Chapter 7

CONCLUSION AND RECOMMENDATIONS

OVERVIEW

This chapter contains the summary of the different forensic evidences studied under the previous chapters. It also co-relates the hypothesis with the result of the decided cases. The principles of admissibility of forensic evidence and its applicability in the decision making process is also analyzed in this chapter. Under each topic regarding where the question is raised, whether the forensic evidences satisfies the hypothesis, the relevancy factor as to whether the forensic evidences satisfies the requirements of relevancy is also discussed.

The chapter has been studied under the following broad topics:

7.1 Whether DNA evidence satisfies hypothesis in criminal cases
7.2 Whether Ballistic evidence satisfies hypothesis in criminal cases
7.3 Whether Fingerprint evidence satisfies hypothesis in criminal cases
7.4 Whether Toxicology evidence satisfies hypothesis in criminal cases
7.5 Recommendations and Suggestions
7.6 Limitation
7.7 Concluding Remarks On Role Of Forensic Evidence In The Decision Making Process Of Criminal Cases
7.8 Total Percentage Of Acquittal And Convictions Using All Four Forensic Evidences

While conducting the study on the “Role of Forensic Evidence in the Decision Making Process of Criminal Cases: A Study of Decisions of Superior Courts in India” what has come to the forefront is that forensic evidence plays an evident role in the decision making process of criminal cases. Majority decisions where forensic evidence has been used helped in awarding conviction. A detailed study of the second chapter, “Law on
Forensic Evidence in India and Abroad: A Comparative Study reveals the principles based on which the criminal cases relating to forensic evidence are dealt with by the courts. In United States, while deciding admissibility of expert evidence the Judge must decide whether the evidence is relevant, reliable, helpful and fit. In United Kingdom (UK) the requirements of admissibility of expert evidence are assistance, relevant expertise, impartiality and evidentiary reliability. The principles of admissibility of expert evidence in Germany are suitability of experts in the specific area. German evidentiary proceedings are governed by the principles of free evaluation of the evidence.\(^1\) With few statutory exceptions both the admission and weighing of evidence are within the discretion of the court. In accordance with the principles of free evaluation of the evidence, German courts do not follow certain evidentiary rules adhered to by the courts in the United States. For example, hearsay evidence is admissible in German courts and it is up to the court to determine whether or not the evidence is convincing. The ‘opinion rule’ which precludes the factual statement by lay witnesses and the ‘best evidence rule’ requiring original documentation to prove the contents of writing is not applicable in German Courts. In Germany judges play an active role in selection of evidence and the court’s judgment on the question of admissibility is final. Mostly, expert opinions are submitted to the court in writing. When it is required, the court calls the expert into the court for a hearing to investigate specific aspects of expert’s opinion. Through this system of active role of courts demonstrates the more integrated evidentiary proceedings before the German Courts, allocating more responsibility and initiative to the court than the U.S. System\(^2\). In India the principles of admissibility of evidence is relevancy. According to the Indian Evidence Act, 1872, evidence can be given only of relevant facts and facts in issue. A fact may be relevant but not admissible, like in case of documentary evidence, only under certain circumstances secondary evidence of a document can be produced. If it does not satisfy the legislative provision, although a document might be relevant but it would not be admissible. It might also happen that a document or an expert report might be admissible as it is an original one or otherwise but since it is not relevant, such evidence is not accepted by courts. Therefore, in India, the principle for accepting

\(^1\) ZPO § 286
forensic evidence is relevancy and admissibility. Under, the broad principles of ‘relevancy’ comes reliability, helpfulness, fitness which are treated as separate grounds in US. Assistance, relevant expertise, impartiality and evidentiary reliability which are the principles for admission of expert evidence in UK, also comes under the requirement of ‘relevancy’.

Now, the task is to find out whether the cases which has been studied under different chapters prove the hypothesis and satisfy the requirement of relevancy. In other words, it can be presumed that if the forensic evidences satisfy the requirement of relevancy it will satisfy the requirement of superior proof or will have more probative value as is contended in the hypothesis. The hypothesis is as follows:

‘Scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’.

7.1 WHETHER DNA EVIDENCE SATISFIES HYPOTHESIS IN CRIMINAL CASES?

In many cases like Chandradevi v. State of Tamil Nadu by Inspector of Police, Kamalanath & Others v. State of Tamil Nadu, State of U.P. v. Amarmani Tripathi, the DNA test revealed that the accused had fathered the terminated foetus, on the basis of which he was convicted. Thus it satisfies and proves the hypothesis that scientific investigation of crime with the aid of forensic science has more probative value, specially where there is no means to resort to direct evidence like witnesses. In this case, it is impossible to determine the father of the foetus without the means of scientific evidence like DNA.

In cases like Anil @ Raju Namdev Patil v. Administration of Daman and Diu, Shakti Singh And Another v. State of Rajasthan, Sachin v. State (NCT of Delhi, the DNA test revealed that the remnants were that of deceased, which also satisfies and proves the hypothesis that scientific investigation of crime with the aid of forensic science has

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4 (2005) 5 SCC 195
5 (2005) 8 SCC 21
7 MANU/RH/0276/2006
more probative value and not only that, it also proves that it has more probative value than direct evidence as in this case no direct evidence was available. Thus, on the basis of indirect and circumstantial evidence, the conviction of the appellant accused was upheld.9

In many cases like rape, DNA test confirmed that the accused has committed rape which confirms and proves the proposition that scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases.10

In Amin Khan v. State of Rajasthan & Others11, the accused was convicted under section 396 of IPC and section 3 and 35 of Arms Act. One of the accused persons murdered R, while committing the plunder. DNA test performed on the hair of the accused persons left in the nails of hands of the deceased confirmed that the same accused persons committed the murder of the deceased. Therefore, the hypothesis is proved that scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases.

In cases of rape and murder, DNA test helped to recognize the appellant accused which proves the hypothesis that scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases12.

In the case of Anil v. State of Maharashtra, Anil was convicted with offences punishable under sections 302, 377 of IPC. DNA evidence helped to prove the matter and it once again supported the hypothesis that scientific investigation of crime with the

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11 (2009) 3 SCC 776

aid of forensic science has more probative value than direct evidences in deciding criminal cases.\(^\text{13}\)

### 7.1.1 DNA Evidence As Relevant Fact In Criminal Cases

The requirement for the acceptance of DNA evidence is in confirmation of the principles of relevancy studied under the second chapter. Moreover, the requirement of professional standard laid down in the *Daubert* Guidelines has also been followed. The Guidelines are as follows:

1) The content of the scientific testimony which has already been tested, can be tested using the scientific method;
2) The technique has been subject to peer review, preferably in the form of publication in peer review literature;
3) There are consistently and reliably applied professional standards and known or potential error rates for the technique.
4) Considers general acceptance within the relevant scientific community.

Later the Kumho Tire Case\(^\text{14}\), expanded the Daubert Analysis, to technical and specialized subjects that do not fall within the category of “science” After the Daubert Guidelines were framed, the Federal Rules Of Evidence were then amended in the year 2000. The Rule 702 now provides: that scientific, technical or specialized evidence (i.e. “Expert testimony”) may be admitted if: (a) the expert is qualified; (b) the expert’s testimony will help the jury decide issues in the case or understand the evidence; and (c) the expert’s testimony is based on sufficient facts or data; is the product of reliable methods and principles, and if the expert reliably has applied the methods and principles to the facts of the case in trial\(^\text{15}\).

