

Role of Forensic Science in Effective Administration of Criminal Justice System in India

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ABSTRACT

Crime today seems as if it keeps getting worse and worse, but without forensic science would we have been able to figure out some of the main details in some cases?. Developments in science and technology have significantly expanded the role of scientific evidences in Criminal Justice System. With the worldwide development of forensic science, crime investigation and Criminal Justice System of India have also adopted the forensic investigation techniques. Being a scientific method, forensic science is a boon to the criminal justice system. But at the same time it has some challenges also like ; Reluctancy on the part of the judiciary, unreliable or invalid forensic evidence, misleading testimony, admissibility issues under law , corruption, lack of expertise etc. These challenges identified in forensic science and its practice in the India can only be addressed by a commitment to reform at multiple levels. *In this paper an attempt has been made to see what forensic science is, what role the forensic science plays in crime detection, and why forensic science is an essential part of criminal investigation. The main objective of this paper is to enlighten the importance of Forensic science in the criminal investigation. This paper will be focusing on the holistic approach of the Forensic science from its use in the investigation to the value it holds in the judicial minds when it comes to the judicial proceedings.*

INTRODUCTION

To administer justice in a time bound manner and to punish a criminal is the most important duty of the court. The growing significance of science and its application in crime investigation has paved an easier path for scientific investigation and administering justice in the right place and at the right time. In most of the cases scientific evidence is required to prove the point in court of law. To make the task easier, the criminal justice system is looking towards giving scientific conclusions to cases and the branch of science which is helping in the application of scientific principles for effective administration of criminal justice system is called Forensic Science. Forensic Science is a multidisciplinary science which helps in proving cases with scientific evidences. Evidence recovered from a crime scene tells its own tale and leads the investigator to the victim, suspect or people involved in the crime. Forensic science is the interface where science meets the law.¹ Forensic science can be defined as “the application of scientific principles to the legal framework, which is then enforced in the criminal justice system by the Police authorities.”² Forensic evidence is corroborative and has secondary evidence value but it is helpful in cases that are based on circumstantial evidence. Forensic evidence plays a vital role in arriving at a just and proper conclusion.

Forensic science is a multi-disciplinary science which helps in improving cases with scientific evidences.³ Evidence recovered from a crime scene tells its own tale and leads the investigator to the victim, suspect or people involved in the crime. A blood stain, a seminal stains in sexual assault, a forged signature in document, a hair sample, skeletal remains recovered from crime scene, a morphed photograph, a fired weapon, a broken glass, a narcotic

¹ C J Plourd ,*Science, the Law, and Forensic Identification*. In: *Forensic Dentistry*, 2010 ,Second Edition (eds. Senn DR, Stimson PG), CRC Press, Boca Raton 1. Link: <https://goo.gl/odtESg>

² Dr Sonia Kaul Shal, “Applicability of Forensic Science in Criminal Justice System in India with Emphasis on Crime scene Investigation”, *Medico-Legal Reporter* (Aug. 9, 2016).

³ J M Miller, “Criminology as Social Science: Paradigmatic Resiliency and Shift in the 21st Century”. In: *21st Century Criminology - A Reference Handbook* (Ed. Miller JM), SAGE Publications, Inc., Thousand Oaks 2. 2009, Link: <https://goo.gl/CLdDSS>

drug, a visceral sample collected after autopsy, a fingerprint on a teacup found in the crime scene and many more evidences can help the police reach the suspect. Forensic evidence is a discipline that functions within the parameters of the legal system. Its purpose is to provide guidance to those conducting criminal investigation and to supply to courts accurate information upon which they can rely in resolving criminal and civil disputes.

Forensic evidence is not only used in criminal investigations and trials. Forensic investigations and analysis have been shown to be useful in mediation, arbitration, and civil litigation also. Physical evidence is subject to the same forensic concepts, protocols, and scientific methodologies whether the case is criminal or not. Handwriting and Questioned Document Examination can be critical in dispute resolution instances involving fraudulent documentation because it addresses issues such as whether a controversial document has been manipulated, backdated, substituted, or whether the signatures on a document were faked. In civil lawsuits involving traffic accidents or industrial mishaps, where the claimant is suing the defendant for negligence in order to recover compensation, the expertise of a forensic scientist who is well-versed and skilled in niche areas such as road accident reconstruction, occupational injuries reconstruction, and examination of damaged materials will be useful in assisting the courts in determining the culpability of the parties involved in the occurrence.

The new methodologies which have helped to unearth the highly synchronized plots and conspiracies are forensic accounting (in case of cyber frauds), Forensic aerial photography (the interpretation of aerial photographic evidence in the cases of environment, Computational Forensics (in cases to assist forensic examination), Criminalistics (to detect and to answer to the questions relating to the fingerprints, footwear impressions and tire tracks), Forensic Ballistics (Firearms section), Digital Forensics, Odontology (relating to the identification of dental science to the identification of unknown human remains and bite marks), Pathology (in identifying the reasons of persons death), Physical anthropology (to identify which persons have died in the casual calamities like fires, blasts & crashes, Psychiatry & Behavioral Science (in many cases where the mental illness or soundness has to be judged especially in cases of domestic and family disputes), Toxicology (also called the medical jurisprudence), DNA Profiling, Forensic Polygraph, Cyber Forensics, Cyber Crime, Cyber Security and Cyber Law services and Forensic chemistry.⁴ So it is very evident that forensic sciences provide plethora of its varieties to be used in the given legal case.

Today we are living in a world of advance science and technology due to which there has been enormous change in globe. This technology has given an effective and precise tool for the purpose of investigation and also immensely contributing in the process of administration of justice. A robust justice dispensation system, especially a criminal justice system is one of the fundamental elements of good governance. Crime is an inevitable part of human society and in order to provide justice to the victims, originally the criminal justice system was depended on the testimony of eyewitness to the crime. The dependence on “eyewitness” did not prove to be effective, as they were found to turn hostile and no justice provided to victim and people started losing their faith in justice. The crime investigators resorted to “third degree methods” for examination of the suspect to reveal the truth, which, due to the cultural change and values accepted generally, were considered cruel, as many innocent people also suffered and sometimes inadvertently.

