After Math
by Miriam Webster

WAYNE PA, ZINKA PRESS, 1997, 280 pp., US $12.95, ISBN 0-96-471711-5

The Parrot's Theorem
by Denis Guedj

NEW YORK, THOMAS DUNNE, 2001, 352 pp., US $24.95, ISBN 0-31-228955-6

The Fractal Murders
by Mark Cohen

BOULDER CO, MUDDY GAP PRESS, 2002, 282 pp., US $25.00, ISBN 0-97-189860-X

The Da Vinci Code
by Dan Brown

NEW YORK, DOUBLEDAY, 2003, 454 pp., US $24.95, ISBN 0-38-550420-9

The Curious Incident of the Dog in the Night-Time
by Mark Haddon

NEW YORK, DOUBLEDAY, 2003, 240 pp., US $ 22.95, ISBN 0-38-550945-6

Leaning towards Infinity
by Sue Woolfe

NEW YORK, FARRAR STRAUS & GIROUX, 1997, 393 pp., US $ 24.95, ASIN 0-57-119905-4

The past few years have seen a proliferation of portrayals of real mathematicians in popular media. Sylvia Nasar's A *Beautiful Mind;* Hugh Whitemore's *Breaking the Code*; Paul Hoffman's charming rendition of the life of Erdös, *The Man Who Loved Only Numbers;* and David Auburn's *Proof* come to mind as contributing to the caricature of mathematicians as peculiar, to say the least, especially if one thinks of what Hollywood did to Nasar's story. Rumors have circulated that a film about the Unabomber is in the works and perhaps a version of Ahmed Chalabi's adventures will include his brief fling as a mathematician. His subsequent shady political career may have some echoes of the tactics of Newton in Carl Djerassi's recent play *Calculus*. Television has been somewhat kinder, producing Simon Singh's *The Proof* with the superb opening scene of Wiles' reflections. In a more esoteric vein, an opera about the eleventh century Islamic mathematician Ibn Sina (Avicenna) recently premiered in Qatar. Fictional mathematicians have also enjoyed some attention, in, for example, Tom Stoppard's *Arcadia* or his screen play for *Enigma*, Matt Damon and Ben Affleck's Good *Will Hunting*, or Daniel Aronofsky's chaotic *Pi.*

Mathematicians and mathematics have also invaded the mystery genre. Not that this is new—Sherlock Holmes dabbled in mathematics from time to time and his nemesis Moriarty was a mathematician as well as a master crook. Michael Innes' *Weight of the Evidence* is a classic, Desmond Cory's Professor Dobie stories date back a few years, and Scott Turow's first huge success, *Presumed Innocent,* featured a mathematician. Not all mathematicians in mysteries are fictitious. A very unpleasant John Wallis figures prominently and Newton makes a cameo appearance in Iain Pears' wonderfully atmospheric *An Instance of the Fingerpost*. In Philip Kerr's *Dark Matter* Newton himself is the detective, albeit in his role as warden of the Royal Mint. And Escher's mathematics, if not the artist himself, appears in Jane Langton's *The Escher Twist.* A cadre of more contemporary mathematicians is thinly disguised in *Maths à mort,* written by Margot Bruyère, a long-time administrator at IHES (Institut des Hautes Etudes Scientiques de Bures-sur-Yvette).

In fiction the representation of women in mathematics appears higher than in real life; of the mysteries reviewed here, only *The Curious Incident of the Dog in the Night-Time* has no woman mathematician involved in the plot. (Yes, the parrot is female!). *Presumed Innocent* is in this tradition as are the Laurie King books featuring Sherlock Holmes' apprentice and later wife, the mathematics student Mary Russell; P.M. Carlson's series with statistician Maggie Ryan; *Arcadia* and *Proof.*

Various theories for the increased interest in and popularization of mathematics in the media have been put forward. Perhaps for many authors it is the strangeness of mathematics that makes mathematicians attractive subjects, although the writers may feel compelled to exaggerate our peculiarities. For others—and perhaps for their readers, the notion that mathematicians are after all, very weird if not actually deranged, may justify their math phobia. In any case, often the books, plays, and films about mathematics and mathematicians written by non-mathematicians are wonderfully sensitive to us and our work.

