Dear students this is the transcript series pertaining to forensic science and the law. We have already discussed in online/offline classes.

By respecting your requests (for providing of study material as you are not having any concrete study material in this paper and because of the fact that it is first time introduced in your syllabus) and to fulfill my obligation as your teacher I am glad to share the first transcript with you. Hope it will be of great help.

Principles of Forensic Science

Introduction: Science and technology has captured the mind of the fact finders in the criminal justice delivery system. The cases involving criminal charges generally require the help of science especially forensic science or the scientific evidence in order to decide a case. The scientific evidence connotes the application of scientific theory and technique in a case specific application for solving an issue which is out of knowledge of fact finders. The discipline developed for the purpose is known as forensic science. Forensic Science is the application science to law. In law, the forensic science is utilized for convicting the guilty and exonerating the innocent people.

Learning Objectives: Dear students in this transcript we shall try to understand various Forensic science principles After studying this topic you shall be able to:

- Explain the principle of mutual exchange
- Know the principle of comparison
- Analyze the principle Law of Individuality

Principle of Mutual Exchange:

The principle is popularly known as of Locard’s Principle of Mutual Exchange. This principle was formulated by French scientist named Edmond Locard. Locard’s Principle of Mutual Exchange, a theory that relates to the transfer of the trace evidence between objects to which they come in contact with. This principle was stated in the following words as; ‘It is practically impossible for a criminal to commit the crime, especially considering the intensity of a crime, without leaving traces of his presence. “or in other words we can say that, “every contact leaves a trace”

This principle states that whenever a contact is established between two surfaces, there will be a mutual exchange of matter across the contact boundary i.e., when a criminal or his tools
of crime comes in contact with the victim or the object in its surrounding area, they will always exchange some traces with each other i.e. the two way traffic of exchange of traces. According to this principle, it is virtually impossible for a criminal to commit a crime without leaving evidence behind and carrying away with him. Likewise, the criminal or instruments also pick up traces from same contact. If these traces evidences left on the crime scene and accused are properly examined, these can establish a decisive link between the suspect and the victim or ascertain their presence with the scene of crime, which forms the basis of scientific crime investigation. Dear students connecting this Locard principles we can connect it with a famous proverb in Urdu …choor ki dhadhi main tinka’ or Thief’s beard has a blade of grass stuck in it, its largest implications reflect a universal truth about the criminals leaving the traces at the crime scene and at the same time Locard principle further adds that the criminal also takes some traces from the crime scene and these traces help in reaching to the criminals, helps in investigation and administration of justice.

This explains the fact that Locard had a strong belief that no matter wherever the criminal escapes or what a criminal does, how professional and efficient he is, he will always leave something or trace material or the other at the scene of crime. At the same time, he will also take something back from there along with him. In other there will be mutual exchange of trace materials on both the sides. A criminal leave may all sort of evidences, including fingerprints, footprints, hair, skin, muscles, blood, bodily fluids, pieces of clothing and other types of evidences possible according to the nature of crime. By coming into contact with these things at the crime scene, a criminal also takes a part of that scene with him, whether it's dirt, or any other type of trace evidence.

Dr Locard justified this principle during many of his scientific investigations. In one of the investigations in the year 1912, when he investigated the case of a French women named Marie Latelle who was found dead in her parents’ home. Her boyfriend, Emile Gourbin, was interrogated by the police. He claimed he had been playing a game of cards with some of his friends during the night when her girlfriend died which later came out as truth while his friends were questioned.

But during the examination of the deceased body however, he was to believe otherwise. He first examined Latelle’s body and found a clear evidence that certainly she was strangled to death. He then scraped underneath the fingernails (trace evidence in this case) of Gourbin for taking the skin cell sample. While analyzing the traces under and results underneath a
microscope. Locard noticed a pink dust among in the samples he collected from his prime suspect, which he figured to be from ladies makeup. Thus, the principle of mutual exchange helped Loocard to come a decisive output as to the involvement of Goubain in Marie’s strangulation. The basic requirement of the principle is to find out as to

1. ‘What are the places or objects with which the criminal or his tools actually came in contact during the commission of the crime?
2. If the investigating officer manages to somehow establish the correct points of contact, and thus a correct investigatory lead, he is most likely to be benefited in the investigation. The following are the most probable locations.

**Point of Entry:** If a criminal enters the premises through a ventilator, he leaves his footprints /fingerprints in dust on the shelf.

**At Crimes Scene:** While committing a crime, if he breaks a window or a door, leaves its mark over the wooden frame or the burglar, who opens the safe by using a explosive or by any other means – hammering etc, leaves the area around and the clothes (including shoes) covered with insulating material as well as some exploded and unexploded material.

