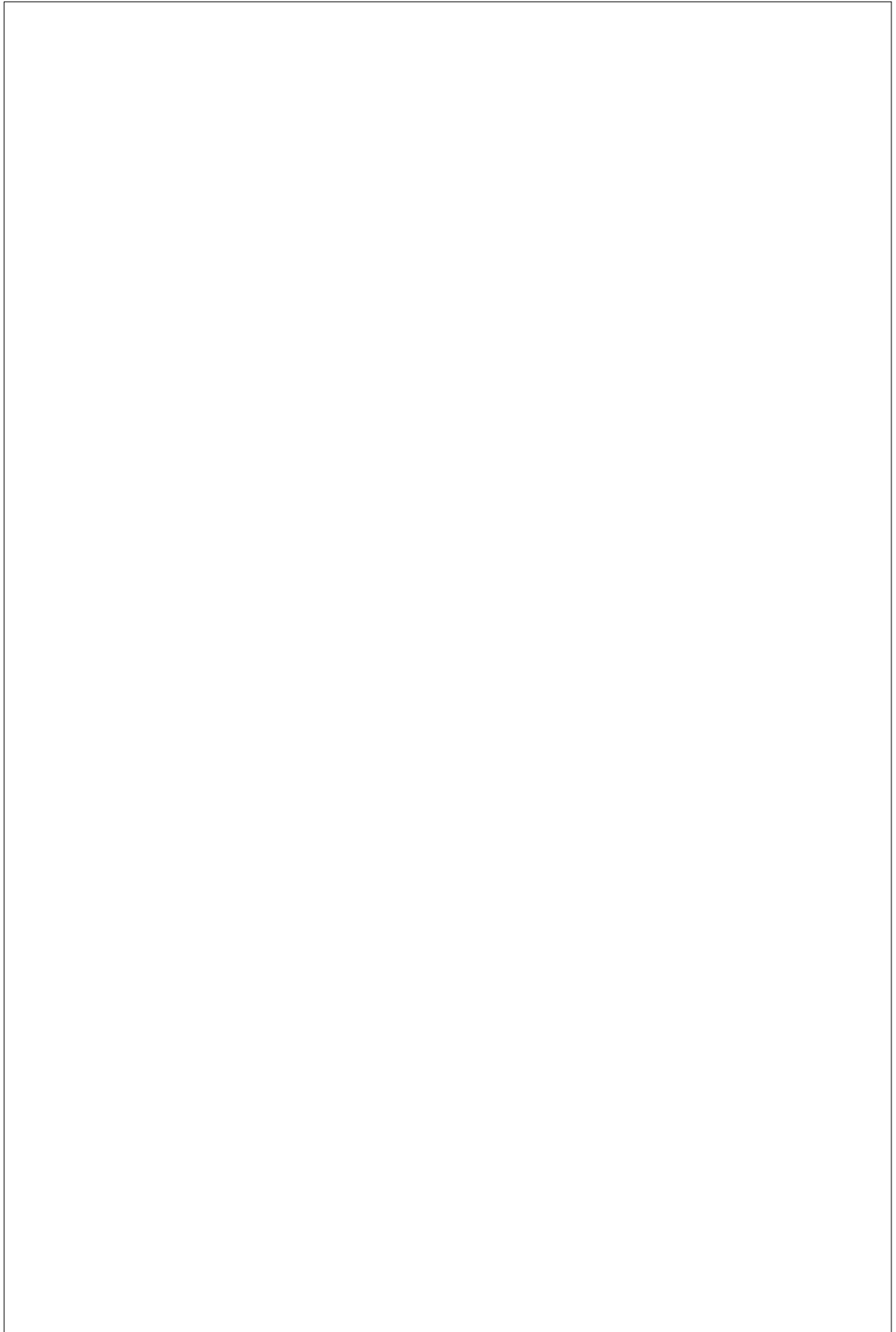
Mel Stover, a fifty-plus-year friend and correspondent of Martin Gardner, lived magic and created his own deliciously pernicious magic-puzzles. Both Martin Gardner and Max Maven wrote articles not only honoring Mel, but also remembering many of Mel's illusions.

"The Impossible Just Takes Longer" was oft quoted by Harry Eng, whose magic tricks, impossible objects, and memory feats pushed the limits of man's capabilities, as described in Mark Setteducati's article. The solution of Harry Eng's Impossible Bottle with inserted coins larger than the bottle mouth is explained in Gary Foshee's article.