In India, the experience and qualification of the expert was recorded by the court in his examination-in-chief in the *Priyadarshini Mattoo Murder Case*,\(^\text{16}\) it was deposed by the


\(^{15}\) Dr. M.P. Kantak, Dr. M.S. Ghodkirekar & Dr. S. G. Perni “Utility Of Daubert Guidelines In India” 26(3) *JIAFM* 110 (2004)

\(^{16}\) *Santosh Kumar Singh v. State (through CBI)*, (2010) 9 SCC 747
expert Dr. Lajji Singh, that he has been involved with the DNA Technology, since 1974 and that he returned to India from UK in 1987 and joined CCMB, Hyderabad and has developed indigenous methods and techniques for DNA fingerprinting which are being used in India. The expertise of Dr. Lalji Singh had earlier been recognized by the Supreme Court in the case of ‘Kamalanantha’  

Dr. G.V. Rao was the other scientist of equal repute and in the case in reference/question, he conducted the DNA test under the supervision of Dr. Lalji Singh. From the arguments placed before the Supreme Court, it was confirmed that the two scientists were persons of eminence and that the laboratory in question was also held in the highest esteem in India. Although adverse findings were recorded by the trial court on the accuracy of the test carried out but no question was put to Dr. Lalji Singh. Thus the Supreme Court rejected the view of the trial court on the ground that it would be dangerous to set aside the expert report by making reference to some texts on the subject without such text being put to the expert. Thus the court once more confirmed that the court cannot take over the function of an expert. From this case itself it was also evident that to make the DNA evidence reliable or relevant the samples like blood, semen etc. collected for the purpose of investigation should be kept in proper custody.

A detailed discussion regarding of the reliability of DNA evidence in conformation of the Second Chapter has been forwarded by the Supreme Court in the Nithari Murder Case. The court referred to a writing of James D. Watson  

“No doubt DNA provides very reliable evidence, yet the evidence needs very careful handling otherwise it may lead to miscarriage of justice. James D. Watson, one of the discoverers of DNA who was awarded the 1962 Noble Prize for medicine, has made the following observations about handling of DNA evidence, “Keeping track of molecular evidence, as opposed to knives and guns, can be an especially demanding chore; scrapings from a sidewalk may be visually indistinguishable from scrapings from a gatepost, and subsequently extracted DNA samples will doubtless look even more alike when placed in small plastic test tubes. In the case of O.J. Simpson’s, a celebrated homicide case of the United States, defense team was able to point a number of instances when it seemed at

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least possible, if not probable, that samples had been confused or, even worse contaminated.”

From the observation forwarded by the Supreme Court in the Nithari murder case, the question of degree of probability is still a matter of concern, as it is obvious fact that matching of the DNA of the deceased victim with the parents and brother can establish the identity of the victim to a certain degree of probability but not absolutely. Till date the there were no discussion regarding the degree of probability in any of the judgments of the Supreme Court and High Court, which is very much required for deciding future cases. Therefore the degree of probability has not been conformed to the second chapter. If this is not settled then it can lead to erroneous convictions.19

In Rajkumar v. State of MP, the court appreciated the exemplary expeditious justice delivered in a country of chronic delay which occurred due to the smooth functioning of the investigating agency, courts and members of legal fraternity. Before the court parted in this case, it had noted with appreciation that in the said case the investigation and all judicial proceedings up to the court stood concluded in a time period of less than eight months from the date of incidence. The court expected such prompt disposal of cases specifically in cases of such grave nature.

7.1.2 Whether DNA evidence satisfies hypothesis in paternity cases?

The hypothesis that ‘Scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’ is also proved where DNA evidence was used in determining paternity or maternity. In cases for determining paternity or maternity, DNA evidence is treated like corroborative evidence as there are no other means to determine the paternity of a child except on scientific evidence. Even direct evidence may not be sufficient to determine paternity or maternity of a child.

The various categories of cases where DNA was used to determine the paternity or maternity of a child a)’Claim for Maintenance’ under section 125 of CrPC where the paternity of the child was in issue b) ‘Suit for Declaration’ by the son against the

19 Surendra Koli v. State of Uttar Pradesh & Others (2011) 4 SCC 80
putative father, c) ‘Criminal Writ Petition’ under Article 32 to issue appropriate order to conduct DNA test for ascertaining the correct identity of the child or direction to the respondents to disclose whereabouts of the child and to deliver custody of the child to the petitioner mother, d) ‘Cheating’ under section 417 of IPC, where the complainant was in fact not married to the accused but gave birth to a child, e) Writ Petition filed by victim of rape for directions to State, for terminating her pregnancy under section 482 of Medical Termination of Pregnancy Act, 1971 and 482 of CrPC to preserve the foetus for DNA test.

Under the first category, 13 cases has been referred, in 8 cases the petition of the petitioner was allowed where in the case of Anil Kumar v. Turaka Kondala Rao And Another DNA test concluded that the respondent was the father of the petitioner, and the respondent was directed to pay maintenance to the respondent. In Premasundari and N. Vanathi represented by her mother and guardian Premasundari v. R. Natarajan, the court directed the respondent to pay maintenance to the petitioners and hence the petition was allowed. Hence, it proves the hypothesis that scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases. Even in cases where the father did not consent for the DNA test, an adverse inference was drawn by the court against the father and he was directed to pay maintenance. In case of ‘Suit for Declaration’ by the son against the putative father, DNA test helped to prove the question of paternity raised by the son which satisfied and proved the hypothesis that scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases. The third category ‘Criminal Writ Petition’ under Article 32 to issue appropriate order to conduct DNA test for ascertaining the correct identity of the child or direction to the respondents to disclose whereabouts of the child and to deliver custody of the child to the petitioner mother. In the instant case the DNA test

23 X v. State and Ors. (22.03.2013 – DELHC) MANU/DE/0747
25 (11.11.2010 – MADHC) MANU/TN/3155/2010
proved that the child produced before the court is not the petitioner’s real daughter. The court stated that since it is proved by the DNA test that the child produced before the court was not the child of the petitioner it was the duty of the respondents to produce the child which was forcibly taken by them on the date of the death of the husband of the petitioner. Again the hypothesis is proved in this case. In case of cheating under section 417 of IPC, where the complainant was in fact not married to the accused but gave birth to a child, DNA test proved the paternity of the child which proved the hypothesis once again.\textsuperscript{29} In case of Writ Petition filed by victim of rape for directions to State, for terminating her pregnancy under section 482 of Medical Termination of Pregnancy Act, 1971 and 482 of CrPC to preserve the foetus for DNA test, directions were issued by the court which once again proves that without DNA test, the determination of the father of the foetus would not be possible and hence it once again conforms to the hypothesis.\textsuperscript{30}

7.1.3 DNA Evidence As Relevant Fact In Determination Of Paternity Cases/Relevancy Of DNA Evidence In Paternity Cases

a) From the above study, it is clear that DNA evidence is also a relevant fact. Moreover, in the case Dwarika Prasad Satpathy v. Bidyut Prava Dixit And Another\textsuperscript{31}, the court held where the purported father denied paternity but refused to undergo DNA Test, such a person was disentitled from disputing paternity. From this comment of the court, the relevancy of the DNA evidence is proved. A study on the grounds for accepting the DNA evidence in the case of Nandlal Wasudeo Badwaik v. Lata Nandlal Badwaik\textsuperscript{32} clearly reveals the relevancy and admissibility of the DNA evidence. In the court’s opinion, when there is a conflict between a conclusive proof envisaged under law and a proof based on scientific advancement accepted by the world community to be correct, the later i.e scientific advancement must prevail over the former. Therefore the husband’s plea that he had no access to the wife when the child was begotten stands proved by the DNA test report and thus the appellant could not be compelled by the

\textsuperscript{29} Ravichandran v. The Sub Inspector of Police (31.03.2006 – DELHC) MANU/TN/8633/2006
\textsuperscript{30} X v. State and Ors. (22.03.2013 – DELHC) MANU/DE/0747
\textsuperscript{31} (1999) 7 SCC 675
\textsuperscript{32} (2014) 2 SCC 576
court to bear the fatherhood of a child, when the scientific reports prove to the contrary. The court was conscious that an innocent child may not be bastardised as the marriage between her mother and father were subsisting at the time of her birth but in view of the DNA test reports and what had been observed by the court, the court could not preclude the consequence which would be denying the truth.

