

Implications of Scientific Aid in Criminal Investigation

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ABSTRACT

Science has the most celebrated feature of stability and certainty. These day science and technology has been playing its role in every sphere of human life. The advancement in medical science and engineering make it possible today to have accurately know the cause of death of a person or reasons of building collapse. But at the same time criminals have also learned a lot from this progress and they also resort to scientific methods and technology while committing the crimes, which either used by them to mislead the police and scientific investigators or for erasing the clues and signs of offence. However, it is also well known fact that despite of all out best efforts a criminal cannot make a crime scene free from evidence. At this point Science and Technology come to aid the law and legal procedure for apprehending the culprit and securing the evidence scattered there in minute forms in the shape of blood patterns, saliva, sweat, trace elements like fragment of glass or paint etc. It is the job of Forensic investigator, who when comes to courts known as Expert Witness, to link such evidence with culprit. This Article analyze the concept of Scientific Aid in relation to Forensic Science which is the field within it all the above-mentioned activities get the shape of evidence and drive the legal authority.

Key Words

Scientific Aid, Forensic Science, Expert Witness, Law, Evidence

1.Introduction

Forensic Science is the common term about which every lawyer aware that it concerns with use of Science and technology in the matters connected with law, while Scientific Aid is not that common, but it is most similar laying the pitch alongside the law as an assistant of law in the administration of justice. "Scientific Aid" is a very broad and comprehensive term, in so far, when its application in the field of law comes into the question, especially in the context of law and legal investigation and justice. However, application of science and scientific methods and techniques in the process of collection of evidence by the investigators from the scene of crime or event, as the case may be, and the analysis of materials so collected in the Science laboratories, along with specific provisions of law providing for application of scientific procedure, which can ascertain a fact relevant for a court as matter of proof, thus, helping a court to reach on a right determination, may be coined as 'Scientific Aid'. Scientific Aid includes the forensic science in itself, however, it is not confined to this only, and its amplitude is much wider, because there are many laws

and statutes which contain specific provisions about use of scientific methodology in the process of implementing the objectives of those laws. Scientific Evidence also comes under the phrase “Scientific Aid”. Scientific evidence has made a vital and well recognized cherished contribution in improving the factual accuracy of criminal convictions¹. Therefore, application of Principles of science in the procedure of law or use of scientific methods and techniques for the proper implementation of law specifically or generally provided under a legislation is scientific aid. Picking up physical evidence from the scene of crime by using the forensic methods and techniques (which are non-other than the scientific methods and techniques) viz chemical analysis of fibre or trace element, or obtaining the evidence from accused by way of conducting the Narco-Analysis Test, DNA Test or Lie Detector Test, are also “Scientific Aid” to the Evidence and Justice in the criminal matters. Besides this, by making available scientific facilities to the common man in the form of computers and others electronic gadgets like mobiles and Televisions, along with advanced scientific techniques for procreation of children through artificial insemination in the form of test-tube babies or babies through surrogacy to those who are deprived from having the child naturally, and for assisting the human beings to lead the easy and happy life, are the other form of “Scientific Aid” to the justice.

2. Jurisprudential Analysis of Scientific Aid:

It is noteworthy that scientific methods are, in a sense, way of practical thinking. They are about the understanding and learning of whatever observed in the form of phenomena and attempt to get the correlation between different components on the basis of philosophy that there exists, under the given conditions, order and consistency in certain activities in the universe. More specifically, the scientific method of inter relating observations of an activity is to draw a hypothesis and then verify it by test, in the form of analysis of other observations, experiments, and specifically devise or controlled instruments aided experiments. When these experiments confirm the so drawn hypothesis, it stands, but if not, a need arise for new hypothesis which must be again needed to be tested. In that manner, thus, a corpus or body of knowledge has been developed which can be relied upon with certain certainty to make avail foundation for extending the process further². Science is, however, much more in comparison with philosophy having its own purposes. The utilization of discoveries and techniques based on concrete scientific foundations, mostly for ensuring the welfare of mankind and humane causes, has been, undoubtedly, the great achievements of the nineteenth and twentieth centuries, and which are and should still continue in twenty first century, but yet another advantage has been coming in the mode of development of techniques and methods of analysis of vital components of materials to determine, for instance, the proportion and presence of elements or impurities of the samples in many substance³.

