

DETERMINING THE RELIABILITY AND ADMISSIBILITY OF SCIENTIFIC EVIDENCE: A JUDICIAL APPROACH IN THE UNITED STATES AND INDIA

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Abstract: *The employment of scientific experts in court has increased rapidly as science and technology have progressed. Numerous innovations have contributed to the enormous growth in the use of scientific evidence. Since crime has been perpetrated deftly using cutting-edge technology, the judicial system has, therefore, always looked to science for support. This trend is only growing. As a result, the judiciary has had a difficult time evaluating the many different components of the evidence that relate to either science or technology and within a short period, the judicial system has become overrun with scientific expert witnesses. Furthermore, every advance in science and technology has a direct bearing on how the judiciary arrives at its conclusions. The appraisal of the high-tech evidence, and whether or not to rely solely on the scientific community or how to draw conclusions about the veracity of the scientific expert's findings, is the actual issue that has been challenging for the court. In addition, whether or not the judges' traditional duty of determining the truth would be negatively impacted if the judge were entirely drawn from the scientific community is also a great concern. Therefore, the paper will examine the reliability and admissibility of scientific evidence while keeping in mind the specific criteria or standards the judiciary has propounded for assessing scientific expert testimony, with a particular focus on the procedures adopted by the judiciaries in India and the United States.*

Keywords: *science and technology, the scientific community, Judiciary, scientific experts.*

1. INTRODUCTION

Our society has become more complex, and as a result, it depends more on the law to control the actions of its constituents.¹ And with the advancement of science and technology, the modus operandi of crime has been overhauled and gotten so complex that it is practically difficult to solve a case without resorting to forensic science. In its broadest sense, forensic science refers to the application of science in the judicial system and there is considerably more to forensic science than just fingerprints and DNA samples. The American Academy of Forensic Science divided the disciplines into twelve broad categories to group the specialties of the various fields: anthropology, criminalistics, digital and multimedia media, engineering and applied sciences, general, law, forensic nursing, odontology, pathology/biology, psychiatry & behavioural science, questionable documents, and toxicology.² The multi-disciplinary nature of forensic science makes it the vital link that holds all types of evidence in place during any type of

investigation and entails applying the theories and procedures of several scientific fields to legal issues. Contemporarily the judiciary has a tough time evaluating the many facets of the evidence that have to do with either science or technology. The trial system has quickly become overrun by a scientific expert witness. Sometimes the evidence presented to the judges is unknown to them and the way that the judiciary determines the truth is directly impacted by almost all scientific and technological advancements. Thus, the concerned fundamental question, which has long intimidated legal experts is “whether the judge or the scientific community” will evaluate the high-tech evidence, and if the task is entirely delegated to the scientific community, will it directly affect the judges' customary obligation to seek the truth? In this regard, the bottom line is that the judges are not expected to function as armature scientists but certain criteria for assessing scientific expert testimony have been propounded by the judiciary in several jurisdictions which will be discussed in the

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¹ RICHARD SAFERSTEIN, CRIMINALISTICS AN INTRODUCTION TO FORENSIC SCIENCE, 22 (11 ed., Pearson 2015).

² <https://www.nu.edu/blog/what-are-the-types-of-forensic-science/>

details of this paper and the forensic science discipline has been developed to meet bounds.³

2. EVIDENCE VIS-À-VIS EXPERT OPINION: A THEORETICAL APPROACH

The word “evidence” is used in common parlance in three different senses: 1) as equivalent to relevant, 2) as equivalent to proof, and 3) as equivalent to the material based on which courts conclude the existence or non-existence of disputed facts.⁴ The term “evidence” can also be found in expressions like “best evidence,” “circumstantial evidence,” “corroborative evidence,” “derivative evidence,” “direct evidence,” “documentary evidence,” “hearsay evidence,” “indirect evidence,” “oral evidence,” “original evidence,” “presumptive evidence,” “real evidence,” “secondary evidence,” “substantive evidence,” and “testimony evidence,” and Indian Evidence Act of 1872 covers all of these different sorts of evidence.⁵ According to the “best evidence rule,” opinions, conclusions, beliefs and simple speculations of witnesses are often not admissible in court, this means that the fact-finder cannot utilise this type of information to come to a certain result.⁶ The notion that the best evidence should be presented before a court of law is known as the cardinal rule of evidence. The term “best evidence” refers to data gathered from a direct source that is in opposition to a derivative source and disproves the existence of an opinion.⁷ The phrase “opinion” refers to judgement or belief, which is belief or conviction deriving from what one thinks about a particular topic, rather than merely reporting gossip or hearsay. The opinion is what a person believes about the reality of a fact; non-opinion is what is provided to a witness’s senses and which he receives direct knowledge of without any process of thought or reasoning. According to Russell, any person who is skilled or has adequate knowledge in a particular field is called an Expert.⁸ One of the revolutionary developments in the legal system is the evolution of the idea of competence. Interaction between many subjects is a necessary component of expertise and through this contact, the law seeks to learn things that are outside the purview of a lay fact-finder. All cases

