

Conned Again, Watson: Cautionary Tales of Logic, Math, and Probability

Reviewed by Jim Tattersall

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Colin Bruce

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Readers familiar with [1] and [2] by Colin Bruce will be pleased to learn that once again the game is afoot. This book is a collection of tales in which Sherlock Holmes solves mysteries that require mathematical deduction. The intent is twofold: to apprise the reader of common logical or mathematical deceptions and to embed those deceptions into detective stories featuring the well-known characters Sherlock Holmes and Doctor Watson. With this book the author accomplishes both goals with high marks.

When it comes to fulfilling the expectations of avid devotees of Sherlock Holmes, the author has set an arduous task for himself. Even though Holmes is a master of deductive reasoning, there are very few significant mathematical references in the adventures of Sherlock Holmes. Among the exceptions is a single instance where Holmes calculates the speed of a moving train using the fact that the telegraph posts he and Watson pass by are sixty yards apart [3]. In addition, two of Holmes' well-known maxims are relatively mathematical in nature, "Eliminate all which is impossible, then what remains however improbable must be the truth" [4] and "It is a capital mistake to theorize before you have all the evidence" [5]. In one of the



early adventures, *A Study in Scarlet*, Watson rates Holmes' knowledge of various subjects and implies that his knowledge of the physical sciences and mathematics is somewhere between moribund and non-existent. There are limited references in Sir Arthur Conan Doyle's stories to statistics or probability. As close as we come to an instance that is remotely connected

to the theory of probability is when Watson in *The Adventure of Shoscombe Old Place* admits to spending half his pension playing the ponies [6]. One of the few statistical references occurs in *The Sign of the Four*, when Holmes remarks, "While the individual man is an insoluble puzzle, in the aggregate he becomes a mathematical certainty. You can, for example, never foretell what any one man will do, but you can say with precision what an average number will be up to. Individuals vary, but percentages remain constant. So says the statistician" [7]. The only descriptive statistics that appear in the Doyle adventures with any regularity usually come from either *Bradshaw's Railway Guide* or *Whitaker's Almanack*.

The flimflammetry in the book at hand is presented in an informative and interesting manner and introduced into the text with a deft hand. The

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stories, set in the 1890s, convincingly incorporate details concerning the London environs from that period. Banter between Holmes and Watson while they are at their Baker Street lodgings or when they are out on a case is remarkably well reconstructed by the author and is consistent with the dialogues recorded by Doyle. We are dealing with a more alert and mathematically sophisticated Holmes than found in the Doyle stories. The current author's portrayal of Holmes as an erudite scholar of statistics, logic, and game theory is carried off well. Holmes goes to great lengths to provide Watson and the reader with clear explanations and illustrations of how not to be duped by fallacious reasoning or to succumb to a con man's tale. It appears that our beloved Holmes has become a pedagogue in his old age.

Appearances by well-known secondary Doyle characters such as Inspector Lestrade, Mycroft Holmes, and Mrs. Hudson add to the atmosphere of authenticity. A fabricated Dr. Penbury, Watson's supposed partner in general practice, makes a cameo appearance in "The Case of the Perfect Accountant". Mr. Barnum Rollman makes a remarkable return from the dead and is featured in two of the stories. An intriguing inclusion of the Reverend Charles Dodgson, better known to the rest of the world as Lewis Carroll, gives a mathematical boost and depth to several of the stories. The author also introduces us to a new cast of characters: villains such as McFarlane, the con man who swindles Watson's cousin James; clients like the Marquis of Whitebridge, an inveterate gambler; and Madam Zelda, High Priestess of the Great Faith, who has a sizable fortune to bequeath.

In "The Case of the Unfortunate Businessman" the author illustrates several deceptions highlighting, in particular, the fallacy of mistaking relative for absolute savings. An understanding of the concepts noted in this chapter will serve consumers well in the marketplace. "The Case of the Gambling Nobleman" points out what can happen when people ignore the small probability of a large loss. The birthday paradox and mistaking a uniform distribution for a random one are highlighted in "The Case of the Surprise Heir". The reader will find an interesting connection between the drunkard's walk, Pascal's triangle, and the normal distribution in "The Case of the Ancient Mariner". Bayesian logic, using the knowledge of the present to predict the future, is featured in "The Execution of Andrews". Holmes goes to great lengths in "Three Cases of Relative Horror" to explain several dilemmas that arise in game theory. Other cases deal with cryptology, fair division, Newcomb's law, statistical justice, and the prisoner's dilemma. A most beneficial aspect of the book is a final section referred to as the "Afterword" where the author

suggests further reading and recaps the main objectives of each chapter.

The dénouements are well thought out and satisfying but not quite as suspenseful as those found in the Doyle stories. In addition, ancillary characters, which add mystique to the Doyle stories, are not as well developed in this book. They are no match for the characters found in the Sherlockian canon, where one can encounter sinister villains the likes of Professor James Moriarty, celebrated author of "The Dynamics of an Asteroid", and Doctor Grimsby Roylott, amateur herpetarian. Missing also are sympathetic damsels-in-distress such as Mary Morstan, Violet Hunter, and the Stoner sisters. Nor will readers find characters the likes of Irene Adler, Sir Henry Baskerville, Dr. Thorneycroft Huxtable, M.A., and Reginald Musgrave, M.P.

To be fair, the author's main objective is not character development. Rather, he aims to use the stories to illustrate mathematical and logical points. In this respect, the author succeeds admirably. The depth present in the Doyle stories is replaced by some very interesting mathematical vignettes that should appeal to the scientific mind. The stories are entertaining and the mathematics is for real. This book is a good addition to Sherlockian lore and would make an excellent supplement to a liberal-arts-based mathematics course or a quantitative reasoning course. And it's just a good book to sit down and read. For subsequent reading, I suggest the canon [8] or [9], the official publication of the Baker Street Irregulars. For those who prefer more mathematics and less dialogue, I highly recommend [10].

Acknowledgments

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References

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