

The
Scientific
Sherlock
Holmes

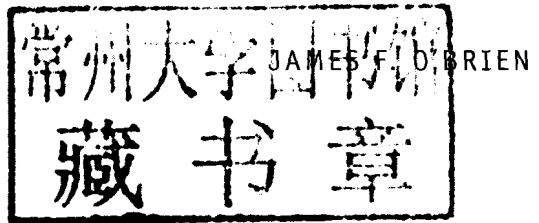
Cracking the Case

with Science & Forensics

James O'Brien

The Scientific Sherlock Holmes

CRACKING THE CASE WITH
SCIENCE AND FORENSICS



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Preface

Few characters in literature are more universally recognized than Sherlock Holmes. The subject of sixty stories by Arthur Conan Doyle and countless pastiches by other authors (not to mention even a “biography” or two), Holmes is nothing short of an icon of literature. While readers are captivated by his powers of observation and deductive reasoning, somewhat overlooked in the stories is the use of science and forensic methods, long before network television made them so popular. Conan Doyle (and Holmes) blazed a new trail in this regard, adding depth and complexity to the detective genre started by Edgar Allan Poe. This book focuses on the scientific aspects of Sherlock Holmes. Essentially every one of the sixty stories has some mention of science. In some of the stories, science is the dominant factor.

We begin by tracing the origins of Arthur Conan Doyle’s science-oriented detective. Then, after describing the main characters in the stories in chapter 2, chapter 3 takes a detailed look at how Holmes used science to solve his cases. Because Sherlock Holmes knows more chemistry than any other science, chapter 4 examines Holmes the chemist. The final chapter looks at his knowledge and use of other sciences. Throughout the book, we use the terms “Sherlockian” and “Holmesian”¹ interchangeably to refer to someone with great interest and/or expertise in Sherlock Holmes.

¹ Sherlockian tends to be used in the United States and Holmesian in the United Kingdom (King, L. R., in King and Klinger 2011).

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Finally I thank my wife, Barbara O'Brien, for reading the manuscript and providing crucial input on how the material should flow in its presentation. She also tolerated the mess in the family room for more than a year.

Introduction

Sherlock Holmes is the most recognizable character in all of literature. The first Sherlock Holmes story, *A Study in Scarlet* (STUD), was published in 1887. Today, over 125 years later, when a deerstalker hat is seen in a book, movie, TV ad, or billboard, the public automatically thinks “Sherlock Holmes.” Old movies run on television again and again. New movies are made with consistent regularity. Plays are done all around the country and the world. Respectable presses publish Sherlock Holmes journals. There are even several Sherlock Holmes encyclopedias (Tracy 1977; Bunson 1994; Park 1994). While limited to sixty original stories by Arthur Conan Doyle, Sherlock Holmes buffs eagerly seek out new Holmes stories by would-be Conan Doyles. They call such stories “pastiche” and are easy marks for even marginal literature. Aspiring authors frequently base their stories on one of the more than one hundred cases mentioned by Doyle but not reported in full (Redmond 1982, xv; Jones 2011). Of course, “stories about the stories” are also coveted. Numerous Holmes societies exist in the United States and around the world. In the United States, the pinnacle of achievement for a Sherlock Holmes buff is an invitation to be a “Baker Street Irregular,” a group apparently as odd as Holmes’s ragamuffin street urchins from whom it takes its name.

Why is all this so? One reason for Holmes’s appeal is that he is a flawed character. For instance, contrary to his image, he does not always correctly solve his cases. He admits that he failed four times. When reading a Holmes story, the reader can’t be sure he will solve it, for even the master detective sometimes fails. Another flaw is his well-known drug dependence, which is discussed later.