Analytical techniques and methods of science and technology are, generally, based on judging the substance by testing, in laboratory or otherwise, of the concerned material in dispute against the well established standard knowledge of concerned subject. For example, to show the presence of the sulphate ion in a liquid solution, barium chloride may be added, which yields certain confirm result. The resulting ‘precipitate’ will indicate that it is indeed there, because barium sulphate, which is not soluble in this solution, has always come out as product under these circumstances. The ‘corpus’ of scientific knowledge in the stream of chemistry relating to barium and its derivatives and compounds, is, in fact, the very basis of

¹ . Kevin C. McMunigal, “Prosecutors and Corrupt Science” 36(2) Hofstra Law Review 437, (2007).

² .David Ellen, Stephen Day and Christopher Davies; *Scientific Examination of Documents: Methods and Techniques* 1 (4th Edi, .R.C. Press, Taylor & Francis Group, Boca Raton, 2018).

³ . Id., at p. 2.

confidence reflected in the results. Therefore, in the same way, similar correlation and dependency on the entirely constant, consistent and re-producible results, under the identical conditions, is the stratum of other analytical methods and techniques, which may be of much greater complexities⁴.

Such scientific analyses by repeated scientific experiments are, generally, of great value in many diverse fields, one of such fields is investigation of crime and, indeed also in other matters concerning the crime and its evidence in courts of law. Forensic Science, as a branch of Scientific aid, employs and applies various significant analytical techniques and methods to measure, compare and identify the material found at the crime scene with that of obtained as sample. According to experts, for tracing, identification and measurement of qualities of drugs, alcohol and other intoxicated substances, conventional methods of the scientific nature have been applied similar to those generally utilized in other fields of quantitative and qualitative chemical analysis. Comparison is obviously very vital and important in many fields of investigation of crimes. Blood splatters, patterns, traces of blood, paints, glass, and fibers left by the offender despite of all the precautions at the scenes of crime or those which are transferred from scene of crime to the culprit, become crucial evidence, later on, in criminal trials. On the similar fashion, marks produced by tools, fingers of victim or culprit, or boots of the assailant can be traced and found at a scene of crime. It is, as a matter of fact before courts, important for the investigators to show and prove that such traces or marks matching their possible origin(s) and, if they do, how much possibility exists that they could, in some cases, might have come from different source. therefore, identification and comparison of the material found at the crime scene with the material obtained in sample is *sine qua non* in the forensic investigation⁵.

2.1. Forensic Science:

Forensic Science is the combination of two words i.e. “Forensic” and “Science”. In order to understand properly the term “Forensic Science”, it become essential to understand the real meaning of both the words viz “Forensic” and “Science” separately and jointly.

2.2. Forensic:

"Forensic" is a term which means “application of scientific principles in the field of law” "or use of science pertaining to the law," or “relating to or dealing with the application and use of knowledge of science in the legal problems” or “scientific analysis’ of physical evidence”⁶. According To Oxford English Dictionary, the word “forensic” means “relating to the use of scientific methods in the investigation of crime” and “relating to a court of law”⁷. Historically, the term “Forensic” is derived from the Latin construction “*forum + ensis*”, indicating towards the public forums in which the Romans, in the ancient time, debated and decide their legal disputes and where ‘verdicts’ were delivered⁸.

2.3. Science:

The word “Science” means a branch of Specific knowledge involving the steps of systematized observations, experiments, re-experiments and induction, or “knowledge so gained (by way of systematized observations, experiments and induction)” or “pursuit or principle of this systematized observations and

⁴ . Id.,

⁵ . Id., at pp. 2-3.

⁶ . Merriam-Webster’s Collegiate Dictionary 490 (Merriam-Webster, Incorporated, Springfield, Massachusetts, U.S.A., 2004).

⁷ . Paperback Oxford English Dictionary 281 (Oxford University Press, Oxford (U.K.), 2012).

