

Forensic Science in Justice in India

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Abstract: *The field of forensic science plays a crucial role in the administration of justice, particularly in crime investigation and the identification of perpetrators. This paper focuses on the development and practical use of forensic science in the context of the Indian legal system and its acceptance by Indian courts. The study aims to analyze the judgments of the superior courts in India over the past decade, which relied on forensic science as evidence. Additionally, it examines the stance of Indian courts regarding the admissibility of forensic evidence and compares it with the perspectives of foreign courts. The paper also explores the existing gaps in Indian criminal laws and supports the integration of forensic evidence in a more effective manner. Furthermore, a comparative study of the principles of admissibility of forensic evidence in the United States, the United Kingdom, and Germany is presented. The importance of circumstantial and forensic evidence is discussed, emphasizing their role in proving or disproving cases beyond reasonable doubt. Finally, the paper delves into the use of forensic toxicology and chemical analysis in judicial decision-making processes in India, highlighting the significance of toxicological examinations in investigating poisoning cases*

Keywords: Forensic wisdom, Lawbreakers, Admissibility of forensic validation, Superior courts in India, Expert testimony, UK courts, Principles of scientific substantiation, Circumstantial evidence, Forensic evidence, Proving the case, Forensic toxicology, Chemical substances, Poisoning cases, Clinical toxicology, Chemical toxicology, Forensic toxicologists, Postmortem examination, Death investigation, Toxicology testing

1. Introduction

“Wherever he steps, whatever he touches, whatever he leaves, indeed unconsciously, will serve as silent validation against him. Not only his fingerprints or his vestiges, but his hair, the filaments from his clothes, the glass he breaks, the tool marks he leaves, the makeup he scratches, the blood or semen that he deposits or collects – all these and further bear mute validation against him. This is validation that does not forget. It is not confused by the factual validation. Physical validation cannot be wrong; it cannot perjure itself; it cannot be wholly absent. Only its interpretation can err. Only mortal failure to find it, study and understand it can reduce its value.” – Paul L. Kirk, Ph.D.

A crime scene constantly is rich in information that reveals the nature of the lawless exertion and the individualities of those persons involved. Perpetrators and victims may leave behind blood, saliva, skin cells, hair, fingerprints, vestiges, tire prints, vesture fibers, digital and photographic images, audio data, handwriting, and the residual goods and debris of campfire, shots, and unlawful entry. [1] Useful validation cannot be gathered without the aid of scientific analysis. Without the use of wisdom, it is not possible to condemn lawbreakers, ranging from common theft to a sanguine rage, unless there was a bystander present at the crime scene when the crime passed. murderers would continue killing, thieves would continue stealing, and drug merchandisers would continue dealing. Fortunately, in the present world, wisdom is used in working crimes. The element of obscurity and lack of territorial borders in cyberspace makes internet an attractive medium for lawbreakers to commit crimes. [2] Not only the conventional crimes analogous as thefts, trace thievery, defamation, or phony are committed through computers, but also new forms of crime have surfaced analogous as hacking, trojan, phishing attacks etc. therefore, forensic wisdom and its use have come necessary for purpose of examinations.

Therefore, the purpose of the study is to, look into the development of forensic wisdom and its realistic use in the lawless justice administration and its acceptability by the

courts in India. To anatomize the decided cases for the last ten to twenty times of the superior courts in India which predicated its opinions with the aid of forensic wisdom? To understand the station of the superior courts in India regarding the admissibility of forensic validation in the decision-making process. To make a relative study of the Indian court opinions with the foreign court opinions regarding the admissibility of forensic validation in courts. To examine and identify scarcities in the lawless Laws as well as support medium of using forensic validation and to suggest any law reforms to use forensic wisdom/ validation in farther effective way.