David Klarner, who is remembered in articles by Solomon Golomb, C. J. Bouwkamp, and David Singmaster, helped develop the mathematics of box-packing problems and created masterful box-packaging puzzles.

We will miss them.

The Participants
G4G1, G4G2, G4G3, G4G4



A Greeting to Martin Gardner

Sir Arthur Clarke CBE

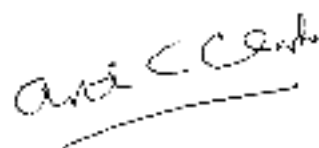
I am very happy to send my greetings to Martin on the occasion of the 'gathering' in his honour.

In particular, I notice that the theme of the event is the "Fourth Dimension"—something that has always fascinated me. I had almost forgotten that it was featured in one of my earliest (1946!) stories *Technical Error* (now in *Reach for Tomorrow*). And my very first television programme (BBC TV, 4 May 1950) was a thirty minutes talk on the Fourth Dimension—live of course, because there was no video tape in those days! After that ordeal, no camera has ever had any fears for me.

I am very grateful to Martin for creatively disrupting my life on at least two occasions, thanks to his columns in *Scientific American*. Thirty years ago he turned me on to Pentagrams, with results you'll see in *Imperial Earth*. However, even more important, he opened my eyes to the infinite universe of the Mandelbrot Set, which I cleverly managed to combine with SS Titanic, in *The Ghost from the Grand Banks*. (Isn't the connection obvious?)

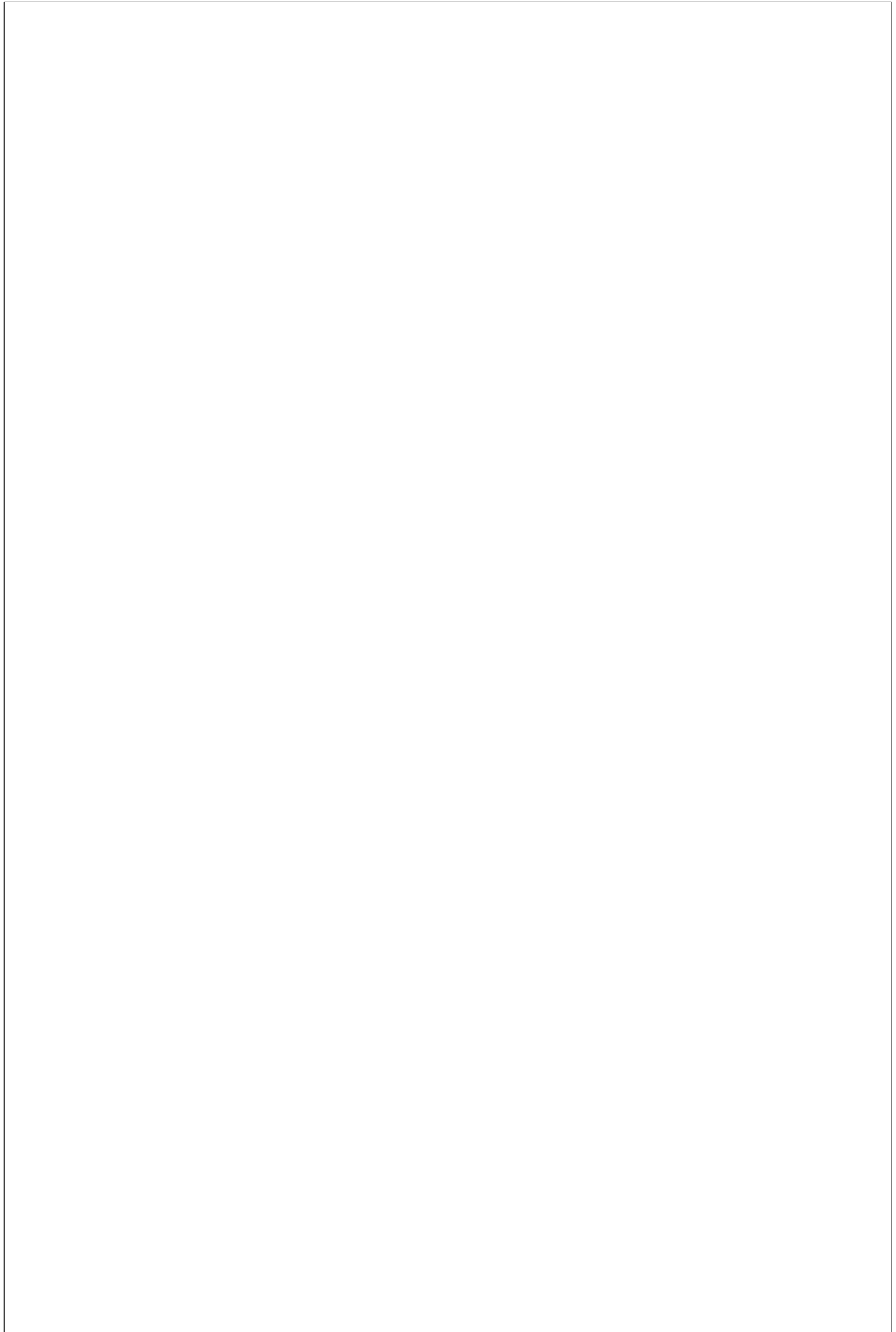
Finally, it was Martin's *The Night is Large* that inspired me to put together my own collection of non-fiction, *Greetings, Carbon-Based Bipeds!*

