



ASSESSING THE FRAGILE NATURE OF FORENSIC EVIDENCE: AN ANALYSIS OF EXPERT TESTIMONY, ADMISSIBILITY STANDARDS AND JUDICIAL DISCRETION IN INDIAN COURTS

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ABSTRACT

It deals with the evolving landscape of Forensic jurisprudence in India, primarily focusing on the transition from the Indian Evidence Act to the Bharatiya Sakshya Adhiniyam 2023. While forensic science is vital for protecting legal integrity and establishing objective facts, its credibility, reliability, and relevance are often challenged by procedural technicalities due to the absence of a codified procedural framework. The study analyses the expanded scope of expert evidence under the ambit of Section 39 of Bharatiya Sakshya Adhiniyam, the scope under the digital forensic world. Focused on the evidentiary value of expert opinion, such as a gate-keeping test that balances scientific certainty against the “fragile nature” of evidence. Sections 41, 42, 43 of the BSA facilitate “communal law” and communal intervention by giving evidence by validating personal acquaintance in handwriting, communal memory in customs and specified knowledge. It emphasises the definition of experts qualified not only from specified scientific skills but also grounded in social interaction and experience. The exploration of the evolution of the Indian judiciary in scientific evidence, highlighting the absence of codified admissibility standards, forces judges to depend heavily on subjective discretion. The lack of structure creates major vulnerabilities in the judicial system through this gap, such as cognitive biases like the “CSI effect” and “reliability-binding paradox”, while emphasising the necessary need for judicial training and statutes to ensure fair and consistent trials.

Keywords: Testimony, Witness, Conclusive, Corroborative, Judicial Appreciation.

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INTRODUCTION

Forensic science is vital for exonerating the innocent and convicting the offender. It creates a bridge between the laboratory and courtrooms to convert the physical evidence into objective facts. The objective facts convert into objective truth that helps to protect the integrity of the legal system. The verified evidence is most accurate as it passes through standardised protocols as well as a peer-review process, unlike “junk science” or anecdotal evidence. Bharatiya Sakshya Adhiniyam¹ came into force on 1st July 2024. It deals with new comprehensive guidelines consistent with new technologies, procedures, and techniques, while the former statute, the Indian Evidence Act², was based on the laws of the British colonial period. The need for a uniform, comprehensive law of evidence required for upholding the principles of justice and integrity is now fulfilled with the implementation of The Bharatiya Sakshya Adhiniyam, 2023³. Forensic evidence holds huge importance in judicial proceedings by establishing facts, corroborating evidence, proving guilt and innocent, as the case may be. A blend of law and science helps the third-highest independent pillar, i.e., the judiciary, which helps in the integrity of the country.

Forensic Science is the application of scientific methods and processes that solve crime and resolve legal issues. Forensic science is categorised into Criminalistics, Forensic biology/DNA, Forensic toxicology, Digital forensics, Forensic pathology, and Forensic odontology. The forensic science chapter deals with the process, which includes collection, analysis, interpretation, reporting, and testimony. Forensic science is the analysis of physical evidence such as footprints, trace marks, blood stains, arms and ammunition, biological genetic evidence of the victim or the suspect, presence of drugs, alcohol, recovery of any electronic devices, the death of the victim's body, to know about the cause of death and dental records to identify human remains or birth marks. Forensic science is multi-disciplinary, utilising the different branches of science in legal investigations to solve crimes, directing the investigation to the truth, identifying the criminals and assisting a just system of justice. A blend of science and law may be challenged by creating delays, problems with preservation and conservation, so that the blend, if it includes modern technologies, makes the outcome faster, smoother, more accurate, reliable and credible. The current scientific knowledge is continuously evolving and is under a state of constant evaluation. Expert opinion is valid in court, but the other party may

¹ Bharatiya Sakshya Adhiniyam 2023

² Indian Evidence Act 1872

³ Bharatiya Sakshya Adhiniyam 2023

ask about the qualification and bona fide intention of not tampering with the evidence to the Expert witness. In support of this, Indian statutory provisions may not have any explicit guidelines. Forensic science is considered paramount in the delivery of justice. The government institute of forensic science is increasing day by day, and currently, there are seven central forensic science laboratories and multiple state and regional labs. In the case of *Nandlal Wasudeo Badwaik v Lata Nandlal Badwaik*⁴, the Hon'ble Supreme Court stated that when there is a conflict between conclusive proof envisaged under law and proof based on scientific advancement, the latter will prevail. Scientific advancement, along with accuracy, becomes the priority for the judicial sphere. These are relied upon as an exception while interpreting section 112 of the Indian Evidence Act⁵.

