

Medical and neurological references in the Sherlock Holmes stories

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ABSTRACT

Introduction. A study of the medical references in the stories about Sherlock Holmes, the literary character created by Sir Arthur Conan Doyle in the late 19th century.

Methods. Analysis of the author's biography and his complete works featuring Sherlock Holmes (56 short stories and 4 novels), focusing on medical references, especially those related to neurology. We compare these fragments with the medical texts of that time, and with current knowledge.

Results. The analysed stories often feature characters displaying different neurological processes (cerebrovascular accidents, drug addiction, catalepsy, etc). A number of treatments are also mentioned.

Conclusions. We found resemblances between the symptoms presented in Conan Doyle's works and the *Manual of Diseases of the Nervous System* written by his contemporary W. R. Gowers.

KEYWORDS

Medicine in literature, Arthur Conan Doyle, Sherlock Holmes, history of neurology

Introduction

The appearance of Sherlock Holmes at the end of the 19th century marked the rise of a new literary genre: the detective story. Although the books are not counted among the great works of literature, this character is now famous worldwide. New editions of his adventures are published regularly, several film versions have been released, and Sherlock Holmes societies are active in many countries, including Spain.

Sir Arthur Conan Doyle, who created this character, was a doctor and as such, he included medical topics in many of his writings. The purpose of this article is to analyse and discuss his stories while comparing them to medical texts of his time and to modern texts.

Sherlock Holmes made his first appearance during the Victorian era (1887). At that time, Britain ruled the largest colonial empire in the world. The country was being transformed by the industrial revolution, and many inhabitants had moved to the cities. The population of London had reached four million by the end of the 19th century. As the middle class increased rapidly and

acquired a good level of literacy, reading became a widespread pastime.¹

Popular authors of English literature in the first half of the 19th century included Charles Dickens (1812–1870). This author wrote numerous works of social realism describing the adventures of young heroes who struggled to overcome their misfortunes and were rewarded with happy endings. Examples include *Oliver Twist* (1837–1839) and *David Copperfield* (1849–1850). In a more light-hearted novel, *The Pickwick Papers* (1836–1837), Dickens describes the habits of the bourgeoisie. These books were published in weekly or periodical instalments known as serial stories.¹ Several female authors who were Dickens' contemporaries or precursors were also popular, beginning with Jane Austen (1775–1817). Austen's most successful books were *Sense and Sensibility* (1811) and *Pride and Prejudice* (1813); her works describe the fortunes and misfortunes of marriageable young women in rural society. Several years later, we find the famous Brontë sisters, especially Charlotte (1816–1855), the author of *Jane Eyre* (1847), and Emily (1818–1848), the author of *Wuthering Heights* (1847). These books feature

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courageous romantic heroines who overcome adverse social situations. Some of their stories have tragic backgrounds, but honesty and justice always triumph.¹

In 1887, *Beeton's Christmas Annual* published *A Study in Scarlet*, whose protagonist was then unknown to literature and society: the detective Sherlock Holmes (Figure 1).²

Earlier literary works also contained detectives, such as Edgar Allan Poe's August Dupin (*The Murders in the Rue Morgue*) and Monsieur Lecoq, created by the French writer Gaboriau. However, these characters were not overwhelmingly popular when they first appeared, and their stories were not fleshed out by so many later instalments.

This detective and his new genre were enthusiastically welcomed by the rising middle class and high society alike; even Queen Victoria was an admirer of Sherlock Holmes.³

The author

Arthur Conan Doyle (Figure 2) was born in Edinburgh on 22 May 1859,⁴ and he studied medicine at his city's university. One of his teachers was Dr Joseph Bell, a very shrewd clinician with a famous ability to establish diagnoses, who inspired the character of Sherlock Holmes (Fig. 3).

Conan Doyle earned his doctorate in 1885 with a thesis titled "An essay upon the vasomotor changes in tabes dorsalis and on the influence which is exerted by the sympathetic nervous system in that disease".

Conan Doyle always honed his writing skills. He also made two journeys as a ship's doctor, once to the Arctic in a whaling ship, and the second time to Western Africa.

He served as a doctor in the Boer War. This experience led him to publish a book (*The War in South Africa, Its Cause and Conduct*) in which he criticised the anti-British sentiment that had come to a head following the war. This book earned him his knighthood.