I would be hard put to think of anyone else to whom I owe so great an intellectual debt, and I wish him many more years of happy puzzling!

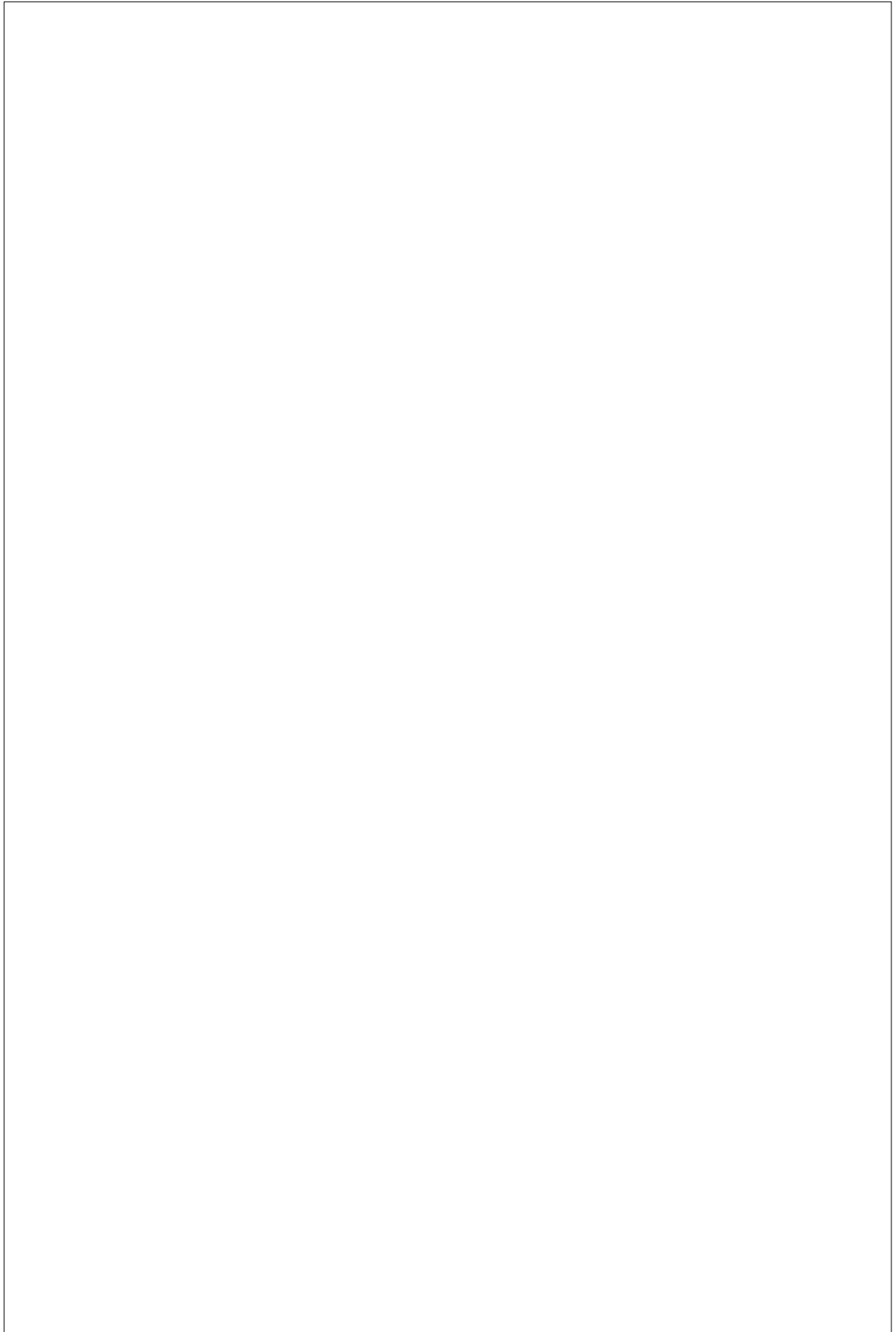


6 December 1999
Colombo, Sri Lanka

Sir Arthur Clarke



Part I
The Toast Tributes



Harry Eng: A Tribute

Mark Setteducati

Harry Eng was a teacher, inventor, minister, artist, magician, and musician whose life was about thinking and inspiring others to think. He was born in California, but the details are vague because he was adopted. For more than 30 years he lived in La Mesa with his wife Betty, raising two children, Greg and Diana.

Harry's house is filled with his creations and described by all who visit as the most unique home they've been in. An extraordinarily innovative school teacher in the San Diego area, in recent years he acted as a consultant to schools giving special lectures to gifted students on creativity and thinking. Harry created many original teaching techniques and devices such as using play money in class printed with his students' pictures on it, and a dummy named Ziggy that had clear plastic lungs attached to a vacuum cleaner. Harry would light up a cigarette for Ziggy and turn on the vacuum to teach kids not to smoke. He used magic and more recently his impossible bottles to inspire students to think.

Harry had a lifelong interest in magic. During the late 1970s he was actively involved in the San Diego magic scene, including being president of a local IBM ring. He never read books on magic and everything Harry performed was original. He invented the "PK Factor," a magnetic principle that was marketed by magic dealers. His hands were chubby and twisted, yet out of these would come incredible feats of magic, inventions, and impossible bottles. Magicians would show him a trick and Harry would often have an insight on a better way to do it — always in a humble way. Harry never made anybody feel he was better or smarter.

