

The Epistemological Friction of Forensic Jurisprudence: Realizing Certainty in Indian Criminal Courts

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ABSTRACT

Modern criminal jurisprudence in India increasingly relies on the intersection of technology, empirical science, and law—a domain currently undergoing a massive structural transformation via the newly enacted Bharatiya Sakshya Adhiniyam (BSA), 2023. However, this critical intersection is fraught with severe epistemological friction. While science seeks empirical truth through fluid statistical probabilities and peer-verified falsifiability, the Indian judicial system demands definitive, static binary outcomes to satisfy the strict threshold of proof "beyond a reasonable doubt." This article explores the core philosophy of forensic law within the contemporary Indian statutory matrix, unpacks the systemic vulnerabilities of pattern-matching evidence highlighted by landmark Supreme Court judgments, analyzes constitutional protections under Article 20(3) against forensic overreach, and proposes a series of structural institutional reforms to safeguard individual liberty and legal integrity.

1. Introduction: The Duplicity of the Forensic Intersection in India

Forensic law is not merely the mechanical or supplementary application of scientific techniques to complex legal problems; it constitutes a distinct, highly sophisticated jurisprudential philosophy that dictates how empirical reality is captured, processed, and translated into actionable legal truth. The historic legal transition from the colonial-era Indian Evidence Act (IEA), 1872 to the newly enforced Bharatiya Sakshya Adhiniyam (BSA), 2023 reflects a deliberate, structural effort by the state to institutionalize forensic science as an indispensable asset to the administration of criminal justice rather than an optional secondary measure.

The ultimate systemic challenge lies entirely within the internal translation mechanism. Law and science operate on fundamentally antithetical and non-convergent tracks:

- **The Scientific Paradigm:** Governed strictly by inductive reasoning, continuous hypothesis testing, fluid statistical probabilities, and ongoing modification based on peer verification. True empirical science rarely, if ever, claims immutable, absolute finality.
- **The Legal Paradigm:** Governed heavily by rigid deductive constraints, statutory boundaries, structural precedents, finality of judgments, and binary adversarial outcomes (guilty or acquitted).

When an expert witness from a State or Central Forensic Science Laboratory (FSL) testifies that a specific DNA profile or chemical toxicology sample matches an accused with an astronomical random match probability, the Indian judiciary is tasked with converting that statistical abstraction into a moral and absolute certainty of guilt. Balancing, regulating, and formatting this conversion process represents the core intellectual challenge of modern Indian forensic jurisprudence.

2. Statutory Evolution: From Section 45 IEA to Sections 39 & 40 BSA

For well over a century, the admissibility of expert scientific and technical testimony within Indian courtrooms was tightly tethered to Section 45 of the Indian Evidence Act, 1872.¹ This provision narrowly restricted admissible expert opinions to five explicitly listed categories: foreign law, science, art, handwriting, and finger impressions. This rigid, nineteenth-century statutory vocabulary continually struggled to seamlessly accommodate rapidly advancing twenty-first-century disciplines such as advanced cyber-forensics, audio-video deepfake analytics, and short tandem repeat DNA profiling.

With the legislative enforcement of the Bharatiya Sakshya Adhiniyam, 2023, the parliament systematically overhauled these foundational blocks. Expert opinion now derives its primary relevancy from Section 39 of the BSA,² which substantially expands the statutory horizon to accommodate modern, highly interdisciplinary scientific and technological fields. Concurrently, Section 40 of the BSA establishes that facts bearing upon the opinions of experts are explicitly relevant, while Section 45 of the BSA reinforces the legal relevancy of the precise grounds on which an expert opinion is based.³



Crucially, however, Indian jurisprudence does not explicitly embrace a pure, rigid equivalent of the American "Daubert standard"—the strict judicial gatekeeping rule evaluating falsifiability and known error rates. Instead, Indian courts historically view expert evidence as fundamentally advisory. As the Supreme Court of India observed in the landmark case of *State of H.P. v. Jailal*,⁴ the proper role of an expert witness is to supply the judge with the necessary scientific criteria and foundational data to independently test the accuracy of the conclusions, thereby enabling the court to form its own objective, independent judgment.

3. The Crisis of Subjective Forensics: Pattern Evidence in Indian Courts

A critical, highly delicate distinction exists within Indian forensic law between objective analytical sciences (such as chemical toxicology, serology, and automated DNA sequencing) and subjective pattern-matching disciplines (such as latent fingerprint comparisons, ballistics toolmark examinations, bitemark observations, and handwriting analysis).

While DNA profiling carries an exceptionally high baseline of empirical and statistical reliability,

subjective pattern evidence frequently suffers from systemic human error, cognitive shortcuts, and institutional vulnerabilities. High-profile structural failures, such as those exposed during the controversial Aarushi Talwar murder trial,⁵ vividly demonstrated to the academic community how contaminated crime scenes, substandard sample collection protocols, and severely biased forensic interpretations can permanently compromise judicial fact-finding.

Cognitive and Administrative Risks in FSL Ecosystems

Unlike automated machine readouts, pattern matching within Indian Forensic Science Laboratories relies heavily on subjective human verification. This specific dependency exposes the resulting evidence to two primary cognitive vulnerabilities:

1. **Contextual Bias:** Analysts operating within regional state labs are often placed under the direct administrative, budgetary, and logistical umbrella of state law enforcement agencies. Awareness of an accused's prior confession or the leading police theory can unconsciously steer an analyst toward interpreting ambiguous pattern data to validate that specific state theory.
2. **Confirmation Bias:** The powerful psychological tendency of forensic practitioners to focus exclusively on matching characteristics while systematically downplaying or ignoring critical, unexplainable discrepancies between a latent sample and a control exemplar.

