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Author:

Vardan

Symbiosis Law School, Noida

2nd Year, BBA LL.B.**THE SCOPE OF SCIENTIFIC INVESTIGATION IN THE
ADMINISTRATION OF THE CRIMINAL JUSTICE SYSTEM****Abstract**

Science has rapidly advanced through time and the scope of science keeps getting wider. Several countries invest huge amounts of money in research and development to develop new technologies through innovation and upgrade their existing capabilities. India took a huge leap from inventing small orbital satellites to attempting to land Chandrayaan-2 on the moon. India went from importing software from developed countries to exporting software tech worth US \$120 billion in 2019-20. This is a major significant growth in the IT sector of India. Science is playing an enormous role in the transformation of the country's capabilities in the defense sector to the use of nano-technology in almost all the devices we use in our everyday life. Medical Science has been playing a major role in battling various diseases and making vaccines to help find various viruses like polio. In this everchanging dynamic of science, it is of utmost importance to put the use of science in the justice delivery system, especially in the criminal justice system. Forensic science is just another aspect of science which if put to use efficiently, will make a great impact in the criminal justice system. The use of DNA profiling, fingerprint analyzing, Post-mortem, narco-analysis, lie detector tests are some of the methods on which are relied upon by the criminal justice system.

Introduction

The criminal justice system comprises an investigation agency, courts, lawyers, prisons. There is an organized structure of working of the system where the concerning investigation agency or police investigated the crime, looks for any form of evidence that may link the crime to a suspect. The cause of the crime, the method used to commit the crime, and various other aspects of the crime which may help discover more about the crime are mainly done by the forensics experts. It relies on forensic science methods like DNA fingerprinting and profiling. Other scientific experts in the field of computer science and engineering may also be called upon to investigate the crime scenes for any potential evidence. Experts are called upon depending on the crime committed, for example, if a certain person fraudulently dupes another person of a certain amount of money through online transaction tech experts on computer science may be called upon to investigate and collaborate with the police in the efforts to look for any evidence. As the evidence collected by these experts through certain scientific methodology, the evidence collected is quite firm to tamper with, this is thus quite reliable in the criminal justice system. The idea of using forensic science in criminal justice is not new to the courts.

DNA fingerprinting was accepted in the courts of Argentina as early as the 1890s. When a crime is committed, even a minuscule of information that may link the crime to the suspect is vital. Footprints, fingerprints, and electronic gadgets, weapons found at the crime scene are extremely important in an investigation. The forensics experts try to associate these various objects found on the crime scenes to any individual who may fit the profile. For example, if a hair is found on the crime scene the experts will analyze its DNA and run it through their database to determine if it links them to an unknown suspect. Forensic DNA profiling is unique to an individual and the chances of it going wrong are extremely minute. Sir Alec Jeffreys pioneered DNA profiling techniques that have been applied in forensic investigations. In criminal proceedings and to determine the genetic relationship, DNA profiling is conducted. Because of the pattern of genetic code inheritance among bio families, DNA profiles can be used to establish relationships between people during an examination. Variable number tandem repeats (VNTRs), short tandem repeats (STRs), single nucleotide polymorphism (SNP), and other DNA analysis techniques are used. These indicators are one-of-a-kind and distinguishable for purposes of identifying and profiling. Profiles are created based on distinct markers in the DNA that are unique to each individual. These profiles are created by combining genetic evidence with the information contained in databases. Investigation agencies around the world keep forensic indicator databases that are distinctive in their organization and

usefulness. The use of species-specific indicators allows for the use of DNA analysis in biological crime investigation for species identification. Identification and gathering of biological samples, DNA extraction and measurement, qualitative analysis, PCR (Polymerase chain reaction) amplification, STR evaluation, and results in the analysis are all part of DNA profiling. Other DNA profiling approaches are used to identify mother's and father's inheritance, such as mitochondrial and Y chromosome analysis.

