**The Case of the Car Carpet**

**Read, Annotate and Answer Questions!**

A few years ago, a young woman was murdered in Sydney. Her body was found among trees, down an embankment, just a few metres from the edge of a road. As the investigation proceeded, the police considered various possible suspects, including her ex-boyfriend. He maintained that since the break-up of the pair a few months ago he had not seen his former girlfriend. Why, then, had he recently called her, and arranged to meet her on the very day that she died? That, he said, was just to give back their affectionate letters and gifts, as the final act in the whole business. He claimed that, in fact, he had not met her on that day.

Alert CSIs at the crime scene carefully isolated the dead woman's walking boots. About fifty black fibres found on their soles were photographed in position, carefully preserved, and taken to the lab for analysis, along with hundreds of other pieces of evidence. It turned out that these fibres came from the carpet of a car.

The ex-boyfriend's car was searched for evidence, and fibre samples were taken from its carpet. Fibre specialists studied the colour composition, size and microscopic features left by the manufacturing process on fibres from the crime scene and the ex-boyfriend's car. They were strikingly similar - so much so, that it was possible to see that they came from the same sort of carpet. However, by itself this proved very little. All cars of a particular make are likely to have the same sort of carpet. But, by a stroke of luck, the ex-boyfriend's car was a very unusual type of imported Honda. Police checks with the company showed that only 200 had been brought into Australia; all of these would have had identical carpet. The carpet was not put into any other models.

Police tracked down nearly every one of those cars, and checked alibis. There were no other cars of this type in the area at the time of the murder. But the case was still far from closed. Even if the fibres on the victim's shoes had come from her ex-boyfriend's car, could this have happened innocently many months ago? Forensic scientists carried out a detailed research project on the transfer of carpet fibres to shoes, and the length of time they could remain on the soles. The results showed that, although there is some variation with differing shoe soles and fibre types, car carpet fibres generally don't stay on shoes for very long - only a matter of minutes in normal conditions.

This information, and the confirmation that the fibres matched the rare car carpet of the suspect's car, helped to clinch the prosecution case and bring about the finding that the accused ex-boyfriend was indeed guilty of murder.

**Background**

Analyzing fibres at a crime scene, on an object or on a corpse, is part of the huge field of 'trace evidence'. Because fibres are so common in modern society - all clothes, carpets and many other materials shed them - fibre analysis has become a specialized discipline of its own.

Forensic scientists distinguish four broad categories of fibre:
\* Animal (e.g. wool, silk, fur) Note that hair analysis is a specialized field, separate from fibre
\* Plant (e.g. cotton, sisal, jute, hemp)
\* Mineral (e.g. asbestos)
\* Synthetic (six broad types: nylon, rayon, acetate, acrylic, polyester and olefin.)

Most work involves synthetic fibres, of which there are thousands of different types known. Each type of synthetic fibre is first grouped according to its chemical composition. This may involve burning a single fibre (pyrolysis) to reveal its elemental composition - that is, the elements present in it and their proportions. Other chemical techniques are also used to determine the precise nature of the organic compounds present.

Then its physical structure is examined. A fibre from a particular machine is manufactured in a particular way, to a specified size and shape and, to the trained eye, displays the tell-tale signs of its manufacturing process. And then there's the colour. Hundreds of different shades are made up by combining dyes, which can also be analysed. Scientists can compare the colours within tiny fragments by using microspectrophotometry, which compares the differences in the absorption of the various wavelengths within a beam of white light shone at the samples. (Different colours will absorb and reflect different wavelengths of light.)

Using a variety of microscopes, scientists can examine a fibre's shape, particularly in cross-section, and its surface. Any changes since its manufacture are also important to notice, especially if it can be compared with a sample of new, identical fibre. (Over time, and depending on environmental conditions, fibres can shrink or expand, or show changes in surface markings or strength; their dyes can also change.) The way in which fibres have faded or worn can give vital clues.

The use of special viewing techniques, such as polarised-light and fluorescent microscopy, can also give extra information on the properties of a fibre. Using these forms of light, the investigator can cancel out the effects of a dye, or see more about the structure of a fibre.

If a fibre has been coated - for example with blood or mud - this can also be detected, and the substance analysed to yield useful clues.

But fibre analysis is rarely enough by itself to prove a case. As with so much forensic science, the analysis is used in conjunction with many other forms of evidence-gathering - along with witness statements, the behaviour and motives of the suspect and so on - to help build a convincing case. Usually (although there are exceptions) the most important use of trace evidence like fibre analysis is to eliminate suspects, rather than point the finger at one individual.

Questions: (Complete sentences, please!)

Based on our discussions, labs and video materials viewed on the topic of fiber evidence. Explain the differences between physical and class evidence as it relates to fiber?

Using the information above to explain the connect of fiber evidence to the Wayne Willams Case reviewed / viewed in class.