Law on forensic in India and abroad A Comparative Study

This chapter deals with the principles of admissibility of forensic substantiation in the courts and a relative study of the principles of admissibility of different countries with. The first content regarding admissibility of scientific substantiation in U.S. is studied under two headlines, Laws on Expert substantiation in U.S. and The Basics of Admissibility. Originally, different rules of substantiation and their contents are studied in an irregular form and secondly, the principles of admissibility like applicability, trust ability, helpfulness and fitness are banded. The alternate content deals with rules of admissibility in UK where the relationship of the four-admissibility test i.e., backing, Applicable Expertise, equity and Evidentiary trust ability are banded, the background of the law commission report along with Law Commission Recommendation and Government Response are banded. The third point is Principles of Scientific substantiation in Germany, whereby sections and contents of the section are studied in an irregular form. Also, the admissibility of DNA substantiation in Germany is banded independently. Eventually the principles of admitting scientific substantiation in India is banded.

Principles of Admitting Scientific Evidence by United States (US) Courts

The purpose of this chapter is to see on what principle the lawless cases relating to forensic validation are dealt with by

the courts abroad. A revolution has taken place in the last decade for the admissibility of scientific validation in civil courts [3]. Fryev. United States [4] was the first important judgment in America regarding the admissibility of scientific validation. The Frye test had two aspects. firstly, the principle or scientific fashion and secondly, the acceptance. The aspects of the test were criticized on two different grounds. i) That there will have to be a considerable time pause for the scientific system to be accepted by the community ii) farther faith is reposed on the scientific community than in the Court of Law. Hence, the Federal Rules Of validation was enacted in 1975. Rule 702, of which stated that "If scientific, technical or other specialized knowledge will help the trier of fact to understand the validation or to determine a fact in issue, a validation qualified as an expert by knowledge, skill, experience, training or education may swear thereto in the form of an opinion or differently. [5]

The study of the laws reveals that expert vouchers are only allowed to swear about subjects that are scientific, technical, or that involved specialized knowledge that is beyond the capability of the jury to understand on its own. The trial is demanded to estimate whether the expert opinion 1) is predicated on sufficient data or data; 2) were reached by the use of reliable styles and principles 3) are the product of a reliable operation of the methodology to the data of the particular case. But to make the rulings, the trial judge is entirely dependent on the parties to furnish the information necessary to make the rulings which indirectly means that if the parties want to be successful, attorneys and experts need to be well- clued for furnishing particulars to the trial judge.

In England, the law dealing with the admissibility of scientific validation is fully different from United States. The English precedential analysis shows that judges are reticent to put any strict morals like 'trust capability' test in U.S. The English courts are still following the traditional common law test "helpfulness" developed by Lawton, L.J. in the notorious case *R. v. Turner*. The four conditions of admissibility of expert opinion in England and Wales (common law) countries are i) backing ii) applicable moxie iii) equity and iv) evidentiary trust.

a) Circumstantial and Forensic Evidence

One of the important ideal of presenting the validation before the court is to prove or falsify the data, and the case is made out beyond reasonable distrustfulness to condemn the criminated without any benefit of distrustfulness. The expression substantiation can be understood as the process of proving the material/ data as true or not true and helps the people to conclude that the subject matter to be correct or not correct. It's our perception of the material or proposition placed before us to be correct. The perception may be because of our belief predicated upon the data or sometimes under the influence of statements made by the people related to the case, whether criminated, or substantiated. Occasionally the perception is concluded predicated upon the validation analogous to the oral evidence, or factual validation. The court will examine the data, evidence and other material presented before it and decide whether case is proved or rebutted. 'A fact is said to be proved when, after considering the matters before it, the court either believes it

to live or considers its actuality so probable that a prudent man ought, under the circumstances of the particular case, to act upon the supposition that it exists'. 'A fact is said not to be proved when it's neither proved nor rebutted'. A fact is said to be rebutted when, after considering the matters before it, the court either believes that it does not live, or considers its life so probable that a prudent man ought, under the circumstances of the particular case, to act upon the supposition that it does not live'. Thus, the evidence plays vital part in proving and not proving the case and in condemning the criminated.

