

The history and development of forensic science flashcard



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The history of forensic science can date back as early as the 19th century if not earlier. Gregor Mendel who is known as the father of genetics, proved that characteristics are passed from one generation to the next. He did a study over 8 years growing pea plants and he noticed there were characteristics passed on to each generation. The discovery of DNA is a debated subject on who actually founded the discovery.

Rosalind Franklin and Maurice Wilkins decided to try and make a crystal of the DNA molecule as if they could get the DNA to crystallize they would be able to make an x-ray pattern of the molecule and being able to study it further in the understanding on how DNA worked. The experiment was successful and as a result of the x-ray it was shown that the DNA had two strands that looked similar to an X shape, this showed that DNA was a helix shape. Although Rosalind Franklin and Maurice Wilkins successfully created a crystallized version of DNA they did not develop their findings further.

In 1953 James Watson and Francis Crick were attempting to create a model of DNA. They saw the picture of the X-ray created by Franklin and Wilkins and had adequate information to create an accurate model of the DNA molecule. They continued to develop their work and later won the Nobel Prize for their development of the DNA molecule. Maurice Wilkins also shared the prize with the two due to his work with Franklin which had led to the initial picture of the DNA. DNA Typing was introduced in the 1980's and revolutionised forensic science.

Dr Alec Jeffreys first described DNA typing in 1985 and this development in forensic science allowed the police and law enforcement agencies to be able

to match perpetrators of a crime to the victim or crime scene. Due to this substantial development it has closed thousands of unsolved crimes, convicting those from crimes they otherwise would have got away with and also freeing innocent people who had not committed the crimes they had been punished for like in the case of Stefan Kiszko.

The first case this was used in was an immigration case of a Ghanaian family. Dr Alec Jeffereys was involved and used DNA from all of the children and the mother⁵ to create a profile that would be a match to the son's. He used the match to prove that the boy was who he said he was and this result led to a change in the Immigration Act. Forensic DNA technology began being used in 1986 by the police as a suspect had admitted to 2 rape-murders. The police called in Dr Alec Jefferys examined the mans DNA and it was proved that the confession was in fact a lie. Police then began collecting DNA samples of thousands of men in the Midlands⁶ and successfully found the murderer a Robert Melias.

Melias was the first person to be convicted of a crime in the UK on the basis of DNA evidence. DNA profiling is not only used in crime detection but also in human identity testing. The use of DNA has grown significantly within the last 15 years and the use of DNA in other areas away from crime is tremendously higher than in previous years, paternity tests are a key point in these figures. In 1993 a database holding DNA samples was proposed by The Royal Commission on Criminal Justice and in 1994 the database was established.

This database is still in use today and as of the 31st March 2010 there were reportedly 4, 946, 613 on the database. 7 This figure represents a small minority of the UK but worryingly within this figure there was 22% who did not have any form of conviction or police record. Dactyloscopy, commonly known as finger prints have been around for thousands of years. The earliest recorded prints were in Egypt over four thousand years ago and the Chinese used fingerprints on official documents in the 3rd century BC. It wasn't until 1798 that it was first claimed finger prints were unique; this was claimed by J. C Mayer of Germany.

There were many significant discoveries after this claim was made that developed the theory of fingerprints. In 1880 Henry Faulds, a Scottish doctor stated that fingerprints were not eradicated by injuries and he suggested that fingerprints could lead to identification of criminals and how prints could be taken off objects using a technique called nature printing. He also recognised that over 50 years his fingerprints had never changed, proving they are unique and that they could always be linked back to the same person. 2 years later English scientist Francis Galton used Faulds' theory and made the first detailed attempt at print classification for purposes of a criminal investigation. The first person to be convicted of a crime by use of finger print analysis was a ranch worker called Velasquez who was accused of murdering two children in Necohea, Argentina.

He was successfully convicted in 1892 of the murders. Henry Faulds' classification is still used in the present day, the study of the tented arches. Loops whorls and twinned hoops are still scrutinized along with the impression of friction ridges on the skin found on all areas of the body.
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Fingertips contain water as there are no sweat glands in the tips; they also include sebum⁹, salt, ethanol and sometimes arsenic as well as amino acids. Prints can be found on anything you touch, and in some cases will remain on the object forever. ¹⁰ Prints on human skin will only remain on the skin for 2 hours on a live hum and on a dead person they can last up to 6 hours as the blood and body goes cold and the print is then preserved. Fingerprints are difficult if not impossible to get rid of, evening burning them will only temporarily remove them as they grow back.

Blood is a key principle in forensic science, not just the blood type to determine who the blood belongs to but all different aspects such as where the blood came from, what angle it came from, how long it's been there as well as many other aspects. This can be seen in once case where a female body was found strangled in a park and later identified by a cheque book in her possession. When the police went to inform the family they advised the police the woman had not been seen for days. When they investigated this they found in her bedroom that she had been viciously attacked as there was blood everywhere including on the walls.

Blood splatters were analysed by the forensic experts to try and determine what had happened. They concluded that there was more than one weapon used, one of which was a baseball bat. Bloody footprints were also found on the victims t-shirt. Chemical enhancers were used to find additional prints and multiple prints were found, which concluded that in theory there was more than one killer. The people in whom she socialised with all interviewed and two names were mentioned on more than once occasion: Alex and David.

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It was discovered they owed money but they both had alibis for the murder. On a more intense search they found shoe prints matching those found on the victims T-shirt. During their interrogation by the police, Alex confessed but David denied all knowledge of the crime and was later released as there was no evidence linking him to the victim. Rope was found in the car Alex owned and it was analysed to see if it matched the rope used to strangle the victim, results confirmed that it was indeed the rope used to kill the victim.

