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## Forensic Criminology

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### ABSTRACT

*This research focuses on the history development of forensic science and also shed light on the fusion of science and law that is how forensic science has brought in the administration of justice. This research aims to point out the flaws in the laws with reference to forensic evidence.*

**Keywords**— Forensic, Criminal justice, Judicial approach

### 1. INTRODUCTION

Medicine and the law generally do not always work in harmony, because the human body is a complex mechanism where even a general abnormality would be justified medically but not legally, for instance in the case of insanity, [1] section 84 of Indian penal code of 1860 speaks about insanity. Insanity is of many types such as an idiot, unsound mind (noncompos by illness), lunatic, and drunkard person. The law clearly states that, a person is said to be legally insane when he is incapable of knowing the nature of the act or what he was doing is contrary to law but, medically mere mental disorder such as stress, depression, or abnormal acts of a person does fall under category of mental sickness [2]. Hence, we may conclude that not all medical insanity is legal insanity but all legal insanity does fall under medical insanity.[3]This has been proved in the judgment of Hari Singh Gond V.State of Madhya Pradesh[AIR 2009 SC 31].[4]

In the modern civilized world, science and law were brought together under a concept called forensic criminology. In today's world law is backed up by science and vice versa. [5]The term forensic originated from the Latin word called "*forensics*" or "*forensic*" meaning *public discussion and debates* or *belonging to the forum*.[6]Hence in a broader context, forensic science is the application of physics, chemistry, and biology to provide a solution to all social and legal issues.

The forensic science came into proper existence around the 19<sup>th</sup> century. James Gordon Bennett, the publisher of the New York Herald became the first investigative reporter who had examined the crime scene of 1836. Later the literacy has developed and there were many frictional stories and characters that helped in the development of forensic science. [7]

Every history has an untold part, originally the field of forensic science has come a very long way since its recorded beginnings in the 700s, and the Chinese found fingerprints to establish the identity of documents and clay sculptures. [8]The first monographic work on forensic medicine is done by Xiyuan Jilu (Collected Writings on the Washing Away of Wrongs), written by Song Ci of the Southern Song Dynasty (1127-1279). This was written in the year 1247, and it is the earliest systematic book on judicial examination in the world. [9]There is another traceable history which goes back to the period of Eureka legend Archimedes who found the concept of buoyancy and with the help of it proved that the crown was not made up of gold. This combination of the medical and legal approach to the study of crimes started in England in the 12<sup>th</sup> century during the reign of King Richard I.[10] In today's world, forensic science has rooted down in all fields and plays a crucial role in judicial proceedings. In the mid of 16<sup>th</sup> and 17<sup>th</sup> century, forensic started playing its role in a legal proceeding.

Sometimes forensic is termed as medical jurisprudence because it applies medical knowledge to criminal and Civil Law. A medical jurisprudence, also called Legal Medicine, it is the science that deals with medical application in the legal aspect. At present, the combination of forensic and law is called "forensic criminology". [11]

### 2. CRIMINOLOGY

The term criminology derived from the combination of Latin and Greek word. The word "crime" is a Latin word which means crime or accusation and Greek word named "logos" which means science or society.[12]The term criminology founded in 1885 by Italian law professor *Raffaele Garofalo* as "criminology".[13]Criminology is the scientific study of crime and criminals and it is

also multidisciplinary in both practice and theory.[14]The the end goal of criminology is to figure out the causes for criminal act or behavior and also provide an effective measure to prevent it.[15]People who study criminology are called as a criminologist. Criminologists are the person who dedicates themselves to the process of solving the crime. They analyze the various dimensions of crime such as frequency, causes, location, social relations, the impact of crime etc.