Due to the advancements in cyber technology people are more vulnerable to cybercrimes. For the prevention of cybercrimes various IT, cells have been established in all of the states to counter the crime. Cyber forensics is useful in collecting and analyzing the digital footprints or pieces of evidence left when cybercrime has been committed. Therefore, the criminal justice system needs to be aware of the advancements in the various fields of science to tackle the ever-growing number of crimes facilitated by the new and advanced technology.

Forensic Science in India

Forensic Science is defined as “*the application of science to those criminal and civil laws that are enforced by the police agencies in a criminal justice system*”.¹ Forensic Science is concerned with applying the knowledge and techniques of several scientific disciplines to legal issues. Evidence analysis entails the application of several disciplines such as physics, chemistry, biology, computer science, and engineering. For example, physics is utilized to decipher the pattern of blood splatter, biology is used to pinpoint the source of an unidentified suspect, and chemistry is used to determine drug composition. As a result, the importance of forensic science in criminal justice and the legal system is often overlooked.

DNA Profiling: As every individual has their own unique DNA, it helps forensics to identify any unknown suspect who may be linked to the crime. It helps in forming a list of potential offenders and eliminate those who are innocent by matching the evidence like hair, saliva, urine, blood to their databases.

Pathology: This branch of forensics help to determine the cause of death of the victim mainly by conducting an autopsy or post-mortem of the body. The experts observe the wound

¹ Available at: <https://ifflab.org/the-importance-of-forensic-science-in-criminal-investigations-and-justice/#:~:text=An%20introduction%20to%20Forensic%20Science,in%20a%20criminal%20justice%20system%E2%80%9D.&text=It%20involves%20the%20use%20of,and%20engineering%20for%20evidence%20analysis>
[Last accessed on 21st July, 2021.]

altogether with the rest of the body, analyze the wounds and any other abnormality in the body to figure out the cause of death and the circumstances surrounding the death.

Anthropology: This involves examining deteriorated human remains or bones to ascertain age, height, gender, and ancestry. It also aids in determining the time since death by detecting and evaluating any injuries.

Cyber Forensics: It helps in investigating cybercrimes by finding evidence in digital forms like in digital storage of any electronic device.

Ballistics: Ballistics is a forensics discipline that studies the speed, behavior, dynamics, angular displacement, and consequences of projectiles like bullets, rockets, missiles, and explosives, among others. Ballistics are mostly used in criminal cases in forensic science.

Regulation and Application of Forensics in Criminal Justice System

The DNA Technology (Use and Application) Regulation Bill of 2019 was passed in parliament. This bill aims to identify missing children or unidentified bodies by the use of DNA technology. It lists all the matters in which the use of DNA technology is to be used. DNA tech should not be used in the matter other than what is listed in the bill. The bill will help in apprehending the offenders of heinous crimes. It laid the regulation for the use of DNA Profiling in a certain manner. According to the Department of Biotechnology (DBT): *(a) there are approximately 30 to 40 DNA Experts in the country with 15 to 18 laboratories looking over the less than 3000 cases per year (b) As the DNA Fingerprinting and Profiling is already in practice in India, this bill will regulate all the procedures and standard operations regarding the collecting, evaluating, storage and reporting of the data (c) Stressing on the need of the bill to regulate DNA Technology the DBT presented in the report that there are roughly 40,000 unidentified bodies reported every year apart from the 10,000 children reported missing per year.*²

The Bill seeks to establish a DNA Regulatory Board which will be given the responsibility to advise the central and state governments on the various issues regarding the formation of new DNA Labs, DNA Data Banks. It will lay down the rules and procedures for the functioning of all the DNA Tech-enabled laboratories. To avoid any evidence tampering and, independent and reliable evidence which makes the basis for prosecution of the accused it was mandatory

