

**Legal Status of Human Genetic Material–
A Study Relating to Human DNA
its Ethical Problems and Law**

A Thesis

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CHAPTER-I

INTRODUCTION

Every day in the newspapers of local, national and international level as well as the television of national and international channel, we read and hear the examples of complicated nature of offences of known and unknown nature. It happens in unknown places and manners and by known or unknown persons like several persons commit adultery with a woman or several persons commit gang rape with a woman or several persons join the commission of an offence or offences with an infant, insane, idiot, illusioned, intoxicated and the like. Sometimes such rape or adulterous relationship result into birth of a child. Therefore, a complicated question arises as to the paternity of the child because it is an age old maxim that **“maternity is certainty and paternity is uncertainty”**.¹ In such matter, in earlier times, super human or super natural means and methods of power used to resolve such issue. But later on these started creating more complications than to resolve the issues. Hence, human being turned towards scientific manner and methods to solve such parentage, heritage, lineage, succession and crime’s issues. The advent of Forensic Science made a revolution in this regard and in the ambit of forensic science, DNA (Deoxyribo Nucleic Acid) test stands on the top. The use of DNA throughout the world annihilated the old scientific and other kind of investigations relating to offences and other issues. The so called most advanced country Great Britain in Kingship or Royal family, whenever there is marriage of a son with a women, the prospective bride of the King has to undergo DNA test for paternity and chastity and when it is established, then only her marriage would be finalized. So, in short, it can be said that DNA is dominating the investigation, enquiry, trial and adjudication. It has turned into an important, material and substantive piece of evidence. Regarding it’s evidentiary value, it is unquestionable. But at the same time it is like an **“unruly horse”** and sometimes ruin the **“established home”** and family and

¹ Thomas Pollet and Daniel Nettle, “Contact frequencies between grandparents and grandchildren in a modern society: Estimates of the impact of paternity”, Journal of Cultural and Evolutionary Psychology, 4(2006) 3-4.

bring “tears from cheers”. Hence, it should be resorted in rarest of rare cases when there remains no alternative or recourse.

In this regard, it can be said that the present world is the world of science and technology, and new researches are taking place in every field. The rate at which the world has progressed is commendable. Advanced scientific technology has given the world an effective and precise tool for criminal investigation, e.g., fingerprinting analysis by fingerprint experts, hand-writing analysis by hand-writing experts, brain fingerprinting, narco analysis, testing of blood samples and other biological materials by forensic science techniques. In fixing paternity, the DNA test technology is coming up as the latest method. DNA technology is helpful in tracing the criminals not only in recent times but in the past unsolved crimes also. A person can change his looks by manipulations and tampering but he cannot change his DNA in order to escape from the clutches of law.²

Many years ago, it was believed that there exist 48 chromosomes in a human being. But in 1956 J.H. Tjio and A. Leven from Sweden discovered 46 chromosomes and changed that belief. Their discovery was, later on, supported by C.E. Ford and J.L. Hammerton (in 1956), and by S. Makino and M.S. Sasaki (in 1961).³ By a famous scientist Garrod (1901) the fact was brought to light that “simply the most evolved and most intelligent living organism is the ‘MAN’ and almost all basic principles related to biology, including those of ‘genetics’ are, therefore, applicable to human beings just as well as are applicable to other organisms”; and he successfully interpreted some human diseases, e.g., *alkaptonuria*, *phenylketonuria*, etc. as traits inherited in accordance with Mendel’s Laws of genetics and heredity. This was the birth of the so called ‘Human Genetics’.⁴

Discovering the natural facts and principles that govern the “biology” of organism requires elaborate laboratory experimentation as well as field study. The

² H.J. Walls, Forensic Science an Introduction to Scientific Crime Detection, Universal Law Publishing Co. Pvt. Ltd., New Delhi, First Indian Reprint 2002.

³ Makino, S. and Sasaki, M. (1961). A study of somatic chromosomes in a Japanese population. An. J. Human Genet 13: 47-63.