Criminology broadly consists of 2 branches namely criminal biology and criminal sociology. Criminal biology which deals with the causes of criminal behavior and criminal sociology deals with the effect of criminal behavior in the society. The object of criminology is to study the sequence of law making, transgression, and reaction to law breaking from the purpose of view of the efficiency of law as a way of control. [16]

### **3. DIFFERENCE BETWEEN CRIMINOLOGY AND FORENSICS**

Forensic and criminology both are concerned with crime and law enforcement but they aren't the same. There is a thin line drawn between these both. Forensic science is a field which approaches and utilizes scientific methods to examine crime and its evidence serves as valid proof before the eye of law. Criminology analyses crime and criminal behavior, as well as its causes and effects. It generally focuses on a sociological aspect of crime when examining law enforcement and prevention. [17]

### **4. THE ROLE OF FORENSIC IN DETECTION OF CRIME**

Forensic science is important in criminal law without the help of forensic the crime would remain unsolved. It is the duty of a forensic scientist is to investigate and solve the crime. For instance, forensic pathologists are skilled at figuring out the cause of death by performing autopsies. [18]An autopsy helps to figure out the cause and manner of death through the examination of body fluids and tissues. Another example is the monographer (fingerprint experts) can solve a crime scene and also produce evidence by identifying the respective fingerprints.

The Forensic specialists will be used by a range of entities, like federal, state or native laboratories or tutorial establishments; they will be known as professional witnesses or employed as consultants to contribute specialized information and advice on scientific or technical problems. Forensic specialists are also appointed by the court to help the decision or jury in an exceedingly criminal or civil case, to assist Associate in Nursing needy criminal litigant, or to supply a 3rd opinion on data and proof antecedent reviewed by the prosecution and defense specialists.[19]

The collection of forensic proof and also the application of forensic sciences became necessary for criminal investigations and prosecutions. Forensic proof fulfills several roles in Criminal investigations (Fisher, 2004):

- (a) Prove a crime has been committed or establish key parts of a criminal offense.
- (b) Relates the suspect with the victim and the crime scene.
- (c) Establish the identity of persons related to a criminal offense.
- (d) Acquit the innocent.
- (e) Corroborate a victim's testimony.
- (f) Assist in establishing the facts of what occurred.[20]

Hence it is evident that without forensic science it will be more difficult to prosecute and punish the offender. Forensic science is further classified into the following fields:

#### **5.1 Trace Evidence Analysis**

Trace evidence analysis is the identification and/or comparison of tiny, presumably microscopic proof transferred by contact or discharged by movement throughout the commission of a criminal offense. This proof will usually link a suspect to a different individual or to the crime scene itself. It's the mission of the trace proof analyst to spot and interpret these materials to be used in legal proceedings [21]. Few types of trace evidence analysis.

#### **5.2 Hair Analysis**

Analysis and comparison of the morphological characteristics present in hair to work out whether or not the hair came from an individual's or an animal.[22]Human and animal hairs are employed in forensic investigations for over a century. During the course of a criminal investigation, many sorts of physical proof area unit encountered. One of the foremost common is hair proof. The identification and comparison of human and animal hairs may be useful in demonstrating physical contact with a suspect, victim, and crime scene. [23]One of the key differences is the core of the hair follicle. The core has properties that allow for the coating of hair to provide excellent insulation not only heat and cold but also from the rain.

#### **5.3 Gunshot Distance Determination**

This is a test which is conducted to figure out the distance the gunshot took place that is the distance between the accused and victim. It also provides a detailed idea about the clothing of the accused and the type of gun and bullets used. When a firearm is discharged it emits smoke, soot, and different residues, primarily from its muzzle. The residues exit the muzzle usually in a very cone shape and might land on the target object encompassing the hole. The dimensions and density of the pattern of residues on the item will vary with distance, permitting a firearm examiner to see the proximity of the shooter to the target once the gun was fired. [24]

#### **5.4 Gunshot Residue (GSR) Analysis**

The presence or absence of gunfire residue will corroborate witness statements and testimony and supply investigational leads. This forensic analysis, also known simply as GSR, is vital in crimes involving any events within which a firearm is discharged.