Mark Setteducati is a magician and inventor of magic, games and puzzles. He created Milton Bradley's *Magic Blocks*[®] and is co-author of *The Magic Stone*. This article originally appeared in *Geni* in October, 1998.

One of Harry's passions was his feats of memory which included books he made that contained 10,000 numbers or thousands of words that he had memorized. He would have you turn to any page and he would recite the contents without looking. He created a cardboard name computer that has over 1000 names programmed into a few cards. With a few questions he could guess anybody's name. He created his own stacked deck and was constantly working on new and more impossible card effects with it. He was a master at origami and would fold an ordinary paper bag into a hat, a pair of shoes or a wallet. My favorite routine that Harry performed was with a single piece of heavy duty rope, sometimes with his trademark button knot tied at the bottom. He would pass the rope behind his back while talking about a courtroom. The first time a knot would appear in the center of the rope. Harry would say, "Knot Guilty." The second time Harry would amazingly be able to snap the rope behind his back so it created a noose as he would exclaim, "Guilty!... Hang 'em!" He would then go on to thread a needle, shoot the rope as a bow and arrow, penetrate the rope through a spectator's thumb, and arrange the rope between his fingers to create a frog and then a dog. Each trick would be accompanied by silly patter and clever puns, all executed with precision skill and a sense of humor that exemplified Harry's personality.



Figure 1. Harry Eng's bottles. Harry explained that cutting the bottle is the hard way to fit the items in for it's nearly impossible to disguise the cut when resealing. (See Color Plate II.)

