

Advancements in Forensic Science: The Contributions of Henri Louis Bayard, John Goodsir, and Harry Goodsir

As Presented to the University of Edinburgh and the Anatomical Museum

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In the annals of forensic science, the names of Henri Louis Bayard (1812-1852), John Goodsir, and Harry Goodsir stand as beacons of innovation and excellence during the 19th century. Born into an era marked by burgeoning scientific inquiry and the nascent development of forensic pathology, these three figures made indelible contributions that reshaped the landscape of criminal investigation.

Henri Louis Bayard, born in Paris in 1812, embarked on a career in medicine under the tutelage of Ollivier d'Angers (1796-1845), a renowned forensic scientist of the time.¹ Following d'Angers' passing in 1845, Bayard inherited much of his mentor's forensic practice, solidifying his reputation as a respected "legal physician" in Paris.² His pioneering research in microscopy, particularly in the development of a reliable procedure for detecting sperm cells, propelled forensic science into a new era of scientific rigour and precision.

Concurrently, John and Harry Goodsir, hailing from Edinburgh, Scotland, began their ascent as two of the finest microscopists in the region. Their collaborative efforts in forensic investigations, exemplified by their involvement in the trial of John Hamilton for assault, showcased their expertise in analysing seminal fluid stains on linen. The forensic report authored by the Goodsir brothers, meticulously documented in the *London and Edinburgh Monthly Journal of Medical Science*, underscored their proficiency in microscopic analysis and its application to criminal investigations.

As we delve into the intricacies of their contributions, it becomes evident that the legacies of Bayard, John Goodsir, and Harry Goodsir are intertwined, their collective impact reverberating through the corridors of forensic science. Together, they epitomise the collaborative spirit and unwavering dedication to scientific inquiry that continues to propel the field forward, shaping the pursuit of justice and truth in criminal investigations.

A defining moment in Bayard's career was his groundbreaking research in microscopy, which led to the development of a reliable procedure for detecting sperm cells. In an era marred by the absence of standardised protocols, Bayard's methodological rigour and keen observational skills brought much-needed clarity to forensic investigations involving sexual assault and related crimes. His systematic study of sperm cell characteristics, including size, shape, and distinct features, laid the foundation for a standardised approach to sperm detection.

Furthermore, Bayard's advocacy for forensic medicine as a distinct field of study, evidenced by his publications and co-editorship of *The Annals of Public Health and Legal Medicine*, played a pivotal role in shaping the discourse surrounding forensic science in France and beyond.³

Bayard conducted extensive work in forensic science, including the analysis of juvenile murders, and authored several publications advocating for the importance of forensic medicine as a distinct field of study. One murder case in particular was the Godin murder case of 1847.⁴ A grocer, by the name of Godin, aged 35 was tried for lighting his wife with charcoal which the testimony by Bayard sealed the grocer's fate by execution.

Bayard's contributions to forensic science were particularly notable in the realm of microscopy. While the observation of sperm cells dated back to Antony van Leeuwenhoek (1632-1723) in the 17th century, Bayard's research significantly advanced the field by developing a reliable procedure for detecting sperm. Prior to Bayard's work, the observation and identification of sperm cells in forensic investigations were fraught with errors and inconsistencies. Various techniques were practiced, but there was no standard criteria for accepting or rejecting findings related to sperm analysis.

Bayard's research in microscopy enabled him to devise a method that provided a more reliable and standardised approach to sperm detection. By meticulously studying the characteristics of sperm cells under the microscope, Bayard established criteria for identifying them accurately. Through his research, Bayard was able to establish a procedure that could reliably detect sperm cells in forensic samples, providing a more scientifically sound basis for their use as evidence in criminal investigations. His contributions helped to improve the accuracy and credibility of forensic analysis, particularly in cases involving sexual assault or other crimes where the presence of sperm cells was relevant. His work

helped standardise the criteria for accepting or rejecting findings related to sperm analysis, addressing previous inaccuracies and inconsistencies in forensic practice.