In present high-tech world, the crimes are on growing path. Laws are persistently being expanded and revised to counter the alarming rise in crime rates. The criminals are fast changing and in order keep pace with developments, it is necessary to improve present investigating measures which may prove a great support in case proceedings. The Criminal case proceedings entail various stages like lodging FIR, police investigation, court proceedings and final verdict. Several types of evidences including scientific evidence shows significant role at all these platforms. The advancements in science and technology are increasingly enhancing the role of forensic science and scientific aids in the criminal investigation. This is a positive trend as it strengthens the much-needed objectivity of investigation, thereby enhancing the credibility of the investigation process and improving the probability of bringing offenders to justice.

It is an unconcealed fact that the role of forensic science and evidence has extensive importance in the justice system. Though the use of forensic evidence has been on a spike in the different judicial systems of the world but its use is restrictive so far as India is concerned. To date also, the court has relied majorly on non-forensic, non-scientific evidence for a judgement. According to the recent survey conducted by the Supreme Court of India and the High Court of Delhi showed that only 60-65 cases are solved with the involvement of forensic evidence. DNA evidence has been used only in about 5% of murder cases and 3% rape cases. These figures are enough to show the lack of scientific evidence in a criminal justice criminal investigation in the Indian scenario. There has been a cosmic endeavour for incorporating forensic science in the process of criminal investigation and judicial process. The rate of conviction has been persistently decreasing lately because of a lack of evidence. In this milieu, forensic evidence, having a clinching nature can to some extent reverse the situation.

⁴ <https://ifflab.org/branches-of-forensic-science/> (accessed on 17.10.2021)

The Court's unwillingness to use forensic evidence for criminal investigation has multiple reasons. From improper collection to preservation, sometimes even non-collection. In many cases, the court found out that the evidence collected from the sites was not properly preserved because of which the report showed the result which was impolitic. The DNA samples get contaminated and become ineffectual. Perpetually there has been a delay in sending the evidence to the lab. The delay in the inspection of biological and serological evidence causes the decomposition of such evidence which tends to release a high amount of alcohol. So, in cases like determining the drunkenness of the body, the negative result can show positive which makes it difficult for the court to rely on the result. The motive of the forensic analysis was to determine the reason for the death and maybe strenuous by examining the crime site. Therefore it is imperative to handle the evidence and organise the documents to make it valid in the court of law. Forensic evidence has immense potential in various affairs, the only step needed is it is incorporated in the investigation and analysis process efficiently. In this paper an attempt has been made to see what forensic science is, what role the forensic science plays in crime detection, and why forensic science is an essential part of criminal investigation. The main objective of this paper is to enlighten the importance of Forensic science in the criminal investigation. This paper will be focusing on the holistic approach of the Forensic science from its use in the investigation to the value it holds in the judicial minds when it comes to the judicial proceedings.

DEFINITIONAL ASPECT

Forensic science is the application of a broad spectrum of sciences and technologies to investigate and establish facts of interest in relation to criminal or civil law. The word forensic comes from the Latin *forensis*, meaning "of or before the forum."⁵ In Roman times, a criminal charge meant presenting the case before a group of public individuals in the forum. Both the person accused of the crime and the accuser would give speeches based on their sides of the story. The individual with the best argument and delivery would determine the outcome of the case. This origin is the source of the two modern usages of the word forensic – as a form of legal evidence and as a category of public presentation. In modern use, the term "forensics" in the place of "forensic science" can be considered correct as the term "forensic" is effectively a synonym for "legal" or "related to courts". However the term is now so closely associated with the scientific field that many dictionaries include the meaning that equates the word "forensics" with "forensic science".⁶

'Forensic Science' can be defined as that scientific discipline concerned with the recognition, identification, individualization, and evaluation of physical evidence by the application of the principles and methods of natural sciences for the purpose of administration of criminal justice. Another strongly associated term which is commonly used in the United States is 'criminalistics'. The terms criminalistics and forensic science are sometimes used interchangeably. The term "criminalistics" was borrowed from the German *kriminalistik*. The term was coined to include the various aspects of using scientific and technological methods to investigate and resolve legal matters. "Criminalists" is another term used in some forensic science labs to describe forensic scientists. The term 'Forensic' originates from the Latin word '*forensis*' which means belonging to courts of justice or to public discussion and debate. 'Forensic Science' would, therefore mean the science which is used in the courts of justice.⁷ More technically, "forensic" means "as applied to public or legal concerns." Together, "forensic science" is an apt term for the profession of scientists whose work answers questions for the courts through reports and testimony.

Peter White has defined the term forensic science in two different senses on one is narrower sense and another is wider sense. This wide meaning covers criminal prosecutions in the widest sense, together with patrons and ecological safeguard and physical condition and protection at work, as well as civil proceeding such as violate of agreement and negligence. On the other hand, in universal practice the term is applied more narrowly to use of science in the in the investigation of crime by the police and by the courts as evidence in resolving the issue in any subsequent trial.⁸

Midwest Forensics Resource Center at the U.S. Dept. of Energy has defined Forensic Science as "Forensic science is the application of natural sciences to the procedures of law. In practice the subject of forensic science draws its Principles and Methods from the subjects like physics, chemistry, biology and other science subjects"

California Criminalistics Institute has defined forensic science as:

"Forensic Science is the application of the methods and techniques of the basic sciences to legal issues. Forensic Science is a very broad field of study. It includes Crime Laboratory Scientists, sometimes called Forensic Scientists or, more properly, Criminalists, work with physical evidence collected at scenes of crimes."⁹

⁵ Cassell's Latin- English & English-Latin Dictionary

⁶<https://www.definitions.net/definition/forensic+science> (accessed on 30/10/2021)

⁷B.S. Nabar, *Forensic Science in Crime Investigation* 1 (Asha Law House, Hyderabad, 3rdEdn., 2008)

⁸ Peter White (ed.), *Crime Scene to Court : The Essential of Forensic Science*(RSC Publication, Cambridge), 1998

⁹<https://www.all-about-forensic-science.com/definition-of-forensic-science.html> (accessed on 20/10/2021)

Forensic science is the application of natural sciences to the matters of law. Forensic science is linked to physics chemistry, biology and other scientific methods and techniques. It involves recognition, identification, individualization and evaluation of physical evidence for the purpose, of administration of criminal justice. It's one of most energetic, charismatic and contemporary and exhilarating branch of science used in identifying crimes and criminals.¹⁰

In criminal investigations and court proceedings, forensic science uses scientific methods to recover, analyze, and interpret relevant materials and data. It serves as an intelligence and evidence-gathering tool to aid in the administration of justice. Forensic science includes all branches of physical and natural sciences, the most significant of which are chemistry, biology, physics, and geology. Anthropometry, fingerprints, footprints, documents, ballistics, odontology, and serology were all developed to assist in the administration of the criminal justice system.