⁸ . Michael Fitting Karagiozis and Richard Sgaglio, *Forensic Investigation Handbook: An Introduction to the Collection, Preservation, Analysis and Presentation of Evidence* 3 (Charles C. Thomas Publishers Ltd., Springfield, Illinois, U.S.A., 2005).

experiments or skillful techniques⁹". Science arises from the discovery of Identity amid Diversity¹⁰. Further, in every act involving science, we are, in fact, engage about some definite identity, similarity, sameness, resemblance, likeliness, analogy, 'equivalence' or equality visible or apparent between two things or objects¹¹.

The entire value and significance of science consists in its capacity and power that confers ability on human beings of precise application to one object the specific knowledge obtained from similar objects, and that's why, one can discover and register the similarities or differences, and the same can be transformed into the observations to account¹². Science is, therefore, a systematic approach or enterprise which builds (constructs), organizes, arranges and shares the specific knowledge in the form of testable and re-testable predictions and explanations about almost everything present in this universe¹³.

2.4. Combination of 'Forensic' and 'Science':

On the combination of both words "Forensic" and "Science", the meaning becomes application of scientific methods in the investigation of crime which yield definite or accurate and identical results on the basis of analysis of data found at the place of crime.

Thus, logically, forensic science involves applying scientific principles to legal investigations. Interestingly, the term "Criminalistics" stands as synonym for "Forensic Science". Criminalistics apply to the various aspects of applying scientific and technological methods to the investigation and resolution of legal matters. In some countries, Forensic Science Laboratories and Forensic Scientists are called "Criminalists"¹⁴. Forensic scientists analyze evidence received from police officers and detectives, and then prepare detailed reports of their findings through analysis of those evidence. Forensic science covers a variety of investigative areas. It can point a criminal investigation in the right direction or provide proof of a suspect's guilt or innocence. Most forensic science technicians specialize in either crime scene investigation or laboratory analysis¹⁵.

In ancient Roman Empire, the Senate of that time had the tendency to conduct its meetings in a public place called the *Forum*. The key here is that the forum was a place anyone could come and observe. The term 'forum' is Latin for 'Public' and "Forensic" is derived from that term. "Forensic Science" implies...something about science and public. In the bigger sense "Forensic Science" can be defined as the methods of science applied to the public matters. By this definition, forensic science does not necessarily have to do with crime, but the term have evolved in modern times to refer to the application of science to courts or criminal matters¹⁶.

Dramatic scientific breakthroughs, especially the finding of DNA Profiling,..... have really revolutionized the application of forensic science. Evidence, in any criminal mater, can be easily

⁹ . Oxford Dictionary and Thesaurus 679 (Oxford University Press, Oxford (U.K.), 2011).

¹⁰ . W. Stanley Jevons, *The Principles of Science: A Treatise on Logic and Scientific Method* 1 (MacMillan and Company, New York, 1874).

¹¹ . Ibid.

¹² . Ibid.

¹³ . Mark Chang, *Principles of Scientific Methods* 1 (C.R.C. Press-Taylor and Francis Group, Boca Raton, Florida, 2014)

¹⁴ . Max M. Houck and Jay A. Siegel, *Fundamentals of Forensic Science* 4 (Academic Press-An Imprint of Elsevier, London, 2010).

¹⁵ . Jeffrey Joyner , "What is Forensic Science and How Can It Aid in Criminal Investigation?" <http://work.chron.com/forensic-science-can-aid-criminal-investigation-27568.html> Last Visited on 28/04/2020.

¹⁶ . Jay A. Siegel and Kathy Mirakovits; *Forensic Science: The Basics* 6 (2nd Ed., CRC Press, Taylor & Francis Group, Boca Raton, (Florida-U.S.) 2010),

obtained by using the microscope through microscopic traces of human body fluids, illegal or legal drugs and explosives like sodium nitrate of sufficient quality for it to be crucial in an investigation conducted by police and trial by the court¹⁷. Moreover, there has been remarkably a parallel and vital revolution taken place in the strategy and method used by the police to investigate crime. It is, of course, more and much effective, rapid, and more trustworthy to investigate those crimes that affect us most today (Car theft, burglary, etc.) using DNA and fingerprints than by any other means. In major crime, such as homicide, forensic scientists have moved from being backroom boffins to the forefronts of international investigations. Forensic Science is now firmly embedded in the criminal justice agenda since it can answer investigative questions in many instances better than any other means available. It is a complex activity at the interface of science and law¹⁸.

