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WHITE BLACK LEGAL is an open access, peer-reviewed and refereed journal provided dedicated to express views on topical legal issues, thereby generating a cross current of ideas on emerging matters. This platform shall also ignite the initiative and desire of young law students to contribute in the field of law. The erudite response of legal luminaries shall be solicited to enable readers to explore challenges that lie before law makers, lawyers and the society at large, in the event of the ever changing social, economic and technological scenario.

With this thought, we hereby present to you

# **FORENSIC SCIENCE – THE SCIENCE** **INTERTWINED WITH LAW**

**AUTHORED BY - NAVDEEP KAUR**

## **Introduction:**

Forensic science plays a pivotal role in the criminal justice system of India, serving as a crucial tool in unraveling mysteries, establishing facts, and delivering justice. With advancements in technology and methodologies, forensic science has evolved into a multifaceted discipline, offering diverse techniques for collecting, analyzing, and interpreting evidence. In India, the application of forensic science in criminal investigations has witnessed significant growth, aiding law enforcement agencies in solving complex cases and ensuring fair trials. This essay explores the indispensable role of forensic science in criminal investigations in India and examining its impact on the judicial process.

## **Meaning**

The term **forensic** is derived from latin word ‘**forensis**’ which means related to the court of law or of or before the forum<sup>1</sup>. According to **black’s law dictionary** ‘forensic’ means belonging to courts of justice<sup>2</sup>. Hence, forensic science is broadly defined as a scientific discipline which helps the criminal justice system by analysing the crime articles in identification, individualization and evaluation of physical clue materials using principles of all material sciences<sup>3</sup>. More specifically, it answers the questions that are of legal interest and employs techniques and tools to interpret crime scene evidence and use that information in investigations<sup>4</sup>. The term ‘forensic,’ symbolizing a link to the legal sphere, accentuates that forensic science administers scientific tenets to matters of law<sup>5</sup>.

## **Role of forensic science in crime investigation:**

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<sup>1</sup>MERRIAM WEBSTER, <https://www.merriam-webster.com/dictionary/forensic> (last visited Mar. 19, 2024).

<sup>2</sup> THE LAW DICTIONARY, <https://thelawdictionary.org/forensic/> (last visited Apr. 9, 2024).

<sup>3</sup> Sarita jand

<sup>4</sup>Nida Parveen , *Role of Forensic Science in a criminal Investigation*, INDIAN LAW PORTAL ( Mar. 29, 2024, 9:24PM), <https://indianlawportal.co.in/role-of-forensic-science-in-a-criminal-investigation/> .

<sup>5</sup>*Role of forensic science in crime investigation*, LLOYD INSTITUTE OF FORENSIC SCIENCE (Mar. 23, 2024, 10:10 PM), <https://lifs.co.in/blog/role-of-forensic-in-crime-investigation.html>.

Forensic science has developed various fields, including toxicology, pathology, DNA analysis, autopsy, and fingerprint analysis. Together, these domains aid in determining the cause of death and establishing any possible linkages between the accused, victims and crime scene.

- **Gathering and Preserving the evidence** -The gathering and preservation of evidence necessitates the careful application of established procedures. Experts in forensics make sure that evidence is treated with extreme care to prevent tampering, deterioration, or misuse<sup>6</sup>. Every piece of evidence is verified through documentation to ensure its authenticity and suitability for use as evidence in court. The trial involving continuous evidence is carefully contested in order to direct the flow of evidence from the crime scene to the lab or research center and ultimately to the courtroom. The efficient gathering and preservation of evidence in forensic science plays a critical role in bolstering the dependability and integrity of the criminal justice system. These measures help ensure that evidence is accurately examined and presented during judicial proceedings.
- **Forensic Lab Analysis** -Following the collection of evidences, a thorough laboratory analysis takes place. A number of forensic scientific specialties, including toxicology, ballistics, DNA analysis, and digital forensics, begin to play a role. Experts use scientific tools and methods to closely inspect the evidence<sup>7</sup>. For example, DNA profiling has the capacity to establish links between suspects, victims, or crime scenes, whereas toxicological analysis detects the presence of drugs or toxins within the body.
- **Cyber Forensics** -The field of digital marks has taken center stage in today's criminal investigations, and forensic science continues to be a crucial component in unraveling the intricate web of digital evidence. Using cutting-edge methods and technologies to extract, evaluate, and analyze the electronic evidence left behind by criminals, forensic specialists effectively monitor this digital sector as criminal operations leave more and more electronic footprints. The combination of technological advancements and investigative methods has

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<sup>6</sup> *Collecting Evidence*, RELENTLESS DEFENSE ( Mar. 29, 2024,10:55PM),

<https://www.relentlessdefense.com/forensics/preserving-collecting-evidence/> .