NATURE OF FORENSIC SCIENCE

Forensic science is not an individual subject and touches boundaries of almost of all branches of science and applies them to purposes of law. Originally all the techniques were borrowed from different branches of science but now the forensic science has evolved and developed as a separate subject. It has also developed various branches which are more or less domains of forensic science. The science of finger printing, anthropometry, track marks, documents (especially examination of hand writing) and forensic ballistics essentially belongs to forensic science alone. This subject of forensic gained more momentum after the advances made in serology, voice analysis, odour analysis and studies relating to pattern recognition, digital photograph. The most significant to twentieth century is DNA Profiling for the identification of human beings. With the development in the said field the technology is now being applied to plants and animals too.

The two main pillars of forensic science are that:

1. It is multi-professional.
2. It is multi-disciplinary

During the utilization of forensic science, for the proper dissemination of the justice, the forensic scientist has to depend upon investigating officer, on one hand and on the presenting counsel and the judge on other hand. The investigating officer has to be specialist in the field of collecting evidence. Likewise the judge and the counsel have to know the science broadly so they can co relate the scientific evidence with the rest of the evidence. The second peculiarity is that the science is an all-inclusive science call for comprehensive Forensic Science Laboratories which should have experts in all discipline, equipment for all branches and comprehensive libraries and other required utilities.

SCOPE OF FORENSIC SCIENCE

The field of forensic science is so wide and diverse that at present it has become an indispensable working horse for criminal justice delivery system. The present scenario of crime investigation and prosecution of criminals, in India is a rather dismal. In India a large number of trails end up in acquittals. We have both official and unofficial figures for it. When its official it's about 90% and as far as the unofficial figure is even higher.¹¹ In India investigation of crime and prosecution of persons having committed the crime are not up to the mark. Even in shocking crimes hefty number of criminals could not be prosecuted and a few percentages of trials end in acquittal as a result of which numbers of criminals as well as crimes are intensifying gradually. These recurring acquittals are mainly because of obsolete procedures of investigation which set out various ambiguities. Thus for actual investigation scientific ways of investigation is very necessary.¹² The need for the application of science in the dissemination criminal justice has arisen from the following factors:

a) Societal Vagaries

The society is undergoing far-reaching changes and that too at a rapid speed. India has under gone a drastic change and has transformed from a imperial colony into a democratic republic. Modern revolution has touches all the means life be it be communication or transportation. But this revolution has not proved positive but it has influenced negative people as well the satellite communication which is helping intelligence agencies on one hand has also proved boon the criminal minds. An American based terrorist group can easily mentor its disciples or followers in India.

¹⁰Nayan Joshi, *Medical Jurisprudence and Toxicology* (Kamal Publishers ,New Delhi, 2008), P.23

¹¹ A Duncan, *Heads of Lectures On Medical Jurisprudence and Forensic Medicine*, 1801, p 177

¹² Satyendra. K.Kaul and M.H.Zaidi, *Narco Analysis, Lie Detector, Narco Analysis, Brain Mapping, Hypnosis Tests In Interrogation of Suspects*,(Alia Law Agency, Allahabad, 2008), pg 1.

b) Obscurity

The change in the methods of transportation and shifting of societal paradigm from rural to urban helped and facilitated the criminal to escape from immediate arrest (and punishment) after the commission of crime. The criminal with the help of advanced facilities can hide himself in any corner of the city or can foldaway thousands miles away from the destination where actually he has committed the crime within a shorter duration of time. The society in present days is not concerned about the facts that what is happening in his neighborhood. Man who was considered as a social animal by Aristotle has now become a selfcentered human being. He, especially in cities does not know even his next door neighbor. Thus if the neighbor gets killed the murderers came into lime light only when the bodies putrefy and emit foul smell.

c) Technical Know How

The technical knowledge of a common man has increased which has refined the ways of committing crime also and in order to combat with these refined methods of committing crime the method and methodologies of combating the said crime should also get refined and modernized.

d) Extensive Arena

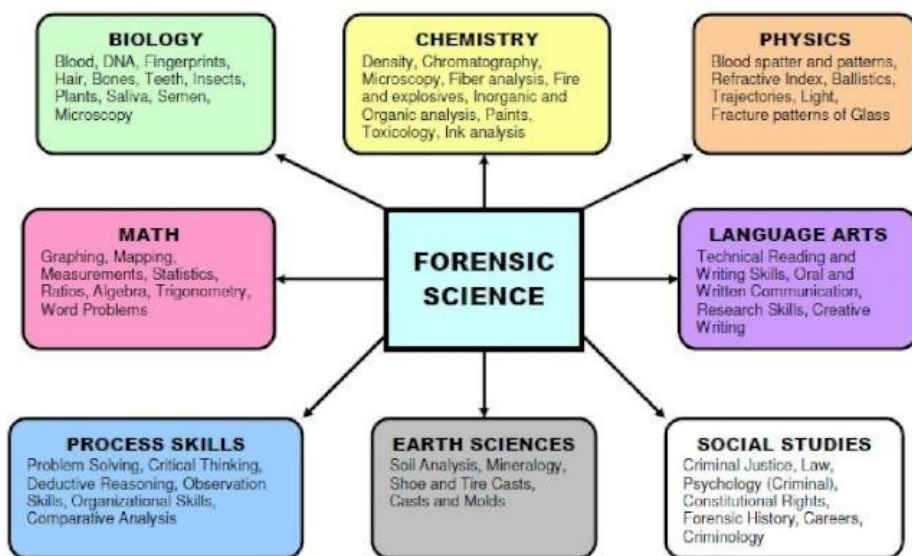
The field of operation of the criminal law is widening at a terrific rate. Formally the crime and criminal used to be local and he usually used age old methods for committing the crime but now national as well as international criminal is a common phenomenon. Smuggling Drug Trafficking, financial frauds and forgeries offer a wide and over expanding field.