submitted to courts are expected to be heard and decided and the court cannot avoid its responsibility by claiming that the issue cannot be resolved because there aren't enough judicial tools available. Judges, therefore, rely on expert testimony both generally and more particularly in their daily work. In addition, relying on expert testimony in court has become increasingly necessary as a result of scientific and technological advancements. Law enforcement agencies now use forensic science as a tool.⁹

3. ISSUES WITH ACCEPTING SCIENTIFIC EVIDENCE IN THE JUDICIAL SYSTEM

Science has always been consulted by law, and this trend is only growing. The link between law and other academic fields like history and sociology has been the subject of further discussions. But the debate between law and science had only started. The fact that they each use a different methodology is one of the primary causes of this late meeting.¹⁰ Law is only found in conventional legal studies, which can be found in legal works like articles and comments from law reviews. Scientific principles and legal study do not have the same origins. Data are used by natural scientists, and the academic field that examines them defines and elevates the relevance of the data. Scientists will use a similar process regardless of which branch of science they are working in, but legal researchers do not apply a universal norm in the area of law and depending on the country it could vary. Judges and lawmakers make decisions based on the specifics of the case at hand and social requirements. In science, concepts and principles never alter which means changes in society have little impact on science. Notwithstanding, scientific research not a social activity changes in the scientific environment may have an impact on other fields of study. For instance, science has complex methods for determining or looking for the truth the court relies on scientific experts in the legal system. Therefore, Ronald Dworkin once said: “True legal scholarship today has its links

³ V.R DINKAR, SCIENTIFIC EXPERT EVIDENCE, 140 (1st ed., Eastern Law House 2013).

⁴ K.A. PANDEY, VEPA P. SARATHI'S LAW OF EVIDENCE, 12 (8th ed. EBC 2020).

⁵ *Id.* 5

⁶ *supra* note 4, at 10.

⁷ *Id.*

⁸ Naveen Krishna Bothireddy v. State of Telangana, 2017 SCC OnLine Hyd 99.

⁹ *Id.* 6, at 37.

¹⁰ CAROL A. JONES, EXPERT WITNESSES: SCIENCE, MEDICINE, AND THE PRACTICE OF LAW, 96 (Oxford: Clarendon Press, 1994)

with formalist traditions: it recognizes the human element in legal decision making.”¹¹

Another significant distinction between science and law is that common sense has no place in the former. Authorities claimed that theories that make sense on a common-sense level may almost likely be wrong scientifically.¹² Whatever the situation, science swiftly became recognised in the legal system as a trustworthy source of knowledge. Although scientific dependability is different from legal dependability, it is "reliability" that makes scientific evidence more appealing. Science seldom entirely replaces old principles with new ones; rather, the old principles are maintained while the new concepts are assimilated into a body of common knowledge. As a result, science may be acknowledged by the law as the real issue solver.¹³

4. IDENTIFYING AN EXPERT

The term "experts" can refer to any group of people. The only qualification that the law seeks to label a person as an expert is that they have superior knowledge and practical experience in the field where he is obliged to provide his or her opinion. No person shall remain permanently in the name. In most cases, having a degree in a particular field of study or career suffices to qualify someone to testify as an expert. In some jurisdictions, it is not confined to professional men.¹⁴ Although expert testimony can be very helpful in establishing the facts, one should be cognizant of its limitations. First of all, one should exercise caution when extrapolating too much from this type of evidence and avoid letting it replace the judge or jury's responsibility for fact-finding. Secondly, experts can be political and lack objectivity, even if their veracity and reliability are typically less of a concern than with factual witnesses. They are typically compensated professional witnesses who are chosen by parties to support their positions. The experts chosen are those who support a party's perspective, and those who do would not be contacted by that party.¹⁵ According to the conventional common law method of selecting an expert witness, no particular credentials were necessary. In the UK, the requirement is that the view must be beneficial to the fact-finder. This standard states

that if an expert's view does not aid the judge in deciding the issue at hand, then it will not be accepted as evidence, regardless of how well-known and skilled he or she may be in the subject matter. This test was derived from the leading decision *R v Turner*.¹⁶ Lawton, LJ., observed: "An expert's opinion is admissible to furnish the court with scientific information which is likely to be outside the experience and knowledge of a judge or jury. If on the proven facts, a judge or jury can form their conclusion without help; then the opinion of an expert is unnecessary."¹⁷