In 1890, he decided to specialise in ophthalmology and moved to Vienna, where he stayed for several months. In later years, due in part to his lack of earnings as a doctor, he decided to dedicate himself wholly to writing. The subject matter of Conan Doyle's books was varied. He wrote historical novels and short stories about sailors, doctors and adventurers, in addition to the Sherlock Holmes books. Thanks to the latter –4 novels and 56 short stories– he became famous worldwide.

His spirit of adventure remained with him for the rest of his life. He organised campaigns in order to clarify cases in which the English courts had been negligent, and successfully proved the innocence of the wrongfully accused by collecting evidence against the true culprits. In 1913, in an atmosphere of imminent war, he warned the government about the possibility of a German underwater offensive against sea transport. His premonition was ridiculed by both politicians and the press.

He spent the final years of his life devoted to the study and practise of spiritism. Sir Arthur Conan Doyle died on 7 July 1930.

The characters

Sherlock Holmes

Generally speaking, the English are very fond of Sherlock Holmes. The *Encyclopaedia Britannica*⁵ describes him in an entry comprising 49 lines; in comparison, the same encyclopaedia dedicates only 18 lines to the great literary figure Don Quixote.³

Sherlock Holmes is an arrogant gentleman with well-developed artistic tastes; an excellent violin player, he has a particular fondness for Mendelssohn's *Lieder*. He also attends a concert at Saint James's Hall to hear the great Spanish violinist Pablo de Sarasate. An opera lover and suspicious of women, Holmes is physically lean, gaunt, and just over six feet tall, with a sharp and penetrating glance, aquiline nose, and resolute air; his chin is prominent and square, showing determination. His skull shape is described as dolichocephalic.³

He is eccentric and somewhat uncommunicative, smokes enthusiastically, and is especially fond of pipes. He uses a 7% solution of cocaine in his moments of boredom when he has no cases to solve. Rather than being manic-depressive, Holmes

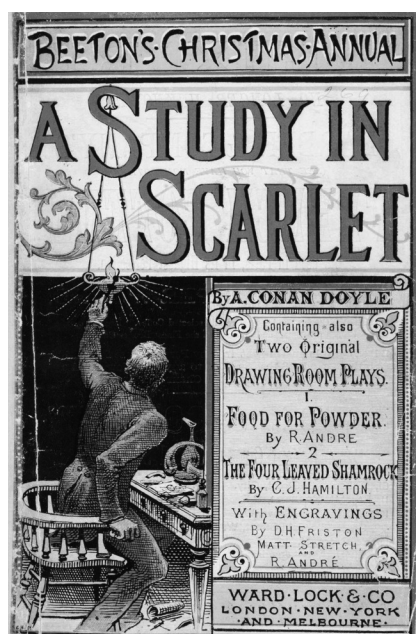


Figure 1. Cover page of *Beeton's Christmas Annual*, in which the first Sherlock Holmes story was published. Credits: General Collection, Beinecke Rare Book and Manuscript Library, Yale University, New Haven, Connecticut.

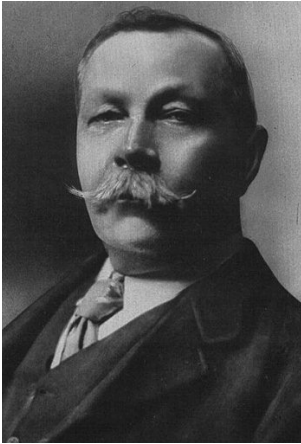


Figure 2. Sir Arthur Conan Doyle.



Figure 3. Dr Joseph Bell, a very shrewd physician who inspired Conan Doyle to create the character of Sherlock Holmes.

appears to suffer depression only when he lacks employment. Keeping active professionally is the best treatment for his condition. Some scholars have indicated his paranoid tendencies. He rarely names his mortal enemy, Professor Moriarty, in his various adventures. He also practices boxing, fencing, and baritsu, a Japanese martial art form.⁶

Holmes attended university, but never earned a degree. From his love of boxing, we may postulate that he studied at Oxford, which was home to an excellent boxing school at the time.

Holmes shares his residence and adventures with his loyal friend Dr John Watson. Their friendship continues after Watson's marriage, and Watson writes each of the case reports.