² Report No.340 Parliament of India, Rajya Sabha

to regulate the conduct and functioning of the DNA technology for conducting a fair trial with no scope for the mistake on the part of the administration. The duty to present all the evidence against the accused is vested in the prosecution, he has to make accessible all the shreds of evidence against the accused. Accused are also free to hire an independent investigation agency to gather evidence for the defense. The DNA report generated by a scientific evaluation of the evidence is credible and the court cannot reject the report based on the complex nature of the methodology. In the case of *Santosh Kumar Singh v State (through CBI)*³ Santosh was convicted of rape and murder. The trial court acquitted him and rejected the findings of the DNA report. The DNA sample of semen was collected from the under underwear of the deceased after the expert opinion of the two scientists. The decision was challenged before the high court where the Court accepted the DNA report as credible and sentenced the appellant to death. The matter was then heard in the Supreme Court where the court upheld the decision of the high court and held that the trial court was wrong in rejecting the DNA Report. The court referred to the report as “scientifically accurate and an exact science”. In a similar case of *Anil v State of Maharashtra*,⁴ the appellant was being held the trial for carnal intercourse with a minor boy and then strangulating him. The forensic expert i.e. assistant chemical analyzer conducted STR and Y-STR profiling tests to determine the presence of the DNA of the accused. The court held that both the tests were credible and can be relied upon to concluded that both the samples from the tests indicate the same biological origin of DNA in both the accused and the deceased. The court was of the opinion that the tests conducted by the experts are an accurate way to use DNA tech to determine the culpability of the accused and there was nothing to doubt the results of these tests.

The importance of forensic science was highlighted in the case of *Dharam do Yadav v. the State of U.P*⁵, Diana, a 22-year-old tourist from New Zealand, was murdered in Varanasi. A DNA sample from the remains matched a sample of blood from her father. The accused was found guilty based on circumstantial evidence. Before passing the decision, the Supreme Court discussed crime scene management and the necessity of forensic science. In its decision, the court stressed the importance of using scientific approaches in criminal detection in order to safeguard the judicial system from low conviction rates. The need to improve forensic science for crime detection was also stressed. In this case, the DNA sample from the bones matched

³ (2010) 9 SCC 747

⁴ (2014) 4 SCC 69

⁵ (2014) 5 SCC 509

the blood sample of the victim's father, according to the report. All of the sampling and testing were carried out by professionals whose scientific expertise and experience were not questioned during the proceedings. As a result, it was thought that the prosecution had succeeded in proving that the skeleton discovered in the accused's home was that of Diana.

Forensics is not just limited to DNA Profiling but there are other aspects of it as well which are crucial in Criminal Justice System. In *Hari Om @ Hero v State of Uttar Pradesh*,⁶ Six people were charged in the case, and they were found guilty of dacoity and murdering four people. The High Court freed three of the defendants, while the penalties of the others, including life imprisonment for Sanjay Sonu and Saurabh Sanju and death for Hari Om, were upheld. Sanjay and Saurabh were convicted primarily on the basis of fingerprint analysis, which matched latent prints found on items in the deceased's home with exemplar prints of the appellants.

The Supreme Court dismissed the fingerprint evidence because the procedure used to extract latent prints from objects located in the deceased's home was not described in the fingerprint report. Furthermore, the technique for photographing the latent prints that were forwarded to the Director, Fingerprint Bureau, Lucknow for evaluation was not recorded, nor was it known whether the procedure was reliable. The Court also highlighted that the document does not reflect that the items from which the dormant fingerprints were lifted were ready for analysis by the Fingerprint Bureau, citing the procedure in the Karnataka Police Manual. Lastly, the Supreme Court questioned the Policeman in question's training and experience in lifting the faint prints in question. As a result, the Court determined that the Fingerprint Bureau's report was untrustworthy. Even if the fingerprint evidence were permitted, substantive evidence linking the Appellants to the offense was lacking. As a result, the three Appellants were acquitted by the Supreme Court.