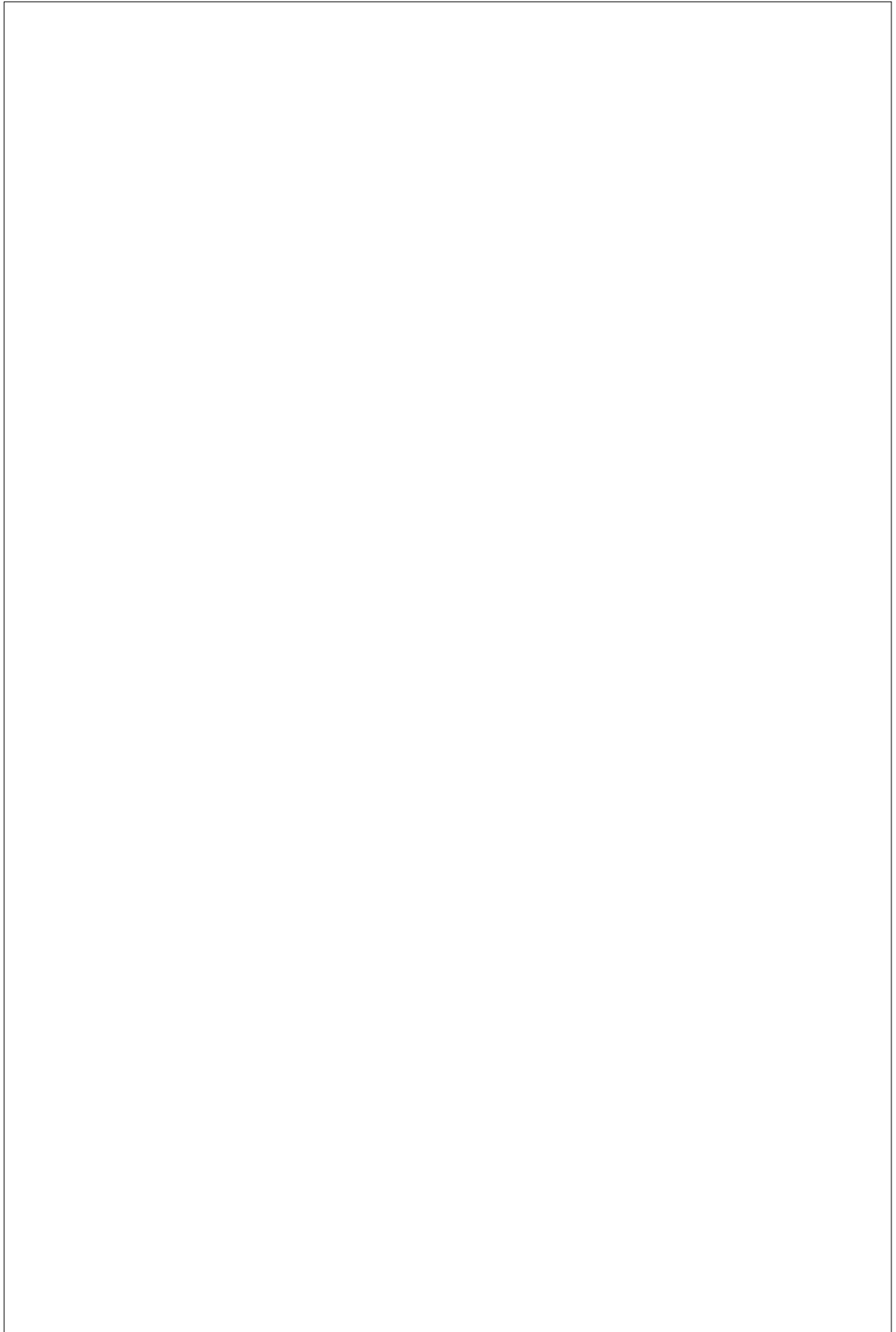
And then there are the bottles. If Harry never made a single bottle he would still be one of the most remarkable men I have known—but it's the bottles that certify him as a true genius. Impossible bottles date back more than a hundred years, and Hoffman describes an arrow through a bottle, as well as a bottle containing a dowel with a screw

through it. And of course there is the classic ship in a bottle. But about ten years ago Harry Eng put a deck of cards in a bottle and it went on from there: ping pong balls, tennis balls, coins, sneakers, padlocks, baseballs, light bulbs, scissors.... You name it and Harry has probably put it in a bottle. He brought to his bottles a level of originality and diversity that astonished and delighted top puzzle experts in the world. The beauty of the way he would tie knots inside the bottles using the same rope he would perform his tricks with and the clever puns he would incorporate in many of the bottles (a deck of cards with a bullet through it is titled a "loaded deck") make them more than just puzzles—they are works of art. When people look at the bottles Harry would say they became Indians because they always say "How." After giving one of his standard humorous answers such as "trained cockroaches" he would tell you his real secret which is: He "thinks his way into the bottle."

Most people assume the bottles were cut, which, according to Harry, would be the hard way to do it—there would be burn marks or evidence on the bottles. Then, after a little thought, people would figure he put the cards in one at a time or he took the lock apart and assembled it inside the bottle and would be satisfied with their answer. But it's exactly at this point, if you keep thinking about it, the more impossible they become. How did he get the steel nut through the deck—there's no clearance to screw the bolt on. How did he lock the padlock through the wooden plug capping the bottle—it doesn't move. Harry put things in bottles to challenge himself and to make people think.