e) Better Evidence

Normally the physical evidence judged by an expert is quite objective in nature, where if a fingerprint is found at the scene of crime, it is viewed to be only one person. If that person happens to be the suspect, he must account for his presence at the scene. Similarly that if a bullet is recovered from a dead body, it can be attributed to only one firearm. If this firearm happens to be that of the accused, he must be accountable for its involvement in the crime. Such evidence is always verifiable.¹³

BRANCHES OF FORENSIC SCIENCE

With its multidisciplinary approach, forensic science is that connecting point which helps to link all types of evidence together in any type of investigation. It comprises the application of knowledge and methodology of several scientific disciplines to legal issues. Criminalistics, Chemistry, Biology, Entomology, Odontology, Medicine & Toxicology, Anthropology, Engineering Sciences, Cyber Forensics, Questioned Documents, and Psychiatry & Behavioral Science are some of the branches related to forensic science. Forensic Science is an applied science that is mainly pertaining to law and judiciary system. It derives it principles and techniques from basic sciences and that's why it has many branches, Some of the branches are shown through this chart:



¹³http://www.ijarse.com/images/fullpdf/1523436914_JK1433IJARSE.pdf (accessed on 5/10/2021)

CRIMINAL JUSTICE SYSTEM IN INDIA

The legal system of India provides the framework for criminal justice administration specifying the powers, functions and procedures of every institution involved in criminal adjudication. In India the Criminal Justice System consists of four institutions namely the police, the criminal courts, the prosecution and the prison. A criminal trial undergoes series of stages namely filing the First Information Report (FIR) to Police Station or Complaint to Magistrate, framing of charge, prosecution and trial and conviction or acquittal. The proceedings followed in each stage and the institutions which carry them out are called as a whole the criminal justice system. A criminal proceeding in India has four stages, i.e. (a) pre-proceeding stage, (b) proceeding stage, (c) trial stage and (d) post-trial stage.

The policies involved in the pre proceeding stage for which they enjoy some powers as well under the Code of Criminal Procedure. The responsibility of police in this stage commences with the filing of the First Information Report¹⁴ or complaint with the Magistrate and comes to an end with submission of the police report either in the form of charge sheet or final report. In preparing the police report, a thorough investigation is required. In case of unnatural death, for instance, the investigation officer is to visit the crime scene to collect forensic evidences and to prepare an inquest report. The role of police at this stage is very important because the merit of a criminal case totally depends on the police report. The criminal courts are mandated to try offences on submission of police report, establish innocence or guilt and award on proof of guilt appropriate sentence. The role of the prosecution is to decide whether there is sufficient evidence to bring a suspect to trial in a court of law and whether or not it is in the public interest to do so. The Criminal Justice System of India has, *inter alia*, the following basic features:

- The criminal proceedings followed in India are adversarial in nature. In the Adversarial justice system, the whole process is contested between two parties one of whom is the State and the other is the accused while the judge acts as an umpire between parties;
- A person accused of a crime is presumed to be innocent until the prosecution proves his guilt. This is a cardinal principle that the accused, unless he pleads guilty, shall be presumed to be innocent.
- The criminal standard of proof is that the guilt of the accused must be proved beyond reasonable doubt. That doesn't mean that the prosecution must prove the case beyond all doubt. But if the Judge or Magistrate is not certain that the state has proved its case, or if they think that the accused's version might possibly be true, they must find the accused not guilty;
- The burden or *onus* of proof usually lies on the prosecution. However, if the accused takes any specific plea, the onus will be shift upon him to prove the same.

So, the nature of criminal justice system in India requires the prosecution to prove the guilt beyond any reasonable doubt otherwise, the benefit of doubt goes to the accused which results in his acquittal. The benefit of doubt can be given only when there is any cogent reason which may be gathered from the whole evidence. Evidence is admissible in the court of law if it is relevant and reliable and it is weighty if it is believable, persuasive, and has probative value. The Court assesses the weight of forensic science evidence when the investigative agency rely on the admissibility of the forensic science evidence. Therefore, the specific circumstances or factors in assessing the weight of forensic science evidence depend on the factors that have enabled the Judge to consider the forensic science evidence admissible. In order to prove the crime forensic science plays the most decisive role both in pre-trial and trial stages of a criminal proceeding. For instance, in case of hurt, rape, death and acid throwing, chemical examination and report of doctors are essential for criminal adjudication. In fact, some criminal cases relating to murder, suicide and rape involve complex medico-legal issues and the forensic science plays a significant role in every tier of investigation and trial of such cases commenced from the management and investigation of crime scene to deposition and assessment of evidence to court room.

The Hon'ble Supreme Court of India in a landmark judgment of *D. K. Basu v. State of West Bengal*,¹⁵ asked the enforcing agencies to develop scientific methods of investigation and interrogation in the cases of custodial deaths. Furthermore, the Report of the Committee on Draft National Policy on Criminal Justice emphasized the need for appropriate training, professionalism, research, and development of forensic science in the policy framework.¹⁶ Similarly, Malimath and Justice Verma Committee laid down the requirements for the complete process of DNA

¹⁴S.154, Code of Criminal Procedure, 1973

¹⁵ AIR 1997 SC 610

¹⁶ Report of the Committee on Draft National Policy on Criminal Justice, Ministry of Home Affairs, Government of India, July 2007.

sampling ranging from police setting to safe storage.¹⁷The goal is to protect every victim's constitutional and human right to gain true justice in the criminal justice process.