Additionally, Bayard made substantial contributions to the understanding of fiber characteristics and their forensic significance.⁵ By documenting the distinct characteristics of various fabrics, he enhanced the reliability of fiber analysis in criminal cases. In his 1839 work entitled *Examen microscopique du sperme desseche sur le linge, sur les tissue de nature et de coloration diverses (Microscopic examination of dried sperm on linen, on tissue of various natures and colors)* Bayard's research aimed to develop a reliable method for detecting and analysing sperm cells in forensic investigations, particularly in fibers. In the study, Bayard described his examination process, detailing the characteristics he observed under the microscope and the methods he employed to distinguish sperm cells from other substances. His findings contributed to the establishment of standardised protocols for sperm detection and analysis, significantly advancing the scientific rigour and accuracy of forensic investigations during the 19th century.

The political unrest in Paris in 1848 prompted Bayard to relocate to Chateau-Gontier, a regional capital in western France, where he continued to practice medicine and oversee his mining interests.⁶ Unfortunately, Bayard's life was cut short at the age of 40 in 1852.

John and Harry Goodsir

Parallel to Bayard's endeavours, John and Harry Goodsir emerged as prominent figures in the field of microscopy, particularly in Scotland. In a letter written to Harry in 1842, John offered to equip Harry with the compound microscope if he sent him ten pounds to cover the cost of the instrument.⁷ It was during this interim period that the forensic detective skills of both John and Harry were called upon to solve a crime. John Hamilton, a police night watchman in Cowan's Close, East Causeway in Edinburgh was tried for assault, with the intent to ravish a minor, Elizabeth Braidwood who was less than seven years old at the time. Harry and John Goodsir were commissioned to conduct tests for seminal fluid on linen sometime after its being deposited. Their forensic report, presented at the trial in the High Court of Justiciary in Edinburgh,⁸ led to the successful conviction of the prisoner and he was sentenced to be transported for fourteen years. They did not treat the accused who had venereal disease but it showed how their opinion as microscopists and forensic scientist was valued. The following is the extract as published in the *London and Edinburgh Monthly Journal of Medical Science* (1844).

“Trial of John Hamilton for Assault, with intent to Ravish. Tests for the Seminal Fluid.

In the High Court of Justiciary, at Edinburgh, on Monday 27th November 1843, John Hamilton was tried for the alternative crimes of assault, with intent to ravish Elizabeth Braidwood, a child under the age of puberty, and to the grievous and severe injury of her person; or, of using lewd and indecent practices towards the child, to the grievous and severe injury of her person. The injury here libelled on consisted in the communication of gonorrhoea, with which the prisoner was affected at the time of the alleged offence. The proof led was of the most distressing character, (the age of the injured child not exceeding seven years), and completely established the commission of the crime, (which had been repeated on several occasions,) as well as the communication of the disease. The medical reports are subjoined.

Report by Messrs John and Henry Duncan Spens Goodsir.

‘Edinburgh University Anatomical Museum, 9th September 1843. - Having been requested to examine certain stains or spots on some shirts, a shift, a sheet, towel, and apron, in possession of the police, and to pronounce, if possible, as to their nature, I have to report, that, after careful investigation, I have arrived at the following results: -

‘1st, On a shift, labelled as belonging to a girl named Braidwood, and on two coloured shirts, labelled as having been taken from the house of John Hamilton, I observed large spots or stains of a yellow colour, entirely resembling the stains produced by purulent discharges from the genitals.’

‘2d, On the girl’s shift, and on a white shirt, two coloured shirts, a coarse towel, a sheet, and a small white apron, taken from the house of John Hamilton, I observed spots characterized by their faint colour, but particularly by their stiffness, as if they had been produced by starching. On the girl’s shift, which was much stained by yellow matter, the stiff spots could only be detected by the feel, but that very distinctly. These stiff spots resembled, in all respect, those produced by seminal discharges.’

‘3d, When one of the stiff spots had been cut from the girl’s shift, and another from the towel taken from John Hamilton’s house, and had been steeped in separate portions of cold distilled water for some hours, they emitted a strong characteristic odour of seminal fluid.’