Gateway Analytical offers gunfire residue testing of sample kits from hand, clothing, and automobile specimens, among others. We can also isolate material from clothing proof within the laboratory for analysis. The data provided at the tip of our gunfire residue testing and analysis includes a final opinion on the presence of particles characteristics and it is usually related to gunfire residue; along with a comment on the meaning of these results. [25]

**5.4.1 Forensic Toxicology:** Forensic toxicology refers to application toxicology to assist the medico-legal investigation of death and poisoning. Forensic toxicology encompasses the measure of alcohol, drugs, and other noxious substances in biological specimens and interpretation of such leads to a medico-legal context. [26]

**5.4.2 Forensic anthropology:** Forensic anthropology is an application of physical examination to legal cases, usually with a spotlight on the human skeleton. Forensic social science uses the techniques of physical anthropology to research skeletal, badly rotten, or otherwise unidentified human remains to unravel crimes. Forensic anthropologists can assess the age, sex, and distinctive features of a dead person and are invaluable in documenting trauma to the body and estimating however long a corpse has been decomposing. [27]Forensic anthropologists may work with bodies in a variety of conditions, including as mummies, piles of bones, rotten bodies, charred remains, and also the victims of craft crashes or natural catastrophes. Investigations usually begin with a ground search team using cadaver dogs or a low-flying plane to find a missing body or skeleton.

**5.4.3 Forensic Odontology:** Forensic Odontology a branch of forensic sciences uses the ability of the dentist in personal identification during mass calamities, statutory offense, and child abuse to name some. Forensic Odontology is proper handling, examination, and analysis of dental proof, which can be presented within the interest of justice. The proof that will be derived from the teeth, the age (in children) and identification of the person to whom the teeth may belong. [28]

**5.4.4 Forensic psychology:** Forensic psychology, as outlined by the American Psychological Association, is the application of clinical specialties to the legal arena. This definition emphasizes the appliance of clinical psychology to the forensic setting. The broad definition of forensic psychological science emphasizes the application of research and experimentation in alternative areas of psychological science (e.g., psychology, social psychology) to the legal arena. This may include applying results from studies in areas like cognitive psychology to legal queries. Forensic psychological science has grown within the past twenty years.[29]It's a broad applied field that gives various opportunities to the practicing. Forensic psychologists work in many various legal environments, writing reports, giving testimony, doing direct treatment or working with therapeutic communities. Forensic psychologists are most ordinarily authorized psychologists who focus on applying psychological information to legal matters, each within the criminal and civil arenas. [30]

There are few other branches of forensic science are such as forensic Linguistics, Forensic Geology, Forensic Entomology, Forensic Engineering, Forensic DNA Analysis, Forensic Botany, forensic pathology, Forensic Archaeology, Forensic Podiatry, Digital Forensics, forensic Ptomology, Criminalistics. Forensic science also includes even more specialized fields, such as forensic accounting, forensic engineering, and forensic psychiatry, among others.

## **6. INTRODUCTION OF FORENSIC SCIENCE IN LEGAL SYSTEM**

In the last few decades, the innovation of technology in criminal investigations has been a major breakthrough in the advancement of criminal justice [31]. The idea of forensic science is certifiably not a new concept in India, however it's the application was not known by our Indian system the use of fingerprint which was otherwise called 'Trija' by the unskilled people which was prompted hundreds of years prior as it was known that the same are incomparable predecessors in the present scientific form yet, its detailed reference can be seen from our writing composed 2300 years prior like the 'Kautilya's Arthashastra'. [32]

Hence it is very clear that the concept of forensic prevails more than decades. At present this concept has been developed by various technologies to solve the crime. The crime rate has also gradually developed with the forensic and legal system. In present years, there are 30 million cases are pending at international forensic and CBI agencies.

It is always been a difficult job to define crime. Sir William Blackstone in his 'Commentaries on Law of England' defined Crime as "an act committed or omitted in violation of Public Law forbidding or commanding it".

