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FORENSIC SCIENCE IN CRIMINAL INVESTIGATION IN INDIA

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ABSTRACT

A group of government workers known as the police are in charge of maintaining peace and order, finding and thwarting criminal behavior, and executing the law. They comprise the whole internal regulatory structure of the State. Under British administration, a codified legislation called the Police Act of 1861 was created. Based on a number of proposals for the creation of the detective wing, the Criminal Investigation Department (CID) was created to look into criminal issues that needed stronger technical expertise following this Act. Bengal was where CID was first established on April 1st, 1906. The Crime Branch may take on difficult cases, such as those involving racial riots or other difficult murder cases, that the Police may find difficult to handle on top of their usual responsibilities. The use of forensic sciences is one of the most crucial elements of the investigative system. Utilizing science and technology for research is not a unique concept in India. Although they did not comprehend the concept of forensic sciences, our forebears used scientific methods in their system of investigation. They were aware that handprints and fingerprints may be used as signatures by uneducated individuals.

INTRODUCTION

In the context of law enforcement investigations, the utilisation of forensic science is both an immediate and universal necessity. The current system of investigating illegal activity and prosecuting those responsible for it paints a gloomy picture. In the end, the jury decides not to convict the defendant in a significant portion of the murder cases. It is believed that the costs associated with each trial run by the prosecuting agency exceed Rs. 10,000.00 on average. As a result, not only does

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a dangerous criminal avoid punishment, but a significant quantity of tax dollars is also thrown away. These frequent acquittals further empower the offenders.

When it comes to criminal investigations and trials, Forensic Science focuses primarily on materials, and indirectly, via materials, on men, places, and times. The man in charge of the investigation is the most significant person in the male population. In point of fact, it is the job that he does that decides whether or not the application of forensic science to the investigation and processing of a criminal case is successful. The conclusions of a forensic scientist will be rendered meaningless if the individual fails to gather the pertinent evidence, allows the exhibits to get contaminated, or does not give the appropriate samples for comparison.[1]

All subfields of science are brought together under the umbrella of forensic science and utilised for legal purposes. At the beginning, all of the methods were adapted from a variety of scientific fields, such as chemistry, medicine, surgery, biology, and photography. Yet, over the course of the previous several decades, it has established its own subfields, each of which is a more or less specialised subfield of forensic science. In recent years, great progress has been achieved in the fields of serology, voice analysis, odour analysis, as well as research linked to studies of ear patterns and nose prints.

IMPORTANCE OF FORENSIC INVESTIGATION IN CRIME DETECTION AND PROSECUTION

Because of the following considerations, there has been a growing demand for the application of science in the field of criminal investigation:

I. Changes in Society:

The culture is undergoing profound shifts in its social makeup at an extremely quick rate. During its days as a colonial subject race, India has transitioned into a democratic republic. There has been the development of a significant industrial complex. The modes and facilities of transportation have undergone a transformation. The rural way of life is giving way to the urban way of life at an alarming

[1] S. Vidalis, An Academic Approach to Digital Forensics, Journal of Information Warfare, vol. 13, no. 4, 2014

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rate. Because of these shifts, the traditional methods of criminal investigation are no longer relevant.

Facilities for concealment:

The commission of crimes has been made easier by the rapid modes of transportation and the high population density that may be found in cities. The offender is able to conceal himself in a remote part of the city or quickly relocate thousands of kilometers away in a matter of hours. As a result, he frequently avoids being apprehended and prosecuted.

II. Knowledge of the technical aspects:

During the course of the last few decades, the common man's level of technical understanding has expanded dramatically. The methods of criminal activity are being perfected. So, the officer who is conducting the investigation needs to utilize new tactics to confront the modern criminal.

Functions

The following three questions can all be answered with the help of forensic science:

1. Has there been some kind of wrongdoing?

Take the example of finding a body that has been recovered. It's possible that the cause of death was natural, accidental, or even intentional. By investigating the circumstances surrounding a person's passing, forensic science can determine whether or not a crime was committed in the person's body.