But Forensic Science cannot override fundamental rights. In the case of *Santosh Kumar Singh v State through CBI [Priyadarshini Mattoo Case]*⁶, the trial court had rejected the DNA report due to a mere doubt of tampering with the evidence. The High Court and Supreme Court overturned the judgment and held that judges should not use minor procedural technicalities to throw out solid scientific evidence. Allegations of tampering with forensic science results must be accepted only with solid proof; otherwise, the reports ought to be sustained. In *State v Sushil Sharma*⁷, popularly known as the "Tandoor Murder Case", the court held that even if the accused tries to destroy forensic evidence, forensic science can still reconstruct the truth. It was also held that forensic science is the combination of pathology, biological genetics, ballistic. The Hon'ble Supreme Court held that scientific facts are more reliable than human testimony. From the above-stated judgments, the dependency of courts in the forensic science sphere is far more than human testimony and the absence of physical evidence. It can convert a reasonable doubt into certainty and helps while dealing with a case.

EXPERT EVIDENCE UNDER BHARATIYA SAKSHYA ADHINIYAM 2023

Section 39(1) of Bharatiya Sakshya Adhiniyam:⁸ Sec 39(1) of Bharatiya Sakshya Adhiniyam⁹ doesn't explicitly define expert; rather, it provides that the expert must possess the specified skills, qualifications, and knowledge in that particular ground of the case to extract

⁴ *Nandlal Wasudeo Badwaik v Lata Nandlal Badwaik* (2014) 2 SCC 576.

⁵ Indian Evidence Act 1872, s112

⁶ *Santosh Kumar Sinng v State through CBI* (2010) 9 SCC 747

⁷ *State v Sushil Sharma* (2007) Cri LJ 4008

⁸ Bharatiya Sakshya Adhiniyam 2023, s 39(1)

⁹ Ibid.

the relevant facts. Its expert testimony should rely on specified skill in such foreign law, science or art, or any other field or in question as to identify handwriting or fingerprint impression.

Section 45 of the Indian Evidence Act¹⁰, which is now replaced with Section 39(1) of BSA,¹¹ was narrowly restricted to foreign law, science, art, handwriting, and fingerprint impression detection. But Section 39(1) of BSA broadly expanded to include “any other field”.

Expanding the Expert Horizon: In the case of the *Sunanda Pushkar* case¹², the experts analysed the deceased's social media, personal diaries and interviewed friends to reconstruct her mental state. The court noted that such reports are corroborative pieces of evidence. By adding “any other field”, the BSA removes the hurdle of proving that psychology is a “science” or “art”. A psychological autopsy expert now fits perfectly into this expanded category. Section 2(1)(f) of the BSA¹³, the definition of “fact” in the BSA, explicitly includes “any mental condition of which any person is conscious”. This provides the statutory backing to say that the “state of mind” is a fact that can be proved by an expert, and thus, psychological autopsy is included under “any other field”. Courts view canine evidence with profound scepticism as it cannot be treated as substantive evidence. The inherent fallibility of the animal, the inability to cross-examine the dog and the reliance on the handler’s interpretation make it highly subjective. The Hon’ble Supreme Court in the case *Abdul Rajak Murtaza Dafadar v State of Maharashtra*¹⁴ declined to establish a conclusive rule validating tracker dog evidence, highlighting that the inherent pitfalls of relying on animal instincts cannot be empirically verified in a courtroom. Also, in *Dinesh Borthakur v State of Assam*¹⁵, the Supreme Court held that the evidentiary value of a tracker dog is of a “fragile nature” and it cannot be a sole criterion for a conviction, and therefore it holds virtually zero substantive weight without independent corroboration.

While getting into the Narco-Analysis, Brain Mapping (BEAP), and Polygraphs, these are fundamentally questionable as it violates Article 20(3) of the Indian Constitution,¹⁶ i.e., the right against self-incrimination and Article 21 of the Indian Constitution¹⁷, i.e. the right to life and

¹⁰ Indian Evidence Act 1872, s 45

¹¹ Bharatiya Sakshya Adhiniyam 2023, s 39(1)

¹² *State v Shashi Tharoor* (Rouse Avenue District Court, 18 August 2021) SC No 05/2019

¹³ Bharatiya Sakshya Adhiniyam 2023, s 2(1)(f)

¹⁴ *Abdul Rajak Murtaza Dafadar v State of Maharashtra* AIR 1970 SC 283

¹⁵ *Dinesh Borthakur v State of Assam* (2008) 5 SCC 697

¹⁶ Constitution of India, art 20(3)

¹⁷ Constitution of India, art 21

personal liberty, of the Constitution as held in the case of *Selvi v State of Karnataka*¹⁸. Even when administered voluntarily the results are not conclusive proof of guilt or innocence and are not admissible as substantive evidence of guilt. They are heavily criticised for higher rates and subjective interpretation of psychological responses.