Forensic Scientist have two major duties. First, analysis of evidence and court testimony, and, Second, Crime Scene Investigation, (though it is not a common part of their job, but some Forensic Scientists do it). Analysis of scientific evidence is the bread and butter of forensic science. In most cases, forensic science laboratories analyze evidence brought to them by forensic investigators or police investigators¹⁹.

Forensic Science is not a discipline in its own right, but engages many disciplines such as chemistry, molecular biology and engineering, though it has number of distinct features. Whilst roosted in science, it is an intensely a practical activity that deals with real world issues: explosions, blood splatters, bodies, and stolen cars. Complex scientific findings must be weighed carefully and dispassionately, and communicated with clarity, simplicity, and precision to police, lawyers, jurors, and the judiciary. Forensic Science encounters all aspects of human behavior²⁰.

3. Forensic Investigation:

Although many claims that Forensic Science is not a true science as there exist no mechanism and conditions for the controlled experiments and analysis of results, but Forensic Investigation has been successful in getting the proper and complete recognition from the scientists, investigators and Jurists. Forensic investigation is concerned primarily with adding and combing together the indiscrete desperate clues (in the form of Evidence) by the culprit(s) at the scene of crime in order to form a coherent picture of events, and, crucially to establish the identity of those involved or-equally importantly- those who were not²¹. Crime scene investigators carefully and systematically sift through a crime scene to learn how and when the crime was committed, who committed it and why, and perhaps what items may have been removed from the crime scene. All these materials, if properly collected, analyzed and interpreted, tells the story behinds the events that took place²².

One of the major aspects of Forensic Investigation is Crime scene investigation, the focal point of which would be on utilizing 'scientific' and social analysis techniques to assist and aid law enforcement and in de-covering all information (possibly all reconstruction of crime, and the material related with crime)

¹⁷ . Jim Fraser; *Forensic Science: A Very Short Introduction* xi-xii (Oxford University Press, Oxford, 2010). See 'Acknowledgement and Preface'.

¹⁸ . Ibid.

¹⁹ . Jay A. Siegel; *Forensic Science: A Beginners' Guides* 2-3 (Oneworld Publications, London, 2016).

²⁰ . Tal Golan; *Laws of Men and Laws of Nature: The History of Scientific Expert Testimony in England and America* 5-6 (Harvard University Press, London, 2004).

²¹ . Nigel McCrery; *Silent Witnesses: A History of Forensic Science* 1 (Random House, London, 2013).

²² . Supra Note 20, p.31. Tal Golan; *Laws of Men and Laws of Nature*

about a crime. Crime scene investigators, obviously, work at the scene of a crime, gathering any relevant evidence for later analysis.

After, investigation of crime, when sufficient evidence have been collected and Investigators are confident enough that a culprit shall be convict by the court on the foundation of the evidence collected by them from the crime scene and other places, they handed over the case to the public prosecutor who initiate the prosecution²³ and Forensic Investigators need also to be appear before the Court as Expert Witness.