The heightened attention to mathematics in the media has done nothing for the recruitment of students at least in the U.S. and the U.K. It has been conjectured that the spurt in applications to law schools in the U.S. can be traced back to television's *LA Law* or to the O.J. Simpson trial. Unfortunately the appearance of the competing statisticians in the latter led, it is reported, to peak usage of water in the homes tuned in to the trial. Maybe an episode of *Law and Order* in which the outcome of the trial depends on statistical evidence would be a more effective recruitment device. Although we do not want our field overcrowded, it would be nice to have more students in undergraduate courses because they love mathematics and not because it is a requirement for graduation. Are there so many more lawyers than mathematicians because we are so litigious or is it the other way around? Or can it be because faking it is so much easier in law than in mathematics? Of course, lawyers from Fermat through Cayley and Sylvester did produce significant mathematics, but the day of the amateur mathematician may be past, although several of the books reviewed here do feature such anomalies.

Magic realism in the hands of a master like Gabriel Garcia Marquez is, well, magical. The same cannot be said for the supernatural *After Math* adventures of the dead mathematician Ray Bellweather and equally dead graduate student Glen Vesper as they combine forces with two colleagues still among the living to expose their murderer. Not that there was ever much doubt about who was the murderer. Author Amy Babich (Miriam Webster is a pseudonym), a mathematician known in the Austin environmental community as an advocate for the use of bicycles and as a city council candidate, claims to follow the revelatory maxim of Anthony Trollope, "The author scorns to conceal from the reader any secret which is known to himself." However well this may have worked for Trollope, in her case it takes out the mystery, leaving very little except for the atmosphere of a university mathematics department.

The author generally has a good feel for this life, but contrary to her characterization, it is NOT the case that all statisticians prefer their chocolate in the form of M&Ms when it comes to eating, no matter what else they may use them for. My colleagues have a strong preference for Godiva, but then none of us regularly wear Birkenstocks nor find it necessary to run our hands over our bodies to determine whether or not we are wearing clothes, other characteristics of mathematicians, according to Babich. Nor can I agree with her assertion that "mathematics is about rules." Doesn't that just perpetuate another stereotype?

After Math also suffers from an overabundance of characters, few of them well-developed, from excessive reliance on quotes from Shakespeare, Trollope, Byron, Heine, Raymond Chandler, Wittgenstein, Gogol, Goethe, and others, and from coy asides from the author to the reader. At least the murdering mathematician is not crazy, just venal. However, as he contemplates a long imprisonment by remarking that good mathematics has been done in prison, he seems to have forgotten the propensity of the state of Texas to impose the death penalty.

It is fair to say that some readers must have liked the book better than I did. A recent site visit to Amazon.com showed copies being offered for as much as $296.

If Babich's primary goal was to write a murder mystery, Denis Guedj's in *The Parrot's Theorem* seems to have been to make the history of mathematics palatable for the masses. Or, as Simon Singh put it in a review in *The Guardian: The Parrot's Theorem* has a "different objective from most other fiction—to smuggle mathematical concepts into the mind of the unsuspecting reader by wrapping the maths inside an engaging plot." Guedj seems to have succeeded fairly well, although the "mystery" is pretty transparent. We have a real parrot bought in a Paris market, a mathematical recluse in the Amazon jungle, a delightful Parisian bookseller, and an amazing deaf child called Max, through whom the reader is introduced to 5000 years of math history, from Thales to amicable numbers to claimed proof of Fermat's Last Theorem and the Goldbach Conjecture. (Apostolos Doxiadis' *Uncle Petros and the Goldbach Conjecture* introduces another recent fictional claimant to the proof of the latter.) Perhaps the frequent references to problems unsolvable by use of a compass and ruler (instead of straight edge) and a few other inaccuracies are a result of mistranslation. My main

quarrel is with his attribution of what I have always thought of as the Problem of Dido to Hassan Sabbah, a friend of Omar Khayam. A nice touch is the link he sees between the origins of mathematics and tragedy in ancient Greece.