The bite mark analysis, or forensic odontology, is increasingly discredited globally, while the Indian courts had administered it under strict conditions in the landmark case of *Mukesh & Anr. v State for NCT of Delhi (The Nirbhaya Case)*¹⁹. The Supreme Court administered a forensic odontology report, which conducted a computer-based 2D analysis that successfully matched the dental models of the accused's bite mark on the victim.

Section 39(2) of BSA:²⁰ Section 39(2) of BSA²¹ states that any matter relating to any information transmitted or stored in any computer resource or any other electronic or digital form, the opinion of the Examiner of Electronic Evidence referred to in Section 79A of the Information Technology Act 2000,²² is a relevant fact.

Link between Sections 39(2) of BSA and 79A of IT Act 2000: Section 79A of the IT Act, 2000²³ gives the Central government powers to notify specific departments as an official “examiner of electronic devices”. By explicitly incorporating the above into Section 39(2) of the BSA, the legislature has created a “Tier-1” expert. While the other experts must pass a rigorous gatekeeper test to prove their skill, such an examiner enters court with a pre-certified status, shifting the burden of proof onto the opposing party to prove the report is wrong. It is not admissible or binding but advisory and corroborative rather than conclusive. Section 39(2) of the BSA²⁴ states that the opinion of the Examiner of Electronic Evidence is a relevant fact. Being a relevant fact, the court may consider it. It depicts complete discretion of the court. The law does not categorise the relevant fact as conclusive. Such opinions are often found to be binding due to Section 329 of Bharatiya Nagarik Suraksha Sanhita 2023²⁵ (Evidentiary Value), which allows reports from specific government scientific experts (including notified electronic examiners) to be used as evidence without calling the expert to testify in person. While Section

¹⁸ *Selvi v State of Karnataka* (2010) 7 SCC 263

¹⁹ *Mukesh v State for NCT of Delhi* (2017) 6 SCC 1

²⁰ Bharatiya Sakshya Adhiniyam 2023, s 39(2)

²¹ Ibid.

²² Information Technology Act 2000, s 79A

²³ Ibid.

²⁴ Bharatiya Sakshya Adhiniyam 2023, s 39(2)

²⁵ Bharatiya Nagarik Suraksha Sanhita 2023, s 329

39(2) of the BSA²⁶ is not de jure binding, it is de facto binding in most cases. Because it comes from a notified government examiner, the burden of proof shifts heavily to the person challenging it. It is the most powerful form of opinion evidence in the BSA. If the expert's report is illogical, based on flawed data, or contradicted by other strong evidence, the judge can reject it. The key difference between Sections 39(1) and 39(2) of the BSA is that Section 39(1) allows both private and government institutions and experts, but Section 39(2) is confined to government-verified lab reports and their companion government reports.²⁷ But gatekeeping is valid for both sections. As the former includes “any other field”, it allows an open field, so strict rules can be applied to take into consideration the opinion of relevant facts. The Hon’ble Supreme Court in *State of Himachal Pradesh v Jai Lal*²⁸ established the principles that remain the constitutional safeguard for Sections 39(1) and 39(2) of the BSA 2023.²⁹ It held that an expert is not a witness of fact, but his evidence is really of an advisory character. It also held the duty of an expert to furnish the judge with necessary scientific criteria for testing the accuracy of the conclusions, to enable the judge to form an independent judgment by application of these criteria to the facts.

Section 63(4) of the BSA acts as an Evidentiary Value:³⁰ Section 63 of the BSA is a procedural gatekeeper. Section 63(4) establishes a mandatory technical prerequisite. It ensures the integrity of the data before it is presented as evidence. Without the presence of a certificate by virtue of Section 63(4) of the BSA and a hash value (data has not been changed, and this report can only be given by qualified experts), the digital evidence is null and void. By this, the legislature has effectively merged technical authenticity with professional accountability. In the case of *Anvar PV v PK Basheer*,³¹ for secondary electronic evidence, a certificate under Section 63(4) of the BSA is mandatory. After the verification of the certificate, expert opinion is then considered under Section 39(2) of the BSA.

