

## Going Ballistic: The Forgotten Origins of Forensic Weapon Identification, 1919-1924

Between 1919 and 1924, thirty British officials were assassinated in the British Protectorate of Egypt. Though most assassinations took place in bustling locations in broad daylight—often in front of dozens of eyewitnesses—British authorities found it impossible to capture the culprits. Local eyewitnesses proved unwilling to cooperate with British investigative authorities. Seeking commonalities in the attacks, British law enforcement turned to budding forensic sciences to try and identify the assassins. With often little more than the bullets extracted from the dead bodies of the victims, forensic scientists endeavored to conclusively identify the murder weapon—and thereby, identify the murderer. At the forefront of this project were chemist Alfred Lucas, Director of the Government Analytical Laboratory and Assay Office, and medical doctor Sydney Smith, Principal Medico-Legal Expert to the Egyptian Government. The efforts of the two culminated in 1925, when Smith’s definitive identification of a .32 Colt automatic pistol sent seven criminal defendants to their death for conspiracy to murder the Commander-in-Chief of the Egyptian Army and Governor General of the Sudan, Sir Lee Stack. This murder investigation and the trial that followed would become the first of a series of trials in Egypt, and throughout the British Empire, in which forensic ballistics would provide the colonial state with seemingly conclusive, objective evidence against anti-colonial activities.

This Article contributes to a growing body of literature that explores colonialism’s role in shaping modern forensic culture.<sup>1</sup> Using forensic ballistics as a case study, the Article highlights two key impetuses that drove forensic innovation in the colonies: opportunity and necessity. Whereas in the imperial metropole introducing investigative innovations was often met with considerable resistance, there were fewer qualms about doing so abroad. The inhibiting forces of public opinion were not as influential in the colonies, making experiments in law and policing easier to realize overseas.<sup>2</sup> Furthermore, at least from a British perspective, colonial policing presented certain exigencies not present—or at least not as forceful—in the metropole. Existing scholarship has convincingly linked

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<sup>1</sup> For a discussion of “forensic culture” from an historical perspective see Ian Burney, David A. Kirby & Neil Pemberton, “Introducing Forensic Cultures,” *Studies in History and Philosophy of Biological and Biomedical Sciences* 44 (2013): 1–3. For a preliminary sketch of how colonialism helped shape “forensic culture” see Christopher Hamlin, “Forensic Culture in Historical Perspective: Technologies of Witness, Testimony, Judgment (and Justice?)” *Studies in History and Philosophy of Biological and Biomedical Sciences* 44 (2013): 4-15. Other examples of forensic sciences developed in and for the colonies include fingerprinting, foot printing, dog tracking.

<sup>2</sup> For a discussion of how Utilitarians used India to advance ideas that were considered too dangerous or too revolutionary for England see Eric Stokes, *The English Utilitarians and India* (Oxford: Clarendon Press, 1959).

the advent of forensic culture to what Christopher Hamlin has termed “arch anxieties” such as growing social mobility, anonymity and fears of mass violence.<sup>3</sup> Colonialism further compounded such metropolitan concerns. Cultural distance in the colonies rendered criminal motives opaque and incomprehensible to British minds.<sup>4</sup> Mutual distrust between colonizer and colonized bred fear of looming insurgency, along with native mendacity and non-cooperation. Coupled with the difficulty of cross-racial identification, such distrust meant that nowhere was anonymity so pronounced, and the fear of mass violence so profound, as in the colonies. These factors lent urgency to exploring new methods for investigating crimes, urgency they perhaps lacked in the metropole.<sup>5</sup> Forensic science addressed such arch anxieties by rendering crime scenes legible. Perpetrators could be prosecuted even if no eyewitnesses were present or willing to come forth, and regardless of whether the police could comprehend the criminal’s motives. Moreover, forensic evidence offered a semblance of objectivity and precision, which helped to legitimize an imposed colonial legal order.

### **The Assassination of the Sirdar**

At 2:55pm on November 19, 1924, High Commissioner of Egypt Field Marshall Edmund Allenby sent an urgent telegram to newly appointed Foreign Secretary, Austen Chamberlain:

“Sir Lee Stack was shot at 1-30 this afternoon near the Ministry of Education while driving home from the Ministry of War. There were several assailants, dressed as effendis and armed with revolvers. They made off in two cars of which the police have the numbers. Sir Lee Stack is now at the Residency being medically attended. He has at least two wounds one of which may be serious. His A.D.C. [aide de camp] and chauffeur were also slightly wounded.”<sup>6</sup>

Major-General Sir Lee Oliver Fitzmaurice Stack *Pasha* was the *Sirdar* (commander-in-chief) of the Egyptian Army and Governor-General of the Sudan. The attempt on Sir Lee’s life was the most

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<sup>3</sup> Cole, *Suspect Identities*, pp. 6 – 31. For a discussion of how this Process was reflected in detective fiction see Lawrence Friedman and Issachar Rosen-Zvi, “Illegal Fictions: Mystery Novels and the Popular Image of Crime,” *UCLA Law Review* 48 (2000-2001): 1411-1430, at 1423-24.

<sup>4</sup> See, for example, Sydney Smith, *Forensic Medicine: A Text-Book for Students and Practitioners* (Philadelphia: P. Blakiston’s Son & Co., 1925) p. 471 (“Motive, which plays so prominent a part in connection with Western crime, is often difficult to understand in the East, for murders of an extremely revolting nature may have what appears to be a most insignificant motive.”)

<sup>5</sup> For a discussion of the seeming irrationality of crime in the Middle East see Frederic M. Goadby, *Commentary on Egyptian Criminal Law and the Related Criminal Law of Palestine, Cyprus and Iraq* (Cairo: Government Press, 1924) pp. 18-20. For a literary treatment of the irrationality of foreign crime in the work of Conan Doyle, see Ronald R. Thomas *Detective Fiction and the Rise of Forensic Science* (Cambridge: Cambridge University Press, 1999), in particular Chapter 13 (“Foreign Bodies in *A Study in Scarlet* and *The Sign of Four*.”)