Science and crime are 2 different paths. It does always seem to be a mystery with regard to the combination of law and science. This paper will discuss the applicability of science in the legal field along with its significance.

## **7. CONSTITUTIONALITY**

Forensic Science plays a really important role in the detection of any crime; it acts as an aid/tool to the investigation method. It's a science through which all physical evidence is collected and tested by forensic specialists. It's been viewed as a final resort in several of the cases conjointly the reports of forensic reports play a very vital role not only in terms of the criminal justice system, however, in terms of civil lies' and different matters. Physical evidence ought to be collected from the scene of the crime. [33] Criminal justice is often outlined as the system through which crimes and criminals are known, understood, judged, and punished. [34]

As we all know, the development and implementation of technology in the process of criminal administration is a major breakthrough in the process of criminal procedure. Equally, the Police also play an important role in the administration of criminal justice. They use this development for investigation, reconstruct of the crime scene and to produce irrefutable evidence.

Forensic science plays an important role in the criminal justice system by providing scientifically based data through the analysis of physical proof. Each crime scene is unique, and every case presents its own challenges. During an investigation, the proof is collected at a crime scene or from an individual, analyzed in a crime laboratory then the results given in court. [35]

In India, the law concerning evidence is uniform in both Civil and criminal cases; the degree of proof needed may be somewhat completely different in civil and criminal cases the however mode of giving proof is governed by the same legislation. Criminal Procedure Code and Indian evidence Act 1872 are the parent procedural laws that govern criminal trials in India, while Criminal procedure Code prescribes the procedure from the purpose of taking cognizance of crime by appropriate judicial Magistrates till the delivery of ultimate order of Conviction or final decision or any appropriate order trying into the fact of the case. Indian Evidence Act is restricted in its scope of leading evidence in civil or criminal cases either by the prosecution or defendant, applicant or respondent. The act says, all the forensic reports or opinion of experts or opinion of the third party when relevant, are permissible under Section 45 of the Evidence Act, 1872. [36]

Act also deals with kind of evidence and connection of any truth which might be brought as proof in any case.[37]When we speak about the law relating to forensic it is also essential to discuss the constitutional validity of the evidence which is submitted by the forensic experts. The constitution of India clearly states that “no person accused of any offense shall be compelled to be a witness against himself”. [38]It protects the accused from the torture caused during an investigation under police custody. Criminal law treats an accused as innocent until his guilt is established beyond reasonable doubt. The Universal Declaration of Human Rights under Article 11, states that "Everyone charged with a penal offense has the right to be presumed innocent until proved guilty according to the law at which he has had all the guarantees necessary for his defense.[39]

The fundamental right secured under Article 20 (3) is a protecting umbrella against testimonial compulsion in respect of persons accused of an offense to be a witness against themselves. The protection is out there not only in respect of evidence given during a trial before Court however also at an earlier stage. The protection against self-incrimination envisaged in Article 20 (3) is available only when compulsion is employed and not against voluntary statement, revelation or production of a document or alternative material. [40]

Section 73 of the Indian evidence act empowers the court to issue an order to take the fingerprints of the accused. Even the court forces the accused to give fingerprint does not violate article 20(3).In *The State of Bombay v. Kathi Kalu Oghad and Others*, the supreme court held that giving thumb impression, specimen signature, blood, hair, semen etc. by the accused does not amount to ‘being a witness’ under the said article. The offender has no right to object to the DNA examination for the purposes of investigation and trial.[41]

Hence it is very clear that forensic evidence does not violate the right guaranteed under section 20(3) of the Indian constitution to an extent. Brain mapping and any other test taken by the respective authority without any reasonable justification will be held unconstitutional. In certain cases, the courts use their discretionary power order to take a DNA test, or fingerprint test forcibly from the accused. In the case of *Ramchandra Reddy and Ors. v. The state of Maharashtra*, the court justified the legality of brain mapping and narco- analysis. The court granted a special court order which allowed the SIT to conduct scientific tests on the accused in the fake stamp paper scam along with the main accused, Abdul Karim Telgi. It was further held that the evidence procured under the effect of truth serum is also admissible. [42]