The Parrot's Theorem would be an excellent text for a general education course in the history of mathematics although those with little mathematics background might find some passages tough going. Also, some of the more colorful legends he describes cannot be taken too seriously. Although the book was a best seller in France, it is unlikely to repeat its success in the United States. The mathematics is too simple or too familiar to mathematicians (of whom there are in any case too few to confer best-seller status) and too inaccessible and digressive for others. Guedj's writing does combine insight and appreciation with a joy he would like his readers to share, but his combination of whimsy, mathematics, and mystery doesn't quite achieve the proper balance.

My favorite among the books reviewed here is *The Fractal Murders*, where I think the author has achieved a great balance between mathematics and mystery. A Heidegger-obsessed former Judge Advocate General lawyer turned private investigator and a University of Colorado mathematician team up to solve the mystery, enlivened by a fairly accurate lay description of fractals. In fact, the book has Mandelbrot's endorsement. The mysterious deaths of three mathematicians who were working on applications of Mandelbrot's trading time theorem trigger the investigation. The lives of academic mathematicians are quite well captured even though the investigator betrays a lack of understanding of the economics of mathematics textbooks by being shocked by a $44.95 price tag he considers excessive.

The monetary value of fractals is also central to the plot of Robert Goddard's *Out of the Sun*, featuring one of my favorite fictional creations, a female mathematician who is described as being at the IAS at Princeton contemporaneously with Einstein, Gödel, Mandelbrot, and von Neumann. Both of these books are helped by great locations, ranging from Nederland, Colorado, to a remote English village. (OK. I confess that any book that uses Nebraska as even a minor locale has a lot going for it as far as I am concerned; we Nebraskans do not see much about our home state in print, fact or fiction.) They can be recommended as good distractions on the long plane rides and security delays faced by peripatetic mathematicians. Cohen is planning a series featuring the same main characters, so look out for their next appearance.

The Da Vinci Code has topped best seller lists and created a lot of controversy with theologians, historians, and mathematicians, among others. At least eight books have been written debunking its various aspects.

A symbologist and a cryptographer set out to solve the murder in the Louvre of its chief curator and to halt attempts to suppress entirely the preservation of the "sacred feminine" in religion. Although that the cryptographer is a woman (and not the first for Brown, as his earlier *Digital Fortress* introduced Susan Fletcher as the head of code breaking at the National Security Agency) may be a gesture for feminism, that nearly all the principal guardians of the sacred doctrine over the centuries were male seems a bit

weird, if in keeping with what we know about the leaders of most religions, not to mention those in influential positions of any kind.

It cannot be said that the reader's understanding or appreciation of mathematics is enhanced by reading *The Da Vinci Code*, but for sheer escapism the book is hard to beat. Yes, Brown implies that the Golden Ratio is a rational number and the Da Vinci Code in not much of a code, but this is a thriller, not a textbook. Criticisms seem to be felt to be necessary by those who probably not only secretly enjoy the book but identify with the protagonists. Apparently these critics need to display their superior knowledge, ignoring Brown's skill in using various devices to make the book exciting reading. They remind one of those in the United States who felt obliged to display their credentials by panning Michael Moore's *Fahrenheit 9/11*, as if it were someone's dissertation, not a skillful propaganda piece with some basic truths and a few exaggerations. The originality and factual basis of Brown's theories may be in question, but he has written an absorbing mystery. As such, it is a page-turning success.