<sup>6</sup> National Archives of the United Kingdom (NAUK) FO 141.502.2 Major General Lee Stack, HC for Egypt to Chamberlain, November 19, 1924, 2:55pm.

recent—and the most serious—of a series of thirty attempts on the lives of British officials since the 1919 Egyptian Revolution. As Sydney Smith, Principal Medico-Legal Expert to the Egyptian Government wrote of Sir Lee’s assassination, “This was a culminating point in the series of political crimes that had begun with the attempted murder of Captain Combe in November 1919.”<sup>7</sup> Following the Great War, nationalists within Egypt were hopeful that their country would finally gain its independence from Britain. Britain, however, rejected requests for an Egyptian delegation to the Paris Peace Conference and exiled a number of nationalist leaders, prompting a popular uprising.<sup>8</sup> During the months of November and December 1919 alone, seven murder attempts on British officials took place. Another nine occurred in 1920-1921. The violence reached its peak with thirteen assassination attempts in 1922. Egyptian leaders were also targeted: a number of bombings were aimed at leaders who were perceived as collaborators with the British. These included Wahba Pasha (Egyptian Prime Minister from November 1919-May 1920), Ahmed Shafik Pasha (Minister of Agriculture), and the Minister of Waqfs (interestingly, Egyptian leaders were typically attacked by bombing whereas British officials were usually shot). The assassinations attempts subsided in 1923 and for most of 1924, after Britain granted Egypt independence in 1922 and a new constitution was ratified in 1923. This made the attempt on Sir Lee’s life all the more dramatic, as it had disrupted an extended period of relative quiet, indicating perhaps popular disillusionment with Britain’s grant of independence. Given both the timing and the rank of the official targeted, it came as a shock which had “grave political bearings both in Egypt and the Sudan.”<sup>9</sup>

Sir Lee had been shot three times: in his hand, foot and abdomen. He was operated upon that evening, given a blood transfusion, and seemed to be recovering well.<sup>10</sup> The abdominal injury, however, showed no exit wound and upon his initial operation that evening the slug could not be found and removed. That afternoon Allenby was visited by delegations of Egyptian dignitaries, including members of the Chamber of Deputies and the Senate, of the royal family, and newly elected Prime Minister Sa’ad Zaghlul—who arrived one hour after the shooting (presumably immediately upon learning of it). Of Zaghlul, Allenby noted: “He had every appearance of being horror-struck and seemed unable to

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<sup>7</sup> Mostly Murder, 97. He continued: “It was also to lead to the climax of my five years’ work on forensic ballistics.” (Note the “MY,” which entirely discounts all of the work done by Lucas).

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<sup>9</sup> NAUK FO 141/502/2 Major General Lee Stack (HC for Egypt to Chamberlain, Telegram 358, November 19, 1924)

<sup>10</sup> NAUK FO 141.502.2 Major General Lee Stack, HC for Egypt to Chamberlain, telegram No. 364, November 20, 1924, 12:10am (“Stack has now been operated upon. It was found that the intestines had not been perforated, but there was much internal hemorrhage from several ligaments. This has been stopped. Blood has been transfused with favourable results. The pulse previously not measurable is now 120. It has not been possible to extract the bullet.”)

express himself coherently.”<sup>11</sup> Throughout the day Allenby updated the Foreign Office in London of Sir Lee’s medical condition and the political ramifications of the attempt on the Sirdar’s life.<sup>12</sup> Without fully consulting Whitehall, Allenby posed an ultimatum to the Egyptian Prime Minister, demanding an indemnity of £.E.250,000, a public apology from the Egyptian government, the withdrawal of all Egyptian soldiers from the Sudan and the prosecution of the assassins.<sup>13</sup>

Much of the political significance of the murder relied on the question of the assassins’ identity and political affiliation. The identity of the target, both commander-in-chief of the Egyptian Army and Governor General of the Sudan, meant that that many factions with competing motivations may have desired his death. At the time of his shooting, HMG and the Egyptian government were negotiating the status of the Sudan in relation to Egypt. It stood to reason, therefore, that the assassins were Sudanese nationalists. Indeed at first, ‘Ali ‘Adb al-Latif’s Sudanese nationalist *Jamiat al-Liwa al Abyad* (White Flag League) were the prime suspects.<sup>14</sup> However, there was also good reason to suspect that the assassins were Egyptian nationalists, outraged that despite nominal independence, the Egyptian Army was still commanded by a foreigner. Sir Lee’s command was seen to weaken the Egyptian Army, to perpetuate British control. This, indeed, was a point of criticism against Sa’ad Zaghlul’s *Wafd* Party government. Yet Zaghlul himself was also displeased with this arrangement. It was therefore not entirely inconceivable to assume that Zaghlul’s supporters—rather than his political rivals—who had planned the attack. At least initially, this was Allenby’s intuition, which is why he demanded Zaghlul’s apology. He blamed Zaghlul for creating the political conditions which allowed such violence: “I understand that the investigation is being conducted upon a pre-conception that the criminals are persons who have been discharged from the Sudan. This may be a correct theory, but there are other lines of inquiry which ought not to be neglected but which are calculated to be distasteful to those at present in power.”<sup>15</sup>

Sir Lee ultimately succumbed to his wounds and died at 11:45pm on the night of November 20. Following his death, Allenby changed the terms of the ultimatum, demanding an indemnity of £.E.5000,000 to the widow. He also grew firmer on demands for Egyptian concessions in the Sudan.

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<sup>11</sup> NAUK FO 141.502.2 Major General Lee Stack, HC for Egypt to Chamberlain, November 19, 1924, 10pm.

<sup>12</sup> NAUK FO 141.502.2 Major General Lee Stack, HC for Egypt to Chamberlain, November 19, 1924, 3:50pm (“The Sirdar is suffering considerably from shock, as the result of three bullet wounds, in the abdomen, in the hand, and in the foot. His condition is serious.”)

<sup>13</sup> Arthur Goldschmidt Jr. *Modern Egypt: The Formation of a Nation State* (2<sup>nd</sup> ed), p. 74.

<sup>14</sup> Malak Badrawi, *Political Violence in Egypt, 1910-1924: Secret Societies, Plots and Assassinations* (Richmond, Surrey: Curzon Press, 2000), pp. 206.

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The Egyptian Government agreed to some of the terms: they agreed to issue a statement of condolence and to compensate the widow. However, Zaghlul and his government refused to accept responsibility for the assassination or for the political climate that allowed it. They also refused to the concessions that HMG demanded in the Sudan. Finding himself unable to accept the ultimatum, Prime Minister Zaghlul resigned in protest, throwing Anglo-Egyptian relations and Egyptian politics back into turmoil.

The political significance of the case made it critical to find the culprits. Surprisingly, not only did British authorities not insist on investigating the crime themselves. They refused to do so. The day after the murder, High Commissioner Allenby wrote to the Foreign Office: “It is not possible or desirable for the existing British Public Security Officials to control the course of the inquiry.”<sup>16</sup> In a scrambled passage of his telegram, Allenby explained that “the knowledge which these officials have gained in similar cases in the past where persons now holding high office have been greatly suspected is such that information and suggestions given by them may be improperly and detrimentally used.” Though somewhat cryptic, Allenby and others believed that for the findings to be considered legitimate, it had to be the *local* rather than the *British* police who found the culprits. Otherwise, the investigation might be viewed as a British pretext to renege on promises for Egyptian independence. Correspondence between Keown Boyd, Director General of the European Department in the Ministry of the Interior and High Commissioner Allenby that same day suggested other reasons why it was preferable that the local police conduct the investigation:

“I beg to request, on behalf of myself and *Miralat*<sup>17</sup> Russell Pasha, that we may be relieved from responsibility in respect of the conduct and results of the investigation into the attempt upon the life of his Excellency the Sirdar and Governor General of the Sudan. In view of our experience enquiring into previous political crimes of similar nature, we consider that the investigation of this crime can at present best be conducted by the other means at the disposal of the Egyptian Government.”