<sup>7</sup>Dr. Swikar Lama, *Police Science and Law Enforcement* (Apr. 3, 2024, 9:29 PM)

[https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp\\_content/S001608/P001746/M022163/ET/1504500890et.pdf&ved=2ahUKEwiBk6nCzLKFAxV6V2wGHXGECzsQFnoECCoQAQ&usg=AOvVaw3mrPtT8EckjIrEI7c5emM0](https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S001608/P001746/M022163/ET/1504500890et.pdf&ved=2ahUKEwiBk6nCzLKFAxV6V2wGHXGECzsQFnoECCoQAQ&usg=AOvVaw3mrPtT8EckjIrEI7c5emM0) .



made forensic science an essential instrument for obtaining digital evidence and illuminating modern-day crimes.

- **Reconstruction of crime scene** –Experts in forensics reconstruct the sequence of events leading up to an offense by merging evidence, research, and scientific principles. This technique makes it feasible for law enforcement to comprehend how crimes are committed, the responsibilities of those involved, and their potential goals. The process of creating a coherent story for the legal arena is made easier for scholars and legal professionals by crime scene reconstruction.
- **Helping court in administering justice** -The declaration of expert witnesses retain a crucial place in the intricate workings of the legal system. These people are essential in helping magistrates and committees understand difficult scientific concepts and evidence because of their extensive training and deep understanding. The combination of scientific expertise and legal transactions enables expert witnesses to provide fair and knowledgeable opinions, bridging the knowledge gap between intricate forensic investigations and the comprehension of individuals tasked with making decisions.

### **Admissibility of Forensic Evidence** <sup>8</sup>

Forensic evidence in India must satisfy four primary aspects to be admissible:

**Relevance**: The evidence must be pertinent to the case at hand, providing a direct or indirect connection to an event or individual involved in the crime.

**Legality**: The evidence must be collected and presented in compliance with legal procedures and rights, including search and seizure laws and the right against self-incrimination. [The SC in **Ranjit Singh Brahmajeet Singh Sharma v. State of Maharashtra**<sup>9</sup>, it was held that admissibility of result of a scientific test will depend upon its authenticity. Whether the brain mapping test is so developed a science that the report should have probative value for enabling the court to rely upon it required consideration.]

**Reliability**: The scientific validity of the methods used to collect and analyze the evidence must be

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<sup>8</sup> *The Role and Admissibility of Forensic Evidence in the Indian Criminal Justice System*, CENTURY LAW FIRM (Apr. 4, 2024, 10:23PM) <https://www.centurylawfirm.in/blog/the-role-and-admissibility-of-forensic-evidence-in-the-indian-criminal-justice-system/>.

<sup>9</sup> *Ranjit Singh Brahmajeet Singh Sharma v. State of Maharashtra*, AIR 2005 SC 2277.

established, often requiring validation by the scientific community.

**Credibility**: The persons presenting the evidence, typically forensic experts, must be credible, with the requisite qualifications and absence of bias.

### **Varied Disciplines of Forensic Science**

1. **Forensic Toxicology** -Toxicology is the study of poisons, toxins, and the harmful effects of chemicals on living organisms. Experts in this field, known as toxicologists, use advanced methods to detect and identify substances, especially when evaluating the cause of an illness, injury, or even death<sup>10</sup>. Examples of poisonings include carbon monoxide, venomous snake or insect bites, and substances like opioids and alcohol.
2. **Forensic Pathology**-Pathology is the branch of medicine that involves the laboratory examination of samples of body tissues for diagnostic or forensic purposes<sup>11</sup>. A forensic pathologist can easily investigate into unexpected and suspicious deaths by medical examination of the body after death.
3. **Forensic Odontology**- When unidentified bodies come to light, Odontology helps in positive identification. All mouths are different and the trained eye of the forensic odontologist will be able to offer a considerable amount of useful information. Most obvious will be to provide an accurate charting of the teeth and fillings present to compare with dental records of missing persons.<sup>12</sup>
4. **Forensic anthropology** – When human remains or a suspected burial are found, forensic anthropologists are called upon to gather information from the bones and their recovery context to determine who died, how they died, and how long ago they died. Forensic anthropologists specialize in analyzing hard tissues such as bones<sup>13</sup>.