According to judicial rulings and Rule 702 of the Federal Rules of Evidence, the criteria that determine the choice of the expert in the United States include not only his appropriate qualifications but also his practical acquaintance with the subject and his ability for presenting. The courts would mandate that an expert possess the necessary credentials for the issue at hand. Although the law governing an expert's qualification is broad, courts have been applying it strictly and narrowly. *Smith v. Hobart Mfg. Co.* is the key U.S. ruling in this matter.¹⁸ The court observed: "An expert witness has been defined as a man of science, educated in the art, or persons possessing special or peculiar knowledge acquired from practical experience. He need not be infallible or show the highest degree of skill and particularly, he need not be registered of or the holder of degrees or certificates to become qualified."¹⁹ In the United States, the decision to appoint a particular person as an expert after evaluating his qualifications is entirely up to the trial court. Unless there has been severe misuse, the appellate court ordinarily cannot intervene in this discretionary jurisdiction. However, some legal experts believed that this authority should be fully granted to the trial judge and should not be subject to scrutiny on appeal however ways, but this viewpoint appears to be false and cannot be accepted. And the best course of action is, to establish a regular practice that an appellate court will not interfere with the trial court's discretion unless there has been an abuse of that discretion.²⁰

Under the Indian Evidence Act or any other statute, the terms "expert" or "expert opinion" are not defined in any way. Experts are defined

¹¹ RONALD DWORKIN, *LAW'S EMPIRE*, 272 (HUP. 1986)

¹² *Id.* 8, at 104

¹³ *Id.*

¹⁴ *supra* note 6, at 44

¹⁵ HODGE M. MALEK, *PHIPSON ON EVIDENCE*, 1742 (sweet & maxwell, 2022)

¹⁶ [1975] QB 834

¹⁷ *Id.*

¹⁸ *Smith v. Hobart Manufacturing Co.*, 194 F. Supp. 530 (E.D. Pa. 1961)

¹⁹ *Id.*

²⁰ 4 JOHN HENRY WIGMORE, *EVIDENCE IN TRIAL AT COMMON LAW*, 643 (little brown and co. 1905)

as those with a high level of knowledge in a particular field, such as foreign law, science, art, handwriting, or finger impressions, in Section 45 of the Indian Evidence Act. Therefore, Section 45 limits the use of expert testimony to these particular subjects "Science, Art, fingerprinting and foreign law". When comparing the laws for expert evidence between the US and India, it is obvious that the US provisions are more expansive and cover expert testimony on any subject and the topics on which an expert can testify have not been specified unlike India's legal regime rather by setting forth a few requirements, the judiciary is afforded discretion in subject selection and is liberal in incorporating even anything into the expression of the provisions of the Federal Rule of Evidence.²¹ According to this clause, they could accept the evidence of people who have experience in their line of employment even without qualification. Thus, it is possible to acknowledge the talent of a surveyor, accountant, blacksmith, and even a farmer.²² The legislation in India may be intended to broaden the definitions of "science" and "art" set forth in section 45 of the Evidence Act. For instance, the court can take into account creative evidence in light of breakthroughs in science or technology by defining these terms (science and art) more broadly. As a first step, the Patna High Court had the chance to interpret Section 45 of the Indian Evidence Act concerning the issue of whether footprint evidence could be admitted under the provision in which *Misir J.* used the word "science" as a universal Dictionary of English language term for proficiency, dexterity, skill-based on long experience and practise and came to the conclusion that it is wide enough to include the evidence of a footprint expert.²³ Similarly to this, the Supreme Court made an effort to define the intent and application of section 45 when addressing the significant legal issue of whether or not the testimony of a typewriter expert was acceptable under section 45 of the India Evidence Act. According to *J.S. Verma, J.*, the terms "science" and "art" as defined in section 45 of the Indian Evidence Act have a broad meaning that encompasses all branches of study.²⁴ The significance of this case was that the court imported the term 'skill or technique within the word 'science'. It is clear from those

decisions that the definitions of "science" and "art" under Section 45 of the Indian Evidence Act of 1872 can be liberally interpreted to include all relevant social and technological advancement. The only restriction is that each time, the new testimony subject must fall into one of the categories of "science" or "art." Additionally, the court may liberally interpret Section 45 to reflect recent technological improvements.