Boyd did not spell out explicitly the “other means” that were at the Egyptian police’s disposal, but his request suggests that interrogation techniques available to the local police were not necessarily available to the European branch. Russell had also repeatedly complained that in investigating political

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<sup>16</sup> HC to FO, Nov. 20, 1924, 8pm.

<sup>17</sup> Lieutenant Colonel. See P. Knepper, *International Crime in the 20<sup>th</sup> Century: The League of Nations Era, 1919-1939*, p. 125. Russell would gain most of his fame in drug regulation and smuggling from Syria.

crimes the local population did not seem particularly cooperative or forthcoming with European authorities. Two years earlier, as assassinations spiked, Russell wrote to the Minister of the Interior:

“The failure of the Police so far to discover the perpetrators of the recent political assassinations is due to the categorical refusal of the public to help the Authorities. Many persons ignorant of Police work seem to imagine that a Police Force ought to be able to discover crime by some mysterious power that they alone possess.”<sup>18</sup>

Though they had handed off the primary responsibility for the investigation to the Egyptian police force, British authorities were not waiting entirely idly for the local police to investigate. Sir Sydney Smith, Principal Medico-Legal Expert to the Government was busy at work, trying to retrieve whatever clues they could from the bullets extracted from Sir Lee’s body and from the cartridge cases found at the scene.

Smith had himself performed the autopsy after Sir Lee’s death and had extracted the fatal bullet. To the uninitiated, there was little distinctive about the bullets fired. They were .32 inch, perhaps the most common caliber in use at that time. Closer examination disclosed six right rifling grooves, suggesting that they were perhaps fired from a Colt automatic pistol. But this was one of the most common firearms of the time. Smith was, however, able to find some useful clues on the slug: immediately upon its extraction, he had noted some distinctive features,

“The bullet extracted from the body was a .32 automatic bullet, the tip of which had been cut in a cross shaped manner with the object of converting it into a “dum-dum” bullet which would expand on striking.”<sup>19</sup>

Smith followed up the following day with further details:

1. The bullet extracted from the foot before the death of His Excellency the Sirdar is a .32 automatic pistol bullet with a strong cupro nickel coating and was fired from a pistol with six narrow right-handed grooves. Such rifling is found in pistols of the Browning type.
2. The bullet extracted from the body of the deceased is a .32 automatic pistol bullet with a heavy brass (or similar metal) casing. It has faint badly marked broad grooves. The tip of the bullet has been cleanly cut in a cross-shaped manner in order to convert it into an expanding bullet, in a similar way to the one previously described.<sup>20</sup>

With these hints in mind, British authorities set out to find the culprits.

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<sup>18</sup> Report on Police Work in Cairo, July 1922 (Russell to Minister of the Interior), Russell 1/4 (Middle East Centre, St. Antony’s College, Oxford)

<sup>19</sup> Murder of His Excellency the Sirdar – Report, November 22, 1924, signed B. Biggar, Principal Medical Officer, Egyptian Army; Frank C. Madden, Professor of Surgery and Medical Officer to the British Consulate; Sydney Smith, Principal Medico-Legal Expert, Egyptian Government; Douglas E. Derry, Professor of Anatomy, School of Medicine; Roy Dobbin, Professor of Gynaecology, School of Medicine; Robert Brown, Anaesthetist to the Kasr el Aini Hospital. Pages 185-188: Medical reports. Pages 186-187 is a post mortem, signed among other people by Sydney Smith.

<sup>20</sup> Page 188: Smith report on the bullets, dated 22 November, 1924, titled: Murder of His Excellency the Sirdar.”

Using their network of informants, British authorities were able to identify a number of suspects. They obtained the services of Mohamed Naguib el-Helbawi, who had been convicted for conspiring to assassinate the Sultan in 1914. With his access to Egypt's secret societies, Helbawi was able to spread rumors that authorities were hot on the culprits' trail, forcing two of the suspects—the 19 and 21-year-old Enayat brothers—into flight. Helbawi had also encouraged the Enayats to flee towards Tripoli, thus allowing authorities to capture them in the Frontier District, where “much less formality was needed in connexion with arrest and imprisonment.”<sup>21</sup> Though the police did not initially find any weapons in the possession of the Enayat brothers, hidden in a basket of fruit were four automatic pistols and a significant amount of ammunition: a Mauser and Libia—both .25 caliber (and therefore not involved in the Sirdar's murder)— a .32 Sûreté, and a .32 Colt. Even after the pistols were discovered, the Enayats denied any connection to the Sirdar's murder. It fell, therefore, to the forensic experts to find a definitive connection that would independently link them to the crime or lead them to confess. The weapons were sent to Cairo for Smith's analysis.

### **Smith and Lucas**

The collaboration between forensic chemist Alfred Lucas and medical doctor Sydney Smith is perhaps one of the most significant and fruitful in the history of forensic science generally, and forensic ballistics in particular.<sup>22</sup> Lucas (1867-1945) arrived in Egypt in 1897, after working at the Inland Revenue Laboratory in London, where he was engaged primarily in determining alcohol content for taxation purposes. Diagnosed with tuberculosis, Lucas left cold and damp England for the warmer and dryer climate of Egypt. After short stints at the Salt Department and the Geological Survey Department in Cairo—where he began working on many recently discovered antiquities—in 1912 Lucas became the first head of the Government Analytical Laboratories set up by the British in Cairo. There Lucas applied his chemical training and expertise in a new direction: criminal investigation. Indeed, by 1920 forensic science had become such a significant component of the laboratory's work that it was later separated into a separate branch. While serving at the Laboratory in Egypt, Lucas published two books: “*Legal Chemistry and Scientific Criminal Investigation*” (1920) and “*Forensic Chemistry*” (1921) considered by many to be among the seminal texts in forensic science—and forensic chemistry

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<sup>21</sup> MM, 103.

<sup>22</sup> Alison Adam, p.

in particular. Lucas became a celebrity in Egypt, Britain and throughout the Empire, appearing quite frequently in the popular press.

Sydney Smith (1883-1969) was a medical doctor. Originally from New Zealand, Smith completed his medical studies in Edinburgh in 1913. Following his graduation he took up a post in forensic medicine in Edinburgh. During the Great War he joined the military and served as a major in ANZAC. After the war he was offered a position as medico-legal adviser to the Egyptian Government and lecturer in forensic medicine at Qasr el-Eini Medical School, where he would spend the next decade before returning to Edinburgh in 1928.