Another best-seller is Mark Haddon's *The Curious Incident of the Dog in the Night-Time*, borrowing from Conan Doyle's "Silver Blaze." [Inspector Gregory: "Is there any point to which you would wish to draw my attention?" Holmes: "To the curious incident of the dog in the night-time." Inspector: "The dog did nothing in the night-time." Holmes: "That was the curious incident."] Originally classified as a book for young people, *The Curious Incident*'s charming simplicity appeals to a broader audience. The "detective," in whose voice the book is written, is fifteen-year old Christopher Boone, who suffers from Asperger's syndrome, a symptom of which is an inability to figure out what is going on in the minds and emotions of others—not that everyone does not have occasional problems doing so. Christopher's curious incident is less benign than Sherlock's as the dog is impaled on a garden fork. Finding out who did this leads to scary revelations about Christopher's family, and crucial to Christopher himself, almost causes him to miss out on a mathematics exam to which he was looking forward with great joy.

The narrative could have become patronizing or pathos-filled, but Haddon manages to achieve just the right tone, making his hero endearing in spite of his quirks. Some of these, like his giving each chapter a prime number, are endearing, but others, such as his refusal to be touched, are less so. He lets the readers interpret for themselves the words and actions that are a mystery to Christopher, whose view of the world is totally literal. Although Christopher loves mathematics, there is not a lot of it in the book (except for some interesting bits about prime numbers and the Monty Hall problem). For that matter, there is very little mystery, but the book is brilliantly written. Whether it is an accurate portrayal of autism, I cannot say, but it feels authentic. Unfortunately, the book may feed the myth that anyone with Asperger's syndrome is a mathematical genius. On the other hand, it certainly has led to an increased interest in, and one would hope understanding of, the condition, a recent indication of which is a wonderful compendium, Ian Stuart-Hamilton's *An Asperger Dictionary of Everyday Expressions*, explaining why "taking the bull by the horns" is not just the tactic of a desperate matador. Maybe

Christopher's enthusiasm will even inspire others with an eagerness to take mathematics exams!

Finally, there is *Leaning towards Infinity* by Sue Woolfe, who has also written a book, *The Secret Cure*, about Asperger's. There is not a lot of mathematics in *Leaning towards Infinity* and the only interesting mystery is how it won an award in its author's homeland of Australia. No doubt the prize committee had few mathematically inclined members. A complicated plot begins with Ramanujan's 1913 letter to Hardy and involves three generations of women: Juanita Montrose, the amateur mathematician who is supposed to be another Ramanujan; Frances her daughter, who was advised not to study mathematics as it might be injurious to her health and so ended up teaching literature, more suitable for a woman; and Frances' daughter Hypatia, who is organizing the book her mother wrote. Neither Hypatia nor Woolfe admits to knowing anything about mathematics, an assertion the reader can easily believe.

Juanita's creativity began, we are told, with the understanding of Zeno's paradoxes at age nine, and Frances fell in love with the story that Einstein's wife was responsible for $e = mc^2$, giving some idea of the level of sophistication Woolfe employs. Borrowed from the life of Sonya Kovalevskaia is the idea of mathematical notes used as wall paper although obviously not to the same good effect. After many unsatisfactory years in her chosen field, Frances responds to an ad soliciting entries for a contest for "radical" new ideas about mathematics, the reward to be an invitation to present the ideas at a conference in Athens. Her winning contribution is the further development of her mother's work on Montrose numbers, apparently conceived by Woolfe as something like transfinite numbers that will turn the mathematical world upside down. Frances' alleged geometrical intuition pushes the concept beyond the first of these new numbers; she sees herself emulating Tartaglia in winning the contest and changing the world.

There are two themes in the book that strike a realistic chord. The first is the difficulty of combining mathematical research with primary responsibility for child care. The second is the atmosphere of an international mathematics conference. With regard to the first, the Montrose women are more or less failures although their frustration is well portrayed. Much about the second rings true, but I doubt that any woman mathematician would go so far as to bare her breasts to get attention when presenting her results to an indifferent male-dominated audience, but maybe I have yet to see true desperation. In any case, both Juanita and Frances go crazy and the revolutionary mathematics never gets a chance. That the "mathematics" is vague and improbable is understandable, but in general the book is difficult to wade through, with the different narratives becoming confused.