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<sup>10</sup> *Role of Toxicology in the Forensic Investigation of Drugs and Poison*, TMU BLOG (Apr. 4, 2024, 10:35PM) <https://www.tmu.ac.in/blog/role-of-toxicology-in-the-forensic-investigations-of-drugs-and-poison> .

<sup>11</sup>CLEVELAND CLINIC, <https://my.clevelandclinic.org/health/articles/24614-forensic-pathologist> (last visited Apr. 5, 2024).

<sup>12</sup> MAX H. HOUCK ET. AL., *THE SCIENCE OF CRIME SCENES*, 423-433 (2nd ed. 2018).

<sup>13</sup>NATURAL MUSEUM OF NATURAL HISTORY,

<https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://naturalhistory.si.edu/education/teac>

5. **Ballistics** – Any bullets left at the scene of a crime are collected by investigators and analyzed by forensic ballistics experts. These analysts examine “rifling” in the spent bullet, which can help identify the firearm—or at least the type of firearm—used in the commission of the crime.<sup>14</sup>
6. **Cyber Forensic-** Digital forensics is a branch of forensic science focusing on digital assets and evidence. Digital forensics requires gathering evidence, preserving and analyzing data, investigating cyber attacks, and identifying the perpetrators in cyber crime cases. By unveiling the hidden digital trails, cyber forensic help in solving crimes from fraud to terrorism.<sup>15</sup>

### How Forensic evidence helped in crime investigation

Following series of cases are few examples that shows how cold cases have been solved through forensic science.

- a. **Vishal Yadav v. State of U.P. (Nitish Katara murder case)(2014 SCC OnLine Del. 1373)**<sup>16</sup>

The identification of victim was difficult due to the availability of only a small bit of one un-burnt palm with fingers. DNA profiling assisted in identifying the body remains by matching DNA profiles with the deceased’s parents, allowing the High Court of Delhi to affirm the accused’s conviction.

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<https://www.google.com/search?q=forensic+anthropology&rlz=1C1GCEwim9uW81LKFAxWpe2wGHeTPCjoQFnoECCIOAQ&usq=AOvVaw2xAhE6CO-RzJmVHwsZ4DvZ> (last visited Apr. 6,2024).

<sup>14</sup>MARYLAND CRIMINAL LAW GROUP,

<https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://mdcriminalattorney.net/ballisticevidence/&ved=2ahUKEwj68JG107KFAxV2TWcHHek-DIEQFnoECA4QBQ&usg=AOvVaw3M45wIn3VY2a51bKdoZKq> (last visited Apr. 6, 2024).

<sup>15</sup>SALVATION DATA,

<https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.salvationdata.com/knowledge/cyber-forensics/&ved=2ahUKEwim9uW81LKFAxWpe2wGHeTPCjoQFnoECCIOAQ&usg=AOvVaw2xAhE6CO-RzJmVHwsZ4DvZ> (last visited Apr. 7, 2024).

<sup>16</sup> Preeti Pallavi Jena, *Admissibility of forensic evidence*, BLOG.IPLEADERS (Apr. 7, 2024, 10:50PM)

<https://blog.ipleaders.in/admissibility-forensic-evidence/> .

b. **State v. Sushil Sharma (Tandoor murder case) (2007 CriLJ 4008)**

This was the first criminal case in India to be solved using forensics. In this case, Sushil Sharma murdered his wife Naina Sahni at home by firing three gunshots into her body. He murdered his wife, believing she was having an affair with Matloob Karim, a classmate, and fellow congressman. Sharma drove his wife's body to the Bagia restaurant after murdering her, where he and restaurant manager Keshav Kumar attempted to burn her in a tandoor. Sharma's revolver and blood-stained clothes were confiscated by police and sent to the Lodhi Road forensic laboratory. They also extracted a blood sample from Harbhajan Singh and Jaswant Kaur, Sahni's parents, and sent it to Hyderabad for a DNA test.