Also among the primary reasons for the enduring popularity of Sherlock Holmes is his ability to make brilliant deductions. Readers continue to be fascinated by the way he can reason his way to the correct solution. In the opening of the first story, STUD, Holmes’s first words to Dr. Watson are “How are you? You have been in Afghanistan, I perceive.” Watson thinks someone has told Holmes

this fact. But Holmes later explains how he deduced it from the doctor's appearance. *Shoscombe Old Place* (SHOS) is the sixtieth and last Sherlock Holmes story, published in 1927. In it, the fact that Sir Robert Norberton has given away his sister's beloved spaniel puzzles everyone but Holmes. The absence of the dog allows Holmes to deduce that the sister, Lady Beatrice Falder, has died and that Sir Robert is concealing that fact. Immediately everything makes sense and the case becomes easy for Holmes to solve. Whatever else changed in the Sherlock Holmes stories, Conan Doyle kept Holmes deducing throughout the entire forty years from 1887 to 1927.

In this study, we suggest that another strong component of the character's ongoing appeal and success is his knowledge of science and frequent use of the scientific method. Doyle himself, in an article in *Tit-Bits* on December 15, 1900, described how he tried to make his detective stories more realistic than the ones he had been reading (Green 1983, 346):

I had been reading some detective stories, and it struck me what nonsense they were, to put it mildly, because for getting the solution to the mystery the authors always depended on some coincidence.

So he resolved to diminish the role of chance by having his detective employ science and reasoning on his way to the answer. With Poe's Dupin in mind, Doyle set out to make Holmes somewhat different. He tells us:

Where Holmes differed from Dupin was that he had an immense fund of exact knowledge to draw upon in consequence of his previous scientific education.

Sherlock Holmes's knowledge of science not only provides fodder for debate among the legions of fans, it also lends credibility to his impressive powers of reasoning. Indeed, among the best-loved stories involving the detective, those that rely not just on deductive reasoning but also employ elements of science are regarded the most highly.

This book focuses on the scientific side of Sherlock Holmes. Initially we look at how the Holmes Canon came to be written. Chapter 2 introduces the main characters: Holmes, Dr. Watson, Professor Moriarty, and Holmes's brilliant brother, Mycroft. In chapter 3 we examine how Sherlock Holmes used scientific forensic techniques in his investigations. Chapters 4 and 5 deal with all of the science that was not used to solve crimes. Chapter 4 describes the chemistry that permeates the entire Canon. Chapter 5 deals with six other sciences that come up in the stories. Finally we conclude with some closing thoughts on Holmes's use of science and its contribution to the enduring appeal of the stories.

The Sherlockian Canon

Review of the Contents

I am the only one in the world. I'm a consulting detective.

—Sherlock Holmes, *A Study in Scarlet*

Early in the first adventure, Sherlock Holmes reveals his profession to his new roommate, Dr. John H. Watson. Eventually Watson describes sixty of Holmes's cases.¹ Murder is the most common offense, occurring in twenty-seven of the stories. Interestingly, the second most-common category is no crime at all. This happens in eleven stories.² The other twenty-two cases are scattered through thirteen other kinds of crime (Swift and Swift 1999).

The clients that consult Holmes come from a diverse set of backgrounds. They can be classified into eight types: business/professional (twenty-three), police (eight), damsel-in-distress (eight), landed gentry (eight), government (four), nobility (four), working class (three), none (two) (Swift and Swift 1999).

Of the thirty-seven times Holmes identifies the culprit, he decides to let him go free a surprising thirteen times. The other twenty-four are turned over to the police. A number of times the perpetrator dies before being caught. Interestingly Holmes claimed to have failed four times.³ Obviously the reader can't know what to expect when even the masterful Holmes sometimes fails.

The use of so many different kinds of crime, so many types of clients, and so many different results, including failure, gives us a variety that keeps the stories fresh, even for rereading.

¹ Dr. Watson mentions numerous other Holmes cases in his narrations of the stories that comprise the Sherlock Holmes Canon. We deal only with the sixty stories published by Sir Arthur Conan Doyle.

² Others say that twelve stories involve no crimes (Berdan 2000).

³ The number of failures depends on how one defines "failure" (Berdan 2000).