7.2 WHETHER BALLISTIC EVIDENCE SATISFIES HYPOTHESIS IN CRIMINAL CASES?

Hypothesis: ‘Scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’.

While researching on the chapter of ballistics, some cases are really worth mentioning specially to relate with the hypothesis of the work i.e. ‘Scientific Investigation Of Crime With The Aid Of Forensic Science Has More Probative Value Than Direct Evidences In Deciding Criminal Cases’. The witness oriented criminal justice system is always desirable. What can be concluded is that scientific evidence cannot be compared with the direct evidence mode, but it helps to strengthen the witness oriented system or makes the traditional system more dependable. It is better when no witnesses are available or the witnesses are not dependable. Where the witness oriented criminal justice system fails, the assignment of proving rests on the scientific evidence or sometimes it also becomes corroborative. On the other hand it is not necessary that to prove a case, compulsorily the scientific evidence has to be on record.

From the opinion of the court in Sukhwant Singh v. State of Punjab, the importance of forensic science has become very evident. The court held that in cases where injuries are caused by firearms, the opinion of the ballistic expert is of a considerable importance where both the firearm and the crime cartridge were recovered during investigation to connect an accused with the crime. Failure to produce the expert opinion before the trial court in such cases affects the creditworthiness of the prosecution case to a great extent. A reading of mind of the court satisfies and proves

33 (1995) 3 SCC 367
the hypothesis that ‘Scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’.

The conditions which are basically required for forensic evidence like, maintaining proper custody of the recovered materials for scientific examination, proper sealing of the recovered materials etc. should be maintained. In the instance case, the court opined that it is not safe to place reliance on the report of the ballistic expert when it was an admitted fact that the empties which were sent to the ballistic expert after six months were not sealed at the time of seizure. From this view of the court it is very much evident, that if the quality control is maintained then the scientific evidence, will be accepted and the hypothesis will be satisfied and proved.34 At the same time, minor inconsistencies like non-mention in seizure memo whether the cartridges seized by investigating officer from place of occurrence were wet or dry though it was raining at that time are immaterial. It reveals that such minor inconsistencies do not diminish the probative value of forensic evidence. Therefore in case of minor inconsistencies also the hypothesis can be satisfied.35 Ballistic evidence, not only includes ballistic expert’s report but even if recovery is made from the body of the deceased, it amounts to ballistic evidence and helps in conviction of the accused and thus satisfies and proves the hypothesis.36 When convincing reasons were given by the ballistic expert in support of his opinion about identifiable marks appearing on pellet, the Supreme Court accepted the view of the ballistic expert which also satisfies and proves the case that ‘scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’.37 As possession of fire arms is an offence, physical examination of the recovered weapons, chemical analysis of barrel wash and test firing of the weapons contained in parcels proved that they were fire arms as defined in Arms Act and were in working order and these were used and fired. Therefore the test of the recovered materials of the parcels proved that they were firearms which satisfies and proves the hypothesis that ‘Scientific investigation of

crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’. 38

7.2.1 Relevancy Of Ballistic Evidence In Criminal Cases

In Jessica Lal Case, the Supreme Court opined that the ballistic expert only said that “it appears that the two cartridge cases are from two different pistols”. Such a vague opinion of the expert could neither be relied upon nor can be any basis to come to a conclusion that there were two persons who had fired two different shots. The court interpreted that the word “appears” which implies that the expert’s opinion was unsupported by reasons which became inconclusive and stood discredited for the purpose of placing reliance. Similarly, the opinion of another expert, was inconclusive. His response to the court questions revealed that he was extremely confused as to the issue which had to be addressed by him in the capacity of an expert. In the concluding part of his testimony he reaffirmed the opinion given by him which was that without test firing the empties from the weapon of offence no conclusive opinion can be given. The court reasoned that an expert is only an expert if he would follow the well-accepted guidelines to arrive at a conclusion which is supported with logical reasoning. It is well settled that while giving reports after the ballistic examination, the bullets, cartridge cases and the cartridges recovered and the weapon of offence recovered are carefully examined and test firing is done at the FSL by the said weapon of offence and then only a specific opinion is given. Although the laboratory reports in this case were vague and ambiguous and could not be relied upon to reach any specific conclusion regarding the incident yet from the discussions and other evidences the court held that the prosecution had established its case beyond doubt against the appellants and the appeal was dismissed as it was devoid of any merit. The court was in agreement with the conclusion arrived at by the High Court. Therefore, an expert opinion becomes relevant when it is not vague in nature.39 When the evidence of the prosecution tallied with the medical evidence, the expert medical evidence became a relevant fact.40 Even if the ocular testimony of the prosecution witnesses receives clear corroboration from the

38 Firoz Abdul Latif Ghaswala & Anr. v. State Govt. of NCT of Delhi (03.09.2012 – DELHC) MANU/DE/4582/2012
40 State of Rajasthan v. Arjun Singh & Others (2011) 9 SCC 115
medical evidence as well as from the Forensic Science Laboratory, then the evidence becomes relevant fact.41

7.3 WHETHER FINGERPRINT EVIDENCE SATISFIES HYPOTHESIS IN CRIMINAL CASES?

Hypothesis: ‘Scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’.

Fingerprint evidence is accepted by the courts on the assumption that no two individuals have identical fingerprints. Scientific research and analysis leads to the conclusion that the probability for the existence of two identical fingerprint patterns in the world’s population is extremely small. The fundamental principles of fingerprints are: i) A fingerprint is an individual characteristic, no two fingers have yet been found to possess identical ridge characteristics ii) A fingerprint will remain unchanged during an individual’s life time iii) Fingerprints have general ridge patterns that permit them to be systematically classified. Fingerprint evidence is a very valuable piece of evidence in any criminal investigation and its importance can never be underestimated.42 Therefore, from this study forwarded by the court, it is proved that ‘Scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’. Like the other forensic evidences, the fingerprint evidence should be properly preserved and properly packed before it is sent to the scientific officers, only then it would be accepted and considered to have probative value. In a certain case, fingerprints of A-1 were taken neither in the presence of the Magistrate nor under the orders of the court and the same were sent to the scientific officers by prosecution witness who did not claim to have properly packed the same. The scientific officer even did not speak of receiving the material from the IO in a properly sealed manner. There is a gap of nearly a month between collecting the material and forwarding the same to the Scientific Officer. What proper care the Investigating Officer has taken to keep the incriminating material intact is not evident

from the record. In these circumstances, the court found it difficult to give any authenticity to the report submitted by the Scientific Officers. Thus in this kind of situation the hypothesis would not be satisfied. Where the place of occurrence was inspected and chance print were found and developed and a report was prepared on the basis of the said inspection but neither any question was put to the said witnesses in their cross-examination regarding the lifting of fingerprints from knives in question nor was any suggestion given to them that they did not make any attempt to lift the fingerprints from the knives in question in such cases having given no opportunity to the witnesses to explain the circumstance pertaining to lifting of fingerprints from the knives in question no adverse inference can be taken against the prosecution. Therefore when the prosecution witnesses were not cross examined properly, the hypothesis that ‘scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’ is satisfied and proved. When Fingerprints of the appellants were taken against which a contention was raised that it violated Article 20(3) of the Constitution of India. In this regard a Judgement of the Constitution Bench of the Supreme Court was referred, where it was held that giving handwriting samples or fingerprints or palm impressions did not tantamount to giving evidence and that when a handwriting sample or a fingerprint or a palm impression was obtained by police it did not amount to compelling an accused to be a witness against himself. This point again satisfies the contention that ‘scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’. In the Nirbhaya case, the fingerprint evidence was really helpful and satisfied and proved the hypothesis that ‘scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’. It helped to identify the accused Vinay Sharma. As the result of examination of the Finger Print Division of the CFSL:CBI: New Delhi was that the chance prints of the accused Vinay Sharma were found on the bus in question.
7.3.1 Relevancy Of Fingerprint Evidence In Criminal Cases