"Blood samples preserved by the doctor while conducting the post-mortem and blood stains on two leads taken from the head and neck of deceased Naina's body are of the 'B' blood group," according to the lab report. "The findings prove beyond any reasonable doubt that the burned body is that of Naina Sahni, who is the biological offspring of Mr. Harbhajan Singh and Jaswant Kaur," the DNA report concluded, confirming that the body was that of Sahni. Finally, with the use of forensic evidence, Mr. Sushil Sharma was found guilty<sup>17</sup>

c. **Sr. Sephy v. UOI( Sister Abhaya murder case)(2009)**

Sister Abhaya, a Roman Catholic Nun was found dead in a well in her hostel compound in Kottayam. In this case, the methods such as polygraph tests, brain mapping, and narco-analysis were used to solve the case. Based on this two fathers of the Church were arrested.

d. **Nupur Talwar v. State of UP(Aarushi Talwar murder case)(2017)<sup>18</sup>**

Aarushi Talwar, a 14-year girl from Noida was found dead in her house. The domestic

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<sup>17</sup> Nihaarika Sangwan,, *Forensic Law and Jurisprudence*, BLOG.IPLEARDES (Apr. 8, 2024, 11:00PM) <https://blog.ipleaders.in/forensic-law-jurisprudence/> .

<sup>18</sup> Chintan Jain, *Development of forensic science in India : A critical study vis-à-vis laws of India*, LATESTLAWS.COM (Apr. 8,2024, 11:15PM)[https://www.latestlaws.com/articles/development-of-forensic-science-in-india-a-critical-study-vis-vis-laws-of-india-194871#\\_ftnref37](https://www.latestlaws.com/articles/development-of-forensic-science-in-india-a-critical-study-vis-vis-laws-of-india-194871#_ftnref37)

help in her house Mr. Hemraj was also found dead on the terrace of the house. Forensic experts collected blood samples and fingerprints from the crime scene. Narco tests were also conducted on suspects including her father to test the angle of honour killing. After several probes into the matter, the trial court convicted the parent of Aarushi. But Allahabad High Court acquitted them in 2017.

### Legal provisions

- **Section 45 of Indian Evidence Act( S. 39 of Bhartiya Sakshar Adhiniyam):** when the court has to form an opinion on a point of foreign law or of science or art or as to identity of handwriting, finger impressions the opinions upon that point of persons specially skilled in such foreign Law, science or art or in questions as to identity of handwriting or finger impressions are relevant facts.
- **Section 112 of Indian Evidence Act (S.116 If Bhartiya Sakshar Adhiniyam):** Birth during marriage conclusive proof of legitimacy  
**Nandal wasudeo Badwaik v. Lata Nandala Badwaik** <sup>19</sup>, Section 112 of Evidence Act was enacted at the time where modern scientific advancement and DNA test were not even in contemplation of the legislature. The result of DNA test is said to be scientifically accurate. All the section 112 raises a presumption of conclusive proof on satisfaction of the conditions mentioned their in but the same is rebuttable. The presumption may afford legitimate means of arriving at an affirmative legal conclusion. While the truth or fact is known that is no need or room for any presumption whether is evidence to the contrary the presumption is reversible and must yield to proof. When there is a conflict between conclusive proof and his age under law and prove paste on scientific advancement accepted by the world community to be correct the letter must prevail over the former.
- **Article 20(3) of Constitution:**No person accused of an offence shall be compelled to be a witness against himself.

A lot of debate is done when it comes to fingerprints DNA profiling and narco analysis test that it

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<sup>19</sup> Nandala wasudeo Badwaik v. Lata Nandala Badwaik, AIR 2014 SC 932.