This work is about the science in the sixty Sherlock Holmes stories. Every story mentions something scientific. Many times it is just a molecule; sometimes it is a method. In some stories the science is of key importance. In others it just sets a mood. Those interested in science will nearly always find something of particular interest in a Sherlock Holmes story. Conan Doyle set out to write about a detective who actively employed science in his work. That he succeeded is not in dispute.

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Codes

Much of the Holmesian world uses the following four-letter abbreviations for the names of the sixty stories written by Sir Arthur Conan Doyle. We use them extensively to avoid constant repetition of the titles. Also for brevity, the words "The Adventure of" are deleted from the many titles that contain them. Collectively the Sherlock Holmes stories are sometimes affectionately referred to as the "Canon."

Code	Title	Publication Date	Story #
ABBE	The Abbey Grange	Sept. 1904	39
BERY	The Beryl Coronet	May 1892	13
BLAC	Black Peter	Feb. 1904	33
BLAN	The Blanched Soldier	Oct. 1926	56
BLUE	The Blue Carbuncle	Jan. 1892	9
BOSC	The Boscombe Valley Mystery	Oct. 1891	6
BRUC	The Bruce-Partington Plans	Dec. 1908	42
CARD	The Cardboard Box	Jan. 1893	16
CHAS	Charles Augustus Milverton	March 1904	34
COPP	The Copper Beeches	June 1892	14
CREE	The Creeping Man	March 1923	51
CROO	The Crooked Man	July 1893	22
DANC	The Dancing Men	Dec. 1903	30
DEVI	The Devil's Foot	Dec. 1910	43

DYIN	The Dying Detective	Nov. 1913	46
EMPT	The Empty House	Sept. 1903	28
ENGR	The Engineer's Thumb	March 1892	11
FINA	The Final Problem	Dec. 1893	26
FIVE	The Five Orange Pips	Nov. 1891	7
GLOR	The "Gloria Scott"	April 1893	19
GOLD	The Golden Pince-Nez	July 1904	37
GREE	The Greek Interpreter	Sept. 1893	24
HOUN	The Hound of the Baskervilles	Aug. 1901	27
IDEN	A Case of Identity	Sept. 1891	5
ILLU	The Illustrious Client	Nov. 1924	54
LADY	The Disappearance of Lady Francis Carfax	Dec. 1911	45
LAST	His Last Bow	Sept. 1917	48
LION	The Lion's Mane	Nov. 1926	57
MAZA	The Mazarin Stone	Oct. 1921	49
MISS	The Missing Three-Quarter	Aug. 1904	38
MUSG	The Musgrave Ritual	May 1893	20
NAVA	The Naval Treaty	Oct. 1893	25
NOBL	The Noble Bachelor	April 1892	12
NORW	The Norwood Builder	Oct. 1903	29
PRIO	The Priory School	Jan. 1904	32
REDC	The Red Circle	March 1911	44
REDH	The Red-Headed League	Aug. 1891	4
REIG	The Reigate Squires	June 1893	21
RESI	The Resident Patient	Aug. 1893	23
RETI	The Retired Colourman	Dec. 1926	58
SCAN	A Scandal in Bohemia	July 1891	3
SECO	The Second Stain	Dec. 1904	40
SHOS	Shoscombe Old Place	March 1927	60
SIGN	The Sign of Four	Feb. 1890	2
SILV	Silver Blaze	Dec. 1892	15

SIXN	The Six Napoleons	April 1904	35
SOLI	The Solitary Cyclist	Dec. 1903	31
SPEC	The Speckled Band	Feb. 1892	10
STOC	The Stock-broker's Clerk	March 1893	18
STUD	A Study in Scarlet	Nov. 1887	1
SUSS	The Sussex Vampire	Jan. 1924	52
THOR	The Problem of Thor Bridge	Feb. 1922	50
3GAB	The Three Gables	Sept. 1926	55
3GAR	The Three Garridebs	Oct. 1924	53
3STU	The Three Students	June 1904	36
TWIS	The Man With the Twisted Lip	Dec. 1891	8
VALL	The Valley of Fear	Sept. 1914	47
VEIL	The Veiled Lodger	Jan. 1927	59
WIST	Wisteria Lodge	Aug. 1908	41
YELL	The Yellow Face	Feb. 1893	17