According to Sir Blackstone, 'validation' signifies that which demonstrates, makes clear or ascertains the verity of the data or points in issue also on one side or the other. validation relating to crime commission is essential to decide the case and shamed. The Supreme Court of India in *State of UP V Ram Sewak and Others* [6] stated that 'It's desirable to have further strong evidence to prove the lawless offence than that of the civil cases. And the burden of substantiation also lies in the prosecution. The standard of validation, though not defined, is necessary for deciding cases and not the presumptions and hypotheticals about the cases. At the same time, other evidence cannot be neglected in the quest of standard evidences and validation. Every validation is important and should not be overlooked. thus, in every case there is a demand of enough validation to prove the case by the prosecution. But the standard substantiation demanded to prove the case is not standard always. It changes from case to case. The prosecution has to submit the substantiation beyond reasonable distrustfulness to prove the case to avoid the chastising of innocent person. Lack of collecting evidence by the prosecution cannot depend on the sins of the criminal or the defense side of the case. 'The prosecution cannot take advantage of weakness of the defense or cannot take advantage of the inconsistent stage taken by the criminated from time to time. The prosecution must stand on its own legs grounding, on the validation that has been let in by it'.⁷

b) M.G. Agarwal vs. State of Maharashtra, [7] the Constitution Bench of the Hon'ble Supreme Court has observed:

"It is a well-established rule in criminal jurisprudence that circumstantial evidence can be reasonably made the basis of an accused person's conviction if it is of such a character that it is wholly inconsistent with the innocence of the accused and is consistent only with his guilt. If the circumstances proved in the case are consistent either with the innocence of the accused or with his guilt, then the accused is entitled to the benefit of doubt. There is no doubt or dispute about this position. But in applying this principle, it is necessary to distinguish between facts which may be called primary or basic on the one hand and inference of facts to be drawn from them on the other. In regard to the proof of basic or primary facts the court has to judge the evidence in the ordinary way and in the appreciation of evidence in respect of the proof of these basic or primary facts there is no scope for the application of the doctrine of benefit of doubt. The court considers the evidence and decides whether that evidence proves a particular fact or not. When it is held that a certain fact is proved, the question arises whether that fact leads to the inference of guilt of the

accused person or not, and in dealing with this aspect of the problem, the doctrine of benefit of doubt would apply and an inference of guilt can be drawn only if the proved fact is wholly inconsistent with the innocence of the accused and is consistent only with his guilt.”

The court further stated that, the term ‘presumptive’ is often used as identical with circumstantial evidence; but in practice it goes beyond. The word ‘presumption’, *ex vi termini*, imports an inference from facts, and the adjunct ‘presumptive’, as applied to evidentiary facts, implies the certainty of some relation between the facts and the inference. Circumstances generally, but not necessarily, lead to particular inferences; for the facts may be indisputable, and yet their relation to the principal fact may be only apparent, and not real; even when the connection is real, the [7] MrSrinivasulu Reddy V State Inspector of Police, Anticorruption Bureau, Nellore Range Nellore, 1993 Cri LJ 558 at 577 (AP) deduction may be erroneous. Circumstantial and presumptive evidence differ with another; therefore, they can be considered as genus and species.’

It should further understand that the impact of the circumstantial evidence on the decision of the case depends upon extent of proofs and its support to the facts and brings near to the truth of the case and all hypotheses should be supported by the chain of events that took place before, during and after the commission of the offence.

Judicial Decision making in India using Forensic Toxicology and Chemical

There is no precise description of bane in India but under the Indian Penal Code, the law describing the word bane are ‘any bane or any astounding, intoxicating, or any wholesome drug, or other thing’ or any sharp substance or any substance which is pernicious to the mortal body to ingurgitate, to swallow, or to admit into the blood’. [8] With regard to ‘any poisonous substance’ used in section 284 of IPC, all the law requires that the substance is analogous as, if taken, is likely to peril mortal life, or will beget hurt or injury to any person. Again, the law takes cognizance of the vicious intention of the existent who administers the drug or other substances, with a view to beget injury or death, irrespective of the volume or quality of the substance. The wisdom of venom is known as toxicology. It can be divided into two types.