John H. Watson

Watson earned his medical degree from the University of London in 1878 and completed further studies in Netley to become an Army surgeon.^{7,8} Following that, he was attached to the Fifth Northumberland Fusiliers and sent to India. Watson disembarked in Bombay at the beginning of the Second Anglo-Afghan War. During the battle of Maiwand, having recently been incorporated into a new unit (the Berkshires), he was wounded in the shoulder.

He was then sent to Peshawar Hospital where he contracted typhoid fever while convalescing from his injury. Due to his poor state of health, he was discharged from the army and returned to England. Watson then took up residence in a hotel on the Strand in London. Since he was living on limited funds, he began searching for more reasonably-priced lodgings. At the Criterion Bar, Watson recognised Stamford, a surgical trainee with whom he had worked at St Bartholomew's Hospital. He mentioned to him that he was

looking for shared accommodation, and Stamford arranged a meeting with Sherlock Holmes, who was interested in the same arrangement. The Criterion Restaurant has a plaque commemorating this conversation, containing the first mention of Sherlock Holmes. (Figure 4)

Watson and Stamford then visited the laboratory at 'Barts', as the hospital was commonly known, and Sherlock Holmes astonished Watson with the words, "You have been in Afghanistan, I perceive".⁸ This sentence appears on a commemorative plaque that was hung in the laboratory (Figure 5).

Holmes and Watson moved into 221B Baker Street with Mrs Hudson as their housekeeper. We learn that Holmes works as a consulting detective, and Dr Watson assists him. The latter writes up all of the case reports, which are published periodically.^{3,6}

Medicine in the adventures of Sherlock Holmes

1. Dr. Watson's war wound

In the novel *A study in Scarlet*, Dr Watson says, "I was removed from my brigade and attached to the Berkshires, with whom I served at the fatal battle of Maiwand. There I was struck on the shoulder by a Jezail bullet, which shattered the bone and grazed the subclavian artery".^{7,8}

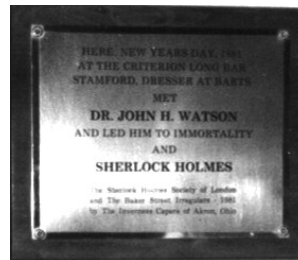


Figure 4. Plaque in the Criterion Restaurant commemorating the first mention of Sherlock Holmes.

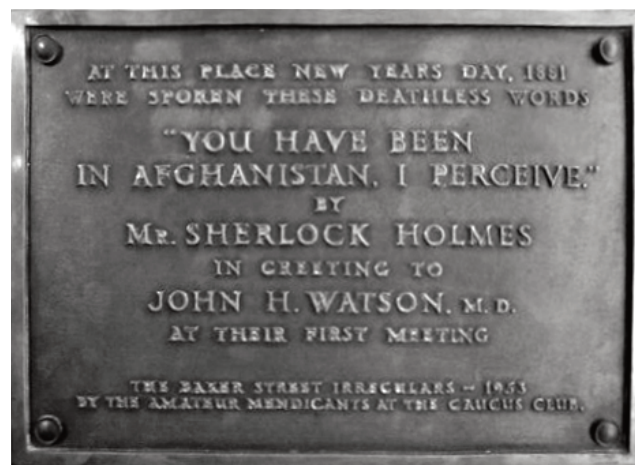


Figure 5. Plaque from the laboratory of St Bartholomew's Hospital, which commemorates the first meeting between Dr Watson and Sherlock Holmes.

In *The Noble Bachelor* he writes, "I had remained indoors all day, for the weather had taken a sudden turn to rain, with high autumnal winds, and the Jezail bullet which I had brought back in one of my limbs as a relic of my Afghan campaign throbbed with dull persistence"^{9,10}

Watson offers further comments in *The Sign of the Four*, writing, "I...sat nursing my wounded leg. I had a Jezail bullet through it some time before"^{11,12}

Holmes experts including W.B. Hepburn and Alvin Rodin¹³ are not sure whether Watson had taken two bullets or just one from a shot that pierced his shoulder and entered the thigh as he was crouching. In some cases, Watson seems to walk with a limp, which is another contradiction, since he indicates that the bullet grazed the subclavian artery. The inconsistencies in the description of the injuries are most likely due to narrative licence.