‘4th, When the two portions of muddy water, in which the two pieces of linen had been steeped, were examined microscopically, seminal animalcules, or spermatozoa, were detected. The majority of them were mutilated - the greater part of the tail being generally broken off, and the head not so plump as in the living state; but perfect specimens were also detected, differing in *no respect*, or in the *minutest detail*, from the living animalcules, except in the want of motion.’

‘5th, I conclude, therefore, from the evidence afforded by the facts just stated, that the stiff spots or stains on the girl’s shift, and on the man’s shirts, towels, etc. were produced by the seminal fluid of a man.

(Signed) ‘John Goodsir, Surgeon, and Conservator of Anatomical Museum of University of Edinburgh, 21, Lothian Street, Edinburgh.

Henry D. S. Goodsir, Surgeon, and Conservator of the Royal College of Surgeons of Edinburgh, residing with Mr John Goodsir, Surgeon, 21, Lothian Street, Edinburgh.’

Certificate by Dr James Yarrall Simpson, Professor of Midwifery.

‘I hereby certify, on soul and conscience, that I have, within the last eight days, examined on three different occasions, John Hamilton, at present a prisoner in the lock-up house. By these examinations I have satisfied myself that Hamilton has a discharge from the urethra which has the usual characters of gonorrhoea in its latter stages. Further, I have had an opportunity of seeing some of the seminal animalcules, obtained from the clothes worn by the girl, who accuses him of having attempted sexual connexion with her. These animalcules are decisive of the spot or spots on the shift, from which they were taken, being stained by male semen. On this subject, however, I enclose the opinions of the Messrs. Goodsir, two of the best microscopists in Scotland, and whose observations on such a subject as the present may be most implicitly relied upon.

(Signed) ‘J. Y. Simpson, M.D., Professor of Midwifery.’

[The report by the Messrs. Goodsir, and accompanying certificate of Dr Simpson are of great interest, as indicating the satisfactory mode of ascertaining the presence of seminal fluid on linen sometime after its being deposited. After an interval of weeks, and even months, the same method of inquiry has proved successful in other cases.]”⁹

The trial of John Hamilton serves as a testament to the invaluable contributions of the Goodsir brothers to the realm of forensic science. Their meticulous examination of stains, coupled with Dr. James Yarrall Simpson's certification, provided irrefutable evidence of Hamilton's guilt, underscoring the importance of forensic expertise in the dispensation of justice.

In conclusion, the collective efforts of Henri Louis Bayard, John Goodsir, and Harry Goodsir represent a watershed moment in the evolution of forensic science during the 19th century. Their pioneering work in microscopy, coupled with their dedication to scientific rigour and meticulous analysis, significantly advanced the field and laid the groundwork for modern forensic investigations. Bayard's contributions in developing a reliable procedure for detecting sperm cells, alongside the forensic expertise of the Goodsir brothers in analysing seminal fluid stains, exemplify the transformative impact of their research on the pursuit of justice.

As we reflect on their legacies, it becomes clear that their collaborative spirit and unwavering commitment to scientific inquiry have left an indelible mark on forensic science. Their contributions continue to resonate through the corridors of justice, underscoring the importance of rigorous analysis and expertise in resolving criminal cases.

¹ https://fr.wikipedia.org/wiki/Henri-Louis_Bayard Accessed on 31 March 2024.

² https://fr.wikipedia.org/wiki/Henri-Louis_Bayard Accessed on 31 March 2024.

³ https://fr.wikipedia.org/wiki/Henri-Louis_Bayard Accessed on 31 March 2024.

⁴ *Morning Advertiser*, 4 October 1847, 4.

⁵ https://fr.wikipedia.org/wiki/Henri-Louis_Bayard Accessed on 31 March 2024.

⁶ https://fr.wikipedia.org/wiki/Henri-Louis_Bayard Accessed on 31 March 2024.

⁷ Chiene, John. *Looking back, 1907-1860* (Edinburgh: Darien Press, 1908): 6.

⁸ “Trial of John Hamilton for Assault, with intent to Ravish – Tests for the Seminal Fluid,” *London and Edinburgh Monthly Journal of Medical Science IV* no. XXXVII (January 1844): 343-344.

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