1

How Sherlock Holmes Got His Start

Section 1.1 Arthur Conan Doyle

Steel True, Blade Straight,

epitaph of Sir Arthur Conan Doyle

One can achieve somewhat of an understanding of how Sherlock Holmes came to exist by looking at the contributions of three people: Conan Doyle himself, Edgar Allan Poe, and Conan Doyle's mentor in medical school, Dr. Joseph Bell. First we shall look at Conan Doyle himself, focusing on those aspects of his life that led to his writing of the Sherlock Holmes stories.

Arthur Conan Doyle was born on May 22, 1859, in Edinburgh. His father, Charles Altamont Doyle, was English and his mother, Mary Foley, was Irish. His father had a drinking problem and was consequently less a factor in Conan Doyle's upbringing than was his mother. Charles would eventually end up in a lunatic asylum (Stashower 1999, 24). Mary Doyle instilled in her son a love of reading (Symons 1979, 37; Miller 2008, 25) that would later lead him to conceive of Sherlock Holmes. Conan Doyle's extensive reading had a great influence on the Sherlock Holmes stories (Edwards 1993). He was raised a Catholic and attended Jesuit schools at Hodder (1868–1870) and Stonyhurst (1870–1875), which he found to be quite harsh. Compassion and warmth were less favored than “the threat of corporal punishment and ritual humiliation” (Coren 1995, 15). Next he spent a year at Stella Matutina, a Jesuit college in Feldkirch, Austria (Miller 2008, 40). As Conan Doyle's alcoholic father had little income, wealthy uncles paid for this education. By the end of his Catholic schooling, he is said to have rejected Christianity (Stashower 1999, 49). At the less strict Feldkirch school, his drift away from religion turned toward reason and science (Booth 1997, 60). At this time he also read the writings of Edgar Allan Poe, including his detective stories. So, although Sherlockians debate the “birthplace” of Holmes, a claim can be made that Holmes was conceived in Austria.

In 1876, Conan Doyle began his medical studies at the highly respected University of Edinburgh. These years also played a large role in shaping the Holmes stories. One obvious factor was his continued exposure to science. Much of this book explores the presence of science in the sixty Holmes tales. The other significant factor from his medical studies was his mentor, Dr. Joseph Bell, whose deductions about patients impressed Conan Doyle to the extent that he added similar scenes in the Holmes tales. Upon completing his studies, Conan Doyle, now ready to set up a practice, headed to London for a meeting with his uncles. They could put him in a position to become a doctor to London's Catholic community through their many wealthy contacts. But he essentially threw that opportunity away by informing the family of his rejection of his Catholic upbringing. He was now, he told them, an agnostic, a term coined only a few years earlier by Thomas Huxley (Stashower 1999, 50). Conan Doyle knew what he was doing to his chances, but refused to pretend that he was still Catholic. As his epitaph suggests, his sense of honor would remain strong throughout his life. His uncles now refused to help him, and his career had a difficult beginning. Instead of London, Conan Doyle set up his medical practice in Southsea, Portsmouth, in 1882. In both his medical school thesis and other publications, Conan Doyle proved astute at understanding causes of diseases in ways not fully explained until much later (Miller 2008, 102). Although he continued to work there until 1890, he was not successful. His income the first year was £154, and it never rose much above £300 (Carr 1949, 66; Stashower 1999, 63). In fact, his first-year income tax return was sent back to him. The revenue inspector had written "Not satisfactory" on it. The quick-witted Conan Doyle resubmitted it unchanged with this notation: "I agree entirely" (Booth 1997, 96).