- a) Clinical Toxicology the recognition of the symptoms of poisoning and the operation of the proper remedial measures.
- b) Chemical Toxicology the discovery of the bane in stomach washings, blood samples, etc. still, or in postmortem material (if he dies),(if the case or the victim recovers).

The business of forensic toxicologists is to probe all fatal cases of poisoning. The exploration of a poisoning case involves.

- a) The separation of the bone or sometimes its metabolite from the material submitted.
- b) The identification of the bone pulled.
- c) The estimation of the total amount present and comparison of this with the known murderous cure. [9]

A study has revealed that in 2006 in United States, 20.8 of the deaths were caused by poisoning, surpassing the death caused by arms which amounted to 17.3.3

Indeed, to Paracelsus, a sixteenth century scientist, a certain amount of every substance, indeed water and air, can be toxic and those amounts can differ from person to person and substance to substance. Forensic toxicology applies logical toxicology to the purposes of the law and includes the analysis of a variety of fluids and kerchief samples to determine the absence or presence of drugs and banes. After the completion of the logical element, the toxicologist interprets the finding. Forensic toxicology is used in cases of suspected drug overdoses. Toxicology testing can determine whether situations of toxic substances may have contributed to the death of any person, irrespective of how he failed.

Krishnan v. State of Kerala (1996) 10 SCC 508

The accused persons were convicted under sections 302/34 IPC. The dead body was sent to the hospital for a post-mortem. The house of A-1 was searched, and MO’s 5 to 7 were taken into custody, and he was arrested. Thereafter the second accused was also arrested. The material objects which were seized during investigation were sent to the

Chemical Examiner and the Chemical Report was obtained which was marked as Ex. P-16. The post-mortem examination revealed that undigested rice particles were found in the stomach of the deceased. The trial court acquitted the accused persons on one of the grounds that since the deceased had not taken any food after 3.30 p.m., such undigested rice particles could not have been found if the deceased had died at 9.30 p.m. The High Court did not accept the opinion of the trial court and convicted the accused persons. The Supreme Court also supported the view of the High Court that presence of undigested food particles did not raise any serious doubt about the time of the incident and the presence of PW1. Moreover, the absence of any bloodstain on the knife of A-2 could be reasonably explained. It was evidence that the knife was thrown away by A-2. It was not unlikely that the bloodstain of the knife had been wiped off when the knife was thrown in the field. Therefore, according to the court, the evidence laid down in the case had clearly established the complicity of both the accused in causing the murder of the deceased. Thus, the appeal was dismissed, and the conviction was upheld. [10]

2. Conclusion and Recommendations

The principles of admissibility of forensic validation and its connection in the decision-making process are also analyzed in this chapter. Under each content regarding where the question is raised, whether the forensic evidence satisfies the thesis, the connection factor as to whether the forensic evidence satisfies the conditions of connection is also banded.

While conducting the study on the “part of Forensic validation in the Decision-Making Process of lawless Cases A Study of opinions of Superior Courts in India” what has come to the van is that forensic validation plays an apparent