⁴ James F. Crow and William F. Dove, “Perspectives on Genetics: Anecdotal, Historical, and Critical Commentaries 1987-1998”, The University of Wisconsin Press, England in 2000.

facts and principles related to human genetics have, however, been mostly gathered from field study or are based upon the genetics of other organisms because human beings, due to social and some other biological phenomenon based factors, cannot be used as “experimental laboratory materials”.⁵ Therefore, from the above said facts, it can be said that ‘man’ is unsuitable and unfavorable, in experimental genetics. However, they still continue to be preferred for genetic studies because of different nature, traits and habits.

Human genetic is a wide branch of the human biology wherein not only “heredity” or “inheritance” is studied but also the methods to determine human genetic traits and their Inheritance, i.e., pedigree analysis and study of twins; Blood groups and their inheritance (which includes Blood Group Antigens and Antibodies; Blood groups and their determination; Blood transfusion; Blood banks and blood donation; Heredity of blood groups; Blood grouping and legal suits, Rh-factor); Sex determination, Chromosomal aberrations, Human syndromes, Sex-linked characters and their Inheritance, Sex-influenced traits, Sex-limited traits, Eugenics, “Nature” and “Nurture”, Euthenics, Inborn errors in metabolism; and genetic analysis, chromosome-mapping and its use in Medical science as well as in Medico-legal and Forensic sciences.⁶

The DNA stands for deoxyribonucleic acid, the strands of identity that living beings receive from their ancestors. Outside of identical twins, no two people have the same DNA pattern. DNA fingerprinting also has certain distinctive features. In 1987, the DNA fingerprinting was utilised as a tool for criminal investigation, to establish blood relations and trace medical history. Investigators would find “anonymous DNA” at the crime scene and compare it with the DNA of suspects for possible matches. The investigator would generally use a swab to collect bodily substances from a suspect's mouth to match it with DNA collected from the crime scene. Prior to the use of DNA, identification was heavily based on finger prints, foot prints, blood, or other evidence that a suspect may have left behind after committing a crime. The process of matching a

⁵ Ibid.

⁶ Sturtevant AH , “The linear arrangement of sex-linked factors in *Drosophila*, as shown by their mode of association”, *Journal of Experimental Biology.*, (1913), 14: 43–59

suspects DNA with DNA found at a crime scene has provided both law enforcement agencies and court officials with a higher probability of ascertaining the identity of offenders. The DNA fingerprinting has been very useful for law enforcement, as it has been used to exonerate the innocents. Unlike blood found at a crime scene, DNA material remains usable for an endless period of time. DNA technology can be used even on decomposed human remains to identify the victims.

The Clinical trial and medical research has long been an important area of medical sciences as it has been referred to in large number of mythological and historical texts and scriptures.⁷

Charaka Samhita (textbook of medicine) and *Sushruta Samhita* (textbook of surgery) dating back to 200 B.C. and 200 A.D. respectively, focus on India's age old proficiency in medical science. Today, there are number of laws which govern clinical research in India, some of them being: The Drugs and Cosmetics Act, 1940; The Medical Council of India Act, 1956 (Amended in 2002); The Central Council for Medicine Act, 1970; The Guidelines for exchange of Biological Material (MOH Order, 1997); and Right to Information Act, 2005.

Since there are shortcomings in the existing legal provisions with regard to identification of individuals for specified purposes such as victims of disasters, missing persons, etc., the Department of Biotechnology came up with a draft Bill titled "The Use and Regulation of DNA-Based Technology in Civil and Criminal Proceedings, Identification of Missing Persons and Human Remains Bill, 2016." On 27 September 2016, the draft Bill was forwarded to the Law Commission of India for examination and its revision, if required.

DNA profiling technology, which is based on proven scientific principles⁸, has been found to be very effective for social welfare, particularly, in enabling the Criminal Justice Delivery System to identify the offenders. Such tests relating to a

⁷ 271 Report of the Law Commission of India, July 2017.