5. ACCEPTANCE AND REJECTION OF EXPERT TESTIMONY

To accept an expert's testimony in India, a qualification is required. The Indian Evidence Act's section 45 defines the term "expert" in terms of the law. If a witness is not covered by section 45, courts are hesitant to accept their testimony as an expert. A clarification of the term's definition in light of section 45 was made by the Allahabad High Court. According to the Court, the term "expert" has different meanings within and outside of the judicial system. A man could be an expert in his field of study outside of court, but in the legal system, the term "expert" has a specific meaning, and no witness is allowed to provide his or her testimony unless they are an expert in that field covered under section 45 of the Indian Evidence Act, 1872.²⁵ In another instance, the court concluded that experienced architects and municipal land surveyors cannot be regarded as valuers or experts merely because they occasionally had the opportunity to value various properties while performing their duties or conducting their business.²⁶ Furthermore, the areas in which an expert's opinion is important are listed in section 45 of the Evidence Act. Opinion evidence that is not listed is not admissible.²⁷ This ruling makes it clear that the court is more concerned with the skill itself than how it was gained. The qualities of a person to be designated as an expert in India must also be determined for a person to be admissible as an expert. The same had been further developed in a historic ruling when the court ruled that a "Person who as an expert provided evidence in the witness box, must be proved as having made the specific study or obtained special experience on the issue."²⁸ Additionally, the court made an effort to define the qualities that a person must

²¹ The Federal Rules of Evidence, U.S.R.702 (2020)

²² *Id*

²³ *Basudeo Gir v. State*, 1958 SCC OnLine Pat 177

²⁴ *State v. S.J. Choudhary*, (1996) 2 SCC 428

²⁵ *Ram Dass v. Secretary of State*, 1930 SCC OnLine All 100

²⁶ *Emperor v. Kauro Mizari*, 1938 SCC OnLine Sind JC 47

²⁷ *Dewan Chand v. Tirath Ram*, 1971 SCC OnLine Del 214

²⁸ *State of H.P. v. Jai Lal*, (1999) 7 SCC 280

possess to be referred to be an expert under the law as follows:²⁹

1. An expert is a person who has made the subject upon which he gives opinion a focus of their study, practice, or observation, giving them a unique understanding of it;
2. He is not a witness of fact, and his testimony is advisory;
3. He must have spent enough time studying the topic.

According to the above-mentioned court's opinion, certification is required in India for the admission of expert testimony. Nobody qualifies as an expert by making a generalised statement without mentioning their education or the type of service they provide. A legal presumption on a crucial competency element is not permitted absent supporting documentation. The onus of proof of expertise is upon the expert. The witness's testimony may be dismissed if the primary examination unequivocally demonstrates that he is incompetent. Normally, an expert would be permitted to present his or her testimony, and the opponent might challenge the expert's competence through cross-examination.³⁰ The primary role of an expert witness is to offer opinions based on the knowledge that is beyond the judge's ken.³¹ An expert's judgement does not, however, replace that of the Common man. The common man can also ponder and make judgments based on their daily experiences. As a result, the primary rule is to disallow expert testimony that will make it difficult for the judges to understand the facts. When the jury may draw the same inferences and conclusions as the witness, according to Wigmore "the expert witness is unscrupulous."³²

As already discussed, the trial judge in the United States has a lot of latitude in deciding whether to include or exclude expert testimony. Unless his action manifests erroneously, it would be upheld. Except in circumstances of abuse, the appellate courts typically do not meddle in the trial judge's judgement. Rule 702 or Rule 403 of the Federal Rules of Evidence allows the trial judge to exclude expert testimony if he determines that it will not help reach a decision.³³ This concept can be vividly elaborated in the case of *U.S v Hall*,³⁴ where the common knowledge requirement and the use of

judicial discretion in rejecting expert testimony were extensively explored by the U.S. Court of Appeals for the Seventh Circuit. The respondent was charged with kidnapping Jessica Roach and found guilty by the district court. During the trial, the respondent requested to introduce expert testimony from a psychiatrist regarding the validity of three eyewitness identifications. However, the district court denied the application on the grounds that, in accordance with Rule 702 of the Federal Rules of Evidence, such testimony would not be helpful to the fact-finder. It subsequently filed an appeal and argued that the district court erred by removing the psychiatrist's testimony regarding eyewitness identification. The appellate court reasoned that expert testimony regarding the risks of eyewitness identification would not benefit the jury because it deals with a subject the jury was already aware of and would not aid in improving their comprehension of the specific factual concerns raised.³⁵ Thus, it is evident that the trial judge in the US has wide latitude in deciding whether to include or exclude expert testimony.