Section 40 of the BSA as a Third-Party Testimony:³² This section is often termed the “Scientific litmus paper test”. A fact that has nothing to do with the specific crime (like what happened in a different lab or to a different person) becomes relevant if it supports or contradicts an expert opinion. Usually, a third-party intervention is not mandatory. But Section

²⁶ Bharatiya Sakshya Adhiniyam 2023, s 39(2)

²⁷ Bharatiya Sakshya Adhiniyam 2023, ss 39(1), 39(2)

²⁸ *State of Himachal Pradesh v Jai Lal* (1999) 7 SCC 280

²⁹ Bharatiya Sakshya Adhiniyam 2023, ss 39(1), 39(2)

³⁰ Bharatiya Sakshya Adhiniyam 2023, s 63(4)

³¹ *Anvar PV v PK Basheer* (2014) 10 SCC 473

³² Bharatiya Sakshya Adhiniyam 2023, s 40

40 acts as an exception *for Res inter alios acta alteri nocere non debet*, which means a thing done between others does not harm or benefit any third party. While the doctrine of *Res Inter Alios Acta alteri nocere non debet* serves as a general shield against the admission of unrelated third-party facts, Section 40 of the BSA acts as a strategic door. It allows the Court to look past the immediate parties of the case to find “supportive” or “inconsistent” facts from the wider world. As scientific truth is universal, it is essential for modern gate-keeping. If a digital forensic science report failed in another jurisdiction, this section can prevent the miscarriage of justice in the present trial. It is the ultimate quality control for expert testimony. By allowing “inconsistent facts” to be admitted, it ensures that an expert’s “gate-keeping” test is not just a formality but a rigorous trial of scientific truth. In the case of *State of Maharashtra v Damu Gopinath Shinde*³³, the Hon’ble Supreme Court held that an expert’s opinion is not conclusive and must be supported by other relevant facts. If a fact contradicts the expert’s theory, this comes under the ambit of Section 40.

Further, in the case of *Ramesh Chandra Agarwal v Regency Hospital Ltd*,³⁴ the court held that the experts must provide the scientific criteria for the conclusion. It has been further supported by the case of *Forest Range Officer v P Mohammad Ali*.³⁵ The court held that while expert opinion is a weak type of evidence, it gets strengthened through its corroboration and supporting facts. Experts’ opinion alone cannot be blindly considered to be relevant facts; it must have supportive facts, reports, statements which are widely accepted, and it must pass the gate-keeper test. In the case of *Malay Kumar Ganguly v Dr Sukumar Mukherjee*³⁶, the court held that the ‘Probative Value’ (the weight) of the evidence is not determined by the expert’s rank, but by the strength of the scientific data.

Section 45 of BSA:³⁷ Section 45 of BSA states that whenever the opinion of a living person is relevant, the grounds on which such opinions are also relevant. The expert’s opinion itself is weak and not even admissible if it does not provide scientific facts in support of these. In the case of *State of HP v Jai Lal*,³⁸ it held “the credibility of such a witness depends on the reason stated in support of his conclusion and the data and material furnished which form the basis of his conclusion.” Further, in the case of *Titli v Jones*,³⁹ it explains that the real function of an

³³ *State of Bombay v Damu Gopinath Shinde* (2000) 6 SCC 269

³⁴ *Ramesh Chandra Agarwal v Regency Hospital Ltd* (2009) 9 SCC 709

³⁵ *Forest Range Officer v P Mohammad Ali* 1994 Supp (1) SCC 1991

³⁶ *Malay Kumar Ganguly v Dr Sukumar Mukherjee* (2009) 9 SCC 221

³⁷ *Bharatiya Sakshya Adhiniyam* 2023, s 45

³⁸ *State of Himachal Pradesh v Jai Lal* (1999) 7 SCC 280

³⁹ *Titli v Jones* AIR 1934 All 273

expert is to put all the materials before the court so that a judge can form their independent judgment. “Expert of experts” judgment should not be done arbitrarily, capriciously and irrationally in the presence of proper verified experts, reports in support of expert opinion, reports presented before the court by the expert for support of his statement, absence of tampering, and facts in support of expert opinion will state the opinion to be a relevant fact of the case.

Section 41 of BSA:⁴⁰ Section 41 of BSA states that when the Court is to form an opinion about the handwriting of the person related to which was written or signed, the opinion of any person acquainted with the handwriting of that person is a relevant fact. The acquaintance will be based on whether they have seen the person while writing, or they received such documents which have been jotted down by that person, in the ordinary course of business, or documents written by that person have been habitually submitted to them. In the case of *Fakhruddin v State of Madhya Pradesh*,⁴¹ it was held that handwriting may be proved by the evidence of a witness who is acquainted with the handwriting of a person. The court clarified that the “weight” of the evidence depends on the degree of familiarity.