2. How and when exactly did the criminal act take place?

The investigation of the "corpus delicti" provides insight on the manner in which the crime was committed and, very probably, the period at which it was carried out.

3. Who is responsible for the crime?

By the use of personal clues such as fingerprints, footprints, blood drips, or hair, forensic science can determine the identify of the individual who committed the crime. It establishes a connection between the criminal and the crime by using items transported from the site by both the victim and the perpetrator that were either left at the scene or left at the scene by the perpetrator.

On the other hand, if the clues that were found do not connect the accused person with either the victim or the location where the crime took place, then the accused person's innocence can be proven. Hence, forensic science is beneficial to the defence of innocent parties.

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Development

Only if the investigating officer is aware of the following will the application of forensic science in the investigation of a crime be able to be effective:

1. the specifics of the physical proof that has to be gathered.
2. Where it can be located.
3. How it is gathered and stored after being used.
4. What kinds of standard samples are required so that we may make comparisons?
5. What is the minimum needed sample size?
6. How the sampling is done.
7. How the evidence will link the crime with the criminal and to what extent his labours will be rewarded by the laboratory findings are two questions that will be answered by the evidence. This is doable if the officer in charge of the investigation has a comprehensive education in the aforementioned topics. Training in theory and in practise are both necessary for him.

Principles

The foundations of forensic science are found in the rules and concepts that underlie each of the natural sciences. In addition to this, it has created its own set of guiding principles.

1. The principle of individuality states that everything, whether it was created by humans or by nature, has a unique quality that cannot be found in any other object.

   At first glance, this idea seems to go counter to the widespread perceptions and experiences that people have. The appearance of individual sand grains, ordinary salt crystals, plant seeds, and identical twins is identical. Nonetheless, one's originality can never be denied. This is because the materials themselves have minute imperfections, the arrangement of the crystals is flawed, the stamping was not done perfectly, or there are inclusions of some foreign stuff.

   The distinctiveness has been substantiated in a number of different areas. The study of fingerprints has received the most attention and attention to detail. There have been millions of fingerprints examined, yet not a single pair of fingerprints, not even from two fingers belonging to the same

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individual, has ever been determined to be identical.

In forensic science, the principle of individuality, often known as the "law of individuality," is of the utmost significance. Individuality can be attributed to anything and everything that is connected to a criminal act. When the sanity is proven, it creates a link between the crime and the perpetrator of the crime.

2. "Contract exchanges traces" is the principle of exchange, which is also known as the "principle of exchange." Edmond Locard, a French physicist, is credited with being the first to articulate it.

   According to the principle, traces are left behind whenever the perpetrator of a crime or the tools he uses to commit the crime come into touch with the victim or the items that are around him. In a similar manner, the offender or his tools pick up traces from the same touch. If these traces are recognised to their original source, that is, the criminal or his instrument (or vice versa), they establish the contact and pin the crime on to the criminal. This is because the perpetrator, the victim, and the items engaged in the crime all exchange traces with one another. Cases involving hit-and-run accidents and assaults on individuals are excellent examples of the principle of trade in action.

3. The rule that "everything changes with the passage of time" is known as the law of progressive change. The pace of change is quite variable depending on the thing being studied. It has had a significant influence on the field of forensic science.

a. The criminal goes through radical transformations. If he is not arrested in time, he will become unrecognisable, with the possible exception of his fingerprints, bone fractures, and other traits of a rather permanent nature that are not usually accessible.
b. The setting of the event is subject to a whirlwind of transformations. The environment, the development of plants and animals, and notably the evolution of human beings are all subject to rapid and profound change over very little time spans. The longer it is delayed until the scene is examined, the more significant the alterations will be. Once a certain amount of time has passed, the scene could no longer be recognised.[2]

[2] Rosen, Christine, Liberty, Privacy, and DNA Databases, The New Atlantis, no. 1, 2003

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c. The shoes get more worn out, the barrels of the firearms become looser, the metal items corrode, and the tools acquire new surface patterns with time. In addition, the surface of the tools changes. During the passage of time, the artefacts can lose any practical identify they formerly had in relation to a specific crime.