2. Descriptions of cerebrovascular events

In *The Adventure of the 'Gloria Scott'*, Watson repeats Victor Trebor's description of the latter's father: "...his mouth and eyelids were all puckered on one side, and I saw that he had a stroke"^{14,15}

The description of a cerebrovascular accident is unequivocal. In addition, Trebor's father had previously suffered confusional episodes with sensory impairment, probably corresponding to transient ischaemic attacks.

In *The Crooked Man*, Holmes is called to examine a victim who has apparently suffered cranial trauma with injury to the scalp; initially, this trauma is thought to be the cause of death. A witness who is suspected of the crime states that the cranial trauma resulted from a simple accident when the man fell and hit his head on the fender. A policeman delivers the autopsy report, which reads, "...medical evidence showed conclusively that death was due to apoplexy"^{16,17} The sensory loss caused by the infarct provoked the fall, which in turn caused the cranial trauma.

In *The Stockbroker's Clerk*, Watson reports, "Old Mr. Farquhar...had at one time an excellent general practice; but his age, and an affliction of the nature of St. Vitus's dance from which he suffered...thinned it"^{18,19} These symptoms may correspond to some type of senile chorea resulting from cerebral angiosclerosis. Dementia, however, is never mentioned.

Sir William Russell Brain²⁰ describes senile chorea²¹ in *Diseases of the Nervous System*:

Choreiform movements may follow vascular lesions of the brain in middle life and old age. Their onset

is usually sudden, and they are generally unilateral. Chronic progressive chorea occasionally occurs in the absence of hereditary predisposition... The large and small cells of the caudate nucleus and putamen degenerate but the cerebral cortex is spared (Alcock). It is difficult to distinguish this from the sporadic occurrence of Huntington's chorea, though...age of onset of senile chorea is usually later...and that mental symptoms are less likely to occur.²⁰

A Manual of Diseases of the Nervous System, published by W. R. Gowers between 1886 and 1888, coincides with the publication of the first adventures of Sherlock Holmes. In this text, we read:

The isolated senile form [of chronic chorea]...differs from that last described [Huntington chorea], not only in the absence of any family tendency, but in the more frequent freedom of the mind...it continues until the end of life, which it does not always seem to shorten... The spasm is often most severe, and may render intended actions almost impossible...The affection of the legs is slighter than that of the arms...In senile chorea changes have been occasionally found in the brain, but frequently the examination has failed to reveal any alterations that can be regarded as the cause of the disease...Choreoid movements are occasional effects of chronic lesions at the surface of the brain...^{22,23}

The relationship between senile chorea and angiosclerosis remains unclear; only old age and the absence of family history point to a vascular cause.

3. Catalepsy

In *The Adventure of the Resident Patient*, Dr Trevelyan describes a case of catalepsy to Dr Watson:

Suddenly, however, as I sat writing, he ceased to give any answer at all to my inquiries, and on my turning towards him I was shocked to see that he was sitting bolt upright in his chair, staring at me with a perfectly blank and rigid face. He was again in the grip of his mysterious malady... I made notes of my patient's pulse and temperature, tested the rigidity of his muscles, and examined his reflexes...I had obtained good results in such cases by the inhalation of nitrite of amyl...The bottle was downstairs in my laboratory, so, leaving my patient seated in his chair, I ran down to get it...Imagine my amazement to find the room empty and the patient gone.^{24,25}

In the words of W.R. Gowers:

The whole or part of the muscular system passes into a state of rigidity. The limbs remain in the position they occupied at the onset, as if petrified...The resistance to passive movement is peculiar; it is as if the limbs were made of wax, and hence the condition has been termed *flexibilitas cerea*. The countenance is usually expressionless...The state of sensibility varies; in profound conditions of catalepsy it is lost to touch,

pain, and electricity, and no reflex movements can be induced even by touching the conjunctiva.^{22,23}

Gowers states that the duration of the attack ranges from a few minutes to several hours and that patients may recover suddenly or gradually. In some cases, attacks may present periodically. The doctor also writes that catalepsy is very frequent in hysterical patients, and that it coincides with other symptoms that characterise this form of neurosis; catalepsy also appears in mental illnesses such as melancholia (could this be catatonic schizophrenia?). He further notes that the condition may also be a sign of malaria and chloroformic narcosis.