It has been supported by the case *State of Gujarat v Vinay Chandra Chhota Lal Pathak*.⁴² The court held that while an expert opinion is helpful, the court can also rely on the testimony of a person acquainted with the writing to conclude. Section 41 of the BSA⁴³ provides a practical “common law” approach to evidence. It recognises that while forensic science under Section 39 of the BSA is precise, the human brain's ability to recognise familiar patterns is equally relevant.⁴⁴ In a trial, Section 41 of the BSA witness acts as a “bridge of familiarity”.

For instance, a bank manager who has seen a customer’s signature for 10 years provides a baseline of “normalcy” against which a Section 39 expert can then test for “Technical Forgery”. If there is a controversy between the two, it depends upon the “expert of experts” to form an independent judgment. If the subject matter is so fabricated and tampered who becomes difficult for the “acquaintance” to identify, it will be passed to the expert evidence under Section 39 of BSA. The court sometimes trusts a Section 41 witness more because they know the “natural flow” of the person’s writing over many years. A forensic expert only sees the

⁴⁰ Bharatiya Sakshya Adhiniyam 2023, s 41

⁴¹ *Fakhruddin v State of Madhya Pradesh* AIR 1967 SC 1326

⁴² *State of Gujarat v Vinay Chandra Chhota Lal Pathak* AIR 1967 SC 778

⁴³ Bharatiya Sakshya Adhiniyam 2023, s 41

⁴⁴ Bharatiya Sakshya Adhiniyam 2023, s 39

specific sample provided to them, which might not represent the person's usual style. This dual verification ensures that the "best evidence rule" is satisfied through both science and experience. In the case of *Magan Bihari Lal v State of Punjab*⁴⁵, it was held that it is unsafe and fallible to rely upon a handwriting expert unless it has been accommodated by corroboration.

Section 42 of BSA:⁴⁶ Section 42 of the BSA establishes the relevancy of opinions regarding general customs and rights. When the court needs to determine the existence of such customs that affect a certain class of persons, by virtue of Section 42, such opinions are admissible. This section transitions the legacy of Section 48 of the Indian Evidence Act⁴⁷ into the modern framework without substantive change, preserving the value of traditional and communal knowledge. The legislation, through Section 42 of the BSA⁴⁸. It states that this archaeological structure serves as a vital "Bridge of continuity". While Sections 39 and 41 rely on technical skills or personal acquaintance, Section 42 relies on communal memory.⁴⁹ It acknowledges certain "facts", such as long-time village customs. Therefore, it effectively democratises the concept of an "expert" by granting evidentiary status to community elders and local authorities. *Laxman Singh v State of Rajasthan*⁵⁰ held that the customs under Section 48 of the Indian Evidence Act (Section 42 of BSA) must be certain, ancient and reasonable. The opinion of a witness is only relevant if they demonstrate a specific "likelihood of knowing" that transcends mere hearsay.⁵¹

Section 43 of BSA:⁵² Section 43 of the BSA acts as the interpretative provision for localised and specified norms. The general provisions, like Sections 39 and 40, connect the masses, while Section 43 allows the court to peek into the "micro-laws" of families and institutions.⁵³ By admitting the opinion of those with "special means of knowledge", the BSA ensures that the judicial decisions are not made in a vacuum but are grounded in actual tenets and linguistic nuances of the parties involved. They can be the family priest of a particular family, an administrator who looks at the waqf property for a very long period of time or a local linguist

⁴⁵ *Magan Bihari Lal v State of Punjab* (1977) 2 SCC 210

⁴⁶ Bharatiya Sakshya Adhiniyam 2023, s 42

⁴⁷ Indian Evidence Act 1872, s 48

⁴⁸ Bharatiya Sakshya Adhiniyam 2023, s 42

⁴⁹ Bharatiya Sakshya Adhiniyam 2023, s 39, 41, 42.

⁵⁰ *Laxman Singh v State of Rajasthan* (1985) 4 SCC 376

⁵¹ Indian Evidence Act 1872, s 48; Bharatiya Sakshya Adhiniyam 2023, s 42.

⁵² Bharatiya Sakshya Adhiniyam 2023, s 43

⁵³ Bharatiya Sakshya Adhiniyam 2023, s 39, 41, 43.

of a particular market. In the case of *Nitai Charan Bagchi v Suresh Chandra Sanyal*⁵⁴, the Court clarified that to prove the “constitution and governance” of a religious foundation, you must bring people who have been directly involved in its management. This evidence must be known about governance.