LAWS ON EVIDENTIARY VALUE OF FORENSIC EVIDENCE IN INDIA

Section 45 of the Indian Evidence Act of 1872 deals with 'expert opinion, where applicable.' However, the expert's opinion is admissible as proof only after it has been scrutinized under Articles 21 and 20(3) of the Indian Constitution, as well as Section 161(2) of the Code of Criminal Procedure, 1973. Section 293 of the 1973 Code of Criminal Procedure outlines the conditions in which such findings of Government science consultants can be used as evidence. Sections 53 and 53A of the 1973 Code of Criminal Procedure are both very useful for DNA profiling of the convicted. The legislation about 'fingerprints' is expressly protected by several provisions of the Identification of Prisoners Act, 1920, Section 73 of the Indian Evidence Act, 1872, and Section 293 of the Code of Criminal Procedure, 1973, in addition to the general laws related to other forensic techniques. Toxicology rules are expressly addressed in some clauses alongside general laws. Section 284 of the Indian Penal Code imposes a penalty for "negligent acts concerning a toxic drug." The Sale of Poisons Act of 1919 prohibits the importation of any prescription poison unless accompanied by a license and, by statute, limits the issuing of licenses. Psychotropic and narcotic medications.

APPROACH OF THE COURT

It has been seen in the past that the expert opinions have only been limited to medical opinions. But now with the development of forensic science and technology, it has certainly reached to such heights that the expert evidence is not limited to the medical opinions but also extends to experts in other relevant fields. As far as, criminal law is concerned: ballistic experts, forensic experts, scientists, chemical examiners, psychiatrists, radiologists and even track-dogs are playing a very vital role in investigation of crimes and their evidence is admissible in the court of law. In plethora of cases, the Courts have asked for expert opinions. The approach of the Courts towards the expert opinions has been analysed in the foregoing study.

In *Anil @ Anthony Arikswamy Joseph v. State of Maharashtra*¹⁸, relying on scientific evidences including DNA profile and oral evidences, the accused was convicted and punished with death sentence and fined by the Sessions Judge, Nagpur for gruesome murder of a minor boy aged about 10 years after subjecting him to carnal intercourse and then strangulating him to death.

In *Vishal Yadav vs State of UP*, Nitish Katara murder case, the identification of the deceased victim was difficult due to availability of only a small portion of one un-burnt palm with fingers. DNA profiling helped in identifying the body remains by matching DNA profile with parents of the deceased which helped the High Court of Delhi to uphold the conviction of the accused¹⁹.

In *State by the Inspector of Police v Manoharan*²⁰, the use of DNA technology paved the way to prosecute and convict the culprit to death, liable for kidnapping and killing after gang rape of a 10 year old school girl by auto rickshaw driver and throwing the corpse of the victim in a running canal .

In *Sushil Mandal v. The State represented by CBI*²¹, the petitioner, father of the deceased boy, challenged the findings of DNA profiling. The deceased boy fell in the adolescent cusp of mutual infatuation with a school girl and parents of both were advised by school administration to keep a check on them. Later, the boy was found reportedly missing and, after a week, a fully decomposed unidentified body was fished out from a lake. The petitioner claimed of not identifying the body remains and clothes of his missing son. He preferred habeas corpus petition in the high court accusing the father of the girl and praying the high court for directing the investigation by the Central Bureau of Investigation (CBI). The DNA test of the body matched with the genetic profiles of the parents (the petitioner and his wife) of the deceased. Petitioner refused to accept the truth of scientific tests despite the fact DNA test was repeated for his satisfaction. The apex court placed reliance on scientific tests including DNA profiling for human identification and accordingly closed the matter.

¹⁷ Committee on Reforms of Criminal Justice System, Government of India, Ministry of Home Affairs, Report, Volume 1, March 2003; Report of the Committee on Amendments to Criminal Law, 23rd Jan 2013.

¹⁸*Anil @ Anthony Arikswamy Joseph v. State of Maharashtra*, (2014) 4S.C.C. 69.

¹⁹*Vishal Yadav v. State of UP*, (2014) S.C.C. Online Del. 1373.

²⁰*State by the Inspector of Police v. Manoharan*, 2015 Cri. L.J. 1215.

²¹*Sushil Mandal v. The State* 2014 S.C.C. OnlineMad. 7362.

In *State of NCT Delhi v Sujeet Kumar*²², the brutal rape and unnatural sexual act with a four year old girl child living in a slum dwelling was investigated by Delhi police and DNA profiling was used to link the perpetrator with the ghastly act of sexual violence. The court after having examined the detailed analysis of the child's testimony and various methodologies involved therein agreed to the investigation findings based upon DNA reports and other evidences and held the accused guilty and set aside the order of the Trial Court acquitting the accused.

In *Dharam Deo Yadav v. State of Uttar Pradesh*²³, a judgment which deals with the admissibility of DNA evidence, Supreme Court observed that "Crime scene has to be scientifically dealt with without any error. In criminal cases specifically based on circumstantial evidence, forensic science plays a pivotal role, which may assist in establishing the evidence of crime, identifying the suspect, ascertaining the guilt or innocence of the accused. One of the major activities of the investigating officer at the crime scene is to make thorough search for potential evidence that have probative value in the crime. Investigating Officer may be guarded against potential contamination of physical evidence which can grow at the crime scene during collection, packing and forwarding. Proper precaution has to be taken to preserve evidence and also against any attempt to tamper with the material or causing any contamination or damage."

In *Krishan v. State of Haryana*²⁴, the Trial Court convicted the appellant under Sections 376 and 506 of the IPC, based on the facts and circumstances of the case and, more specifically, on the FSL report. In another judgment in case of *State of Gujarat v. Mohan Hamir Gohil and others*²⁵, after consulting numerous authorities on DNA technology, diverse testing methodologies, and scientific breakthroughs made worldwide the Division Bench of this Court observed that throughout time, courts across the globe, including in India, have placed a high premium on DNA results. It was noted that "with time, DNA testing technology has advanced and more sophisticated, resulting in results that may frequently be utilized to determine an accused's inclusion or exclusion

There is no denial to the fact that in the last few decades, the infusion of technology in crime investigation has been a major breakthrough in the process of advancement of criminal justice. Police utilise scientific tools and techniques to detect a crime, reconstruct the crime scene, identify the alleged offender and establish vital links; the courts, on the other, take account of these physical evidences, otherwise infallible, and determine with enhanced accuracy the innocence or guilt of the offender. Somewhere, the efficiency and effectiveness of the criminal justice functioning has come to be intertwined with the extent of use of technological tools in crime investigation. Presently, the courts are heavily depending upon evidences obtained through the forensic techniques to find the truth because the information which has been obtained from these techniques is accurate and can be relied upon and it is very easy to store, search and analyse great amount of genetic data. The results of these techniques are being widely used in criminal justice system as well as in civil cases also.