4. Expert Witness:

Witnesses are the eyes and ears of the Court, says Bentham, but when it comes on Expert Witness, that dictum does not apply. An 'Expert' witness is that person of the special expertise who has practical experience and qualification (not necessarily academic qualification, but it is desirable) in a specialized field like metallurgy, nuclear science, medicinal science, engineering etc. Before coming upon expert witnesses, it is not unworthy to recounts a late Eighteenth Century legal development that serves in the legal literature about the origin story as the notable surge of expert testimony in the modern Anglo-Indian Legal System. At the start of the Eighteenth Century, natural Law philosophy was regarded as not practical but merely a doctrinal 'bookish' study of 'nature' in general. At the dusk of that century, however, it has squeezed its area and narrowed its focus on inanimate materialistic world, supplants learning from treatises and books with empirical study focusing on the results of experiments, borrowed a little matter from mathematics and material sciences and showed inclination towards the practical utility of law. Meanwhile the lawyers were, as observed, consolidated their control on the pleading and arguments and, in particular on the production of evidence and its presentation in the court rooms before the judges. At the dawn of the Eighteenth century, especially in the English Legal System, it was the judiciary which dominated the criminal proceedings, and as the trend of that time, the accused represented themselves. The evidence was mostly, as a matter of fact, adduced either by direct in court altercations between accusers, accused and witnesses, or by the judge(s) who examined the parties and witnesses himself. By the end of the century, the lawyers had reduced the trial judge to an umpire, took over the examination of witnesses, developed the techniques of cross examination, established their rights to argue point of law, and completely transformed the English Legal System into the adversarial system as we know it today²⁴.

Traditionally, experts appeared in the court either as a member of jury (in many western Countries) or in the role of court advisors. In both cases, their performance was initiated and controlled by courts, which assumed the impartiality of experts. But it is noticed that during the eighteenth century, as the courts slowly and steadily assumed the relatively neutral position, as the (parties) litigants started to call their own specialists or experts to favourably represent them before the courts, and as adversarial ideology was given free reign, a new place had to be found for the experts²⁵. The incipient conflict reflected first time in *Folkes v. Chadd*²⁶. In this case, also known as 'Wells Harbor' Case, litigants summoned to court several sorts of "men of Science", to testify before the jury as to what has caused to decay of a certain harbor at Norfolk Coast of England. The testimony of one of these experts, a prominent Newtonian philosopher, was disallowed because of the lawyers' objection that his philosophical explanation was "matter of opinion,

²³ . Code of Criminal Procedure, 1973 (India); Section 170

²⁴ . Supra note 20, at 5-6.

²⁵ . Id., p.6.

²⁶ . (1782) 3 Doug K.B. 157.

which could be no foundation for the verdict of the jury.” On appeal, Lord Mansfield, Chief Justice of the King’s Bench, found the silencing of the philosopher to be an error and granted a new trial on the ground that the philosopher’s theory was “Very proper evidence.”²⁷

“If technical or scientific, or any other ‘specialized knowledge’ will go to help the adjudicator (judge or Magistrate) who in trial verify the facts and also to properly evaluate and understand (either accept or reject) the evidence presented in a dispute or help to determine a fact in issue, then a witness, in fact an expert witness, who is well qualified as an expert because of his special knowledge, special skill, vast experience, professional training, or special education, may, if the court permits, testify thereto, however, such testimony would generally in the form of an opinion, but in some cases, it may be otherwise as well i.e. demonstration”²⁸. The admissibility²⁹ of Expert’s Evidence depends on question, will such testimony before the court would help the judge in making up the mind about a fact, and whether that witness, who is claiming possessing the special knowledge, is fulfilling all the conditions of qualification as an expert, as in no law, hard and fast definition of Expert is given for the purpose of Evidence Law.

The common law, in England and other Common Wealth Countries, recognizes as a matter of general rule that evidence presented by an expert would be admissible as a matter of law only if such evidence is “*sufficiently well established to pass the ordinary tests of relevance and reliability.*” However, relevance of an evidence can be determined only when if it is first assumed or concluded by a judge that such evidence will actually connected with the event in question and, hence, do provide the court with assistance in making the final conclusion. However, the validity or trustworthiness of this assumption or conclusion much depends, in turn, on another concrete assumption or major finding that such evidence is by all means sufficiently reliable to be considered and relied upon by the court³⁰.