The Supreme Court opined that evidence of fingerprint expert is not substantive evidence. Such evidence can only be used to corroborate some items of substantive evidence which are otherwise on record. In the instant case it was never alleged that there was any altercation between deceased and accused at place of occurrence, or that accused had any physical contact with deceased. Deceased was fired at from point-blank range and he immediately fell down, half inside a car. Thus, no prosecution evidence to the effect that A-4 and A-5 had any occasion to touch car and that too with ring-finger. Hence, evidence of fingerprint expert on car was irrelevant.\(^\text{47}\) It is settled principle of law that, if the fingerprints of the accused are taken procedurally when the material objects recovered from the place of occurrence were sent for the purpose of comparison with the fingerprints taken from the accused, then such evidence become relevant.\(^\text{48}\) If the specimen fingerprints is taken before or under the order of a Magistrate, it becomes relevant.\(^\text{49}\) If a link exists between the evidence of the fingerprint expert and the IO, then it becomes relevant.\(^\text{50}\) When fingerprints were not exhibited, no question was put to accused in statement under section 313 CrPC and SDM before whom the specimen fingerprints were allegedly taken were not produced in evidence, the fingerprint evidence was not reliable.\(^\text{51}\) If the lifted chance fingerprints matches with the admitted fingerprints when compared with each other, the fingerprint evidence becomes relevant.\(^\text{52}\) The Supreme Court held that if the appellant was employed by the deceased as a domestic help, then the presence of some fingerprints on the household articles which matched with the fingerprints taken from the appellant would only be common and natural and therefore that cannot be a circumstance to establish the guilt of the appellant. Hence, in such case the fingerprint evidence would not be relevant.\(^\text{53}\)

\(^{47}\) Musheer Khan And Another v. State of Madhya Pradesh (2010) 2 SCC 748
\(^{48}\) Palanichamy and v. The State represented by The Inspector of Police (26.07.2010 – MADHC) MANU/TN/2116/2010
\(^{49}\) Mohd. Aman And Another v. State of Rajasthan (1997) 10 SCC 44
\(^{50}\) Abdul Razak @ Razak v. State represented by Inspector of Police, Cheranpadi Police Station (07.08.2000 – MADHC) MANU/TN/0944/2000
\(^{51}\) State of Rajasthan v. Rakesh (03.05.2000 – RAJHC) MANU/RH/0629/2000
Prisoners Act, 1920 without permission of the court is not relevant. When the receipt produced by the prosecution bore the thumb impression of the deceased was not proved, therefore the comparison of the fingerprints of the deceased with that of the thumb impression was of no consequence and was irrelevant. When none of the prosecution witness deposed about when and how, the specimen fingerprints and palm prints were secured from the accused, the fingerprint evidence become irrelevant. When the court opined that although fingerprints the appellant was found on the knife but he might be forced to hold the knife so as to get his fingerprints on the knife, the fingerprints evidence became irrelevant. Where there was a doubt in the statement of R, the expert, whether the fingerprint on the negative of the photograph taken was that appearing on the passbook, the testimony of R with regard to the fingerprints of accused on bank pass book was regarded as inconsequential by the court.

7.4 WHETHER TOXICOLOGY EVIDENCE SATISFIES HYPOTHESIS IN CRIMINAL CASES?

Hypothesis: ‘Scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’.

The scientific evidence of crime can lead to conviction as well as acquittal. In a certain case of rape and murder under Article 376 and 302, the seized articles were sent for chemical analysis and the chemical analyzer’s report regarding blood group of the accused/appellant and other accused persons were obtained and were brought on record. The semen, blood and pubic hair of the accused appellant were collected by the prosecution witness and were sent for chemical analysis. As regards the semen and blood of the accused/appellant, the Chemical Analyzer showed that the blood group of the accused/appellant was ‘A’ group. Chemical analyzer’s report further showed that neither semen nor spermatozoa was detected on the pubic hair of the accused/appellant. Clothes of the accused/appellant were seized and the analysis of all the items revealed

55 Sadashio Mundaji Bhalerao v St. of Maharashtra (2007) 15 SCC 421
57 Majenderan Langeswaran v. State (2013) 7 SCC 192
that no blood was detected on any of these articles nor any semen was found. On the other hand, the clothes of the deceased which were seized revealed that they were stained with blood of group ‘O’ as well as blood group ‘B’. Undisputedly, the blood group of accused/appellant was ‘A’ but the victim’s clothes had blood stains of group ‘O’ and semen of blood group ‘O’ and ‘B’. These facts created doubt about the involvement of the accused/appellant in the crime. Vital links of chain to bring home guilt of appellant under section 376(g) beyond reasonable doubt was missing. Therefore, benefit of doubt was given to the appellant and the appellant was acquitted. This fact satisfies and proves the hypothesis that ‘Scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’ and in the instant case it helped in acquittal of the accused.\textsuperscript{59} When the chemical analysis revealed that the tablets and the water contained cyanide, it resulted in the conviction of the accused.\textsuperscript{60} Again the hypothesis is proved and satisfied. In cases of rape, chemical analysis is very much required and helps in conviction of the accused when there is absence of serious injuries on the private parts of the prosecutrix.\textsuperscript{61} In another case, the report of the chemical examiner showed that the blood stained earth collected from the spot was found to be stained with human blood, which was further corroborated by the evidence of the doctor and aided in conviction.\textsuperscript{62} Thus the hypothesis is satisfied and proved. Chemical analysis also helps in straining the unwanted result, thus helping in conviction. Chemical analysis helps the investigator or the investigating agency to have access to all domain relevant information they need and shields the domain-irrelevant information, as it happened in \textit{Krishnamurthy v. State by Ashok Nagar Police, Bangalore}.\textsuperscript{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 surmise regarding commission of suicide by the two ladies. This case again satisfies and proves the hypothesis that, scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases’.

\textsuperscript{60} Shyam Sunder v. The State (18.04.1996 – DELHC) MANU/DE/0622/1996
\textsuperscript{63} (29.05.2000 – KARHC) MANU/KA/0448/2000
Like, the other forensic evidences, if the conditions for non-contamination of the samples and the procedures of sealing are maintained, the hypothesis would be satisfied and proved. The science of Toxicology also helps to identify the poison which caused the death. In this particular case, as per Medical Jurisprudence and Toxicology, on account of consumption of powder of root of yellow oleander, a young man died in 2 to 3 hours after taking his meal mixed with powdered root. Therefore the hypothesis is satisfied and proved. In *Hardip Singh v. State of Punjab*, as per the report of the chemical analyst, the contents of the sample parcels were said to be opium. The court was of the opinion that the question regarding delay in sending the samples of the opium to the Forensic Science Laboratory (FSL) had no relevance as the fact that the recovery of the said sample from the possession of the appellant stood proved and established by cogent and reliable evidence led in the trial, that opium was seized from the appellant and seals put on the sample were intact till it was handed over to chemical examiner. This itself proves and establishes that there was no tampering with the aforesaid seal in the sample at any stage and the sample received by the analyst for chemical examination contained the same opium which was recovered from the possession of the appellant. Therefore, the delay was not fatal to prosecution case and could not have caused prejudice to the appellant. Moreover, the said recovery was effected in the presence of the said officer, who had also put his seal on the said parcels of opium. Thus, the hypothesis that scientific investigation of crime with the aid of forensic science has more probative value than direct evidences in deciding criminal cases is satisfied and proved. Chemical analysis can also identify the individual as it happened in the case of *Ponnusamy v. State of Tamil Nadu* where the dead body was also sent for opinion of a chemical examiner who opined that skull, could very well have belonged to the female individual seen in photograph.