## **8. FORENSIC SCIENCE AND OTHER LAWS**

The legal procedure is especially based on the Constitution of India, the Indian Evidence Act, Code of Criminal Procedure, Code of Civil Procedure and Indian penal code. Cases are determined in India on the premise of adduced proof. Crime detection, discovery, identification, and analysis of criminal evidence are the means of law enforcement. The prosecution should prove the guilt of accused beyond reasonable doubt. It’s the responsibility of the law imposing agencies to discover the crime, apprehend perpetrators and to produce such evidence that leads to the conviction of a criminal. India has enough legislation on numerous crimes however they're not latest. The laws prevailing are centuries old. To keep pace with ever-changing desires of society, every other day a brand new law is passed by the Parliament. But, these laws are passed usually after the commission of new heinous crimes.

However, there are recent changes which took place in laws especially criminal law. For example, before the Criminal Law (Amendment) Act, 2013, ‘acid- attacks’ were dealt with under Section 320 of the Indian Penal Code, 1860. Now, it is dealt under section 326-A which says that the offender shall be imprisoned not less than 10 years and it may extend up to life imprisonment and shall be liable to pay the fine to meet medical expenses of the victim may be imposed.

In 2005 the criminal procedure code was amended which widened the scope of the scientific examination. Previously, under section 53 the accused person may undergo medical examination only if there is a reasonable ground to believe that these examinations may serve as evidence. After the 2005 amendment, the scope of forensic or medical examination is extended to the extent of examining blood, blood stains, semen, and DNA profiling in the case of sexual offenses. However, the provision is limited only to rape cases yet these amendments have developed and extended the scope of forensic science and proved that the forensic investigation has a greater value. [43]

In the view of DNA profiling, the Indian judicial system has extended the ambit, under a criminal procedure which explicitly states that medical examination is done to the female victim who alleged for rape also includes DNA profiling. [44]

The Orissa High Court accepted the legality of granting a DNA test in criminal cases to ascertain the involvement of persons accused. If the accused refuse to cooperate then it would result in an adverse inference drawn against the accused. [45]

The court has also laid down certain conditions for conducting DNA profiling, they are:

- (a) The intensity of the crime.
- (b) The circumstance under which the crime is committed.
- (c) The physical and mental condition of the accused.
- (d) The respective officials must also figure out whether is there any other alternative ways can be used in the method of finding out the truth.
- (e) The reason, if any for which the accused is refusing to give consent for such procedures.

These conditions are too fulfilled for the court to grant permission to conduct such medical examinations.

## **8. RESTRICTIVE USE OF FORENSIC EVIDENCE**

The most important function of forensic investigation is to prove the accused is either guilty or innocent. However; the courts had relied heavily upon the non-scientific evidence due to the lack of facilities. In the study which is conducted in 2011 shows that only the 47 cases in Supreme Court and High Courts in which the DNA has played an important role. Out of these 47 cases, 23.4% decisions are decided by Delhi High Court alone. Only 4.7% and 2.3% rape and murder cases recognize DNA evidence.

The area of forensic science in India has, yet, not been amalgamated. Many a time, neither the judge nor the lawyer nor even the police appreciated the advances or the intensive, promising potentialities of the science and the fusion of latest technologies, methodologies, modalities, and research. Multitask and multi-professional nature of forensic science want an inter-professional approach, which is, many a time, lacking. [46]

The Committee on Reforms of Criminal Justice System also indicated that the current level of application of forensic science in crime investigation is somewhat low within the country, with only 5-6% of criminal cases are referred to the FSLs and Finger Print Bureau put together. [47]

The reasons for restrictive use or reluctant use of forensic are numerous such as,

- (a) Lack of technological development
- (b) Misuse of physical evidence
- (c) Poor maintenance of a chain of custody
- (d) Delayed dispatch of physical evidence to the court
- (e) Sometimes, failing to give details of the said evidence.