6. UNDERSTANDING THE GIST OF RELIABILITY AND ADMISSIBILITY

Evidence is the deciding factor in a case for either convicting or acquitting the accused per the law. It is a basic rule that evidence is always offered to support or refute a fact in question, but each of these facts has a certain amount of evidentiary value, which directly influences the relevance, admissibility, and reliability of that evidence. Therefore, making a distinction between what constitutes relevance, admissibility, and reliability of evidence is crucial.

Relevancy is the first stage of admissibility since for evidence to be admitted, it must first be necessarily relevant, this means the admissibility of evidence is based on relevancy and reliability.³⁶ And the court has the authority to decide whether or not the evidence is admissible, regardless of whether it pertains to

²⁹ Balkrishna Das Agarwal v. Radha Devi, 1988 SCC OnLine All 868

³⁰ V.R DINKAR, SCIENTIFIC EXPERT EVIDENCE, 56 (1st ed., Eastern Law House 2013).

³¹ CHARLES T. MCCORMICK, EVIDENCE, 33 (3rd ed., West, St. Paul, Minn. 1984)

³² John Henry Wigmore, Evidence In Trial At Common Law, §1917(2020)

³³ *Ib.* at 63

³⁴ *U.S. v. Hall*, 165 F.3d 1095 (7th Cir. 1999)

³⁵ *Ib.* at 32

³⁶ <https://legal-dictionary.thefreedictionary.com/admissibility>

a factual or legal issue.³⁷ Therefore, even scientific data is only reliable to the extent that it aids in providing answers to the issues raised in the context of a particular situation. In some cases, forensic methods may be less valued and beneficial than direct eyewitness testimony, yet they may be able to provide an answer to a crucial question. But sometimes this direct testimony might be risky. An apt illustration of this is the case of Adolf Beck, who was twice convicted after eight or ten witnesses identified Beck as the person who had cheated them. It was later determined that this was an instance of mistaken identity.³⁸ People were occasionally mistakenly imprisoned for crimes they did not even commit before the advent of forensic science, which relied on eyewitness testimony. That episode illustrates the likelihood of identity confusion occurrences, and forensic science can at least help rule out potential suspects by providing evidence rather than identifying the criminal. Therefore, in the modern era with the advancement of science and technology that prompt the commission of a crime in a more sophisticated manner, the court frequently seeks and relies upon more on expert opinion now, and speaking of the admissibility of scientific evidence presented in court just like any other evidence the judge will determine and make the final decision. Hence, the judge is the ultimate arbiter.

7. THE ADMISSIBILITY OF SCIENTIFIC EVIDENCE IN THE UNITED STATES

The admissibility of scientific evidence was in pathetic condition in the United States until the Frye test was formulated. The first case in which the court had attempted to formulate a particular standard for the admissibility of scientific expert testimony, especially the novel scientific expert testimony. Though there was various problem in the application of the prescribed standard, courts in the United States jurisdiction uniformly applied it for seventy years. The Freye decision was delivered by Judge Van Ordsdel and was reported in the Federal Reporter as having only two pages. The Standard pronounced by the judge was: "Just when the scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone, the evidential

force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-organized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs."³⁹ The dictum seems to be that to admit a particular piece of scientific evidence, the person adducing it shall sufficiently establish that the scientific principle or the discovery from which the concerned expert testimony was deduced has gained general acceptance in the particular field in which it belongs. The Court also mandates that to be admissible, the expert scientific testimony should be in the demonstrable stage and not merely in the stage of experimentation.⁴⁰ That means the technique when comes before the court of law for admissibility, the scientific process should achieve the stage of demonstrability.