It was while in Portsmouth that Conan Doyle was first exposed to spiritualism. Although he would not publicly espouse it until 1917, eventually agnosticism would be discarded, and spiritualism would come to dominate his later life. Another important event during his Portsmouth years was his meeting Louisa Hawkins, known as "Touie." They met when he was called upon to give a second opinion of her brother Jack's diagnosis of cerebral meningitis. Conan Doyle took Jack Hawkins into his lodgings as a resident patient, but Jack died within a few days. The twenty-third Holmes tale would be titled *The Resident Patient* (RESI). Conan Doyle proceeded to court Touie, and they were married a few months later, on August 6, 1885. Because Touie had a small income of her own, Conan Doyle's poverty was somewhat relieved. But her health was very fragile, and she died at age forty-nine in 1906. Conan Doyle in the meantime had fallen in love with Jean Leckie, whom he had met in 1897. He is considered to have handled this delicate matter honorably. He married Jean fourteen months after Touie died (Stashower 1999).

Conan Doyle finally gave up the Portsmouth practice in 1890 when he went to Vienna for advanced study in ophthalmology. Upon his return he set up practice in London. He later wrote, "Not one single patient ever showed

up.” This gave rise to the well-known anecdote about him writing the Sherlock Holmes stories while waiting in his office for the patients who never came. As enticing as this story is, evidence exists that it might not be entirely accurate (Lellenberg et al. 2007, 291). Conan Doyle, a natural teller of tales, had already published several stories, beginning with *The Mystery of Sassassa Valley* in 1879. Now he decided to write a detective novel. Poe’s detective, C. Auguste Dupin, would be his model. Holmes’s intelligence would be so superior that he could solve mysteries that baffled others, but his solutions would be deduced. Chance, so common in the crime stories written between Poe’s time (1841) and that of Conan Doyle (1887), would play no role. The result, *A Study in Scarlet* (STUD), was rejected by four or five publishers before Ward, Lock & Co. bought it outright for twenty-five pounds. It was published in *Beeton’s Christmas Annual* for 1887. Conan Doyle never received any additional money from this story, which is still in print today. He later reported that STUD was not particularly well received in England, although it did go through several printings there.

But in America, Holmes was an immediate hit. STUD was well received in the United States. It actually “created an excited audience of Holmes fans” (Lachtman 1985, 14). So, conceived in Austria and born in London, Holmes was next resuscitated in America. Thus it was that in 1889, *Lippincott’s Magazine*, published in Philadelphia, invited Conan Doyle and Oscar Wilde to meet in London (Coren 1995, 56). They shared a meal at the Langham Hotel with Lippincott’s agent, Joseph Stoddart, and Irish MP Thomas Gill (Miller 2008, 119). Conan Doyle described the event as a “golden evening” (Green 1990, 1). The result was an agreement whereby each author would write a novel. Wilde proceeded to write his only novel, *The Picture of Dorian Gray*. Soon after the meeting, Conan Doyle submitted the name of his promised novel, *The Sign of the Six* (Booth 1997, 132). Conan Doyle had thought of his detective and decided to write the second Sherlock Holmes story. He even pays a bit of homage to Oscar Wilde by having one of the main characters, Thaddeus Sholto, resemble him. The title eventually became *The Sign of the Four* (SIGN). Like STUD it was one of the four long Sherlock Holmes stories. It has been argued that it was American interest that kept the Holmes saga going (Stashower 1999, 103).

With the third story, *A Scandal in Bohemia* (SCAN), Conan Doyle began his long series of Holmes short stories published in *The Strand Magazine*. It was the first of the fifty-six short stories, and it hit London like a bombshell. The circulation of magazine soared to 500,000 whenever a Holmes story was published (Riley and McAllister 1999, 24). The publisher, George Newnes, estimated that an extra 100,000 copies were sold whenever a Holmes tale appeared (Stashower 1999, 125; Miller 2008, 141). The small income of Dr. Conan Doyle now became a distant memory. But Conan Doyle tired of Sherlock Holmes quickly and considered killing him off in the