Forensic science is a dynamic field of knowledge and skills which can be highly helpful and useful for criminal investigation. Forensic science applies technical skills to detect, identify and prosecute offenders. The future of forensic science in India depends on overcoming the constraints and strengthening the development factors. The constraints are orthodox attitudes, lack of implementation, lack of funds, lack of training staff, equipment and laboratories. Forensic science-investigation is possible if police adopts new professional culture, ethics of professionalism, scientific methods and tools, merit-based recruitment and promotion, discouraging political interference, enhancing training inputs and establishing the forensic laboratories.

The crime scenario in this century has become very complex. It is further expected to be more complex in the coming years. The modus operandi of crime has become scientific as the criminals are using scientific methods in the commission of crime. As there is a famous phrase "*Diamond cuts Diamond*", hence it is essential to use science and technology in apprehending the criminals with the tools of science. Forensics not only enables the police and courts to get good irrefutable evidence for the issues under investigation and scrutiny but also provides credible solutions with certainty, within a framework of scientific principles by employing modern tools and techniques. Forensic needs winding its ambit to meet emerging challenges of tax savvy criminals, set new standards of service and work for innovative solutions to solve real problems.

Forensic Science plays an important role in investigation of crime. This science is used to investigate criminal cases such as robbery, assault, murder, kidnapping, rape etc. and civil cases such as fraud, negligence, forgery etc. In criminal justice system, there is requirement for application of forensic science because in India acquittal rate is very high as compared to conviction rate. It is only due to improper investigation and the main reason of it is lack of forensic techniques knowledge. Our investigating agency has not so much knowledge regarding these techniques

²²*State of NCT Delhi v. Sujeet Kumar*, 2104 S.C.C. Online Del. 1952.

²³*Dharam Deo Yadav v. State of Uttar Pradesh*, 2014(5)S.C.C. 509.

²⁴(2014) 13 SCC 574.

²⁵R/CR.A/224/2012

as compared to criminals due to which there is no evidence against them and they easily acquit. Now it has been realized that forensic science is better evidence as compared to another because there is less chance of fabrication of evidence and these evidences are more reliable. During investigation and trial forensic techniques helps to answer three essential questions necessary for detection of crime, i.e. 1). When was crime committed?, 2). How has been crime committed?, 3). Who committed the crime? And for this, investigating agencies use different techniques such as toxicology, DNA profiling, personal identification, fingerprint, ballistic and firearm identification, soil examination, identification and association of human hair, blood, serum, hair, saliva etc.

In India, the application of forensic science to crime investigation and trial has to stand the limitation of law. The predominant questions therein are: viz. a) How far such techniques are legitimate and supported by any authority? b) How far these forensic techniques helpful in crime investigation? c) How could we obtain evidentiary importance from the forensic experts? As per Articles 20(3) of the Indian Constitution, no person accused of any offence shall be compelled to be a witness against himself. Article 20(3) is based upon the presumption drawn by law that the accused person is innocent till proved guilty. It defends the accused by protecting him from the probable agony/torture during investigation during detention. Criminal law believes an accused as innocent until his guilt is proved beyond reasonable doubt. The Universal Declaration of Human Rights, Article 11 deals with "Right to the presumption of innocence" and states that "Everyone charged with a penal Offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defence."²⁶ Article 20 (3) of the Constitution of India guarantees fundamental right against self incrimination and guards against forcible testimony of any witness. The fundamental right guaranteed under Article 20 (3) is a protective umbrella against testimonial compulsion in respect of persons accused of an offence to be witness against themselves. The protection is available not only in respect of evidence given in a trial before Court but also at previous stage. The protection against self-incrimination envisaged in Article 20 (3) is available only when compulsion is used and not against voluntary statement, disclosure or production of document or other material²⁷. This right has been taken to ensure that a person is not bound to answer any question or produce any document or thing if that material would have the tendency to expose the person to conviction for a crime²⁸. Sec. 73 of the Indian Evidence Act gives authority to the court to direct any person including an accused to allow his finger impressions to be taken. The Supreme Court has also held that being compelled to give fingerprints does not violate the constitutional safeguards given in Art. 20(3)²⁹. There are undoubtedly many queries as to whether forensic evidence violates Art. 20(3) of Indian Constitution or not? In the *State of Bombay v. Kathi Kalu Oghad & Others*,³⁰ the court held that giving thumb impression, specimen signature, blood, hair, semen etc. by the accused do not amount to 'being a witness' within the meaning of the said Article. The accused, therefore, has no right to object to DNA examination for the purposes of investigation and trial. The Bombay High Court in another significant verdict in the case of, *Ramchandra Reddy and Ors. v. State of Maharashtra*,³¹ upheld the legality of the use of P300 or Brain finger-printing, liedetector test and the use of truth serum or narco analysis. The court upheld a special court order allowing SIT to conduct scientific tests on the accused in the fake stamp paper scam including the main accused, Abdul Karim Telgi. The verdict also maintained that the evidence procured under the effect of truth serum is also admissible. In a 2006 judgment, *Dinesh Dalmia v State*³², the Madras High Court held that subjecting an accused to narco-analysis does not tantamount to testimony by compulsion.

Keeping the same spirit in another judgment, the court had held that the narco-analysis test is a step in aid of investigation³³. It forms an important base for further investigation as it may lead to collection of further evidences. Therefore, with reference to the proliferation of crimes against society, it is necessary to keep in mind the necessity of the society at large and the need of a thorough and proper investigation as against individual rights while ensuring that constitutional rights are not infringed. Consequently, in the court's opinion, the narco-analysis test does not suffer from any constitutional infirmity as it is a step in aid of investigation and any self incriminatory

²⁶ Universal Declaration of Human Rights, United Nations High Commissioner For Human Rights, [http://www.icnl.org/research/library/files/Transnational/Universal Declaration of Human Rights .pdf](http://www.icnl.org/research/library/files/Transnational/Universal%20Declaration%20of%20Human%20Rights.pdf) (accessed on 9.11.2021).