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7.4.1 Relevancy Of Fingerprint Evidence In Criminal Cases

When the sample of Narcotics were not taken in terms of the Standing Instruction and by complying section 55 of the NDPS Act, the toxicology evidence became irrelevant. When the recovery effected from the house of the appellant on the same day containing the remaining tea and the utensils, on analysis showed the poison to be Organophosphorus, the toxicology evidence became relevant. If the Chemical analysis report, serology report and Toxicology report corroborate each other, then the evidence become relevant. When the eyewitness’s version, chemical examiner’s report and dying declaration corroborate each other, then the evidence becomes relevant. In a certain matter, the court did not understand as to why there was delay of more than two months for sending the sample for analysis to Central Forensic Science Laboratory (C.F.S.L.) This doubt was required to be removed by prosecution by adducing reliable evidence on that behalf, more specifically when there was contradiction with respect to samples having resealed at three or four places and seal used by Police at time of recovery and re-sealing remained with police and Narcotics Control Bureau (NCB), which allegedly contained facsimile of seal. Thus report of analysis of sample could not be connected with recovery of alleged contraband from appellant. Also Court found that report issued by Director of Forensic Science Laboratory, fell short of requisite particulars. Chemical Report stood not connected with recovered stuff and it also did not prove that stuff recovered were charas within meaning of NDPS Act. Accordingly, conviction and sentence of appellant passed by trial court was unsustainable and was therefore set aside. Thus appeal was allowed and acquittal given as the evidence was not relevant. When the report of the chemical examiner indicated the sample as opium whose seals were intact when it was received and tallied with the sample impression of the seal, in such cases the report of the chemical examiner is considered to be relevant. When the Chemical Analyzer had stated that the bullet which was recovered was a deformed copper jacketed bullet fired from 7.62 mm short rifle, the court considered the information as relevant on the basis

69 Anita v. State of Haryana (22.03.2010 – PHHC) MANU/PH/0118/2010
73 Jairnail Singh v. State of Punjab, (2011) 3 SCC 521
of which conviction was confirmed.\textsuperscript{74} When reports of two experts reveals two different things and are totally contradictory to each other, Court accepted the second report of the chemical analysis as it was relevant.\textsuperscript{75}

7.5 RECOMMENDATIONS & SUGGESTIONS

From the study of the cases it seems that the assistance of science which law had sought has become a truth. Although the admissibility of scientific evidence in United States depends on the overall view of Frye, Daubert, Joiner and Kumho but the Indian judicial precedents confirm that the requirements of corroboration have been playing a vital role in the admissibility determination of scientific evidence. Indian judges decline to award conviction on the basis of the sole scientific expert testimony.\textsuperscript{76} A study of the reasons for acquittal in the criminal cases in each chapter also reveals that in many criminal cases due to the fault of the prosecution the accused had to be acquitted or in some cases due to improper investigation or lack of collection of evidence the courts were bound to record acquittal. In the same way in cases for determination of paternity or maternity some problem might influence or might have influenced the result of the test. Therefore, some recommendations are put forth to overcome the problems responsible for the acquittal which might not be unique but are based only on the study where there is failure to grant conviction.

7.5.1 Recommendations For Cases In Which DNA Evidence Was Used To Determine Paternity And Maternity

DNA is a three decade long technological evolution, the use of which started in the year 1985. Application of DNA technology is successful in paternity, maternity dispute cases.\textsuperscript{77} But there are some socio-legal complications due to technological advancements to alternatives of pregnancy and parenthood. The tradition of adoption is not new in our society and the DNA evidence cannot address the parenthood issues in such adoption cases as it is beyond its scope. Moreover, the recent technological such

\textsuperscript{75} O. M. Baby v. State of Kerala (2012) 11 SCC 362
\textsuperscript{76} Mohd. Yunus v. State (05.04.2010 – DELHC) MANU/DE/0753/2010
\textsuperscript{77} Moitra & Kaushal, Medical Jurisprudence & Toxicology And Special Chapter On DNA 8, (Delight Law Publication, 3\textsuperscript{rd} edn., 2007)
as “Assisted Reproduction Technologies (ART) involving pregnancy by the donated sperm or egg seeds in surrogate or recipient mother had introduced several levels of complications in the legitimacy of parenthood issues of donors and recipients as well as in the inheritance rights of children born out of such practices. There are reports that in western countries women have inseminated themselves with sperm, then sought after child support by providing the DNA evidence on fatherhood and won such legal battle. In other cases to hide the adulterous acquaintances and despicable conduct, the mother pretended that she recourse to ART through a donor to become pregnant. There are still no reports of such scam in India, however it is not unlikely to happen in future.

The problem of DNA evidence on parentage in such cases is that DNA cannot differentiate between pregnancies out of recourse to ART or by actual sexual intercourse. To combat this problem the scientific societies around the world have formulated guidelines for the secured and ethical practice of ART. Government of several countries such as U.K., USA and Australia and European Union and have taken steps to form statutory bodies to accredit and superintendent the performance of infertility clinics, to keep the database of every IVF treatment carried out in the country including the database on the use of donated gametes (egg or sperm) and maintaining the anonymity of the donors or exposing it as per the law of the land. These provisions and legislation greatly reduce the risk of women falsely accusing a genuine sperm donor to be the legal father of her ART child and demanding for the inheritance rights and child support by showing or misusing the DNA evidence on fatherhood. Similarly, it also stops the men to deny the fatherhood of a child born out of rape or adulterous relations by pretending that he had been a sperm donor or falsely accusing the woman to have taken recourse of AID in an ART clinic.

In India, there is no such legislation pertaining to the exercise of ART and just the doctor practicing the ART is supposed to do everything such as screening the donor for

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78 State of Louisiana v. Frisard, 694 So. 2d 1032, La. App.5 Cir. 29 April 1997
79 IVF is the process by which eggs are removed from your ovaries and mixed with sperm in a laboratory culture dish. Fertilisation takes place in this dish, "in vitro", which means "in glass". Thousands of IVF babies have been born since the first in 1978. In 2009, nearly two per cent of all the babies born in the UK were conceived as a result of IVF treatment. available at: http://www.babycentre.co.uk/a4094/fertility-treatment-in-vitro-fertilisation-ivf/iixzz3aPoZeb9 (Last visited on May 16, 2015)
health or maintaining record to enduring the anonymity of the donor. In the absence of well defined laws and a regulated system of ART, a chaos may arise in India and in such cases the DNA evidence would either be helpless or would mislead the judiciary rather than helping to extend justice to the affected individuals. Therefore India also should formulate for secured and ethical practice of ART. The Indian Government also should taken steps to form statutory bodies to accredit and superintendent the performance of infertility clinics, to keep the database of every IVF treatment carried out in the country including the database on the use of donated gametes (egg or sperm) and maintaining the anonymity of the donors or exposing it as per the law of the land like the other countries of the world.

7.5.2 Recommendation and Suggestion For Cases In Which DNA Evidence Was Used To Record Conviction And Acquittal

DNA technology is also helpful in the identification of habitual hardened criminals, by keeping the DNA profile records of listed offenders. For the purpose of crime investigation, an investigating officer has to face much trouble in absence of a specific DNA legislation. The phenomenon of DNA theft followed by forge and intentional planting at the scene of crime is alone sufficient to prove that DNA profile is not ‘beyond a reasonable doubt evidence’ The problem is that once planted at the scene of crime, the DNA evidence itself cannot infer whether it is a real one or the forged, fabricated and intentionally planted one. For this reason the criminal courts need to be extremely careful while accepting the DNA evidence to prove guilt or innocence of the accused. In United Kingdom, DNA theft has been announced as a crime. In India, there is no such legislation, but such legislation should be brought into force as early as possible. Therefore stealing someone’s DNA is the simplest and easiest thing in the current times due to advancement of technologies. Specific DNA profiles of target individuals could also be forged and artificially created in the laboratories by simple cloning procedures, which could be planted at the scene of crime.