After suffering a major heart attack more than 15 years ago, the doctors gave Harry about a year to live. Thankfully he didn't listen to them then—but he did suffer health problems that made him face his mortality every day, never letting it get in his way of living and enjoying life to the fullest. Ironically it was in the middle of performing his rope routine for a group of friends in Northern California on the afternoon of July 29, 1996 at age 64, Harry felt a little faint, sat down and passed away.

Harry truly loved people. He traveled extensively and had friends all over the world—there isn't a person who knew him who hasn't been influenced by his inspirational mind and personality. He was one of those rare people who I never saw get angry and who would always look at the positive side of things. Since his passing I think of him every day and the image that keeps coming to me is not of his incredible mind or creations, but of a happy man with a great sense of humor that was reflected in everything he did—always telling silly jokes and laughing. Harry loved to laugh.



The Eng Coin Vise

Gary Foshee

Of all the objects Harry Eng has placed inside of a bottle, a solid metal coin is one of the most amazing. The effect is one of total impossibility. I pondered over this for some time until Harry let me in on his secret: he bent the coin, placed it in the bottle, then used a specially constructed metal vise *inside* the bottle to flatten the coin. To accomplish this, some of the vise pieces are fed into the bottle one at a time, and then reassembled while inside the bottle. The remaining pieces of the vise are assembled outside of the bottle and joined to the pieces inside. The bent coin is now maneuvered into the vise inside the bottle, the vise closed, and the coin pressed flat. The vise is now disassembled and removed from the bottle. The real beauty of the vise is that the force applied to flatten the coin is generated *outside* of the bottle.

The basic principles of Harry's vise are presented here. There is sufficient detail to build a vise from this description, but it will prove quite difficult. Proper high-strength steels must be used for certain components to withstand the considerable force required to flatten the coin. Consulting someone skilled at metalworking is highly recommended.

The vise consists of an inside piece, an outside piece, and a connecting rod joining the inside and outside pieces. The inside piece is shown unassembled in Figure 1 and assembled in Figure 2. The central hole in the upper bar of Figure 1 is threaded to accept the connecting rod. The two lower bars of Figure 2 slide freely on the two bolts.

The parts of the outside piece are shown in Figure 4. The block has a vertical hole through the center. The hole is threaded at the top to accept a bolt, and threaded at the bottom to accept the connecting rod. A solid push rod fits inside of the connecting rod. The part to the right

Gary Foshee is a mechanical puzzle collector and designer living in Seattle, Washington.

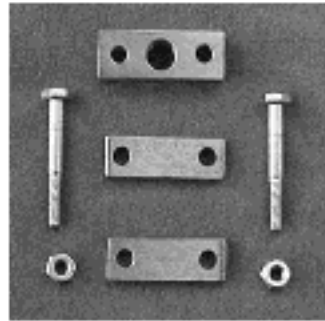


Figure 1.

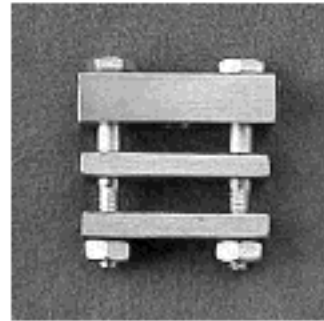


Figure 2.

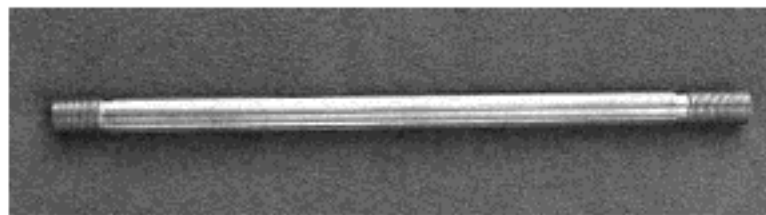


Figure 3.

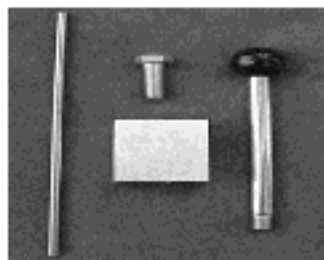


Figure 4.

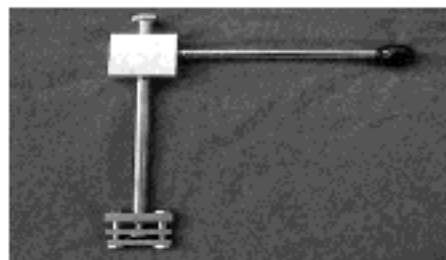


Figure 5.

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