²⁷ Justice U.C. Shrivastava, "Immunity from Self-Incrimination under Art. 20(3) of the Constitution of India", *JJTRI, U.P.*, <http://ijtr.nic.in/articles/art19.pdf> (accessed on 9.11.2021).

²⁸ McDougall, Justice Robert, The Privilege Against Self-incrimination: A Time for Reassessment, Paper presented at *New South Wales Bar Association*, 18 October 2008, <http://www.supremecourt.lawlink.nsw.gov.au/agdbase/v7wr/supremecourt/documents/pdf/mcdougall181008.pdf>, (accessed on 29.05.2021) p. 2;

²⁹ Gaurav Aggarwal, *Smart Study Series Forensic Medicine & Toxicology*, 73 (ELSEVIER A division of Reed Elsevier India Private Limited, Gurgaon Haryana), 2009).

³⁰ AIR 1961 SC 1808, 1962 SCR (3) 10.

³¹ 2004 All MR (Cri) 1704.

³² 2006 Cri. L. J 2401

³³ *Sh. Shailender Sharma v. State*, CrI. WP No. 532 of 2008.

statement, if made by the accused, cannot be used or relied upon by the prosecution. The court ordered the accused to undergo the narco-analysis test in stipulated period. These judgments were clearly supporting the use of DDTs (deception detection tests) in investigations

However, in a subsequent case, i.e., *Selvi & Ors v. State of Karnataka & Anr*³⁴, the Supreme Court questioned the legitimacy of the involuntary administration of certain scientific techniques for the purpose of improving investigation efforts in criminal cases. In the above mentioned case, the Supreme Court held that brain mapping and polygraph tests were inconclusive and thus their compulsory usage in a criminal investigation would be unconstitutional.³⁵ The Code of Criminal Procedure, 1973 was amended in 2005 to facilitate the assortment of a host of medical details from accused persons upon their arrest. Section 53 of the Criminal Procedure Code 1976 provides that upon arrest, an accused person may be subjected to a medical examination if there are “reasonable grounds for believing” that such examination will afford evidence as to the crime. The extent of this assessment was expanded in 2005 to include “the examination of blood, blood-stains, semen, swabs in case of sexual offences, sputum and sweat, hair samples and finger nail clippings by the use of modern and scientific techniques including DNA profiling and such other tests which the registered medical practitioner thinks necessary in a particular case.”³⁶ On the other hand, the provision that was introduced through an Amendment in 2005 is restricted to the cases related to rape only.

This section also does not permit a complainant to collect blood, semen, etc, for bringing criminal charges against the accused; neither does it apply to complaint cases³⁷. In similar lines, Section 164A Code of Criminal Procedure, 1973 offers for the medical examination of a woman who is an alleged victim of rape within twenty four hours and such examination includes the DNA profiling of the woman. Both the sections allow any medical practitioner within the meaning of Sec. 2(h) Indian Medical Council Act, 1956 to collect a DNA sample. The matter lies as to whether every medical practitioner is competent enough to collect and preserve DNA evidence or not. It is a renowned fact that DNA evidence is completely dependent upon suitable collection and preservation of sample. Any simple error or negligence can contaminate the sample and contaminated sample is absolutely of no use. Under Indian Evidence Act, 1872, forensic report is regarded as a “belief” tendered by expert. An expert may be defined as a person who, by practice and observation, has become experienced in any science or in his area of expertise. He is one who has devoted time and knowledge to a special branch of learning, and is thus especially skilled in that field wherein he is called to give his expert judgment³⁸. The real function of the expert is to put before the court all the equipments, together with explanations which induce him to come to a certain conclusion, so that the court, although not an expert, may form its own judgment by its own observation of those equipments³⁹. The trustworthiness of an expert witness completely depends on the reasons stated in support of conclusion and the tools, techniques and materials, which form the basis of such conclusion⁴⁰. Although, the court can completely disagree with the conclusions drawn by the expert and depend on other evidences for the purpose of judgment.

When looked into the Indian Forensic scenario carefully, there are several shortcomings and pitfalls which need to be addressed for proper functioning. In the case *Dharam Dev Yadav v/s State of Uttar Pradesh*, the Supreme court of India discussed the importance of forensic evidence, especially in more brutal and well-organized crimes⁴¹. The most alarming issues in Forensic Science are the erroneous convictions based on faulty forensic evidence⁴². Nearly 318 convicts were released from jail based upon DNA tests who were earlier wrongly convicted on the basis of faulty forensic evidence⁴³. As regards the scene of crime investigations, most of the investigating officers are not adequately trained in the collection, preservation, packaging, and forwarding of forensic evidence due to a lack of

³⁴ AIR 2010 SC 1974.

³⁵ *Ibid*

³⁶ http://www.genewatch.org/uploads/f03c6d66a9b354535738483c1c3d49e4/India_DNA_Bill_Memo_2.0.pdf, (accessed on 25.10.2021).

³⁷ Jyotirmoy Adhikary, *DNA Technology in Administration of Justice*, (LexisNexis, Butterworths, 2007)

³⁸ Pragati Ghosh, “Evidentiary Value of Expert Evidence under Indian Evidence Act, 1872”, <http://www.shareyouressays.com/119180/evidentiary-value-of-expert-evidence-under-indianevidence-act-1872>, (accessed on 26.9.2021).

³⁹ S. C. Parakh, ‘Expert Witness’ 421 *IJA* Vol.55 (2011).

⁴⁰ Report of the Committee on Draft National Policy on Criminal Justice, Ministry of Home Affairs, Government of India, July, 2007.

⁴¹ *Dharam Dev Yadav vs State of Uttar Pradesh* on 11 April, 2014. <<https://indiankanoon.org/doc/39335671/>> (accessed on 16/4/ 2021).