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80 Gene theft or DNA theft is the act of acquiring the genetic material of another human being without his or her permission, often from a public place. The DNA may be harvested from a wide variety of common objects such as discarded cigarettes, used coffee cups, and hairbrushes. available at: http://dictionary.sensagent.com/gene%20theft/en-en/ (Last visited on July 15, 2015)
The study of cases in Chapter III reveals that in many cases acquittal was recorded due to the failure of the prosecution to prove the case wherein there was faulty investigation or negligence of the prosecution. In *Ramkisan v. State of Maharashtra*, there was total failure on the part of the prosecution to prove that bones seized from compound of appellant were human bones although DNA test proved that bones were of deceased.\(^{81}\)

In *State of Karnataka v. M.V. Mahesh*, The Supreme Court opined that even if it proceeded on the basis that the DNA examination resulted in identifying the bones found by the police as that of the deceased, still what had to be established was the involvement of the respondent in the commission of her murder which the State had failed to prove.\(^{82}\) In *Vivek Bithle's* case although the DNA test was conducted but it could not be relied upon as prosecution failed to prove that weapon seized from deceased’s premises was of appellant.\(^{83}\) In *Ankush Wadhwa’s* case, the Court directed to send the recovered clothes of the deceased to the DNA testing laboratory, Hyderabad, for blood grouping and DNA test but the findings of the said testing were withheld from the court by the prosecution.\(^{84}\) So, to get rid of such problems the prosecution should be well equipped, must be very careful, must be technologically updated and the investigators must possess the required qualification and experience to conduct such work.

### 7.5.3 Future Hazards Arising Due To Use Of DNA Evidence In The Decision Making Process

Bone Marrow Transplantation (BMT) is a recent phenomenon which is increasing day by day. It has been observed that the individual who had undergone successful bone marrow transplantation, showed a true mixed profile of recipient and donor in buccal and fingernail samples or purely a donor’s profile in blood, with the exception of hair, wherein the recipient’s profile remained unmixed. This phenomenon points out the serious risk that the potential marrow donors may reflect in DNA profile databank if the recipient later commits a crime. Hence investigative agency may have to analyze both

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cheek swab and blood samples to be sure of personal identification of a transplant recipient. Similarly, the stem cell technology to cure many un-tenable diseases is now emerging which further alarm justice realm to not blindly accept the DNA as ‘evidence’ in the interest of justice. Further, it is known fact since a long time that the monozygotic twins have 100% similar DNA profile and cannot be distinguished using any DNA based method. This phenomenon was documented to limit the applicability of DNA evidence in judicial realm. However, such type of cases could be the rarest of the rare case types and not had yet been reported in India. The phenomenon of DNA theft and manipulations, sperm theft followed by IVF, BMT, stem cell transplant and identical twins has great implication in criminal law.

7.5.4 Suggestions For Making DNA Evidence Effective In The Judicial Making Process

In 2007 an initiative had been taken by the Centre for DNA Fingerprinting and Diagnostic, to direct the Draft Human DNA profiling Bill. This piece of legislation intended to introduce the use of DNA for forensic and other purposes. In February, 2012, again the Bill was drafted by Department of Biotechnology, Government of India. Another working draft of the Bill was created in April 2012. The most recent version of the Bill seeks to create DNA databases at the State, regional and national level. It is alleged that the bill not discussed properly by legal acumen and public at large and till date did not come into force.

In the initial years of the discovery of DNA profiling it was assumed to be infallible evidence in criminal justice system. It is now evident that DNA per se is unique but DNA profiles are not unique. Further, there is a long way on the road map from DNA to DNA profiling, hence the DNA profiles may not be in strict sense ‘beyond a reasonable doubt’. It is now being realised globally that DNA evidence should not be treated as ‘gold standard’ or as ‘truth machine’ as proclaimed earlier. The possibilities of ‘DNA theft’ and intentional planting of biological evidence at the scene of crime, DNA forgery, celebrity genetics including genetic slalking and voyeurism further complicates the issues and creates significant risk of false incrimination and which can mislead criminal justice system. Thus, there is great need of practicing extreme caution while using DNA as evidence in the process of delivering justice especially in countries
like India where criminal justice system is alleged to suffer with corrupt pathologies at various stages of delivery of justice. Therefore, India must formulate rigorous quality assurance and accreditation programs for DNA testing for implementing the DNA evidence criminal investigative uses so that a clear distinction could be made between human error, attempted fraud and technical failures. Moreover, lack of DNA Bank in India is another problem which has to be soughed out. DNA technology is helpful in the identification of habitual hardened criminals, by keeping the DNA profile records of listed offenders. Therefore, some mechanism should be implemented to create the DNA Bank.

7.5.5 Recommendation and Suggestion For Cases In Which Ballistic Evidence Was Used To Record Conviction And Acquittal

When ballistics is used within a legal context the prefix forensic can then be applied. According to US House Bill of 2000, “forensic ballistic is a comparative analysis of fired bullets and cartridge casings to identify the firearm from which the bullets or cartridge casings were discharged through the identification of the unique characteristics that each firearm imprints on bullets and cartridge casings”. Firearms identification also involves restoring filed off serial numbers, retracing projectile flights, identifying the various types of bullet wounds, and determining the range of close range shots through powder stain patterns on the target. Firearms identification experts apply the sciences of metallurgy, chemistry (gunshot residue analysis), microscopy, and ballistics. But a ballistic expert might face certain problems unless he is properly equipped to overcome the difficulties. The ballistic expert should have proper knowledge and experience in the field. Like document examiners, forensic firearms experts are trained in crime laboratories while they work. Many firearms expert can testify about topics ranging from whether a specific object is, legally, a firearm, to intricate reconstruction of crime scene evidence. In the case of study of firearms, it is not necessary that in all cases ballistic expert has to intervene to classify

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the case under ballistics, even if it is found by medical examination that the nature of
injury was caused by firearm, or if the medical examiner reveals the type of firearm
used, or whether it’s a gunshot injury, the case falls within the purview of the chapter
ballistics as it is the study of firearms and can be studied even by a doctor\(^88\) or the IO.\(^89\)
In the case of State of Punjab v. Jugraj Singh And Others, conviction was recorded on
the testimony of the IO where he categorically stated the guns seized were not in
working condition and that no purpose would be served by sending the same to the
ballistic expert for his opinion. Rather, it is better to refer to the offence i.e when the
offence is caused by using firearms it falls within the category of ‘Ballistics’. The
Supreme Court in State of Punjab v. Hakam Singh, that the failure of the IO to have
seized the firearms and empties for examination by ballistic expert was not fatal in view
of the categorical testimony of PW3 about the whole incident.\(^90\) The court held that the
examination by the ballistic expert would only have corroborated the prosecution case.
In Surendra Paswan v. State of Jharkhand\(^91\), the bullet hit the left eye of the deceased
which lead to his death. Failure to send bullet for ballistic examination was not fatal. In
Vinnet Kumar Chauhan v. State of Uttar Pradesh \(^92\), having regard to the ocular
evidence adduced by the prosecution, there was no reason to discard the prosecution
theory that the injury whereof the deceased suffered complete paralysis of both the
limbs etc. was caused by a bullet fired from a revolver. In Gajadhar Soni v. State of
M.P.\(^93\) as the ballistic expert failed to point out the time with exactitude when the gun
belonging to the accused had been fired acquittal was recorded. In Manoj Kumar’s
case, the alleged weapon recovered from the possession of the appellant was neither
sent to ballistic expert nor tested by the police personnel himself. Failure of the expert
to mention the fact properly in the report resulted in acquittal.\(^94\) Sometimes since the
empties which were sent to the ballistic expert were not sealed properly acquittal was
recorded. Therefore the IO must be very particular while collecting the evidence,
pointing out the time. The collection, preservation and transportation should be made
and also properly made.