### **Seeking Patterns**

Beginning in 1919, while serving as Director of the Government Analytical Laboratory and Assay Office, Lucas began collecting detailed information about the means used in each of the attacks in an effort to identify patterns of *modus operandi* in “political crimes.” His reports pertained primarily to two kinds of attacks: shootings and bombings.<sup>23</sup> In bombing cases, Lucas tried to identify the distinctive characteristics of each bomb, in an effort to detect commonalities between the explosives and other materials used. Beginning with the 1919 shooting attempt on the life of Combe, Lucas began analyzing the physical evidence in shootings as well. In the absence of the murder weapon itself, Lucas became heavily focused on the bullets themselves, and the hints they might provide. Since the same bullet could be used in multiple weapons, and suiting a bullet for a particular weapon often required adjustment (such as filing down), the bullet could often provide clues concerning the identity of the weapon—and of the shooter.

In each shooting, Lucas issued a detailed report considering the measurements of the bullet (weight, size, shape), its composition (lead, copper, nickel, zinc), manufacturer, and what powder—if any—was detected (black, smokeless, etc). He also recorded the rifling marks he identified under the microscope: the number of grooves and their direction, as well as any distinctive features he noticed, namely, the scratches or marks that did not seem to be caused by the design of the weapon.

Initially, the victims of the attacks were low ranking officials, which made the killings seem almost opportunistic. In 1922, however, the attacks became bolder and significantly more focused. On February 18, 1922—ten days before the British unilateral proclamation of Egyptian independence—a group of assassins shot Aldred Brown, Controller General at the Central Administration in the

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<sup>23</sup> His analysis of bombs began with the December 1919 attempt on the life of H.E. Wahba Pacha [sic], Prime Minister of Egypt from November 1919 to May 1920.



Ministry of Education, between his home and the ministry. Brown held considerable authority over appointments or decision of any consequence within the Ministry of Education. The High Commissioner telegraphed the Foreign Office at once,

“Richard Aldred Brown, Controller General of Administration in the Department of Education, was fired at with revolver this afternoon in public thoroughfare by an unknown man dressed as an effendi. Two shots took effect and he is in a critical condition. Assailant got away. I am informed Brown had no personal enemies and it is conjectured that motive was political.”<sup>24</sup>

Though his attendant and the tramway conductor tried to intercept the killers, they were threatened and had to back down.<sup>25</sup> The killers were never found.

The wave of political assassinations of British persisted—and indeed intensified—after independence. In May 1922, *Bimbashi* (equivalent of colonel) Cave, a deputy commandant in the Cairo Police with a reputation for brutally oppressing protest, was shot and killed. Colonel Piggott, Paymaster-General of the British Army, was shot (but survived) in July 1922. In August, T.W. Brown of the Ministry of Agriculture were shot.

Lucas’s reports tried to link the various shootings through the bullets left at the scene. He tried, for example, to link the weapon used to shoot T.W. Brown to previous crimes. Lucas concluded that though the bullets used were all of a .32 inch caliber, there were three different kinds of distinctive rifling marks left on the bullets, suggesting at least three different weapons were employed. When comparing these bullets to other crime scenes Lucas noted “The rifling marks on the bullet extracted from Bobby are very unusual and similar marks have only been seen in one previous case, namely that of Colonial Piggott where several (but not all) of the bullets were marked in this unusual manner.” As for the other bullets, extracted from Mohammed Awad and Linda Brown, Lucas noted that they were “similar to one another and are somewhat unusual and are generally similar to the marks on several (but not all) of the bullets extracted from Bimbashi Cave.”

Though cautious, Lucas concluded “There is sufficient likeness between the marks on some of the bullets to make it possible that one of the pistols used in the Brown case was the same as one of the pistols used in the Piggott case and that another pistol used in the Brown case was the same as one of those used in the Cave case.” Still, despite the seeming distinctiveness of these “unusual and similar marks” he warned: “The minute details of these marks however as seen through a microscope are not

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<sup>24</sup> NAUK FO 141/494, Telegram No. 75 from HC for Egypt to Foreign Office, 18.2.1922.

<sup>25</sup> The gun was later found hidden in a loaf of bread. *Political Violence in Egypt, 1910-1925*, p. 176.

sufficiently alike to enable me to state positively that these bullets which are similarly marked have been fired from the same pistol, but the differences are not greater than is sometimes the case with bullets that have been fired from the same weapon.”<sup>26</sup>

On December 26, 1922, William Newby Robson, a professor of law at Cairo University, was shot from behind five times, from two different weapons: a .32 and a .25. Robson died shortly thereafter “due to hemorrhage and shock.” In an attempt to tie this murder to other shootings, Smith noted “The similarity between this case and those of Bimbashi Cave and Hassan Pasha Adb El Razik in which two weapons of similar caliber were used should be noted.”<sup>27</sup> The following day, however, Smith noted the rashness of his initial conclusion: though “[t]he bullets agree[d] in calibre,” at least with regard to the .32, “the rifling is distinctly different.” As for the .25, there were “no bullets with which to compare.”<sup>28</sup>

As of September, 1922, Lucas had collected information concerning fifteen shootings at British officials, dating back to December 1919. Beyond trying to glean as many details as possible from each attack, Lucas recorded the commonalities between the bullets used as various attacks. He began maintaining a master chart which included a number of characteristics he had observed on the slugs (and cartridge cases where available) collected at the various shootings: the caliber of the bullet, the number and direction of the rifling marks, and as a conclusion—the probable kind of the weapon used.

In all fifteen cases the weapons were of three calibers: 0.25, 0.32, and 0.455. The rifling grooves provided a second clue: the grooves were either right or left twisting, and between 5 and 7 landings. From these bits of information Lucas was able to glean which kind of pistol had likely been used: first, whether a revolver or automatic, and second, its make: Webley & Scott, Colt, Browning or Smith & Wesson.<sup>29</sup> Lucas was able to conclude, for example, that a number of the early shootings (between 1919 and 1922) were performed with the same *kind* of weapon, a .455 inch caliber with 7 right rifling grooves. This suggested that they were committed using a Webley & Scott revolver, the standard British military-issued pistol of the period, which had precisely those specifications. Lucas’s hypothesis was further corroborated by the fact that no cartridge casings were found at the crime scenes, which suggested that this was not an automatic pistol.

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<sup>26</sup> (SMS/4/149)

<sup>27</sup> (SMS/4/151)

<sup>28</sup> Id.

<sup>29</sup> Royal College of Physicians, Edinburgh (RCPE), Sydney Smith Papers (SMS), SMS/4/130.

Though these indicators may have seemed like a promising lead towards finding the culprits, the commonness of the weapon made it virtually impossible to identify the particular murder weapon. There were, however, some unique features that Lucas recorded that provided additional clues and to which Lucas and Smith began paying particular attention: for example, they noted that all of the bullets had a “heavy cupro-nickel coating,” which were typically used in automatic pistols—but not revolvers.<sup>30</sup> This type of ammunition was also unavailable for purchase in Egypt at that time, suggesting the assassins’ international connections and access to smugglers.<sup>31</sup> The relative rarity of the ammunition provided great promise. There was limited information, however, that could be gleaned merely from the slug in the absence of the casings.