Hence, it is clear that the applicability of forensic in India is restricted compared to other countries. This scenario must be changed in order to solve the pending cases. Though there are laws relating to forensic and also there are other laws which are enacted in India to bring out the importance of forensic, still its usage is low.

## **9. JUDICIAL APPROACH**

Previously, criminal law considered only the opinion of medical experts with respect to certain cases. The reason behind that is the lack of knowledge in the field of forensics. At present, the forensic has been developed to an extent. There are certain cases where the forensic has played a major role such as rape cases.

Tandoor Murder Case (1995) Delhi this was the first criminal case in India solved by the help of forensics. In this case, Shushil Sharma (husband) killed his wife by firing three bullets. He murdered her thinking that she has an illicit relationship with her classmate and fellow congress worker named Matloob Karim. After murdering his wife Mr. Sharma took her body to the Bagiya restaurant and burned the body along with the help of the restaurant manager Keshav Kumar. Police found the revolver and blood-stained clothes which was sent to Lodhi Road forensic laboratory. They also took a DNA blood test of the deceased wife's parents to ascertain that the blood stains the cloth belongs to the deceased. As per the lab report, "Blood sample preserved by the doctor while conducting the post mortem and the blood stains belong deceased Naina (wife). yet it is was confirmed the death of Naina. The DNA report said that "The tests prove beyond any reasonable doubt that the charred body is that of Naina Sahni and finally the court held Mr. Shushil Sharma was guilty. [48]

In one of the case, The Supreme Court observed that "Crime scene should be scientifically dealt without any error. In criminal cases, which are specifically based on circumstantial evidence are the case where the forensic science plays a crucial role because it assists in establishing the evidence of a crime, finding the suspect, gives a reasonable certainty of the guilt or innocence of the accused".[49]

In a few other cases, the courts have treated medical evidence as an important piece of evidence. DNA is one of the important tests which are conducted to ascertain the paternity which is in question. The court has the power to direct parties for a DNA test to decide the paternity.

The Supreme Court in Goutam Kundu vs. State of West Bengal has given certain guidelines governing the power of courts to order blood tests.

- (a) Indian courts cannot order a blood test a matter of course;
- (b) Without proper inquiry, the courts cannot grant an order for such tests.

- (c) There must be a strong prima facie case in that the husband must establish non access in order to dispel the presumption arising under section 112 of the Evidence Act.
- (d) The court must carefully examine the consequence of granting permission for the blood test.
- (e) No person can be compelled to give a sample of blood for analysis.[50]

The judiciary is still in the process of figuring out the appropriate approach in the view of the implementation of forensic science. There are still more cases which are to be resolved and to bring out the significance of forensic examination.

## 10. CONCLUSION

In the Indian scenario, there has been inflated emphasis on the employment of such technologies in criminal investigation and trials. The Commissions appointed on reforms of criminal justice have reiterated that the infusion of technology in crime detection will facilitate the system to operate efficiently. The relevant laws are amended from time to time to create a method to be used of forensic technologies in crime investigation and trial. Yet, it may be the same that there are existent flaws within the laws which require to be addressed. The courts also are reluctant to depend upon scientific evidence because of their restrictive approach in the evidence as made in courts that deter them from hopping on it entirely. The main expression of the criminal justice system is to supply honest justice. Without a doubt, forensic proof is a lot of authentic than ocular proof. Forensic science being scientific proof may be a boon for the criminal justice system. We've got to beat the prevailing flaws to step forward

I would also suggest that medical experts should be encouraged to get into the field of medico-legal work as they play a vital role in the administration of justice. Recently forensic science has also gained equal importance like medico-legal. The concerned law and the state should make necessary provisions for the development of the field so that the efficiency and evidential value would be raised and it could also solve the cases as quickly as possible.

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