Section 44 of BSA:⁵⁵ Section 44 of the BSA states that when the court has to form an opinion regarding the relationship status of a person through the conduct of both, here the court can consider any family member or any person who may have the specific means of knowledge about the subject matter. The case may not be confined to marriage cases; it also involves the legitimacy of a child, a relationship by adoption. Though the opinion is not a subject matter of the evidence. Section 44 of the BSA recognises societal factum over mere legalism. By making the opinion of the person relevant who resists with specific knowledge, the law accepts that relationships are often proved by how a community coexists in societal interaction. But in the case of *Dolgobinda Paricha v Nimai Charan Misra*⁵⁶, it was held that the credibility of such evidence rests on its external perceptibility. It serves as strong corroborative evidence in property cases but is rightfully stripped of its powers in matrimonial offences, where the Adhinyam demands the highest standard of direct proof.

GATE KEEPING TEST (STANDARD OF PROOF)

However, all such expert witness and their testimony, including foreign law, science, and art, are not binding in nature, though admissible. They may be considered to be the most reliable, relevant and credible but not binding. Judges are considered to be “Experts of Experts”, and thus their reliability is to be considered by a Judge only. “The Reliability-Binding Paradox” constitute frequently but won’t be removed. It makes the scope of law much wider. If an expert's opinion were binding, the expert would effectively become the judge. A judge must maintain their independence and look at the entire case, not just one lab report. Suppose an instance state DNA report is 99.9% true, but a police officer contaminated the samples and a clerical error resulted; it can completely change the case, and the police cannot be held liable for tampering with the evidence. The “Scientific certainty” replaces “Judicial discretion”. Judges have a discretionary power to gate-keep such opinions to convert into facts, which has been followed by the guideline in the case of *Daubert v Merrell Dow Pharmaceuticals Inc*⁵⁷.

⁵⁴ *Nitai Charan Bagchi v Suresh Chandra Sanyal* (1921) 26 CWN 110

⁵⁵ Bharatiya Sakshya Adhinyam 2023, s 44

⁵⁶ *Dolgobinda Paricha v Nimai Charan Misra* AIR 1959 SC 914

⁵⁷ *Daubert v Merrell Dow Pharmaceuticals Inc* 509 US 579 (1993)

To admit an expert opinion in the judgment, a judge should test the peer review, error rate, and acceptance rate. Though it is a US case, it still creates a golden standard for judges across the world. Historically, a judge weighs conflicting testimonies, evaluates a witness's demeanour, and exercises discretion to determine the truth. But when presented with undeniable scientific certainty, the space for judicial discretion vanishes. If a mathematically certain DNA proves a suspect's blood was at the crime scene, the judge cannot simply use "discretion" or rely on contradictory eyewitness testimony to rule otherwise. It is a limitation on the grounds of forensic science, as India lacks a codified framework for assessing scientific evidence. Judges might blindly defer to the "certainty" of the science without exercising discretion over the procedure.

JUDICIAL APPRECIATION OF SCIENTIFIC EVIDENCE

The Indian judiciary's approach to scientific evidence has evolved from extreme caution to a more receptive, yet critical, stance and therefore stands at a critical crossroads. This is because India lacks a codified test and procedure for scientific Admissibility; judges are heavily relied upon to filter reliable science from "junk science". As criminal methodologies are evolving and becoming sophisticated, the judiciary is turning toward forensic science. However, a judge cannot simply accept/ admire the scientific report based on face value. The "judicial appreciation" of scientific evidence is an evaluative process where a court must weigh the accuracy of science against the procedural rights of the accused.

Evolution of Acceptance: From Extreme Caution to Critical Reliance: Historically, Indian Courts evaluated expert testimony with extreme caution. In the early years, judges viewed forensic evidence merely as corroborative pieces of evidence, deeply hesitant to base a conviction solely on an expert opinion without primary factual corroboration. However, landmark judgments have progressively widened the scope of admissibility. The Supreme Court in *State of Bombay v Kathi Kalu Oghad*⁵⁸ established that compelling an accused to provide physical identity like fingerprints or handwriting samples does not violate the fundamental rights against self-incrimination guaranteed under Article 20(3) of the Indian Constitution⁵⁹. Later, in *Selvi v State of Karnataka*, the Court restricted the constitutional

⁵⁸ *State of Bombay v Kathi Kalu Oghad* AIR 1961 SC 1808

⁵⁹ Constitution of India 1950, art 20(3)

boundary, ruling that involuntary narco-analysis and brain mapping violate a person's liberty, as the state cannot force/bound to extract cognitive knowledge from an individual's mind.