It is understood that the Freye ruling was rendered long before the Federal Rules of Evidence were adopted in 1975. As a result, following the enactment of the said Rule (Federal Rules of Evidence), it has certain effects on how the 'Frey Standard' is used to determine whether expert testimony is admissible. The Rules were designed to be applied uniformly over the entire United States jurisdiction. Rule 702 to 702 exclusively deals with expert evidence, Rule 702 expressly says that " if the scientific, technical, or other specialized knowledge will assist the trier of the fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education, may testify thereto in the form of an opinion or otherwise."⁴¹ Since the enactment of the Federal Rule of Evidence, there arose a conflict between judicial decisions favouring and rejecting Frey's general acceptance standard. United States v Williams, was one of the first decisions in which the Frey standard was abandoned and a more flexible and liberal approach was adopted the Second Circuit Court held that the Frye standard had been superseded by the Federal Rule of Evidence, which stressed a more permissive method for determining admissibility.⁴² At that point of juncture, the major question posed before the

³⁷ Edmund M. Morgan, Functions of Judge and Jury in the Determination of Preliminary Questions of Fact, 43 Harv.Law Rev.166,172(1929).

³⁸ Hindu Singh v. State, 1951 SCC OnLine Raj 162

³⁹ Frye v. United States, 293 F. 1013 (D.C. Cir. 1923)

⁴⁰ *Ib.*

⁴¹ The Federal Rules of Evidence, Fed.R.Evid. 702 (2020)

⁴² United States v. Williams, 175 F.2d 715 (7th Cir. 1949)

court was whether Frye had been superseded by the rules of the Federal Rule of Evidence. Some courts took the stand that even though Frye remains the majority rule, its precedential value has been diluted by the Rules. However, some federal courts continue to follow Frye since it became a dispositive test for the admissibility of the proffered evidence. In the meantime, the United States Supreme court addressed the issue regarding the standard of admissibility under the Federal Rule of Evidence.⁴³ Finally, in 1993 the United States Supreme Court put forward another standard overruling Frye's monopoly in determining the criteria for evaluating the scientific evidence. This was imported after considering the provisions in the Federal Rule of Evidence. This path-breaking decision was handed down by the Supreme court in *Daubert v Merrell Dow Pharmaceuticals, Inc.* Judges always considered the testimony of an expert if they have their technique marketable. The court suggested several criteria that the trial judge should take into account when deciding whether a theory or method is scientific knowledge that will be helpful to the fact-finder.⁴⁴ The court specifically stated that; "focus shall be given to the principles and methodology and not on the conclusions that they generate. The court is also cautious that instead of wholesale exclusion under the general acceptance test, the trial judge might use the conventional methods like probative value substantially outweighed by the danger of unfair prejudice, confusion of the issues and misleading the jury. Finally, the task was ended by entrusting trial judges with a "gatekeeper's" role while evaluating scientific evidence."⁴⁵

As a result, the *Daubert* court clarified the criteria for accepting scientific expert testimony; nonetheless, the criteria for accepting non-scientific evidence are still up for debate. This issue came before the Supreme Court in *General Electric Co. v. Joiner*⁴⁶ and *Kimho Tyre Co. v. Carmichael*.⁴⁷ In this case, the issue before the court was whether *Daubert* standard was framed to suit only scientific expert testimony also. Court held that *Daubert's* four-part reliability test applies not only to scientific evidence but also to non-scientific expert testimony. Therefore, while the federal standard called for widespread acceptance, the

courts clarified that trial judges serve as the final arbiters and "gatekeepers" for the admissibility of evidence and recognition in their courtrooms. And the following factors should be taken into account by judges while making such decisions:⁴⁸

- 1) What is the fundamental idea and was it put to the test?
- 2) Are there any guidelines governing the methodology?
- 3) Has the idea or method been applied to peer review or publishing?
- 4) What is the standard or anticipated level of error?
- 5) Is the principle generally accepted?
- 6) Has the expert sufficiently researched all potential theories?
- 7) Has the expert unfairly extrapolated from a presumption that was agreed upon?

It is crucial to emphasise that the *Daubert* ratio also acknowledges that doubts about flimsy evidence may be addressed by cross-examining witnesses, thorough guidance on the standard of evidence and analysis of evidence to the contrary. Medical expert testimony is, nevertheless, a common practice in many nations when applying the *Daubert* principle. Nevertheless, several jurisdictions continue to use the *Frye* standard's revision.

In the United States, the question of "How does the court decide if an applicant is an expert?" and "Which qualifications do they have to follow?", in addition to the standard established in *Frye* and *Daubert* is addressed in Rule 702, which only seek for specialists who have been "trained via skill, ability, practise, learning, and schooling." Typically, a significant amount of education and experience is required to be recognised as a genuine (specialist in any area). The person who presented the laboratory report and takes credit for the study and finding by publishing a report will typically serve as the court expert. Both parties are subject to the competency of that court, and the defendant may use their experts to refute this evidence (*Frye*, *Daubert*, Rule-702). Expert witnesses must know how to react to these types of questions when they are called witnesses. It is important to remember that the judge presiding over the case alone decides whether forensic evidence is admissible. As a recent development, all forensic science service

⁴³ V.R DINKAR, SCIENTIFIC EXPERT EVIDENCE, 157 (1st ed., Eastern Law House 2013).