⁴² B. Garrett, P. Neufeld, “Invalid Forensic Science Testimony and Wrongful Convictions,” *Va. Law Rev.*, 95 (1) (2009), (accessed on 27/4/2021). Available: <https://scholarship.law.duke.edu/faculty_scholarship/3861>

⁴³ V.R. Dinkar, Forensic Scientific Evidence: Problems and Pitfalls in India, *Int. J. Forensic Sci. Pathol.* (2015), pp. 79-84, 10.19070/2332-287x-1500020

education and training. Thus, the investigating skills need to be updated for adapting scientific procedures. Moreover, there should be scientific auditing at the scene of the crime to avoid suspicion by the courts of law⁴⁴.

Another point is, most of the Forensic Science Laboratories in India are in the government sector mostly under the police department; however, several State Forensic Science Laboratories are functioning directly under Home Department. The Central Bureau of Investigation (CBI) laboratory in Delhi is functioning under the administrative control of the CBI. The people at large in India and the courts of law suspect the forensic evidence submitted by the experts whose laboratories are working under the control of police departments. It is further mentioned that forensic reports in India are mostly depicting the probability and rarely the individualizations which are just corroborative evidence and are not treated as conclusive evidence for adjudicating a criminal case in the court of law. Several factors are adversely affecting the reliability of scientific evidence in India, some of these can be listed as lack of scientific certainty, lack of research, forensic science as having meager resources, lack of well-defined code of ethics, lack of certification of the experts, non-available databases and non-availability of error rate statistics for all the techniques⁴⁵.

CONCLUSION AND SUGGESTIONS

It can be well stated that the forensic sciences is the scientifically advanced discipline for the impartation of criminal justice delivery system and it contributes to the speedy justice delivery system and because of the presence of sophisticated and hi-tech forensic advancement and studies the justice imparting system has become more reliable and dynamic in nature. There is no doubt in stating the fact that the advent of forensic science has revolutionized the manner of detecting crime. Investigative procedures have seen a change over the course of the past three decades due to the constantly developing technologies used as a part of forensic science. It plays a major role in the justice system as it is majorly due to forensic science that crimes and criminals are identified. Since, it is a developing study and requires a lot of education, skills as well as experience, the Courts have often viewed forensic science as not being enough or completely reliable. Nevertheless, its role in getting convictions cannot be denied.

In spite of the fact that forensic science has been a great tool aiding the criminal justice delivery system there were a set of precautions and a few changes required in order to make the effective use of the given forensic sciences techniques. There was a lack of work culture in the Courts for the application and optimum utilization of the forensic sciences. In this regard the reference to the report submitted by the Malimath Committee is essential to be made. It suggested changes in the few of the sections of the Criminal Procedure Code in order to incorporate and give shape to the forensic sciences. It proposed for the formulation of the specific guidelines and law for setting uniform standards for the Police Officials to follow while obtaining genetic information and to provide for adequate safeguards to eradicate and obliterate any misuse or tampering of the same. The Committee suggested for the creation of DNA database to curb and fight against terrorism. The Malimath Committee also suggested for the enhancement of the infrastructural standards such as the establishment of well equipped laboratories to deal with the DNA samples. Today, in the present day scenario most of the suggestions submitted by the Malimath Committee have been incorporated with slight modifications. The mechanisms of the Courts have been digitalized, the fingerprints and the biometric identifications are being recorded and uploaded in almost every Thana. A lot has been done and much is required to be done.

Evidence must be allowed to speak for themselves and alterations and misinterpretations on part of humans should be avoided in order to avoid errors in the forensics domain of law. Where on the one hand forensics has created a scientific corridor in the analysis of crime and provides a better approach for reaching conclusions, hasty and unethical conduct in forensics can be threatening not only for justice but also for individual human rights. There are many instances when a case stands at crossroads and forensic sciences become the basis of the decision of exoneration or guilt of the suspect. Therefore it is expected that forensic organizations must follow ethical and procedural codes. The lackadaisical attitude of the government to regulate the forensic science discipline has resulted in a considerable absence of updated, reliable empirical research on the functioning of forensic science laboratories. Disparities in the internal functioning of forensic laboratories in terms of the quality of services offered, levels of funding, staff availability and accreditation systems is another area of concern needs to be addressed.

To provide legal support to Forensic Science in India, it is immediately needed to pass a DNA Bill that has been pending since the last several years. Moreover, to have regulatory mechanisms on Forensics in India, it is also

⁴⁴M. Airlie, J. Robertson, M.N. Krosch, E. Brooks, "Contemporary Issues in Forensic Science—Worldwide Survey Results", *Forensic Sci. Int.*, 320 (2021), Article 110704, 10.1016/j.forsciint.2021.110704

⁴⁵J. Peterson, I. Sommers, D. Baskin, D. Johnson, The Role and Impact of Forensic Evidence in the Criminal Justice Process, 2010. (accessed on 18/4/2021). Available: <https://www.ojp.gov/pdffiles1/nij/grants/231977.pdf>.



needed to pass Forensic Regulatory and Development Authority Bill. This will also provide codes of conduct and ethics for forensic practitioners in the country. Specific law should be enacted giving guidelines to the police for setting uniform standards for obtaining genetic information and creating adequate safeguards to prevent misuse of the same. Efforts must be made to create more awareness among general public, judges and advocates as also police machinery regarding scientific techniques of investigation..Scientific technique of investigation should not be permitted to the extent they became violative of human rights and constitute torture of the accused. The author suggests that Rules laid down by the National Human Rights Commission (NHRC) must be strictly followed while using any scientific technique. To make Criminal Justice System more efficient, effective police and judicial officers training plans should be developed. Police investigating officers and judicial officers must be educated in advanced technology, new dynamics of forensic science, and the efficacy and application of modern forensic techniques. Regular skill training in scientific investigations should be provided to them. Attachment of senior forensic scientists to courts for clarifying the forensic reports will go a long way in minimizing the forensic doubts in the minds of courts. Forensic experts should be truthful in respect of their laboratory findings & their interpretation in their report & finally while deposing expert evidence in the Courts. In order to curb the culture of corruption there should be strict penalties against examiners falsifying, exaggerating or in any way misrepresenting scientific results.