\(^{88}\) Hari Singh And Another v. State of Uttar Pradesh (2010) 13 SCC 756
\(^{89}\) State of Punjab v. Jugraj Singh And Others (2002) 3 SCC
\(^{90}\) State of Punjab v. Hakam Singh (2005) 7 SCC 408
\(^{91}\) (2003) 12 SCC 360
\(^{92}\) (2007) 14 SCC 660
\(^{94}\) Md. Moinul Haque v. The State of Assam (06.06.2012 – GUHC) MANU/GH/0350/2012
7.5.6 Recommendation and Suggestion For Cases In Which Fingerprint Evidence Was Used To Record Conviction And Acquittal

In India, fingerprint matching is done by taking fingerprint from the accused and matching it with the chance fingerprints collected from the place of occurrence. Although fingerprint evidence continues to play a prominent role in criminal investigations, it has recently been subject to considerable criticism with questions being raised over the scientific basis of the underlying assumptions of the technique, particularly from scientific and legal scholars. Although science of fingerprinting is popularly perceived as error-free, some critics have charged that it is not an exact science. Many people have been convicted on the basis of mistaken fingerprint identification. In 2004, the FBI used a fingerprint to link Brandon Mayfield, an American attorney, to a train bombing in Madrid. However, he was vindicated after a review revealed that the fingerprint, did not belong to him. According to the British standard, if a set of fingerprints found at a crime scene is incomplete, it may be said to match another set, if the two share at least 16 characteristics. However, no particular number of characteristics is accepted everywhere and some jurisdictions require as few as 12 characteristics to reach a conclusive identification. In India, according to section 45 of the Indian Evidence Act, expert opinions on fingerprint impressions are admissible. As such, the court has to consider only one criterion i.e. the reliability of the evidence adduced by the expert in each case. Bhaluka Behera v. The State, is one of the leading cases in this area. In this case one of the important question was whether the accused had falsely personated himself by using other name through executing and registering a document by putting his thumb impression on the document. In order to prove the thumb impression on the document an expert was allowed to state his opinion. Even though court considered the opinion of the fingerprint expert as a weighty piece of evidence, opined that court was not bound to accept and act upon it. In this regard, the court cited with authority the observation made by Beaumont, J. in

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97 Bhaluka Behera v. The State, AIR 1957 Ori 172 : 1957 CrLJ 902
Fakir *Mahomed v. Emperor*. The direction was that in case of fingerprint evidence court must conduct a three prong analysis. At the first step, court shall evaluate with the help of the expert, the similarities of the evidence print and the prints collected from the accused and shall reach a conclusion. In the second step, the court shall directly come to the evaluation of point resemblance of the evidence print and the accused. In the third step, court shall evaluate the experience of the expert on the particular field. The court said that the directions given by Beaumont, J., were correct and proper guide in matters of fingerprint evidence. Finally, the court concluded that the trial judge properly examined the fingerprint very carefully and the expert also stated cogent and convincing reasons for his conclusions. The critical observation which was made by the court in this case is that even though the science of fingerprint evidence has developed to a stage of exactitude, the trial judges shall scrutinize it to determine the reliability. In Jessica Lal Case, *Sidhartha Vashisht @ Manu Sharma v. State*, the Supreme Court held an expert is an expert only if he follows the well accepted guidelines to arrive at a conclusion and supports the same with logical reasoning which is a requirement of law as laid down in the Evidence Act. In this case the fingerprint expert undertook to examine the different sets of fingerprints which were in question without having the specimen or admitted fingerprint of the accused. In *Kashinath Mondal v. State of West Bengal*, the Supreme Court held, although fingerprints were not obtained from the place of incidence it is well settled that remissness and inefficiency of the investigating agency should not be a ground to acquit a person if there is enough evidence on record to establish his guilt beyond reasonable doubt. In the past, in many cases it has been contended that if an accused is forced to give his fingerprint, it is equivalent to compel him to be a witness against himself which is against Article 20(3) of the Constitution. Finally the Supreme Court cleared the matter where the bench of judges decided that taking of fingerprints against the wishes of a person is not against the Constitution.

From the above study, it is important that the fingerprint expert should be very particular while collecting the fingerprints, preserving the fingerprints and comparing

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98 *Fakir Mahomed v. Emperor* AIR 1936 Bom 151
99 *Supra* 32
100 *Kashinath Mondal v. State of West Bengal* (2012) 7 SCC 699
101 Article 20(3) “No person accused of any offence shall be compelled, to be a witness against himself”
the fingerprints. Experts should examine or compare the different sets of fingerprints in question by placing or bringing the specimen fingerprint of the accused before him. The investigating agency should be competent enough to conduct efficient and flawless investigation.

7.5.7 Recommendation and Suggestion For Cases In Which Toxicology Evidence Was Used To Record Conviction And Acquittal

Cases of poisoning are common in India. Poison can be administered not only orally but also hypodermically or intravascularly with the help of a syringe. In many cases where the death of the deceased results from poisoning, it is difficult to successfully isolate the poison and recognize it. Several poisons particularly of the synthetic hypnotics and vegetable alkaloid groups do not leave any characteristic signs which can be noticed on post-mortem examinations. Sometimes due to insecticide poisoning, death may result from asphyxia. In some cases where chemical analysis was used acquittal of the accused was recorded. In the instant case, prosecution failed to prove the revealed blood group was same with that of the deceased. In another case, the report of the chemical analysis was accepted but the motive could not be proved as a result of which acquittal was recorded. Where the blood samples along with other articles were sent for chemical examination but the report was not available on record acquittal was recorded. Seized articles were sent for chemical analysis but prosecution failed to prove that they were properly sealed. Sealed parcels were deposited with chemical examiner but prosecution failed to prove the case. In a certain case the report of the chemical examiner was not specific. In another matter the CFSL report did not enable the court to conclude that deceased died of poisoning. Where the samples of the narcotics were not taken in terms of the Standing Instructions

105 Babu v State of Kerala (2010) 9 SCC 189
106 Appasaheb And Another v. State of Maharashtra (2007) 9 SCC 721
and by complying section 55 of the NDPS Act. From the study of few cases it has been revealed that many of the acquittals were recorded due to the failure of the prosecution. Therefore, prosecution must be competent to prove cases where toxicology evidence is used. The art of proving cases must lie with the prosecution. The prosecution should be prompt enough to properly place the documents on record. The requirements of sealing should be complied with by the prosecution. Chemical examiner’s report must be specific and conclusive. The collection of the Narcotics should be made by following the Standing Instructions and by complying section 55 of the NDPS Act.

7.6 LIMITATION

In this study the researcher has focused on only four major forensic evidences that are used by the courts in most of the cases i.e. DNA, Ballistics, Fingerprints and Toxicology. Other forensic evidences are used in very limited cases in India. Hence the findings of the study are based on those forensic evidences only.

7.7 CONCLUDING REMARKS ON ROLE OF FORENSIC EVIDENCE IN THE DECISION MAKING PROCESS OF CRIMINAL CASES

A critical analysis of the various forensic evidences revealed that it is an indispensible tool in the hands of the decision making process of criminal cases which has to be properly used. The study has also revealed the lacunae on the part of the system which involves investigation and prosecution. The study also helped to understand the minds of the court while accepting forensic evidence and while rejecting it in the decision making process. Still some efforts and improvements are required in this field to make it much more trustworthy and dependable.