The .455 Webley which featured so prominently in the early assassinations had, however, disappeared from the crime scenes of 1922. It had given way to a different arsenal of weapons. As Smith would later note: “The next batch of assassinations was more satisfactory from my point of view, as cartridge-cases were always found at the scene of the crime.”<sup>32</sup> This provided Lucas and Smith far more data points for comparison: they could compare not only the slugs fired—their caliber and groove marks—but also the markings on the casings, namely, the firing-pin’s and the ejector’s mark. Though perhaps less conclusive as evidence, they could also begin collecting data on the manufacturers of the bullets, a mark that was typically left on the bottom of each casing. To the extent that bullets made by a certain manufacturer were rare or otherwise unavailable in Egypt, their presence at various scenes might suggest an identity. Though different weapons featured in the various murders (including .25 inch caliber weapons), “one particular pistol, a .32 automatic with markings suggestive of a Colt, was involved in them all. The presence of this weapon over and over again made it very likely that the murders were the work of an organized gang.” Lucas and Smith set out to find the distinctive features of these bullets in a manner that might allow them to identify the weapon with certainty—if seized.

### **Forensic Ballistics: The State of the Field**

To fully appreciate the significance of Smith and Lucas’s pathbreaking work in Egypt, and their new claim to certainty in this novel forensic science, we must evaluate the state of the field at that time. Forensic ballistics was by no means *invented* by Lucas or Smith. Smith would hyperbolically reflect that “Little progress had been made [between 1835 and] when I became interested in 1919, and so far as I

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<sup>30</sup> Smith, MM, p. 100.

<sup>31</sup> Smith, MM, 101. The initial hypothesis was, therefore, that perhaps an unknown automatic pistol had been used under a gown or *galabieh*, which is what prevented the casings from being left at the scene.

<sup>32</sup> (MM, 101)

was concerned it was still a virgin field.”<sup>33</sup> Though Smith most certainly exaggerated his role (and entirely omitted his senior partner Lucas from the record), it is true that he and Lucas had broken new ground. The Sirdar’s murder was likely the first in history to use forensic ballistics evidence in quite that fashion. In 1936, Calvin Goddard, an American pioneer in the field, published an article entitled “A history of Firearm Identification.” The article began with a note from the journal’s editor, stating that “firearm identification is a relatively new science, dating as it does only from 1925...”<sup>34</sup>

Indeed, existing accounts on the history of forensic identification of mass-produced weapons often credit Colonel Calvin H. Goddard, a physician in the U.S. military as the discipline’s founder. This is in large part due to the significant role that Goddard played in the death sentence of Nicola Sacco and Bartolomeo Vanzetti: in 1927, Goddard confirmed that the fatal shots were fired from the same kind of weapon found in the possession of Sacco. Still, Goddard did not purport to match the fatal slug to a particular pistol. The only information he was able to provide was the type of gun used, and that the shots could have issued from Sacco’s gun.

### **The Bow Street Runners**

The first instance of matching a bullet to a particular weapon took place in 1835. Henry Goddard, a London Bow Street Runner,<sup>35</sup> was summoned to assist with the investigation of a burglary at the home of a certain Mrs. Maxwell, “a lady of independence residing in Hamilton Place, Southampton.”<sup>36</sup> Upon arriving at the scene, Goddard was informed that Joseph Randall, the family’s brave butler, had managed to successfully chase the burglars away. He did so with the pistol Mrs. Maxwell had bought him for Christmas to protect the house, but not before the burglars fired a bullet that Randall had only narrowly escaped. Goddard examined the entry marks left on the door by the burglars and the bullet that the butler had later found in his room.

Goddard was able to discern some distinctive features of the bullet itself: a “very small round pimple” which was presumably left by its mold. At a time before the mass-production of weapons or ammunition, gun owners typically owned molds into which they cast molten lead to produce unique bullets that fit their weapons. Determined to conduct a thorough investigation, Goddard asked Russell for his mold and bullets for examination. “[O]n comparing [the fired bullet] closely with the others I discovered a very small round pimple on all the bullets, including the one alleged to have been

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<sup>33</sup> Mostly Murder, 98.

<sup>34</sup> Calvin Goddard, A History of Firearm Identification, Chicago Police Journal (1936)

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<sup>36</sup> Goddard, Memoirs of a Bow Street Runner, p. 98.

discharged. In looking into the mould there was a very little hole hardly so large as the head of a small pin, and this I found accounted for the pimples.”

Identifying these similarities, Goddard decided to “call upon a Gun-smith” to confirm his suspicion that the bullet allegedly fired by the burglars in fact originated from the butler’s pistol. “After a very attentive examination [the gun-smith] said he was ready to come forward and make oath before the bench of Magistrates that all those bullets including the flattened one were cast in the mould now produced.”<sup>37</sup> His suspicions were further confirmed when the newspaper used for wadding (to create the seal between the bullet and the gunpowder) had been torn from the newspaper found in Randall’s quarters. Confronted with the evidence amassed against him (in the finest tradition of the best detective stories) Randall confessed to having staged the burglary to gain Mrs. Maxwell’s appreciation,, with the hope of being rewarded handsomely.<sup>38</sup> His confession affirmed the force of the physical forensic evidence. Though perhaps cliché, it was once again the butler who did it.

### **Mass Production**

Developments in the weapon industry across the Atlantic merely one year later, however, limited the significance of the investigative method that Goddard had just devised. In 1836, Samuel Colt revolutionized the weapon industry by introducing mass-production. In his Hartford armory, Colt standardized the machinery used to manufacture each part, creating uniform, interchangeable weapon components. His assembly line was soon able to turn out 150 guns per day. Guns became a pioneering industry launching the American age of mass production, which spread from guns to many other industries including bicycles, sewing machines and typewriters. Though much of the gun industry remained non-industrial in the following decades, mass-production would eventually take over the industry and thus make Goddard’s investigative technique obsolete.

During this transitional period towards mass production, identification of firearms was—as in the Randall case—largely the expertise of gunsmiths or military personnel, with specific practical knowledge in weaponry (the prime example being Robert Churchill). As we shall see, Smith and Lucas’s foray into the field also represented a shift in the *scientific* claims of forensic ballistics. Moreover,

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<sup>37</sup> Goddard, p. 101.

<sup>38</sup> Henry Goddard, *Memoirs of a Bow Street Runner* (1956), chapter 13 (pp. 102)

this shift would create tensions between forensic chemists and medical doctors, with both vying for dominance in the field.<sup>39</sup>

Though mass production had limited the realm of the gun expert, even mass-produced weapons could provide hints that could assist in criminal investigation. The caliber of the slug and the number and directions of rifling grooves, for example, could aid in identifying the *kind* of weapon used—or at least narrow down or exclude certain weapons. During the American Civil War, for example, an investigation into the death of Confederate General Stonewall Jackson during the battle of Chancellorsville (May 2, 1863) disclosed that the fatal bullet was a .67 caliber ball projectile fired from a smooth bore musket. Those were weapons used exclusively by the Confederate Army (the Union at the time used .58 caliber Minnie ball projectiles), meaning that the General had been the victim of unamicable friendly fire.