Gowers makes no mention of amyl nitrite as treatment, but recommends using smelling salts, snuff, and stimulation with faradic current. Subcutaneous apomorphine is cited as being equally effective in doses of 0.003 to 0.005 g.

Catalepsy is a very frequent sign in catatonic schizophrenia, conversion neurosis (hysteria) and in situations inducing a substantial emotional shock.²⁶

Described by Kahlbaum in 1874, catatonia (derived from the Greek for 'stretching tight') manifests as catatonic stupor and catatonic excitement; the course of the disease follows a relapsing-remitting pattern. Many cases display only stupor or only excitement. Catatonia may appear without psychosis,²⁷ as has been described in cases of multiple sclerosis; central pontine myelinolysis; AIDS treated with retrovirals; malaria; consumption of ecstasy or MDMA (3,4-methylenedioxy-N-methylamphetamine); treatment with donepezil and neuroleptic drugs (neuroleptic malignant syndrome); treatment with anticholinergic drugs or valproic acid; haemorrhages of the thalamus, third ventricle, and frontal and temporal lobes; and in cases of lethargic and typhoid encephalitis, hepatic encephalopathy, hypercalcaemia, and Wernicke encephalopathy.

Intravenous lorazepam is the effective treatment for catatonia, even in cases caused by neuroleptic drugs. Electroconvulsive therapy may resolve the condition in difficult cases. Amyl nitrite is a vasodilator, and it was commonly taken inhaled. The drug was indicated in cases of heart attacks, and between 1880 and 1912, it was also used to treat syncope, stupor, or decreased level of consciousness.

4. Intoxication

The Adventure of the Greek Interpreter describes treatment for intoxication caused by breathing charcoal fumes:

It was locked...Holmes flung open the door and rushed in, but he was out again in an instant, with his hand to his throat. "It's charcoal" he cried...With a rush we got to the poisoned men and dragged

them out into the well-lit hall. Both of them were blue-lipped and insensible, with swollen, congested faces and protruding eyes.^{28,29}

One of the poisoned characters recovers rapidly, but Watson informs us that the other had to be treated: "in less than an hour, with the aid of ammonia and brandy, I had the satisfaction of seeing him open his eyes".^{28,29}

The Sign of the Four describes the dangers of taking more than two drops of castor oil and the sedative effects of strychnine.^{11,12} Until the early 20th century, strychnine was indicated for dyspepsia, nocturnal enuresis, amblyopia, and paralysis.³⁰ Although almost completely avoided today, it may still be employed in cases of severe nervous system depression, especially those caused by a barbiturate overdose.

5. Cardiac manifestations

In a conversation between Dr Watson and Thaddeus Sholto (a character in *The Sign of the Four*), Sholto seeks to obtain Watson's opinion about his state of health. While asking Watson to auscultate his heart, Sholto says, "I have grave doubts as to my mitral valve, if you would be so very good. The aortic I may rely upon, but I should value your opinion upon the mitral".^{11,12}

Curiously enough, Thaddeus Sholto's words have been altered in the Spanish translation; the mention of the aortic valve has been replaced by a reference to the so-called aortic vein.

The character's children know that their father suffers from a chronic disease, mentioning, "...he had suffered for years from an enlarged spleen".^{11,12} This condition was probably due to a tropical disease (malaria), as Sholto was a soldier and had spent many years in India. His valvular condition does not seem to be related to malaria.³¹ Autopsies of patients who have died from malaria do not show signs of myocarditis. On rare occasions, we may find epicardial and subendocardial haemorrhages. The small vessels in the myocardium will show deposits of parasitised erythrocytes.

6. Brain fever

Brain fever is mentioned in several stories, including *The Adventure of the Musgrave Ritual*: "Rachel –who is a very good girl, but of an excitable Welsh temperament– had a sharp touch of brain-fever, and goes about the house now...like a black-eyed shadow of her former self".^{32,33}

In *The Adventure of the Naval Treaty*,^{34,35} the pivotal character, Percy Phelps, suffers from a bout of brain fever lasting several weeks.