Another case of *State of Madhya Pradesh v Sitaram Gajraj Singh Rajput and others*.⁷ By generating phony muster-rolls and showing payments to fictitious persons working as laborers, the respondents were found guilty of conspiracy to conduct a criminal breach of trust and misappropriation. Some of the interviewees were accused of imprinting their thumbs on the names of laborers who had received cash. The Trial Court found that the prosecution had failed to prove its case against any of the respondents beyond a reasonable doubt. The State Fingerprint Expert was only able to expand images of 12 of the contested thumb impressions

⁶ 2021 SCC OnLine SC 2 CP No. 1256 of 2017

⁷ 1987 MPLJ 197

because he failed to magnify photos of all of the contested thumb impressions. The trial court disregarded the evidence and acquitted the Respondents because of discrepancies in the explanation of the Fingerprint analyst during cross-examination. The Court came to the conclusion that there is "no hard and fast rule" for determining the number of points of similarity required for comparison. The Court in this case underlined the importance of enlarged images of the disputed and specimen fingerprints, as well as the difficulty of inspecting the prints with a magnifying glass. The Expert had also failed to evaluate the general pattern of the specimen and the contested prints, according to the Court. In the end, the Court found no flaws in the Trial Court's reasoning and upheld its verdict.



Section 73 Of the Indian Evidence Act, 1872

According to the section "In order to ascertain whether a signature, writing or seal is that of the person by whom it purports to have been written or made, any signature, writing, or seal admitted or proved to the satisfaction of the Court to have been written or made by that person may be compared with the one which is to be proved, although that signature, writing, or seal has not been produced or proved for any other purpose. The Court may direct any person present in the Court to write any words or figures for the purpose of enabling the Court to compare the words or figures so written with any words or figures alleged to have been written by such person. This section applies also, with any necessary modifications, to finger-impressions"

According to this section, the court has the authority to compare the signatures which are disputed, any writing or seal which might have been admitted in the court as evidence. The section allows us to compare the conflicting signature, writing, or thumb impression directly. When evaluating whether writing, signature, or seal belongs to the person who claimed to have written or manufactured it, the court might compare it to other writings, signatures, or seals that have already been admitted or proven to be that individual's writing, signature, or seal. Sometimes when the parties are unable to bear the expense of the experts to determine the originality of the writings, signatures, or seal admitted in the court, the court can invoke section 73 and may compare the writings by seeking help from some textbooks and other credible resources. The court can conclude cases based on the findings of the comparison and the decree passed on the basis of the reports are just as effective and proper as in any other case.

Note-: Forensic pieces of evidence collected against the accused do not violate Article 20(3) of the Indian Constitution. Article 20(3) - No person accused of any offense shall be compelled to be a witness against himself. It was held in the case of *The State of Bombay v KathiKaluOghad and ors*⁸ that collecting and using forensic evidence like hair, blood sample, thumb impressions, etc in the trial against the accused does not violate the right against self-incrimination. The accused cannot object against the collection of DNA samples from him or from the crime scene. In a similar case of *Dinesh Dalmia v State*⁹ the High Court of Madras held that narco-analysis of the accused does not amount to testimony by compulsion.

Conclusion

Thus, it may be concluded that Criminal Justice System should be well versed with the new advancement in the field of forensics sciences to counter the growing number of crimes facilitated by the same advancements in science and technology. Forensic science can significantly increase the conviction rates in the Criminal Justice System. It is reliable and the accuracy of the test is not contestable as laid in the cases mentioned above. The cases before the court can be concluded on the basis of the reports of forensic science which are credible and reliable. The laws relevant to forensic evidence must be amended from time to time to keep up with the rapid pace of innovation and advancements in science. Forensic evidence is more genuine than the physical evidence visible to our naked eyes. We must help make sure that law enforcement and investigative agencies once again understand and employ forensic science as a holistic problem-solving tool.

⁸ AIR 1961 SC 1808, 1962 SCR (3) 10

⁹ 2006 Cri. L. J 2401