part in the decision- making process of lawless cases. The maturity of opinions where forensic validation has been used helped in awarding conviction. A detailed study of the alternate chapter, "Law on Forensic validation in India and Abroad A relative Study" reveals the principles predicated on which the lawless cases relating to forensic validation are dealt with by the courts. In United States, while deciding admissibility of expert validation the Judge must decide whether the validation is applicable, reliable, helpful, and fit. In United Kingdom (UK) the conditions of admissibility of expert validation are backing, applicable moxie, equity and evidentiary trust capability. The principles of admissibility of expert validation in Germany are felicity of experts in the specific area. German evidentiary proceedings are governed by the principles of free evaluation of the validation. With numerous statutory exceptions both the admission and importing of validation are within the discretion of the court. In agreement with the principles of free evaluation of the validation, German courts do not follow certain evidentiary rules stuck to by the courts in the United States. For illustration, report validation is admissible in German courts and it's over to the court to determine whether or not the validation is satisfying. The 'opinion rule' which precludes the factual statement by lay vouchers and the 'swish validation rule' taking original documentation to prove the contents of notation is not applicable in German Courts. In Germany judges play an active part in selection of validation and the court's judgment on the question of admissibility is final. mainly, expert opinions are submitted to the court in notation. When it's demanded, the court calls the expert into the court for a hail to probe specific aspects of the expert's opinion. Through this system of active part of courts demonstrates the more integrated evidentiary proceedings before the German Courts, allocating farther responsibility and action to the court than the U.S. System. In India the principles of admissibility of validation are connection. [11] According to the Indian validation Act, 1872, validation can be given only of applicable data and data in issue. A fact may be applicable but not admissible, like in case of factual validation, only under certain circumstances secondary validation of a document can be produced. still, although a document might be applicable, but it would not be admissible, if it does not satisfy the legislative provision. It might also be that a document or an expert report might be admissible as it's an original one or differently but since it is not applicable, analogous validation is not accepted by courts. therefore, in India, the principle for accepting forensic validation is connection and admissibility. Under, the broad principles of 'applicability' comes trust capability, helpfulness, fitness which are treated as separate grounds in US. backing, applicable moxie, equity and evidentiary trust capability which are the principles for admission of expert validation in UK, also comes under the demand of 'connection'.

Therefore, the benefit of distrustfulness was given to the plaintiff and the plaintiff was acquitted. This fact satisfies and proves the thesis that 'Scientific exploration of crime with the aid of forensic wisdom has further probative value than direct evidence in deciding lawless cases' and in the instant case it helped in exculpation of the criminated. When the chemical analysis revealed that the tablets and the water contained cyanide, it was rebounded in the conviction of the

criminated. Again, the thesis is proved and satisfied. In cases of rape, chemical analysis is truly important demanded and helps in conviction of the criminated when there is absence of serious injuries on the private corridor of the prosecutrix. In another case, the report of the chemical examiner showed that the blood- stained earth collected from the spot was set up to be stained with mortal blood, which was further corroborated by the validation of the croaker and backed in conviction. Thus, the thesis is satisfied and proved. Chemical analysis also helps in straining the unwanted result, thus helping in conviction. Chemical analysis helps the investigator or the delving agency to have access to all sphere applicable information they need and securities the sphere- irrelevant information, as it happens in Krishnamurthy v. State by Ashok Nagar Police, Bangalore.⁶³ The chemical analysis of the viscera proved that death was caused by strangulating the two ladies with pillow and it was not suicidal in nature. thus, it shielded the part which raised conjecture and suspect regarding the commission of tone- murder by the two ladies. This case again satisfies and proves the thesis that scientific exploration of crime with the aid of forensic wisdom has further probative value than direct evidence in deciding lawless cases.

A critical analysis of the colorful forensic attestations revealed that it's an indispensable tool in the hands of the decision-making process of felonious cases which has to be duly used. The study has also revealed the crunches on the part of the system which involves disquisition and execution. The study also helped to understand the minds of the court while accepting forensic substantiation and while rejecting it in the decision-making process. Still some sweats and advancements are needed in this field to make it much more secure and reliable.

To ameliorate the quality of forensic wisdom, some recommendations are encouraged herewith as A. Increased Funding B. Perfecting Forensic Education to Enhance an exploration Culture C. perfecting the Culture of Forensic Science Journals D. Using Scientific Standard to Guide Casework E. Enhancing the "Science in the Scientific Working Groups (SWGs) F. Access to Data G. Managing the Tension Between an Adversarial Culture and a Research Culture.