Boots were later found in his room which were analysed as well, these were found to have blood splatters on, the blood matched the victims and when the splatters were studied it was found that it matched the blows that were inflicted upon the victim. On close inspection of the blood splatters on the wall, it was found that a shadow had been formed on the wall confirming there were definitely two people present at the time of the murder. David was re-arrested and later convicted with Alex and sentenced to life imprisonment without parole.

In this case the analysis of not only the blood type but also the splatters on the wall lead to a 2nd conviction, it is of paramount importance that all blood is analysed as killers could walk free. The development of this aspect of forensic science is advancing all the time, and is a key factor within the history of forensic science. It has been confirmed with intense study that if blood falls down a wall in a straight line it would form a circular pool of blood however if it is hit at an angle it would spear at an angle on the wall.

Forensic scientists can also confirm from the blood splatters whether the killer is left of right handed. Stephen Phillips murdered a woman with a gold

club, it was identified that he was right handed from the blood splatters and he was later convicted of murder on this basis. Ballistics is the study of firearms and bullets and is broken down into different sections. Firstly there is the Internal ballistics which studies the process originally firing projection for example; a bullet through a gun barrel. The second is transition Ballistics which studies the projectiles behaviour when it leaves the gun.

Thirdly there is the study of the passage of the projectile through the air known as external ballistics which then links into the study of the interaction of the bullet with the target. Lastly there is Forensic Ballistics which is the science of analysing firearm use in crimes. The first known form of firearm was the cannon, first used by the Chinese in the 9th century who in turn also developed gunpowder. In 1515 the wheel lock pistol was invented in the Italian town of Pistoia and this changed the nature of gun crime forever.

Ballistics experts are concerned with four key principles. Firstly if a particular bullet was fired from a particular gun, secondly the range at which a shot was fired. Thirdly the time it was fired and lastly the cause nature and effect of bullet. The 1800's was a turning point in history for the development of guns and bullets . Henry Goddard in 1835 first used bullet comparison based on unique markings of a bullet taken from a victim which matched the bullet mould belonging to the victim, it was the first time it was used to try and catch a killer.

The 1880's developed the compound microscope magnification and increased it to 2000 times. In 1846 the first modern revolver was invented by Thomas Colt, this was another key development in the history and future of

guns. In 1920's three important dates emerged with Charles Waite being the first man to catalogue all the different manufacturing data about weapons from all known gun manufactures. He later created a comparison microscope that can compare marks on two bullets to see if they were fired from the same gun, this he did with Calvin Goddard.

Calvin Goddard did a lot of work on the St Valentine's Day Massacre and his work lead to the founding of the Scientific Crime Detection Laboratory in Evanston, Illinois. The development of the study of ballistics did not have any significant developments until 1974 where the detection of gunshot residue using electron microscopy using electron x-rays was developed at the Aerospace Corporation. Another significant development was in 1991 when IBIS was launched. IBIS - Integrated Ballistics Identification System.

Walsh Automation INC based in Montreal launched this automated imaging system to compare marks on bullets, cartridge cases and shell cases. They developed it for the US market alongside the Bureau of Alcohol, Tobacco and Firearms. The FBI later developed " Drugfire" a more sophisticated version of IBIS, this came only a year after the initial launch of IBIS. The forensic study of Ballistics is used in all forms of gun crime. The murders of Kermode and Pamela Jordan are an example of where the study of ballistics helped trap the killer.

Kermode and Pamela were found in their bedroom with shots to their heads and found to have been slashed with a knife. The room was a mess with overturned furniture blood all over the floor, walls, ceiling and bloody handprints were also found on the door knobs. It was confirmed that

Kermode was shot twice in the head and twice in the shoulder and Pamela was shot twice in the shoulder. It was confirmed by analysis there were in fact two separate guns used and a knife. Kermode was shot at point blank range in the head but this failed to kill him.

It was found that the bullets used in the gun were undersized which resulted in the bullet having low energy and speed when it was fired. The average speed of a bullet is 118mph and the bullets were certainly not fired at this speed. They tested this by firing undersized bullets into water and measuring the length they travelled, a full speed bullet would have no problem moving through water, it would just slow the speed down slightly whereas when the undersized bullets were fired they hit the water then almost instantly lost all power.

Being able to study the impact speed of a bullet has to determine that the shots had not killed the couple is a key factor in the study of ballistics, without this evidence the case would have taken longer to solve. Another analysis that was carried out was Bullet Trajectory where experts can analysis the angles at which the bullets were fired, giving an accurate location to where the killer was situated.

The use of this analysis on this case found that Pamela's son and Kermit's stepson was the person who fired the fatal shots, it was later discovered that Kermit had a gun that he kept in his bathroom, a bathroom that was also linked to the son's bedroom which gave him access to the gun which he then fired and killed his parents with. 11 The other person who had initially attacked the couple was Gabrielle Adams who believed he was a

reincarnated soldier from Vietnam. The two boys were found guilty of Murder in the first degree and were given mandatory life sentences.

The forensic evidence found in this case was compelling and covered all aspects of DNA, Fingerprinting, ballistics and blood. It shows how far technology has come and the development of forensic science. The science is ever developing and will continue to do so as the years go on. Experts who study the different aspects of forensic science help to catch killers, rapists and other such criminals by piecing together the broken puzzle of a crime scene and using all the different aspects of forensic science to ensure that the right person is tried in court and that no further miscarriages of justice happen.