PHYSICAL EVIDENCE

There are two types of evidence :

1) Physical Evidence – Real evidence generated as a result of crime committed
2) Demonstrated Evidence – Fabricated evidence used to explain physical evidence

Using of Physical Evidence

➔Circumstantial : inference of contact, but not knowledge or observation
➔Aids in linking a perpetrator or victim to the scene of crime
➔Deciding factor in determining the guilt or innocence of suspect(s)
➔a person may be exonerated or excluded from suspicion if physical evidence collected at a crime scene is found to be different from standard/reference samples collected from that subject.

Physical Evidence tells us

1) Modulus Operandi : method by which crime was committed
   : Criminal's signature
2) Links suspects/victims to primary/secondary scenes : Locard's exchange principle
3) Support witness statements

Sometimes, when we look at the crime scene and hear the suspect statements, they might not match and confuse however physical evidence tells different story and helps to link the crime scene and witnesses' statements.

Case study

In April 2005, a body was discovered in a bedroom
The man was dressed only in a towel and was shot twice at close range with a shotgun
There was no sign of forced entry

Witnesses : the witnesses were two teenage girls, acquainted with the 50-year-old victim ◦ One girl visited and drank with the man periodically during the previous 3y

◦ The other girl had been romantically involved with the lead suspect in the case

Both denied knowledge of the death ◦ However, when they became the focus of the investigation, they both provided detailed statements of what happened

According to the girl who drank with the victim, she was an eye witness to the shooting ◦ Suspect hid behind the door to the bedroom and emerged to face the victim who entered the bedroom from the hallway ◦ First shot was in the hallway near the door ◦ Second shot was fired as the victim stumbled forward into the bedroom

◦ The suspect held a pillow in front of the shotgun

◦ Shots were fired while the suspect was partially hidden behind the bedroom door

The Physical Evidence Tells a Different Story No Shotgun pellets were found in the hallway ◦ Shotgun was fired from the hallway into the bedroom

Blood spatter on the wall next to the doorway is consistent with an arterial gush ◦ Indicating the victim was facing the hallway just inside the doorway when shot

Pillowcase had several small tears in the upper portion ◦ Consistent with a glancing blast or discharge from a shotgun muzzle

Case conclusion :

The physical evidence collected together with crime scene documentation, investigators were able to reconstruct the scene of events refuting the eyewitness' account of what happened

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Examining Physical Evidence

Identification :

If we can define very specifically, that means we can link the evidence to a common source, this is individual characteristics. If we can link an evidence to a group of things but not individual, that is class characteristics.

Comparison analysis

a suspect specimen and a standard/reference specimen to the same tests and examinations for the ultimate purpose of determining whether or not they have a common origin.

➔We can actually individualise tire or footwear pattern.

If we can piece back glass pieces and know ow it was broken, it is much better and powerful than what glass material it is. This is individual characteristic.

Even if we get it individualised doesn't mean that's the end.

We need to be able to link an analysis to a database for verification.
➔The crime laboratory is requested to identify the chemical composition of an illicit drug.
➔Sometimes, asked to identify gasoline in residues recovered from the debris of a fire, or it may have to identify the nature of explosive residues—for example, dynamite or Trinitrotoluene.
➔The identification of blood, semen, hair, or wood are also very common and, can be used to determine species origin.

Role pf probability :

1) To comprehend the evidential value of a comparison, one must appreciate the role that probability has in ascertaining the origins of two or more specimens.
2) Probability is the frequency of the occurrence of an event

Characteristics classification

Individual characteristics : evidence that can be associated to a common source with extremely high probability is said to possess individual characteristics.
Class characteristics : evidence associated only with a group is said to have class characteristics.

Individual characteristics

➔matching ridge characteristic of two fingerprints
➔random striation markings on bullets, or tool marks
➔irregular and random wear patterns in tire or footwear impressions
➔handwriting characteristics
➔piecing together irregular edges of broken objects
➔ In all cases, it is not possible to state with mathematical exactness the probability that the specimens are of common origin
➔ It can only be concluded that this probability is so high that the specimens cannot be excluded from being of a common origin

Class characteristics

➔ A crime scene laboratory may be unable to relate physical evidence to a common origin with a high degree of certainty.