⁴⁴ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S. Ct. 2786 (1993)

⁴⁵ *Ib.* at 41

⁴⁶ *General Electric Co. v. Joiner*, 522 U.S. 136 (1997)

⁴⁷ *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 119 S. Ct. 1167 (1999)

⁴⁸ STA Law firm, United States: Admissibility Of Forensic Evidence In Courts – USA Overview, (Oct. 15, 2022, 10:04 AM), <https://www.mondaq.com/unitedstates/crime/897356>

providers should be required to be accredited, according to a recent important change proposed by the National Academies Study 2009 (NAS Report). All laboratories and facilities, both public and private, should be certified, according to the NAS report's seventh recommendation, which also recommends that when choosing acceptable accreditation standards, consideration be given to clearly defined and acknowledged international standards like those produced by the International Organization for Standardization (ISO).⁴⁹

8. ADMISSIBILITY OF EXPERT OPINION IN INDIA

In India, the evaluation of scientific evidence is not uniform and in place. The formulation and application by the judges per their whims and fancies are the variables influencing the admissibility of scientific evidence. The main issue in India is that the Indian Evidence Act is silent on the criteria that trial judges should use when assessing scientific evidence. Sections 45, 45A, 46, and 51 of the Indian Evidence Act's 1872 deal with the relevancy of opinion evidence in both civil and criminal proceedings. According to section 45, a person with "particular competence" in either the subjects specifically stated in section 45 or any other subjects that would fall under the broad categories of "science" or "art" may provide opinion testimony if the court required one. It is clear from the provision's phrasing that the testimony of those covered by section 45 must take the form of an opinion, and that the court may only take this kind of testimony into account. The court interprets the words 'science' and 'art' liberally and thereby updates the Law in tune with technological advancement. The new testimony should either come under 'science' or 'art'. It is assumed that the legislature would foresee temporal developments and intend for the Act to be applied in a way that will give effect to its actual objective.⁵⁰ It is also evident in some cases that the court took a very strict stance and excluded the evidence that was not directly come under the words specifically mentioned in section 45, likewise the court held that the opinion of a sub-inspector would not come under s.45 of the

Indian Evidence Act since the court was not called upon to form an opinion on the point of freeing law, science, art or as to identify of handwriting.⁵¹ Currently due to the advancement of technology, is inevitable to include information technology experts under the term 'science'. And it is pertinent to distinguish the terms 'science' and 'art' and technology since there is a possibility that this term might confuse the fact-finder. In some cases, the subject may either come under science and art and in others, it may come under the two heads. Likewise, it is not possible to say the term under which typewriting, psychology and photography would come. Thus, in a landmark case, the court was confused about whether telephony would come under science or art. Quoting with approval from Ameer Ali's Law of Evidence, the court held, the person; testimony would come either under science or art if the person had expertise in the telephony in question since it come either under science or art.⁵²

Considering that scientific evidence is merely inferences taken from data, it would not take precedence over direct eyewitness testimony unless there was a significant enough discrepancy between the two to invalidate the oral testimony, it was held that "expert evidence is opinion evidence and it can't take the place of substantive evidence. It is a rule of procedure that expert evidence must be corroborated either by clear direct evidence or by circumstantial evidence."⁵³ As was previously mentioned, for scientific evidence to be admissible, it must first be relevant. Additionally, a court may examine an expert to evaluate whether or not their view is reliable. Accordingly, the court has established the following principle in this regard:⁵⁴

- (i) the expert's educational background in the field,
- (ii) practical understanding of the subject,
- (iii) The thorough analysis in the conclusion suggested, and
- (iv) the capacity to clearly describe how he arrived at the specified conclusion.