violate Art. 20(3). The Supreme Court in the case of the **State of Bombay v. Kathi Kalu Oghad and Anr**<sup>20</sup> held that compelling any person to give any sort of forensic evidence like fingerprints, blood, hair semen, does not violate the provision of Art. 20(3) but in *Selvi v. State of Karnataka*<sup>21</sup>, the apex court rejected High Court's reliance on the utility, reliability and validity of narco analysis test and other such tests as methods of criminal investigation. The Court found that it is a requisite compulsion to force an individual to undergo narco-analysis test, polygraph tests and brain-mapping. The answers given during these tests are not consciously and voluntarily given, so the individual is unable to decide whether or not to answer a question, hence it amounts to testimonial compulsion and attracts protection under Article 20(3). The Court stated that narco-analysis test is a cruel and inhuman treatment which violated the right to privacy of an individual. That courts cannot permit administration of narco-analysis test against the will of the individual except in cases where it is necessary under public interest. In **Santokben Sharmanbhai Jadeja v. State of Gujarat**<sup>22</sup>, the Court while upholding the order for conducting a Narco Analysis on the accused Santokben Sharmanbhai Jadeja, observed that "when after exhausting all the possible alternatives to find out the truth and nab the criminal/accused and when it is found by the prosecuting agency that there is no further headway in the investigation and they are absolutely in dark, there is a necessity of such a test. On the basis of revelations and/or the statement recorded while conducting/performing the Narco Analysis Test, prosecuting agency may have some clues which would further help and/or assist the Investigating Agency to further investigate the crime and at this stage, there will not be any bar of Article 20(3) of the Constitution of India and merely conducting/performing of a Narco Analysis Test on the accused, the protection guaranteed under Article 20(3) of the Constitution of India is not violated. As stated above, only and only at the stage when the prosecuting agency is likely to use such statement as evidence and if it is inculcating and incriminating the person making it, it will attract the bar of Article 20(3)."

In another case of **State of U.P. v. Sunil**<sup>23</sup>(2017) it was held that any person can be directed to give his finger prints or foot-prints for corroboration of evidence but the same cannot be considered as violation of the protection guaranteed under Article 20(3) of the Constitution of India. The Court however, added that non-compliance of such direction of the Court may lead to adverse inference,

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<sup>20</sup> State of Bombay v. Kathi Kalu Oghad and Anr., AIR 1961 SC 1808.

<sup>21</sup> Santokhben Sharmanbhai Jadeja v. State of Gujarat, AIR 2010 SC 1572.

<sup>22</sup> [https://www.legalserviceindia.com/article/1375-Article-20-\(3\)-Of-Constitution-of-India-And-Narco-Analysis.html](https://www.legalserviceindia.com/article/1375-Article-20-(3)-Of-Constitution-of-India-And-Narco-Analysis.html) (last visited Apr.7,2024).

<sup>23</sup> <https://www.google.com/amp/s/www.scconline.com/blog/post/2017/05/03/conviction-cannot-be-solely-based-on-the-non-compliance-of-the-order-to-give-fingerprintsfootprints/amp/> (last visited Apr.8,2024).

nevertheless, the same cannot be entertained as the sole basis of conviction.

- **Section 293 of CRPC,1973 (S. 329 of Bhartiya Nagrik Suraksha Sanhita):** Report of certain government scientific experts

### **Recent Trends**

In the first case of **Virendra Khanna v. State of Karnataka**, the Karnataka High Court<sup>24</sup> decided that compelling the accused to disclose the passcode or biometrics would not violate the rule against self-incrimination because mere disclosure of password, passcode, or biometric alone is not incriminating and is relevant to searches as permitted by Section 93 of the Criminal Procedure Code (CrPC)<sup>3</sup>, which allows the ordering for a search of a “place” or a specified area.

In the other case **CBI v. Mahesh Kumar Sharma**<sup>25</sup> (2022 SCC Online Del. Dis crt.48), the Delhi CBI Special Court disallowed an application seeking direction to the accused person for disclosure of the passcode as it directly affects the right against self-incrimination. However, it held that unlocking of the phone through fingerprint/facial recognition will not violate Article 20(3) of the Constitution.

### **Conclusion**

Hence it is proven that Forensic science and criminal investigation are interwoven with each other. Both cannot move without each other. Section 176 of Bhartiya Nagrik Suraksha sanhita which provides for joining forensic experts during during criminal investigation of heinous crimes . This further clarifies how important has been the developments in forensic science for investigation of crime.

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<sup>24</sup> <http://www.sconline.com/DocumentLink/1ZEFFTef> (last visited Apr. 9,2024).

<sup>25</sup> <https://www.sconline.com/blog/post/2023/03/18/right-of-self-incrimination-in-digital-age-whether-compelled-disclosure-of-password-biometrics-is-unconstitutional/> (last visited Apr.10,2024).