

Report of 19 November 2015 Meeting

Royal Society

Southern Highlands Branch

Speaker: Senior Sergeant Charles Agius

Topic: Overview of Forensic Investigation within the NSW Police Force

It was a pleasure to see the enjoyment of the 75 audience members attending the last lecture of the year at the Southern Highlands Branch of the Royal Society. Senior Sergeant Charles Agius presented an excellent overview of Forensic Investigation from the earliest records of that science to the present day situation where real time forensics are being developed and employed to astonishing effect.

As early as the 8th century, the Chinese were using fingerprints to establish the identity of documents and clay sculpture. Although the fingerprints were able to be compared, there was at that time no attempt to create a formal classification system. Several hundred years later, Quintilian, a lawyer in the Roman courts showed circa 1000 that bloody palm prints were meant to frame a blind man for his mother's murder. This was the first recorded genuine use of forensic evidence in a formal court of law.

Agius spent some time speaking of the "principle of exchange", one of the fundamentals of Forensic Science. This term first appeared in 1940 in *Police and Crime Detection*, having been adapted from Dr Edmond Locard's observations. Locard (1877-1966) observed that it is impossible for a criminal to act without leaving traces of his presence. The "principal of exchange" which followed his observations dictated that when two objects come into contact with each other, each will take something from the other object, or leave something behind.

Seven years later, in the case of *Harris vs United States* 331 US 145, the "principle of exchange" was relied upon in testimony in a very powerful quote: "Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as silent witness against him. Not only his fingerprints or his footprints, but his hair, the fibres from his clothes, the glass he breaks, the tool marks he leaves, the paint he scratches, the blood or semen he deposits or collects – all of these bear mute witness against him. This is evidence that does not forget. It is not confused by the excitement of the moment. It is not absent because human witnesses are..."

It was as early as 1853 that Ludwig Teichmann in Krakow developed the first microscopic crystal test for haemoglobin using hemin crystals. By 1913 Victor Balthazard, professor of forensic medicine at the Sorbonne, published the first article on individualizing bullet markings. In 1984, Sir Alec Jeffreys developed the first DNA profiling test. It involved detection of a multilocus RFLP pattern. These findings were published in 1985. A year later, Jeffreys used DNA profiling to identify Colin Pitchfork

as the murderer of two young girls in the English Midlands. Significantly, in the course of the investigation, DNA was first used to exonerate an innocent suspect.

Charles Agius was originally requested to give a lecture of approximately 40-50 minutes duration, but as the audience became more and more involved with his subject matter, it became abundantly clear that the original time guidelines could not be applied. The lecture proceeded for twice as long, much to the appreciation of all attending. One subject which consumed a great deal of lecture time related to fire dynamics, where videos were shown of the origin and cause of fires, and the forensic investigations that ensued in particular cases after a devastating event. A video that will stay in the minds of all attending was a real time record of a fire originating from a Christmas tree light, where in exactly 48 seconds, the entire room was engulfed in flame and completely destroyed. Agius' commentary throughout the sequence gave vivid description of the physics and chemistry of the situation.

It must be recognized that in this far-ranging and informative lecture, a description such as this is far from adequate. The audience was delighted to hear that Charles presents lectures such as these to young students at early university level, where the significance of physics, chemistry and mathematics studies is presented as a wonderful invitation to a fascinating career in science.

Anne Wood