➔Evidence is said to possess class characteristics when it can be associated only with a group and never with a single source.

➔Probability is a determining factor.

➔The high diversity of class evidence in our environment makes their comparison very significant in the context of a criminal investigation.

➔ The value of class physical evidence lies in its ability to provide corroboration of events

➔When dealing with more than one type of class evidence, their collective presence may lead to an extremely high certainty that they originated from the same source

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Crossing over

Crossing over the line from class to individual does not end the discussions.

There are practical limits to the properties and characteristics the forensic scientist can select for comparison.

Natural vs evidential limits

➔ Modern analytical techniques have become so sophisticated and sensitive that natural variations in objects become almost infinite.
➔Carrying natural variations to the extreme, no two things in this world are alike in every detail.
➔ Evidential variations are not the same as natural variations.
➔ Distinguishing variations of evidential use from natural variations is not always an easy task.

There are many Canadian databases that we need to learn about

Canadian Forensic Databases

National DNA Data Bank is responsible for two principal indices:

- The **Convicted Offender Index** (COI) is the electronic index that has been developed from DNA profiles collected from offenders convicted of designated primary and secondary offences identified in section 487.04 of the Criminal Code (DNA Designated Offences, http://www.rcmp-grc.gc.ca/nddb-bndg/form/ddo-did-eng.htm)
- The **Crime Scene Index** (CSI) is a separate electronic index composed of DNA profiles obtained from crime scene investigations of the same designated offences addressed in the Act.

Canadian Forensic Databases

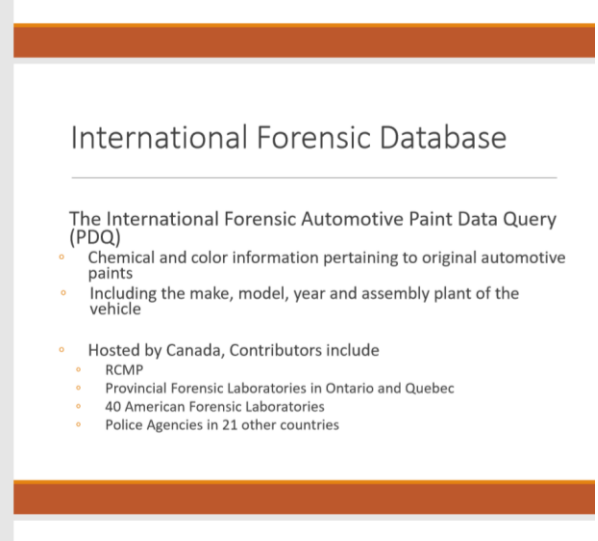
The Canadian Bomb Data Centre (CBDC)

- National repository for data relating to the criminal use of explosives
- Responsible for holding information concerning the components and use of real or hoax improvised explosive and incendiary (inflammatory) devices (IEDs), thefts and recoveries of explosives, and suspects in reported explosives incidents

Canadian Forensic Databases

The National Sex Offender Registry

- A national registration system for sex offenders who have been convicted of designated sex offences and ordered by the courts to report annually to police
- Not available to the public



Branches of forensic science

1) Pathology : investigation of unnatural, unexplained or violent deaths
   ➔conduction of autopsy
   After a human body expires there are several stages of death. ◦ Rigor mortis results in the shortening of muscle tissue and the stiffening of body parts in the position at death (occurs within the first 24 hrs. and disappears within 36 hrs.). ◦ Livor mortis results in the settling of blood in areas of the body closest to the ground (begins immediately on death and continues up to 12 hrs.). ◦ Algor mortis results in the loss of heat by a body (a general rule, beginning about an hour after death, the body loses heat by 1 to 1 1/2 degrees Fahrenheit per hour until the body reaches the environmental temperature).
   ➔ The following are to be collected and sent to the forensic laboratory:
   1. Victim's clothing
   2. Fingernail scrapings
   3. Head and pubic hairs
   4. Blood (for DNA typing purposes)
   5. Vaginal, anal, and oral swabs (in sex-related crimes)
   6. Recovered bullets from the body
   7. Hand swabs from shooting victims (for gunshot residue analysis)
2) Anthropology : identification and examination of human skeletal remains
3) Entomology : study of insects and their relation to a criminal investigation, mainly to estimate time of death