Jurisprudentially, the Supreme Court of India has routinely warned against over-reliance on uncorroborated pattern evidence. In the foundational judgment of *Magan Bihari Lal v. State of Punjab*,⁶ the apex court explicitly held that it is highly unsafe to base a criminal conviction solely on the expert opinion of a handwriting witness without substantial, independent circumstantial or direct corroboration.

4. Constitutional Frictions: Article 20(3) and Neuro-Forensics

The expanding, aggressive integration of forensic methods into active police investigations routinely creates severe structural friction with the sacred fundamental rights guaranteed under Part III of the Constitution of India.

A. The Right Against Self-Incrimination and Biometric/Neuro Data

Article 20(3) of the Indian Constitution mandates that no person accused of any offence shall be compelled to be a witness against himself.⁷ The constitutional boundaries of this right in relation to forensic science were originally established by an eleven-judge bench of the Supreme Court in the historic case of *State of Bombay v. Kathi Kalu Oghad*.⁸ The Court ruled that compelling an accused to provide physical, biometric specimens (like fingerprints, handwriting exemplars, or blood samples) does not violate Article 20(3) because these components constitute non-testimonial materials that do not forcibly reveal the active contents of the accused's mind.

However, the advent of advanced neuro-forensics (such as Narco-Analysis, Polygraph testing, and Brain Mapping/P300 wave tests) fundamentally challenged this neat binary classification. The Supreme Court addressed this critical shift in the landmark judgment of *Selvi v. State of Karnataka*,⁹ holding that the involuntary administration of neuro-forensic techniques violates Article 20(3). The court masterfully reasoned that these tests forcibly extract cognitive, testimonial responses from the subject's subconscious mind, deeply infringing upon individual "mental privacy." Consequently, any data derived from involuntary neuro-tests is inadmissible as direct evidence, though physical fruits discovered as a result of voluntary statements may remain relevant under Section 23 of the BSA, 2023.¹⁰

B. The Mandate for Mandatory Forensics vs. Structural Realities

The *Bharatiya Nagarik Suraksha Sanhita (BNSS)*, 2023 introduces a highly progressive mandate

requiring mandatory forensic investigation for all criminal offences punishable by seven years of imprisonment or more.¹¹ While this provision aims to modernize the investigative process, it creates immediate structural tension. The demand for scientific precision often collides with the operational realities of understaffed regional FSLs, an insufficient number of qualified forensic experts, and a high risk of systemic backlogs that can severely delay judicial proceedings.

5. Structural Reforms for India's Forensic Framework

To effectively ensure that scientific advancements support rather than compromise the pursuit of justice, India’s forensic ecosystem requires systemic updates outlined below:

Existing Structural Challenge	Proposed Jurisprudential & Policy Remedy
Institutional Proximity to Police	Forensic Science Laboratories (FSLs) must be decoupled from the administrative control of Home Departments/Police and placed under autonomous judicial or scientific bodies to eliminate pro-prosecution bias.
Lack of Standardization	Establish an independent National Forensic Science Regulatory Authority tasked with enforcing uniform standard operating procedures (SOPs) and error-rate calculations across all state and central laboratories.
Expert Witness Over-claiming	Indian trial courts should strictly bar experts from testifying to "100% scientific certainty" for subjective pattern evidence. Testimony must be legally constrained to validated statistical likelihoods.

6. Conclusion: The Path Ahead for Indian Forensic Law

Indian forensic law stands at a major evolutionary crossroads. The systemic transition to the Bharatiya Sakshya Adhiniyam, 2023 signals a clear intent to move from a colonial system heavily reliant on oral testimony to an empirical framework grounded in objective science.

However, technology is only as reliable as the legal framework that regulates it. As legal scholars and practitioners, we must emphasize that science within the courtroom must adhere to the same rigorous skepticism it faces within the laboratory: it must remain precise, probabilistic, and always open to correction. The pursuit of justice under the rule of law requires that scientific evidence be treated not as an infallible verdict, but as an aid to the independent conscience of the court.

FOOTNOTES (BLUEBOOK 21ST EDITION CITATION FORMATS)

1. Indian Evidence Act, § 45, No. 1 of 1872.
2. Bharatiya Sakshya Adhiniyam, § 39, No. 47 of 2023.
3. Bharatiya Sakshya Adhiniyam, §§ 40, 45, No. 47 of 2023.
4. State of H.P. v. Jailal, (1999) 7 S.C.C. 280 (India).
5. State of U.P. v. Rajesh Talwar, (2013) 4 L.R.S. 211 (India).
6. Magan Bihari Lal v. State of Punjab, A.I.R. 1977 S.C. 1091 (India).
7. India Const. art. 20, cl. 3.
8. State of Bombay v. Kathi Kalu Oghad, A.I.R. 1961 S.C. 1808 (India).

9. Selvi v. State of Karnataka, (2010) 7 S.C.C. 263 (India).
10. Bharatiya Sakshya Adhinyam, § 23, No. 47 of 2023.
11. Bharatiya Nagarik Suraksha Sanhita, No. 46 of 2023.
12. Law Commission of India, 185th Report on Review of Indian Evidence Act, 1872 (2003).