Courts have elevated the role of forensic science from a supporting role to the primary basis for conviction in complex cases. The *Tandoor Murder Case* resulted in a conviction based predominantly on DNA evidence linking the accused to the crime scene, while the *Jessica Lal Murder Case*⁶⁰ saw an acquittal reversed largely due to the meticulous appreciation of ballistic evidence.

Procedural Sanctity: Science is only as Reliable as the Police Procedure: A judge's appreciation of scientific evidence is intrinsically tied to the investigative procedure. A scientifically flawless/perfect DNA match is legally worthless/void if the procedural integrity or chain of custody is compromised.

Chain of Custody: judges must scrutinise the journey of evidence from the crime scene to its analysis in the laboratory to the courtroom. Any unexplained gap raises the scientific findings. In the case of *Kattavellai Devakar v State of Tamil Nadu*⁶¹, the Supreme Court emphasised that even the most compelling DNA evidence must be disregarded if the prosecution fails to follow proper method during the collection, sealing and storage of the samples. Subsequently, in *Datar Singh v State of Punjab*⁶², the Court highlighted that mishandling vital evidence breaks the chain of circumstances, severely impacting the outcome of the case and forcing the judge to reject the scientific findings entirely.

The Judges as a “Gatekeeper”: Rejecting the *Ipsa Dixit*: The judge must evaluate the reasoning and the methodology behind the conclusion itself. Courts must not blindly accept an expert's *ipse dixit* (an unproven, bare assertion simply because “I said so”). The judiciary is moving towards demanding strict scientific validity, mirroring the “*Daubert Standard*” utilised or accepted in the United States. Under this method, judges act as a strict “gatekeeper” who assesses whether a scientific method is testable, peer-reviewed, carries a known error rate, and is generally accepted by the scientific community. While in India, there lacks a formally codified Daubert standard, the Supreme Court in *Harjinder Kaur v State of Punjab*⁶³ explicitly highlighted that Indian judges are increasingly obliged to act as gatekeepers. They must

⁶⁰ *Sidhartha Vashisht @ Manu Sharma v State (NCT of Delhi)* (2010) 6 SCC 1

⁶¹ *Kattavellai Devakar v State of Tamil Nadu* (2014) 2 MLJ (Crl) 24

⁶² *Datar Singh v State of Punjab* (1975) 4 SCC 272

⁶³ *Harjinder Kaur v State of Punjab* (2004) 11 SCC 253

carefully analyse the underlying methodology and reasoning of the expert testimonies and not just the conclusion.

The Challenge of Judicial Discretion: The most critical challenge in the judicial appreciation of scientific evidence today is the lack of standardised, codified admissibility rules, which means there is an unstructured reliance on individual judicial discretion. Because Indian courts lack a codified test for scientific admissibility, judges rely heavily on individual discretion and thereupon to filter reliable science from junk science. This creates several profound systematic vulnerabilities. The newly enacted Bharatiya Sakshya Adhiniyam, 2023 (BSA), acknowledges expert testimony under Section 39, yet it critically omits any definition of special skill.⁶⁴ Moreover, the statute imposes no mandatory licensing, accreditation, or certification for such experts prior to their opinions receiving evidentiary weight in court. This legislative silence entrusts the assessment of an expert's testimony competency.

When admissibility standards remain uncoded, justice devolves into a geographic lottery. Absence of a uniform criterion exhibits unambiguous inconsistency in judicial rulings. One trial judge might impose Daubert-like scrutiny on a digital forensic report, scrutinising error rates and software validation. Another judge in a different jurisdiction could admit the identical report merely based on the expert's government designation. Such variability erodes the predictability of law and threatens the fundamental right to a fair trial. In contrast to the United Kingdom's statutory Forensic Science Regulator, which enforces mandatory quality standards, Indian courts lack any centralised regulatory framework.

THE “AURA OF INFALLIBILITY” AND THE CSI EFFECT

Judicial discretion is profoundly influenced by human psychology. Forensic science, with its esoteric terminology, advanced instrumentation, and emphatic numerical probabilities (e.g., “a 99.9% match”), exudes an “aura of infallibility”. This fosters the “CSI Effect”, a well-documented cognitive bias. Under pressure to adjudicate complex, heinous crimes, judges may yield unduly to a forensic expert's assured testimony. The peril of unchecked judicial discretion here is the temptation of judicial abdication, where a judge abandons their critical evaluative role and simply defers to the expert's conclusion. When discretion is overwhelmed by the

⁶⁴ Bharatiya Sakshya Adhiniyam 2023, s 39

illusion of scientific certainty, courts risk validating flawed methods or biased analyses merely because they resonate with authority.