Hence, timely action is required in all facets of the criminal inquiry in order to adhere to the concept. Only things that are comparable may be compared, according to the principle of comparison, which states that. It stresses the need of providing comparable samples and specimens for comparison with the goods that are being questioned:

- In the investigation of a homicide, a gunshot is discovered within the body of the victim. The knowledgeable individual has formed the opinion that the bullet came from a weapon that fires bullets at a high velocity, such as a service rifle. It is a waste of time to send in shotguns, pistols, or revolvers in the event that the weapon in question is a handgun.
- A clump of hair is discovered in the hands of a person who has passed away. The guru is of the opinion that the hair belonged to a person of the Negroid race. There is no use in collecting hair from people of white races for the sake of comparison.
- The writing that was called into doubt was revealed to have been written using a ballpoint pen. It would be pointless to send a fountain pen in the hopes that it could be used as a writing tool.[3]

The handwriting that was reportedly scribbled on a wall was found in a photograph, and that handwriting was matched to the specimen that was written on paper. It did not produce results that were of any value.

Writing on the same wall at the same height and with the same equipment led to the collection of a second set of specimens, which were subsequently photographed. That was conducive to comparison. The analysis can be no better than the sample that was analysed, according to the principle of analysis. Even the most thorough analysis is rendered meaningless by improper sampling and contamination. This approach places a strong emphasis on the importance of accurate sampling and accurate packing in order to make good use of expertise.[4]

[3] *ibid*
[4] *ibid*

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Techniques and Equipment

The equipment and methods should have a high degree of sensitivity because the amounts of materials involved are so minute, typically falling within the micro, submicro, or microscopic categories. For instance, some poisons only need a few milligrammes of the substance to kill a person. The quantity is distributed throughout the entire body.[5]

It's common to find tiny amounts of things like paint, soil, dust, ink, and bodily fluids.

There are more investigations every day that necessitate a careful review of the available data. Therefore, the processes and equipment need to move quickly. Each component of the viscera and organs is subjected to a laborious process that involves extraction, purification, identification, and estimate in the conventional method of analysis. To make sure there are no errors, the results are examined and double checked. If contemporary methods are applied, the majority of these stages might not even be required.

The tools and methods used in today's forensic science labs represent both conventional and cutting-edge methods. Here are some instances of both types of strategies:

- The measurements
- In a microscope
- Photos as Art
- Transparent beams
- Chromatographic Technique
- Process of Electrophoresis
- studying spectrum
- Laser Methods
- Aspects of Mass Spectroscopy
- Using the diffraction method to examine objects with X-rays.[6]

[5] Mairs, G. Tyler, Identification of Individuals by Means of Fingerprints, Palmprints and Soleprints, The Scientific Monthly, vol. 7, no. 4, 1918
[6] Ulery, Bradford T., et al., Accuracy and Reliability of Forensic Decisions, Proceedings of the National Academy of Sciences of the United States of America, vol. 108, no. 19, 2011

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CONCLUSION

The term "scene of the event" refers to the specific location where the events took place. The participants in a given scene engage in the exchange of traces, which can take the form of physical objects or impressions such as handprints, footprints, and tool marks. These traces serve as a record of the activities that occurred within the scene and can provide insight into the behaviors and practices of those involved. Consequently, the venue of the event offers a plethora of information that can be utilized in the subsequent situations:

1. The identification of the corpus delicti should be established.
2. Determine the correlation between the perpetrator, the target, and the location of the offense; and
3. Analyze the repetition of occurrences.

In almost all criminal cases, the crime scene holds great significance, except in cases of forgery where its value is comparatively lower. Thorough planning, attentive observation, and persistent investigation of the site are essential. The efficacy of an investigation is often contingent upon the appropriate handling of the scene.

The preservation of the incident scene in a static state is unattainable due to its perpetual transformation. Certain pieces of evidence tend to become lost in the immediate aftermath of an event, while additional evidence may become compromised, corrupted, or modified as time elapses following the occurrence. There exists a singular occasion to comprehensively scrutinize the events that transpired at that location. If the opportunity is not fully utilized, the knowledge wealth will be lost permanently.