Under the law, the experts can and may, or, in most of the cases usually do, in the court and express their opinions in the form of testimonies. The opinions of such experts required to have been supported by the proper and adequate concrete ‘foundation’ of reliable and to some degree, trustworthy facts or data, or any material, rather than by surmise or conjecture. Thus, an expert of any specialized field usually and frequently relies on (firsthand or secondhand) material ‘observations’ of data and facts, or anyone of them, or opinions of the investigator or other experts delivered prior to the commencement of trial, or presented at trial during the process of recording the testimony or during the time when a ‘hypothetical question’ related to it posed by a lawyer or judge. Moreover, Courts don’t require from specialists presented themselves before the court as experts to actually have ‘firsthand knowledge’ of concerned facts, data, or opinions because, generally, as a matter of practice experts in the specialized field do not generally rely on such ‘firsthand knowledge’. For instance, a surgeon or radiologist while on doing his duties routinely make ‘diagnoses’ relying on substantial information from various sources, such as medical records from the hospitals, X-ray or sonography reports, and specialists opinions from other surgeons or radiologists or any other medical expert concerning the subject.

However, whenever an expert presents a scientific or technological fact as substantive piece of evidence forming foundation of his or her opinion, the court, as a matter of precaution and credibility, must

²⁷ . Id.

²⁸ . Federal Rules of Evidence, 1975 (U.S.), Rule 702

²⁹ . A Fact is said to be admitted when the Court accept it as a reliable Evidence.

³⁰ . The Law Commission (U.K.) Consultation Paper No.190; “The Admissibility of Expert Evidence in Criminal Proceedings in England and Wales” 25 (2009)

ascertain the relevancy of such scientific or technological fact by thorough overview of such material, viz. the validity and reliability of the scientific principle in question, as well as the validity and reliability of that specific technique used in applying that scientific principle, also ensure proper adherence to well recognized prescribed procedures, plus the state and condition of instruments used in such process, and, last but not the least, the qualifications of those persons who perform the test and analyze & interpret the outcome in the form of results. Serious doubts recurrently arise over the use of such scientific instruments and the techniques viz polygraph or lie detectors, D.N.A. test, B.E.A.P Test and other similar tests. Some of the scientific tests, for example, drug tests, radar reading, and Paternity blood tests, are, generally, trusted by the scientific community and, hence, accepted as reliable by the courts, and, even, in some cases, their reliability and admissibility may be provided by Legislations, however, they are mostly relevant at investigation stage.

The American Medical Association, in order to overcome the difficulties, maintains the guidelines and ensures compliance by the physicians and surgeons who testify before the courts, with both capacities as treating physician experts, in those cases where actually treated the victims and patients, and as non-treating expert witnesses, in those cases where courts' seek their opinion only as the expert. Many States' Medical Associations in U.S. also have comprehensive guidelines for those doctors who testify usually testify in the courts as an Expert Witness.³¹

The Honourable Apex Court of India in a leading case *Sivrajban v. Harchandgir*³² has held that "The word 'evidence' in connection with Law, all valid meanings, includes all except agreement which prove or disprove any fact or matter whose truthfulness is presented for Judicial Investigation". Further, the Apex Court added that "At this stage it will be proper to keep in mind that where a party and the other party don't get the opportunity to cross-examine his statements (the statements of each other) to ascertain the truth then in such a condition this party's statement is not Evidence"³³.

5. Conclusion:

No doubt science and technology have indispensable role in picking and gathering the materials which are vital clues and evidence helpful in investigation leading a crime investigator upto the culprit. Moreover, through D.N.A. profiling, the paternity of a child or relation of victims of natural tragedies can be determined with reasonable certainty. All this phenomenon become the part of Forensic Science which, in turn, become the portion of Scientific Aid. Evidence of scientific nature can be given only by Expert Witness before the Courts because an expert can comprehensively explain such evidence to the satisfaction of the court.

It is submitted that expert's evidence would become admissible only when the opposite party has cross-examined him and all the reasonable doubts emerging from a dispute are adequately resolved by the expert to the satisfaction of the court. However, sometimes, an expert's testimony may go unchallenged as the other party, for whatsoever reasons, not preferred cross-examination of that expert.

³¹ . American Medical Association: Code of Medical Ethics Opinion 9.7.1 Available at <https://www.ama-assn.org/delivering-care/medical-testimony> Visited on 18/04/2020.

³² . AIR 1954 SC 564

³³ . Id., at 566