In 1900, Dr. Albert Llewelyn Hall took such observations to another level: he authored an article in the *Buffalo Medical Journal* which drew attention to “The fact that bullets of the same caliber and type fired through weapons of different makes acquire rifling marks varying in character...” According to Calvin Goddard, Hall was “The first investigator to bring this forcefully to the attention of the world at large...” Goddard crowned him “the father of firearm identification in America.”

In 1913 Victor Balthazard, a professor of forensic medicine at the Sorbonne, published an article in which he advanced the theory that every weapon—even mass-produced ones—left *unique* marks. With microscopic analysis of the striation left by the lands and grooves of the barrel, he argued, these could in theory be identified. With proper photographic enlargement and comparison between bullets fired from the suspected firearm and the reference bullet, he argued, such a match could be determined and furthermore, demonstrated to fact finders in legal proceedings. Such techniques could be applied not only to the projectile itself, but also to marks left on the casing by the ejector, extractor and firing pin. Still, Balthazard’s insights remained mostly academic and were not operationalized.

Though their methods and observations continued to improve, ballistic experts remained largely constrained to opinions concerning the *kind* of weapon used—but unable to identify the precise weapon. For example, in 1915 an illiterate New York farmer by the name of Charles Stielow was charged with the double murder of his ninety-year-old landlord and employer, Charles B. Phelps, and Phelps’s housekeeper, Margaret Wolcott. Phelps had been murdered shortly after withdrawing a large

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<sup>39</sup> “Lucas, at the Government Laboratory in Cairo... thought it should be a branch of forensic chemistry; but since the identification of the missile was closely associated with the examination of the body of the person shot, I considered it essential to undertake the ballistic investigation in our own laboratories.” Mostly Muder, 98.

sum of money, which was gone from the house when the police arrived to investigate. When questioned, Stielow had initially denied owning a gun at all, but was found to be in possession of a .22 revolver—the caliber of the fatal bullets that had killed Phelps and Walcott. After a lengthy interrogation Stielow confessed to the crime. The prosecution relied heavily on the testimony of Dr. Albert Hamilton (a charlatan without a high school diploma) who had peddled his forensic expertise in various branches of chemistry, toxicology, handwriting and ballistics. Hamilton testified that the murder weapon was Stielow's revolver. The jury convicted Stielow and he was sentenced to death. Stielow continued to claim innocence and his case was ultimately reopened by New York Governor Whitman. Charles E. Waite, a former attorney at the New York Attorney General's office was placed in charge of reexamining the ballistic evidence. With the aid of Captain Henry Jones (an NYPD firearms expert) Waite discovered that Stielow's revolver could not have fired the fatal shots since the bullets removed from the victims were smooth whereas those fired from Stielow's revolver bore groove marks.

Following the Stielow case, Waite embarked on a journey to systematize the field of forensic ballistics and improve its standards and methods of identification. In 1925, along with medical doctor and military veteran Calvin Goddard, John H. Fisher, “an expert in micrometrics,” and Philip O. Gravelle, “a master of all phases of photography,” Waite established the Bureau of Forensic Ballistics of New York City. The Bureau's aims were modest: it was “established for the avowed purpose of banishing ‘opinion’ from any legal question bearing upon small arms, ammunition and their components. It aims to supplant opinion with facts...”<sup>40</sup>

To that end, its founders set out to collect the rifling information from every pistol and revolver manufacturer in the world, beginning with the United States and Europe. Using among other things the patent applications for firearms beginning in 1833, they set out to compile “practically all modern revolvers and automatic pistols, as produced by domestic and foreign makers.” Their aim was to catalog all weapons (based on factors such as their bore diameter, number and direction of grooves, their depth, width and diameter and rate of pitch) and to create a “reference library” of “bullets of all calibers, styles and types, fired through arms of nearly every known make...” This would allow an identification of the kind of weapon based solely on the bullet.

Using this reference library, in 1927 Calvin Goddard reexamined the evidence against Nicola Sacco and Bartholomeo Vanzetti in the service of the Lowell Committee (headed by Harvard University

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<sup>40</sup> (Calvin H. Goddard, “Scientific Identification of Firearms and Bullets,” 17 *Am. Inst. Crim L. & Criminology* (1926) p. 254, 263)

President, A Lawrence Lowell) appointed by Massachusetts Governor John Fuller. Using a comparator microscope developed by the late Waite, Goddard concluded that the fatal shots that killed Frederick Parmenter and Alessandro Berrardelli were likely fired from a Colt of the same model found on Sacco when he was arrested.

Goddard, Waite, Fisher and Gravelle endeavored to take a far more comprehensive, systematic and scientific approach towards the analysis of weapons than Lucas or Smith had. Lucas and Smith, operating with limited means at their disposal in Egypt, were trying and solve a politically troublesome wave of assassinations, relying mostly on what might be considered an “opportunity sample” of slugs from crime scenes. Goddard et al, by contrast, cataloged bullets shot from every weapon known in the United States at the time, to provide a comprehensive atlas of tool markings. Indeed, Goddard endeavored to make forensic ballistics *fact*, rather than a matter of *opinion*. He considered forensic ballistics a “silent witness, one that embodies the two qualities so desirable, but never attainable, in the human witness—inability to tell anything but the truth, and freedom from all personal prejudice...”<sup>41</sup>

Though perhaps unsurprising from a current vantage point, the notion that a mass-produced weapon (or any mass-produced device) left unique marks—and that these marks could be detected—was not at all trivial. The notion that a bullet could be traced back to the unique features of an individual, albeit mass-produced weapon, stemmed in large part from the imperfections of each weapon. These imperfections were of two kinds: in manufacturing and through use. The latter often stemmed from wear and tear and neglect (rust etc.). As Goddard explained, the basic intuition stemmed from a parallel idea concerning human beings: just as no two individuals were entirely identical, so two weapons were not. “No two objects, either of God’s or man’s fabrication, are even identical in detail.”<sup>42</sup> But the underlying logic of Goddard’s proposition warrants deeper analysis. Essentially, the argument made by Goddard was that even God could not create two identical creatures; therefore, it should come as no surprise that humans—even the great Samuel Colt—could not. Goddard’s observation was novel in that it framed human distinctiveness as a divine shortcoming, rather than a sign of omnipotence.