To improve the quality of forensic science result some recommendations are forwarded herewith as A. Increased Funding B. Improving Forensic Education to Enhance a research Culture C. Improving 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 funding to support research is one of the biggest obstacles specifically in developing countries. In the US, forensic science research projects are sometimes funded by the National Science Foundation. Some of the necessary research within these fields may make important methodological and theoretical contributions to broader disciplines, such as probability theory, statistics, decision research and cognitive psychology\textsuperscript{113}. Recently, funding has also been made by the National Institute of Justice (NIJ) in the pattern identification sciences. Such funding is made to promote fundamental research to improve understanding of the accuracy, reliability, and measurement validity of forensic science disciplines.

To benefit forensic science it is very much required in future legions of individuals with skills and background should join the field to work in the academic research community and also as practitioners. If some of these people keep good hold on both research and practice they would be extremely beneficial for both the sectors as they could be valuable translators, mediators and educators in both domains and also convey to fellow practitioners the need for a research based approach and contribute to ensuring that research focuses on areas of genuine and important concerns to practitioners. The Government should provide generous competitive grants for highly qualified practitioners to pursue advanced graduate training in relevant disciplines or research-focused forensic science program. These grants could, even pay half of an analyst’s salary for a period of few years to allow the time and financial resources for pursuing a PH.D. A few highly competitive and well-funded grant opportunities of this kind would significantly contribute to the research culture of forensic science. It is

\textsuperscript{113} 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 Psychologypych.rutgers.edu/co
experienced that currently, in U.S. in the “pattern identification”\textsuperscript{114} field, the number of practicing analysts with a PH.D. is quite small compared to the forensic fields, including DNA analysis and toxicology, in which a significant number of analysts hold PHD.

To improve the research culture in forensic science some changes to the current approach to journals and publications are very much needed. First, of all forensic science journals should insist upon a full-fledged commitment to research norms. Publication in any journal that is not indexed by at least some of the major indexing services should, not be counted as publication. Peer review should be serious, blind, and carried out by individuals who are well qualified to access the research merits of any given article. While non-research oriented practitioners can play a valuable role in peer review, evaluations by those with the necessary qualification to access the merits and execution of any given study should dominate the criteria for acceptance. The peer review process for acceptance of forensic evidence is forwarded by the \textit{Frye v. United States}\textsuperscript{115} and \textit{Daubert v. Merell Dow Pharmaceuticals, Inc}\textsuperscript{116} which is already discussed in the second chapter.

Efforts should be made to use conventional scientific standards to guide ‘casework’. One key example of ‘casework’ is “sequential unmasking”\textsuperscript{117}. Analysts should have access to all the domain-relevant information they need to conduct their inquiry, but they should be shielded from domain irrelevant matters. A fingerprint examiner, for example, likely does not need to know the surface from which a print was lifted. A fingerprint examiner does not need to know, however, about the suspect’s confession or his three prior convictions for similar crimes. A document examiner cannot escape

\textsuperscript{114} 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.

\textsuperscript{115} \textit{Frye v. United States} 293 F.1013 (D.C. Cir. 1923)
\textsuperscript{116} \textit{Daubert v. Merell Dow Pharmaceuticals, Inc} 509 U.S. 579 (1993)
seeing the content of the document being analyzed; however, she need not be told broader aspects of the prosecution’s theory of the case.

Improving documentation\textsuperscript{118} practices in order to increase transparency is another step to incorporate scientific standards. While the particular degree of documentation may appropriately vary with the complexity of the comparison, documentation should be both thorough and transparent. If a fingerprint examiner, for example, finds additional minutiae on a latent print after beginning the comparison process, this back-and-forth reasoning should be clearly noted. Similarly, an examiner should indicate the degree of confidence (for example, high, medium, low) in the existence of minutiae or striations or handwriting features in the disputed exemplar in advance of undertaking any comparison. While careful documentation is no substitute for the empirical research needed to establish the power and the limits of various techniques, it can usefully clarify an examiner’s reasoning process and the basis for any conclusions, and may offer some protections from the potential biasing effect of the comparison process.

Guidelines and standards for forensic practice in a great many forensic disciplines are developed and recommended by entities known as Scientific Working Groups (SWGs), funded by the Department of Justice. Most of these working groups, which have emerged over the past twenty years, operate under the auspices of the FBI laboratory. They were designed to develop best practices, create appropriate technical standards, and improve communications both within and among various forensic disciplines. Scientific Working Groups exist for firearms and toolmarks, friction ridge analysis study and technology, imaging technology, DNA, shoeprint and tire tread evidence, drug analysis, as well as for a number of other forensic disciplines. These organizations have provided important venues for consensus building, policy development, and knowledge dissemination. Scientific Working Group should also be established in India to develop the communications between the various forensic disciplines.

\textsuperscript{118} Material that provides official information or evidence or that serves as a record. The process of classifying and annotating texts, photographs, etc.
Another needed dimension for a robust research culture is access to data\textsuperscript{119} and test subjects. Participation in the research enterprise must obviously be balanced against a laboratory’s other needs, and a laboratory may be unable to participate in every research project asked of it. However, access to data exemplars and databases should not be limited to practitioners at a given laboratory. With appropriate precautions for protecting confidentiality and the necessary input of Institutional Review Boards, forensic laboratories, as well as institutions like the FBI and state and federal criminal justice authorities, should make data available to qualified researchers to the maximum extent possible.

Numerous commentators have criticized the institutional connections between the police, the prosecutors, and the crime laboratories. Therefore it is necessary to make crime laboratories independent of these other domains.

7.8 TOTAL PERCENTAGE OF ACQUITTAL AND CONVICTIONS USING ALL FOUR FORENSIC EVIDENCES

**DNA: RATE OF CONVICTION AND ACQUITTAL**

i. Out of 76 criminal cases in 67 cases conviction was recorded, which amounts to 88.16\%. In other words in 88.16\% criminal cases in which DNA evidence was used conviction was recorded.

ii. Out of 76 criminal cases in 9 cases acquittal was recorded, which amounts to 11.84\%. Therefore in 11.84\% criminal cases in which DNA evidence was used acquittal was recorded.

**BALLISTICS: RATE OF CONVICTION AND ACQUITTAL**

iii. Out of 100 criminal cases in 82 cases conviction was recorded, which amounts to 82\%. In other words in 82\% criminal cases in which ballistic evidence was referred to, conviction was recorded.

\textsuperscript{119} Data means a representation of information, knowledge, facts, concepts or instructions which are being prepared or have been prepared in a formalized manner, and is intended to be processed, is being processed or has been processed in a computer system or computer network, and may be in any form(including computer printouts magnetic or optical storage media, punched cards, punched tapes) or stored internally in the memory of the computer; Section 2(o) of IT Act, 2000
iv. Out of 100 criminal cases in 18 cases acquittal was recorded, which amounts to 18%. Therefore in 18% criminal cases in which ballistic evidence was referred to, acquittal was recorded.

**FINGERPRINTS: RATE OF CONVICTION AND ACQUITTAL**

v. Out of 100 criminal cases in 71 cases conviction was recorded, which amounts to 71%. In other words in 71% criminal cases in which fingerprint evidence was referred to, conviction was recorded.

vi. Out of 100 criminal cases in 29 cases acquittal was recorded, which amounts to 29%. Therefore in 29% criminal cases in which fingerprint evidence was referred to, acquittal was recorded.

**TOXICOLOGY RATE OF CONVICTION AND ACQUITTAL**

vii. Out of 100 criminal cases in 79 cases conviction was recorded, which amounts to 79%. In other words in 79% criminal cases in which toxicology evidence was referred to, conviction was recorded.

viii. Out of 100 criminal cases in 21 cases acquittal was recorded, which amounts to 21%. Therefore in 21% criminal cases in which fingerprint evidence was referred to, acquittal was recorded.

**TOTAL RATE OF CONVICTION**

Rate of conviction (DNA + Ballistics + Fingerprints + Toxicology) = 88.16 + 82 + 71 + 79 = 320.16

Therefore the total rate of conviction in all the four types of forensic evidence = 320.16/400 x 100 = 80.04 %