Widow Barclay in *The Crooked Man* suffers the same condition after her husband's death: "No information could be got from the lady herself, who was temporarily insane from an acute attack of brain-fever".^{16,17}

This term may have been used to denote acute processes involving agitation and confusion. Some cases may have resulted from organic causes, while others would have been psychogenic and related to difficult situations and experiences. The symptoms tended to last a few hours or some days, and they were characterised by behavioural, eating, and sleep disorders.

This syndrome may fall under catatonic excitement caused by emotional distress. It has an acute onset and resolves quickly, and it is in no way related to either excitement or stupor in catatonic schizophrenia.

7. Paediatric neurology: oligophrenia and behavioural disorders

In the case of *The Adventure of the Copper Beeches*, a governess describes a child who suffers from congenital encephalopathy or severe oligophrenia. The governess says:

He is small for his age, with a head which is quite disproportionately large. His whole life appears to be spent in an alternation between savage fits of passion and gloomy intervals of sulking. Giving pain to any creature weaker than himself seems to be his one idea of amusement, and he shows quite remarkable talent in planning the capture of mice, little birds, and insects.^{36,37}

In the same story, Holmes utters what might be an opinion about psychopathology or child psychiatry, when he says to Dr Watson: "My dear Watson, you as a medical man are continually gaining light as to the tendencies of a child by the study of the parents".^{36,37}

8. Drug addiction

In *The Man with the Twisted Lip*, we find a description of the face of a long-term opium addict. Watson speaks of Isa Whitney as follows: "I can see him now, with yellow, pasty face, drooping lids, and pin-point pupils, all huddled in a chair, the wreck and ruin of a noble man".^{38,39}

Chronic alcoholism is described briefly in *The Adventure of the Blue Carbuncle*. In the following passage, Watson sketches Mr Barker: "He was a large man with rounded shoulders, a massive head, and a broad, intelligent face... A touch of red in nose and cheeks, with a slight tremor of his extended hand, recalled Holmes's surmise as to his habits".^{40,41}

9. Doctors as characters

Several doctors appear in the Sherlock Holmes stories, including the following noteworthy examples:

James Mortimer, a character in *The Hound of the Baskervilles*,⁴² and Grimper Dartmoor's doctor. Surgery resident at the Charing Cross Hospital; winner of the Jackson prize for Comparative Pathology with an essay entitled "Is Disease a Reversion?" Author of "Some Freaks of Atavism" (Lancet 1882), and "Do we regress?" (Journal of Psychology, March 1883). Corresponding member of the Swedish Pathological Society.

Percy Trevelyan, a character in *The Adventure of the Resident Patient*.^{24,25} Specialist in nervous system diseases, interested in catalepsy. He studied at London University and occupies a minor position at King's College Hospital. Winner of the Bruce Pinkerton prize and medal for his monograph on lesions of the nervous system.

Conclusions

Himself a doctor, Conan Doyle describes several medical conditions affecting different characters in his Sherlock Holmes stories. Curiously, most of the cases display neurological manifestations. Similarities can be drawn between the conditions described in Conan Doyle's writings and those in the Gowers neurology textbook. Both authors belong to the same historical period, and their texts describe cases of cerebrovascular disease that can easily be interpreted using modern terms. The description of catalepsy is an example of the psychiatric component of neurology in the late 19th century.

The treatments described in the stories are interesting and their use is often *sui generis*, such as administering brandy to a patient suffering from carbon monoxide poisoning. Sherlock Holmes also expresses an interesting opinion regarding parental influence on a child's pathological behaviour.