### **Lucas’s Contribution to the Field**

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<sup>41</sup> (Calvin H. Goddard, “Scientific Identification of Firearms and Bullets,” 17 *Am. Inst. Crim L. & Criminology* (1926) p. 254, 263)

<sup>42</sup> Calvin H. Goddard, “Scientific Identification of Firearms and Bullets,” 17 *Am. Inst. Crim L. & Criminology* (1926) p. 254, at 257



In 1921 Lucas published his book “*Forensic Chemistry*,” still considered by many a monumental work in the field. Though Lucas dedicated an entire chapter to firearms, he addressed primarily the various kinds of powder (black, smokeless) and the ability of the forensic chemist to detect when a weapon had last been fired. Though the composition of bullets was also addressed, there was absolutely no discussion of matching a bullet to a particular weapon.

This changed to some extent in Lucas’s 1923 article “The Examination of Firearms and Projectiles in Forensic Cases.” There, “secondary markings” became more prominent. Secondary markings were what allowed the forensic expert to identify not only the *kind* of weapon used, but also try to match the bullet to a particular weapon based on its unique features and faults. Still, Lucas wrote nothing of the ongoing sample of bullets that he had assembled in Egypt in his attempt to find the culprits behind the British assassinations. Whether he did not find them sufficiently “scientific” or did not want to alert anyone to his findings is unclear. In any event, Lucas appeared somewhat reserved on the ability of even experts to derive too much from secondary markings, noting,

“From the point of view of criminal investigation, a very important aspect of firearms is the rifling of rifled arms, since this affects the bullet fired, imprinting on it distinctive and characteristic markings by means of which the nature of the weapon, and sometimes even a particular weapon, may be recognised.”

A particular weapon could only “*sometimes* be recognised,” presumably depending on just how distinctive the secondary markings were. This is noteworthy since within a short time Sydney Smith, Lucas’s junior partner in this field, would make far bolder claims: that *every* weapon was unique and left distinctive marks, which in the hands of a trained ballistic expert could point to the exact murder weapon.

Shortly after publishing this article in 1923, Lucas retired from the Government Laboratory at the young age of 55. He embarked on a second career in Egyptology. Lucas was recruited as a consultant for the Egyptian Department of Antiquities—where he worked until his death in 1945. Lucas applied many of the techniques he had devised for solving crimes to unlocking some of the more ancient mysteries of Egypt. He is perhaps best remembered today for his work on the tomb of King Tutankhamen. Thanks to his path-breaking work on the tomb, Lucas became one of the world’s foremost authorities not only in forensic science, but also in Egyptology, publishing the first edition of his renown “*Ancient Egyptian Materials*” in 1926. But even after his formal retirement from the Government Analytical Laboratory, Lucas continued to assist the police and prosecution, in Egypt

and in other parts of the British Empire, in crime scene investigation, thus cross-pollinating the fields of forensic science and archaeology.

### **Analyzing the Colts**

With Lucas's retirement, Smith took over as the primary ballistic expert. In his memoirs, Smith acknowledged the expectations placed on him once the weapons were seized and brought in for testing. Though his memoirs generally exhibit a flair for the dramatic, it is clear from his description that when the weapons were brought in for examination he felt the full weight of Anglo-Egyptian relations hanging on his analysis.

In an attempt to discover a possible link between the weapons found in the Enayat's possession and Sirdar's murder, Smith fired the .32 ammunition found in the Enayats' possession. The evidence from the Sûreté pistol slugs was inconclusive: though the grooves were identical in width and pitch to some of the bullets found at the scene, there was significantly more scratching on the test bullets. Though this did not in his opinion *exclude* the Sûreté, Smith could not conclusively opine that the slugs had emanated from that weapon. A careful examination of the cartridge casings, however, proved more promising: "a deep nick in the edge of the cap caused by the ejection bar, curved marks on the smooth surface of the cap caused by the breech-block" proved "beyond all doubt that three of the crime bullets had been fired from the Sûreté pistol."

The moment of truth came, however, with the test shots of the Colt—the likely murder weapon of the Sirdar. At first glance the Colt did not seem particularly distinctive: "The extractor and ejector marks were characteristic of any Colt pistol..."<sup>43</sup> Furthermore, both the bullets from the scene and the test bullets "did not show clearly marked rifling grooves, owing to the bad state of the barrel and the worn lands." Moreover, the ammunition found on the suspects did not match the bullets found at the scene. Though these facts would still allow Smith to testify to the *possibility* that the bullets were fired from the same weapon, this was not the conclusive evidence required by the prosecution.

Ultimately, it was a "broad scratched groove caused by a fault in the muzzle end of the barrel" that allowed Smith to match the cases from the scene to the weapons confiscated.<sup>44</sup> Using what he would later characterize as an "improvised comparator microscope," Smith concluded that the bullets had been fired from the confiscated Colt. Still, to evaluate the significance of such a mark, Smith would

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<sup>43</sup> MM, 104.

<sup>44</sup> MM, 105.

have to demonstrate that such faults were not typical of all such Colt pistols. He therefore fired 24 other Colts as controls to show that no other had left quite the same marks.<sup>45</sup>

Though the Enayat brothers had been arrested immediately after the crime, they denied all involvement. Without further evidence implicating them, the authorities found it impossible to detain them further. Faced with this physical forensic evidence against them, however, the two brothers confessed and implicated their coconspirators. One of the people they implicated was Mahmoud Rachid. Authorities searched his home and discovered a box of tools, including saws, two vices, and fifty-three files of varying degrees of fineness. All were sent for Smith's analysis. Upon examination of the vice, they discovered traces of lead, copper, zinc and nickel, "identical with the filings from the seized bullets." Though innocent explanations existed for the presence of these metals, it was at least consistent with the prosecution's theory that the bullets had been modified to create dum dums, and tended to corroborate the Enayat's confession.

### **The Trial**

The case against the eight conspirators was set for trial at the Native Assizes Court. Yet there existed at least two other venue options: a "mixed tribunal," or a special court for crimes against the army of occupation. The latter was rejected due to its "unenviable notoriety at the time of the Denshaway case," (a 1906 clash between the British military and Egyptian villagers, considered to be a turning point in Anglo-Egyptian relations). The former, too, seemed less desirable, as it would appear less legitimate to the Egyptian public and might have the makings of a show trial. Despite the considerable risk of having the case tried by an Egyptian court, British authorities preferred that option.

The probative difficulties of the case against the eight were apparent to Keown Boyd, commander of the European Police Force, from the outset. In a letter titled "Very Secret"<sup>46</sup> he explained that the entire case against all eight conspirators hinged on the confession of Shafik Mansur, a nationalist attorney, who seemed to be the leader and the only one who could link all of the coconspirators to the murder. However, his confession presented two evidentiary hurdles: first, the prosecution would have to prove that Mansur's confession was "free and voluntary"; second, the confession would have to be corroborated. Egyptian courts exercised considerable discretion on both points. Regarding what degree of corroboration they might require, the court could determine whether it would be satisfied by the confession generally be corroborated by external evidence, or instead insist that there be

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<sup>45</sup> MM, 104.