The absence of specific backing to support exploration is one of the biggest obstacles, especially in developing countries. In the US, forensic wisdom exploration systems are occasionally funded by the National Science Foundation. Some of the necessary exploration within these fields may make important methodological and theoretical benefactions to broader disciplines, similar as probability proposition, statistics, decision exploration and cognitive psychology. [12] lately, backing has also been made by the National Institute of Justice (NIJ) in the pattern identification lores. similar backing is made to promote abecedarian exploration to ameliorate understanding of the delicacy, trust ability, and dimension validity of forensic wisdom disciplines.

To profit forensic wisdom it's veritably important needed in unborn legion of individuals with chops and background should join the field to work in the academic exploration

community and also as practitioners. However, intercessors and preceptors in both disciplines and also convey to fellow interpreters the need for an exploration grounded approach and contribute to icing that exploration focuses on areas of genuine and important enterprises to interpreters, If some of these people keep good hold on both exploration and practice they would be extremely salutary for both the sectors as they could be precious translators. The Government should give generous competitive subventions for largely good interpreters to pursue advanced graduate training in applicable disciplines or exploration-concentrated forensic wisdom program. These subventions could, indeed, pay half of a critic's payment for a period of many times to allow the time and fiscal coffers for pursuing a PH.D. Many largely competitive and well-funded entitlement openings of this kind would significantly contribute to the exploration culture of forensic wisdom. It's endured that presently, in U.S. in the "pattern identification" field, the number of rehearsing judges with a PH.D. is relatively small compared to the forensic fields, including DNA analysis and toxicology, in which a significant number of judges hold PH.D. [13]

To ameliorate the exploration culture in forensic wisdom some changes to the current approach to journals and publications are veritably important demanded. First, forensic wisdom journals should contend upon a full-fledged commitment to exploration morals. Publication in any journal that isn't listed by at least some of the major indexing services should not be counted as publication. Peer review should be serious, eyeless, and carried out by individuals who are well good to pierce the exploration graces of any given composition. While non-research acquainted interpreters can play a precious part in peer review, evaluations by those with the necessary qualification to pierce the graces and prosecution of any given study should dominate the criteria for acceptance. The peer review process for acceptance of forensic substantiation is encouraged by the *Frye v. United States* [14] and *Daubert v. Merrell Dow medicinals, Inc* [15] which is formerly banded in the alternate chapter.

Sweats should be made to use conventional scientific norms to guide 'casework'. One crucial illustration of 'casework' is "successional unmasking". [16] Judges should have access to all the sphere-applicable information they need to conduct their inquiry, but they should be shielded from sphere inapplicable matters. A point monitor, for illustration, probably doesn't need to know the face from which a print was lifted. A point monitor doesn't need to know, still, about the suspect's concession or his three previous persuasions for analogous crimes. A document monitor cannot escape seeing the content of the document being anatomized; still, she need not be told broader aspects of the execution's proposition of the case.

Total rate of conviction

Therefore, the total rate of conviction of forensic evidence = $80/100 \times 100 = 80.0\%$

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- [11] Burkhard Bastuck and Burbard Gopfert, "Admission and Presentation of Evidence in Germany" 16 Loy. L.A. Int'l & Comp. L. Rev. 609 (1994)
- [12] Cognitive psychology is the scientific study of mind and mental function, including learning, memory, attention, perception, reasoning, language, conceptual development, and decision making. The modern study of cognition rests on the premise that the brain can be understood as a complex computing system. Cognitive Psychology- Department of Psychologypsych.rutgers.edu/co
- [13] Pattern Identification is a discipline which includes fingerprint analysis, firearms and toolmark comparison, questioned document examination, shoeprint examination, microscopic hair comparison, tire tread comparison, blood spatter analysis, bite mark analysis and other physical object comparison. These disciplines have in common that they attempt to determine whether or not a particular pattern or impression –be it a shoeprint, a tire tread, a fingerprint, or a bullet- can be associated with a particular source (Blood spatter analysis is an exception, as it attempts to use the pattern of blood to infer something about the physical events that gave rise to them). The pattern evidence do not apply to DNA analysis to arson investigation to toxicology.
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