THE RELIABILITY-BINDING PARADOX AND THE EROSION OF JUDICIAL AUTONOMY

The paramount philosophical quandary of judicial discretion in the contemporary era manifests as the “reliability-binding paradox”. The legal system insists on supremely reliable, objective scientific evidence to secure precise convictions. Yet, when a scientific technique attains near-absolute certainty, it paradoxically eclipses the judge's conventional discretion. Traditionally, judges assess witness credibility, reconcile conflicting narratives, and exercise discretion to discern truth. But if a DNA test definitively places an accused's blood at a crime scene, the judge cannot simply use “discretion” to rule otherwise based on a contrary eyewitness testimony. The scientific certainty essentially displaces the judge's fact-finding autonomy. The key challenge is for judges to shift their focus from the final result to the process itself, carefully checking the chain of custody, the calibration of the lab equipment, and potential risks of human error in the laboratory.

This paradox echoes the tension in *Frye v United States*⁶⁵, where general acceptance replaced raw judicial intuition, yet *Daubert v Merrell Dow Pharmaceuticals* refined it through factors like testability and peer review mandating process-oriented gatekeeping. Ultimately, the paradox demands a jurisprudential pivot: from result-scepticism to procedural vigilantism, ensuring science serves justice rather than supplanting it.

THE COMPETENCY AND EDUCATIONAL GAP

Perhaps the most critical practical constraint on judicial discretion is the educational background of the judiciary. Judges are trained in law, jurisprudence, and statutory interpretation, occasionally possessing a formal scientific background. Requiring them to critically evaluate the algorithmic error rates of facial recognition software or the chemical composition analysis in toxicology reports imposes an enormous task and a heavy burden on them. When judges lack the scientific literacy to properly evaluate expert evidence, their “discretion” becomes little more than speculation. To remedy this, there is an urgent need for regular, intensive training programs conducted via Judicial Academies nationwide. An All-

⁶⁵ *Frye v United States* 293 F 1013 (DC Cir 1923)

India training module on forensic reliability and limitations of forensic techniques would empower judges to critically assess forensic reports and reduce their blind reliance on experts. The Indian judiciary has taken several notable steps to enhance forensic science awareness and training, building on precedents like *State of Maharashtra v Damu Gopinath Shinde*, where the Hon'ble Supreme Court emphasised meticulous scrutiny of forensic evidence recovery and admissibility under Section 27 of the IEA⁶⁶.

The National Judicial Academy (NJA), Bhopal, was established in 1993 under the Supreme Court's oversight. It has conducted over 543 training programs from 2017 to 2025, including specialisation sessions for forensic jurisprudence, evidentiary value of reports, and new criminal laws integrating forensics. Topics like DNA analysis, chain of custody, and expert testimony reliability are covered in the training of more than 20,900 judicial officers across the nation. The NJA also coordinated with State Judicial Academies (SJAs) and the Central Academy for Police Training (CAPT) for forensic modules, such as "Jurisprudence of Forensics" workshops on criminalistics protection. The recent efforts include capacity building for BNSS forensic under the new laws.

Rulings under *Selvi v State of Karnataka* restricted narco-analysis as unconstitutional if taken involuntarily, mandating judicial understanding of forensic limits. *Mukesh v State (Nirbhaya)* highlighted the importance of the DNA report, reinforcing training needs. Recent guidelines, like the *Kattavellai* case, focus on DNA handling protocols and police academy training.

While the 273rd Law Commission Report focused on torture conventions and related reports like the 69th, 74th, and 88th. It advocated specialised modules and evidentiary reforms for scientific techniques. The 185th report also urges judicial literacy in forensics. The National Forensic Infrastructure Scheme (NAFIS) also invested ₹2,254 crore for judicial and police training.⁶⁷

Ultimately, until India enacts codified admissibility standards as per BSA and invests heavily in the scientific capacitation of its judiciary, the appreciation of forensic evidence will persist as a highly subjective, inconsistent, and perilous exercise of judicial discretion.

⁶⁶ Indian Evidence Act 1872, s 27

⁶⁷ Law Commission of India, 273rd Report (2017); Law Commission of India, 69th Report (1977); Law Commission of India, 74th Report (1978); Law Commission of India, 88th Report (1983); Law Commission of India, 185th Report (2003)