<sup>46</sup> NAUK FO 141/493 (document 4/280) Boyd to C. Hartopp (The Residency, Cairo), January 17, 1926.

corroboration implicate each of the conspirators in the crime. The former the prosecution could perhaps supply, but the latter would be far more complicated:

“This confession without evidence in support, would of course be of little value in a Court of law. We have evidence on certain minor points which goes to prove the truth of the statement on those points. If the Court accepts the confession as true in the main on the strength of such support as we could shot, things will go hardly with the accused. If they insist on separate proof on each individual case, it will be much more difficult to get convictions.”<sup>47</sup>

More generally, High Commissioner Allenby was concerned that witness tampering might lead to an acquittal. On Feb 22, 1926, on the eve of the opening of the trial, he wrote to Russell, asking “Have you, or can you get, any evidence which would justify very drastic action, such as the removal of the case from the Native Courts and its trial by Court Martial?”<sup>48</sup> Russell seemed less concerned with witness tampering and advised against a change of venue. “If it is merely a question of tampering with the witnesses – a frequent practice in this country and one very likely to be tried in the present case – this would not be a reason for interfering with the composition of the Court. As a matter of fact a native Court which is very well accustomed to witnesses changing their evidence would be less likely to attach undue important to this fact than a purely British Court.”

Still, fear loomed that the case might end in an acquittal, and in great embarrassment to HMG. Smith’s ability to deliver convincing forensic evidence was, therefore, crucial to the case. Although the prosecution relied heavily on the confession, Smith’s testimony was required to corroborate them.<sup>49</sup> When the defence challenged his expertise, Smith responded in his characteristic confidence (and neglecting to credit his fellow traveller, Alfred Lucas):

“I have had so much experience in these things, that I doubt if anybody has had more.”<sup>50</sup>

Still, Smith’s comment did not address a deeper question: to what extent could forensic ballistics be regarded as a form of scientific knowledge worthy of substantiating judicial findings. Seeking to address this issue, the prosecutor stated,

It may seem strange how the Medico-Legal Expert gives such definite opinions. The question, however, is entirely technical and in giving such opinions the Medico-Legal Expert relies on both science and long experience.

My attention was drawn to a piece recently published in the “Siyassa” newspaper under the heading “Every firearm has its own marks” which goes to confirm the Medico-Legal Expert’s

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<sup>47</sup> NAUK FO 141/493 (document 5/280) Boyd to Hartopp (The Residency, Cairo), January 17, 1926

<sup>48</sup> NAUK FO 141/493 Urgent, Secret and Personal (P1060765)

<sup>49</sup> Sydney Smith, *Mostly Murder* (London: The Companion Book Club, 1959) p. 111.

<sup>50</sup> NAUK FO 141/493 “Murder of Major General Sir Lee Stack: Police and Judicial Proceedings” (P1060778)

opinion that it is possible to identify the fire-arm by the examination of the bullets fired from it.<sup>51</sup>

Attempting to obscure precisely how novel (and questionable) this matching of a bullet to a mass-produced weapon truly was, the prosecutor presented it as “entirely technical” and derived wholly from science. His appeal to scientific authority seems in many ways even more bewildering: unable to cite academic journals to establish a general acceptance within the relevant scientific community, the prosecutor cited a popular science periodical instead.

On March 31, 1926, Smith was called to testify. Unsurprisingly, he delivered a dramatic performance on the witness stand. When asked “Is it easy for anyone to convert an ordinary bullet into a dum-dum?” Smith replied “Anyone can convert it if he has the necessary tools.” Smith then proceeded to use the file and vice found at Rachid’s home to demonstrate to the court how he could do so within seconds. Still, given the commonness of Colt pistols, Smith would have to convince the tribunal that it was this Colt rather than any other that had fired the lethal bullet. Smith went on to explain how he was so confident that this was indeed the murder weapon:

“The Colt has a fault in its barrel which makes a special groove on any bullet fired through it. The bullets taken from the Sirdar’s chest and from Captain Campbell’s have this special groove.”

He then raised the pistol over his head and added dramatically:

“I declare definitely that they were both fired from this Colt.”<sup>52</sup>

During his time on the stand, Smith provided details not only of the injuries sustained by the *Sirdar* and his companions, but linked the ammunition, guns and explosives found in the possession of several of the conspirators to the murder attempts on a number of other British figures who had been targeted for assassination between 1919 and 1924.<sup>53</sup> Smith’s testimony was particularly remarkable considering how reserved Lucas, who had worked on compiling such clues for years, remained about the possibility of matching these clues.

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<sup>51</sup> National Archives, FO 141/493 “Murder of major General Sir Lee Stack and other Political Murders. Police and Judicial Proceedings”, p. 33.

<sup>52</sup> MM, 110.

<sup>53</sup> These included the cases of Steele, Cohen, Headon, Knight and Hatton. National Archives, FO 141/493 “Murder of major General Sir Lee Stack and other Political Murders. Police and Judicial Proceedings”, p. 33.

Smith was the last witness for the prosecution. Despite its unfamiliarity with this nascent forensic science, the court was adequately convinced by the ballistic and explosives evidence to convict all eight defendants, sentencing seven of them to death.<sup>54</sup>

### **The Ballistic Option: After the Sirdar's Murder Trial**

With Smith's convincing performance at the Sirdar's murder trial, the potential of ballistic testimony had been realized. Before their execution, the Enayat brothers, Rachid and Mansur provided further information about Egypt's secret societies and their membership. One of the people they had implicated was Hag Ahmed Gadulla, an official at the railway administration. Authorities conducted a thorough search in his home and discovered a .455 Webley revolver, a weapon implicated in five of the early shooting incidents. The automatic ammunition found with the Webley was marked with an 'E'—meaning it was manufactured by Eley. Identical bullets were discovered at the five crime scenes. With this discovery, Smith had solved five of the cold cases. Smith's impressive performance and instrumental role in securing convictions against the eight defendants in the Sirdar's murder trial paved the way towards bolder conclusions with less distinctive bullets retrieved from other crime scenes.

### **Conclusion**

When explaining why Egypt proved so significant in breakthroughs in forensic ballistics, Smith noted, "Our opportunities for research were exceptional: the steady and copious supply of shooting enabled us to test, correct, and increase our knowledge without intermission." Yet beyond the research opportunities underscored by Smith, the political context in which he and Lucas operated helps explain how and why a rather tentative form of forensic specialization became tremendously bold in its claims within a very short period of time. From Egypt, forensic ballistics would spread to other parts of the British Empire and would make claims equally as bold: in neighboring Palestine, forensic ballistics (and Smith himself) would play a crucial role in the 1934 murder trial of Dr. Haim Arlosoroff, head of the political department of the Jewish Agency. In Kenya, it would similarly play a key role in finding the murderers of Lord Erroll. From its infancy in 1923, forensic ballistics had become, almost overnight, a mature (or perhaps precocious) science.

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<sup>54</sup> Donald M. Reid, "Political Assassination in Egypt, 1910-1954", *The International Journal of African Historical Studies* 15, 4 (1982), pp.630-631; 648.