References

1. Grant M. Historia de la cultura occidental. Madrid: Ediciones Guadarrama; 1975. p. 305-12.
2. Klinger LS. Sherlock Holmes anotado. Madrid: Akal; 2010. p. 17-49
3. Balcells M. Sherlock Holmes. Anatomía de un mito. Barcelona; 1989.
4. Conan Doyle A. Memorias y aventuras. Madrid: Valdemar; 1999.
5. Sherlock Holmes. In: Encyclopaedia Britannica. Micropaedia, IX. Chicago: The University of Chicago Press; 1974. p. 137-8.
6. Park O. The Sherlock Holmes Encyclopedia. New York: Carol Publishing; 1994. p. 68-87.
7. Conan Doyle A. Estudio en Escarlata. Barcelona: Ediciones Orbis; 1987.
8. Conan Doyle A. A Study in Scarlet. Unknown edition. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyScar.html>
9. Conan Doyle A. La aventura del solterón aristocrático. Barcelona: Ediciones Orbis; 1987.
10. Conan Doyle A. The Noble Bachelor. The Strand Magazine: an illustrated monthly. 1892;3:386-99. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyNobl.html>
11. Conan Doyle A. El signo de los cuatro. Barcelona: Ediciones Orbis; 1987.
12. Conan Doyle A. The Sign of the Four. Oxford Text Archive, P-1768-A. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoySign.html>
13. Hepburn WB, Rodin A. The Jezail Bullet. In: Klinger LS. Sherlock Holmes anotado. Madrid: Akal; 1989. p. 83
14. Conan Doyle A. La aventura de Gloria Scott. Barcelona: Ediciones Orbis; 1987.
15. Conan Doyle A. The Adventure of the 'Gloria Scott'. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyGlor.html>
16. Conan Doyle A. El jorobado. Barcelona: Ediciones Orbis; 1987.
17. Conan Doyle A. The Crooked Man. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyCroo.html>
18. Conan Doyle A. El caso del escribiente del corredor de bolsa. Barcelona: Ediciones Orbis; 1987.
19. Conan Doyle A. The Stockbroker's Clerk. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyStoc.html>
20. Russell Brain W Sir. Diseases of the Nervous System. 5th ed. London: Oxford University Press; 1955. p. 501
21. Alcock NS. A note on the pathology of senile chorea (non hereditary). Brain. 1936;59:376-9
22. Gowers WR. Enfermedades del Sistema Nervioso. Barcelona: Espasa Calpe; 1895. p. 663-5.
23. Gowers WR. A Manual of Diseases of the Nervous System. p. 626-7. Available at: <http://archive.org/stream/manualofdiseases1892gowe#page/n5/mode/2up>
24. Conan Doyle A. El enfermo interno. Barcelona: Ediciones Orbis; 1987.
25. Conan Doyle A. The Adventure of the Resident Patient. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyResi.html>
26. Ey H, Bernard P, Brisset Ch. Tratado de Psiquiatría. Barcelona: Toray- Masson; 1969. p. 213-21
27. Friedman JH. Estereotipias y catatonía. En: Tolosa E, Jankovic J. Enfermedad de Parkinson y movimientos anormales. Madrid: Lippincott Williams & Wilkins; 2007. p. 468-80.
28. Conan Doyle A. El intérprete griego. Barcelona: Ediciones Orbis; 1987.
29. Conan Doyle A. The Adventure of the Greek Interpreter. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyGree.html>
30. Valdecasas FG. Farmacología experimental y terapéutica general. 6th ed. Barcelona; Salvat; 1972. p. 216-8.
31. Bradley DJ, Newbold CI, Warell DA. Paludismo. Weatherall DJ, Ledingham JGG, Warell DA. Oxford Tratado de Medicina Interna. Buenos Aires; Madrid [etc.]: Editorial Médica Panamericana; 1993. p. 753-5.
32. Conan Doyle A. El ritual de Musgrave. Barcelona: Ediciones Orbis; 1987.
33. Conan Doyle A. The Adventure of the Musgrave Ritual. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyMusg.html>
34. Conan Doyle A. El Tratado naval. Barcelona: Ediciones Orbis; 1987.
35. Conan Doyle A. The Adventure of the Naval Treaty. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyNava.html>
36. Conan Doyle A. La Finca de Copper. Barcelona: Ediciones Orbis; 1987.
37. Conan Doyle A. The Adventure of the Copper Beeches. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyBeec.html>
38. Conan Doyle A. El caso del hombre del labio retorcido. Barcelona: Ediciones Orbis; 1987.
39. Conan Doyle A. The Man with the Twisted Lip. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyTwis.html>
40. Conan Doyle A. El carbunco azul. Barcelona: Ediciones Orbis; 1987.
41. Conan Doyle A. The Adventure of the Blue Carbuncle. Available at: <http://etext.lib.virginia.edu/toc/modeng/public/DoyBlue.html>
42. Conan Doyle A. El sabueso de los Baskerville. Barcelona: Ediciones Orbis; 1987.