It seems on the evidence here that compelling mysteries are best written by someone other than a mathematician, although *Leaning towards Infinity* shows that ignorance does not necessarily produce a masterpiece either. Ultimately, it would be interesting to know how many readers previously uninterested in mathematics are motivated to explore more deeply concepts from the best of these books such as prime numbers, growth equations, probability, the golden ratio, cryptography, and fractals.

REFERENCES

Daniel Aronofsky, *Pi*, film, Artisan Entertainment, 1998.

David Auburn, *Proof*, London: Faber & Faber, 2001.

Dan Brown, *Digital Fortress*, New York: St. Martin's Press, 1998.

Margot Bruyère, *Maths à mort*, Paris: Aleás-Editeur 2002 (originally published as *Dis-moi qui tu aimes, je te dirais tu hais*, 1990).

P.M. Carlson, *Audition for Murder*, New York: Avon Books, 1985.

_____, *Murder is Academic*, New York: Avon Books, 1985.

_____, *Murder is Pathological*, New York: Avon Books, 1986.

_____, *Murder Unrenovated*, New York: Bantam Books, 1987.

_____, *Rehearsal for Murder*, New York: Bantam Books, 1988.

_____, *Murder in the Dog Days*, New York: Crimeline, 1990.

_____, *Murder Misread*, New York: Doubleday Books, 1990.

_____, *Bad Blood*, New York: Doubleday Books, 1991.

Desmond Cory, *The Catalyst*, New York: St. Martins Press, 1991.

_____, *The Strange Attractor*, New York: MacMillan, 1992.

_____, *The Mask of Zeus*, New York: St. Martins Press, 1993.

_____, *The Dobie Paradox*, New York: St. Martins Press, 1994.

Matt Damon and Ben Affleck, *Good Will Hunting*, film, Miramax Films, 1997.

Carl Djerassi and David Pinner, *Newton's Darkness: Two Dramatic Views*, London: Imperial College Press, 2003.

Apostolos Doxiadis, *Uncle Petros & Goldbach's Conjecture*, New York: Bloomsbury USA, 2000.

Arthur Conan Doyle, Silver Blaze, *Strand Magazine*, 1892.

Robert Goddard, *Out of the Sun*, New York: Henry Holt & Company, 1997.

Paul Hoffman, *The Man Who Loved Only Numbers*, Westport CT: Hyperion Press, 1998.

Michael Innes, *The Weight of the Evidence*, New York: Dodd Mead, 1943.

Philip Kerr, *Dark Matter*, New York: Crown Publishers, 2002.

Laurie R. King, *The Beekeeper's Apprentice*, New York: St. Martins Minotaur, 1994.

_____, *A Monstrous Regiment of Women*, New York: St. Martins Press, 1995.

_____, *A Letter of Mary*, New York: St. Martins Press, 1997.

_____, *The Moor*, New York: St. Martins Press, 1998.

_____, *O Jerusalem*, New York: Bantam, 1999.

_____, *Justice Hall*, New York: Bantam, 2002.

_____, *The Game*, New York: Bantam, 2004.

Jane Langton, *The Escher Twist*, Rollinsford NH: Thomas T. Beeler Publisher, 2003.

Michael Moore, *Fahrenheit 9/11*, film, Lions Gate Films, 2004.

Sylvia Nasar, *A Beautiful Mind*, New York: Simon & Schuster, 1998.

Iain Pears, *An Instance of the Fingerpost*, New York: Putnam Publishing Group, 1998.

Simon Singh, *The Proof*, video, WGBH, 2003.

Tom Stoppard, *Arcadia*, New York: Doubleday, 1995.

Tom Stoppard, *Enigma*, film, Miramax Films, 2001.

Ian Stuart-Hamilton, *An Asperger Dictionary of Everyday Expressions*, London: Jessica Kingsley Publishers, 2004.

Scott Turow, *Presumed Innocent*, New York: Farrar Straus & Giroux, 1987.

Sue Woolfe, *The Secret Cure*, Sydney: Picador, 2003.