**Point of Exit:** After committing the crime when the criminal tends to leave the crime scene, he is most likely to leave a carry some minute traces for example his footprints at the point of exit. It is although very rare that he dares to or neglects to leave a carry gross objects or traces on a thorough search, (the ambiguous traces will always be found in all the types of crimes one does). These traces evidences left owing to the principle of exchange, help to connect the crime and the criminals as effectively as the bigger objects or traces.

**Principle of Comparison:** This principle is very important particularly in the laboratory investigation i.e. the type of specimen or sample required for comparison in the lab. It states that “Only the likes can be compared” It emphasized the necessity to provide like/similar type of samples and specimen for comparison with the questioned items. For example, in any murder case if a bullet is found from the body of the deceased and the expert opinion states the bullet has been fired from a high velocity firearm, then it becomes useless to send in for a shotgun or pistols or revolvers for comparison of the firearms under question.
Similarly, if a bunch of hair is recovered from the hands of a deceased and the expert opines that the hair belongs to a white person, in such a case, hair from person of Negroid races for comparison will not be of any use.

Thus an important requirement, according this principle is to supply specimen/samples of similar nature for proper comparison with the questioned sample recovered from the crime scene.

**Principle of Analysis:** This principle also possess a great significance in the laboratory investigation of the clue materials. It states that “**The analysis can be no better than the sample analyzed**” Improper sampling, contamination render the best analysis useless. The principle emphasizes on the necessity to collect proper sample and properly packed for effective use of expertise. In any rape case, the investigation officer collects the clothes of the victim, which carry both blood, and semen stains. The investigating officer after properly drying the clothes packs them in such a way that affected area or areas containing stains should not touch each other and not even to the walls of the container and sends them to forensic science laboratory for examination. He wants to know if the clothes carry semen stains, it so, to which blood group does the sample belongs.

**Law of Progressive Change:** Another important principle which affects the quality of analysis and their results in the lab or otherwise is the law of progressive change. According to this principle “Everything changes with the passage of time” this principle require timely action in criminal investigations. The rate of change varies extremely with different types of objects. It has a giant impact on the forensic science investigation. For examples.

1. The criminals undergo several progressive changes with time. If criminal(s) is not apprehended in time, he/she becomes unrecognizable except perhaps through his fingerprints, bone fractures or any other characteristics of permanent nature, which may not be always available, therefore not dependable.
2. The scene of crime also undergoes rapid changes. Longer the delay in examining the scene, greater will be the changes. After some time the scene may become unrecognizable and the culprits may go unpunished.
3. The evidences involved in crime may be affected by external conditions, change gradually like, metal object rust, the shoes or shoe prints suffer additional wear and tear and the tool acquire new surface pattern. The degree of change depends upon the
time, the upkeep and the use or the misuse of the particular object. In course of time the object may sometimes lose all practical identity vis-à-vis a particular crime.

**Law of Individuality:** “Every object, natural or man-made, has an individuality which is not duplicated in any other object or in other words, no two things in this universe are alike even when they are manufactured in the same factory. The most extensive work has been carried out on fingerprints. Millions of fingerprints have been examined but no two fingerprints; even from two fingers of the same person have ever found to be identical. The law of individuality, has fundamental importance and from the basis for forensic identification. Anything and everything involved in a crime has individuality. If the same is established, it links the crime and the criminal. For example fingerprints, footprints, tool marks, obtained from the crime scene are studied and analyzed on the principle of individuality.

**Summary:**

Dear students we now know that there are certain forensic principles/theories which are used in the criminal investigations in order to reach to the criminal and they provide an aid to the investigating agencies and help the courts in the administration of the criminal justice. However since nothing is perfect and absolute in this world same is the case with these theories. There is no absolute theory or the principles existing therefore these principles or theories do possess certain disadvantages and thus liable and vulnerable to criticism. In this transcript we studied we tried to understand the principles, theories laws of forensic science which help in investigating so as to reach ultimately to the criminal who actually is involved in the commission crime and help the courts to convict the criminal and to exonerate the innocent. I conclude this transcript with the message,

*Stay home Stay Safe*  
*Play your part*  
*To break the covid-19 Chain*

**Best of luck.**

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Note:

Dear students the contents I am sharing herewith are the extracts of my under print book titled Forensic Science & the law. The contents have been compiled as per your syllabus and aimed to be utilized purely for your academic purpose. It is believed that the contents may be helpful from your examination point of view and also exceptionally advantageous in understanding the relatedness of forensic science and law in brevity.