In the same way that other pieces of evidence are tested, the expert opinion must also be examined for reliability. The Supreme Court thus adopted in the Murari Lal case, the following guidelines.⁵⁵

⁴⁹ *Ib* at 46

⁵⁰ *State v. S.J. Choudhary*, (1996) 2 SCC 428

⁵¹ *Harakchand Radhakishan v. State*, 1953 SCC OnLine MP 135

⁵² *Bachraj Factories Ltd. v. Bombay Telephone Co. Ltd.*, 1939 SCC OnLine Sind JC 107

⁵³ *Arshad v. State of A.P.*, 1995 SCC OnLine AP 650

⁵⁴ *Naveen Krishna Bothireddy v. State of Telangana*, 2017 SCC OnLine Hyd 99

⁵⁵ *Murari Lal v. State of M.P.*, (1980) 1 SCC 704

1. Corroboration must be sought when necessary.
2. The justification for the opinion needs to be carefully analysed. Other pertinent evidence must be taken into account.
3. The risk in believing an expert's view comes from the fact that all human judgement is subject to error, not from the fact that experts are unreliable witnesses.
4. An expert's opinion is reliable, but it is neither binding nor definitive. The court shouldn't give up its opinion to that of the experts.

In each of the aforementioned opined, it is clear that the expert is not exempt from being questioned in court just like any other witness, and that it is impossible to rely solely on an opinion without having the expert under cross-examination.⁵⁶ The mandatory requirement of the expert's examination suggests that "no expert would claim today that he could be undisputedly sure that his opinion was correct. Expert depends to a great extent upon the materials put before him and the nature of question put to him."⁵⁷ Also, the court views expert testimony as weak evidence and does not find it to be decisive. Therefore, without getting corroboration, it is not safe to rely on.⁵⁸ Additionally, if sections 45 and 60 of the Indian Evidence Act, of 1872 conflict, section 45, which dealt with expert testimony, and Section 60, which dealt with oral and direct evidence, section 60 should take precedence. For instance, the Supreme Court held that where there is an inconsistency between the eye witness and the Doctor on the point of how the injury was caused, the Evidence of the Doctor cannot override an impeachable eye witness testimony.⁵⁹

9. CONCLUSION

It is determined that the requirement hear expert testimony underlies the relevance, admissibility, and reliability of scientific evidence in both the United States and India. The standard is whether the subject is outside the realm of ordinary knowledge and experience and if the court would be knowledgeable about it. Only the relevance of expert opinion is addressed in Section 45 of the Evidence Act of 1872; its reliability, admissibility, and dependability are left up to the discretion of the

court. According to section 45 of the India Evidence Act, of 1872, the term "science" and "art" continue to be relevant when referring to areas on which a course of specific study or experience is required for the formation of an opinion. As a result, the terms "science" and "art" are extensively interpreted to mean more than just the fine arts and higher sciences, respectively. The test to be used to evaluate whether a given matter is scientific or not is whether the subject of investigation is such that untrained people are unlikely to prove capable of making a proper decision without the help of professionals. In the United States, the cases of Frye, Daubert, and Kumho were crucial in establishing the criteria for expert admissibility. Frey's general acceptance test, which was widely used to determine the admissibility of novel scientific evidence from 1923 to 1993, was overturned by the United States Supreme Court in the Daubert case, and the U.S. Congress responded by amending Rule 702 of the Federal Rule of Evidence. As a result, this provision, along with the Frey standards and Daubert principles, is largely what determines whether scientific evidence is admissible in trials to date. The law of evidence in both nations (India and the United States) is designed to ensure that the court considers only the evidence which will enable it to reach a reliable conclusion and is the one thing that both nations have in common.⁶⁰

In India, the evaluation of scientific evidence under section 293 of Crpc 1973 seems to have an overriding effect on section 45 of the Evidence Act, of 1872. The purpose of the sections is to exempt certain Government scientific officers from examination, given their status, qualification and experience in the field. The officers specifically mentioned in the concerned sections are privileged from their appearance before the court of law.⁶¹ And this privilege is not vested to any other experts in private laboratories regardless of their qualifications and expertise. In India upshot of the provision is that the courts are admitting the evidence based on the scientific report given by the Government experts at the face value since the defense lawyers are not in a position to cross-examine the witnesses. This section has given a very wide power to the judiciary in admitting the experts' reports and the court is

⁵⁶ State of Maharashtra v. Damu S/o Gopinath Shinde, A.I.R. 2000 S.C 1691

⁵⁷ State (Delhi Administration) v. Poli Ram, A.I.R. 1979 S.C.R. (1) 931

⁵⁸ S. Gopala Reddy v State of Andhra Pradesh A.I.R 1996 S.C. 2184

⁵⁹ Darshan vs State of Haryana, A.I.R. 1997 S.C. 364

⁶⁰ *supra* note 40, at 161.

⁶¹ CrPC. s. 293

expected to use it judicially without committing any abuse.