⁸ The DNA test has 99.99 % chance of correct conclusions and is perceived as an objective scientific test which may be difficult for an individual to refute. See: *Veeran v. Veeravarmalle & Anr.*, AIR 2009 Mad. 64; and *Harjinder Kaur v. State of Punjab & Ors.*, 2013 (2) RCR (Criminal) 146.

party would definitely constitute corroborative evidence.⁹ Appreciating the use and regulation of DNA based technology in judicial proceedings, particularly, identification of persons accused of offences under the Indian Penal Code 1860 (IPC) and other laws, identification of missing persons and disaster victims apart from its use in medical sciences; a need has long been felt to have a special legislation to regulate human DNA profiling. DNA analysis offers substantial information which if misused or used improperly may cause serious harm to individuals and the society as a whole.

DNA tests are highly reliable as because every person's DNA is unique except in identical twins. The greatest asset of DNA is that it is so specific to every individual that it cannot be tampered. DNA tests can be used for various reasons, such as, to establish parentage of a child, detect crimes and identify mutilated dead corpses. They are of immense help in criminal justice administration and even in some civil disputes like succession, inheritance etc.¹⁰

DNA testing has become an established part of criminal justice procedure, and the admissibility of the test results in court has become routine.¹¹ DNA testing has also endeavoured in opening up new sources of forensic evidence, It has full potential to identify and distinguish between perpetrators and innocent people.

The development of forensic DNA testing has expanded the types of useful biological evidence. In addition to semen and blood, such substances as saliva, teeth, bones and even fossils can be sources of DNA.¹² These sources are still expanding as researchers are exploring the potential of other biological substances, such as hair, skin cells, and fingerprints.

Although the use of DNA testing is expanding but the use of DNA evidence is currently limited because most of what could be tested remains unrecovered and unanalyzed. The number of crimes are increasing, but in all the criminal convictions for which DNA collection is legislatively mandated, their

⁹ *Simpson v. Collinson*, (1964) 1 All ER 262.

¹⁰ *Ibid.*

¹¹ Subbash Chandra Singh, DNA Profiling and the Forensic use of DNA Evidence in Criminal Proceedings, *Journal of the Indian Law Institute*, Vol. 53, April-June 2011.

¹² Report of the Royal Commission on Criminal Justice, HMSO, London 1993, Chapter 9.

samples are being obtained from less than half of the individuals, and of the cumulative number of DNA samples obtained, merely 20 per cent have been processed.

The reasons for the delay or non-recovery of evidence and processing are scarcity of law enforcement resources, lab backlogs caused by insufficient funding, time-consuming and costly. Deadlines imposed by the courts, make it impossible to analyze all the potential evidentiary specimens submitted.

More rapid processing of DNA evidence could make it possible to overcome these obstacles in forthcoming years as a result of improvements in technology. Likewise, the turnaround time of Restriction Fragment Length Polymorphism (RFLP) analysis has recently been reduced. The anticipated replacement of Restriction Fragment Length Polymorphism by Polymerase Chain Reaction (PCR) based technology is more promising which takes only days to perform. Initial collection of evidence is improving as a result of the establishment in many jurisdictions of more structured crime-scene teams and more specialised evidence collection procedures. In the past few years alone, major technological advances have been made in fingerprinting, the development of computerized fingerprint databases are perhaps most familiar because of recent sensational criminal cases related to DNA testing.

Ironically, there is no specific DNA legislation enacted in India, although Section 53 and Section 54 of the Criminal Procedure Code, 1973 provides for DNA tests impliedly and they are extensively used in determining complex criminal problems.

Section 53 deals with examination of the accused by medical practitioner at the request of police officer/investigating officer. If there are reasonable grounds to believe that an examination of the person will afford relevant evidence as to the commission of the offence.

Section 54 of the Criminal Procedure Code, 1973 further provides for the examination of the arrested person by the registered medical practitioner at the

request of the arrested person.¹³ The Law Commission of India in its 37th Report stated that to facilitate effective investigation, provision has been made authorizing an examination of arrested person by a medical practitioner, if from the nature of the alleged offence or the circumstances under which he has alleged to have been committed and there are reasonable grounds for believing that an examination of the person will afford relative evidence.¹⁴

Similarly, Section 27(1)¹⁵ of Prevention of Terrorism Act, 2002 states, that when an investigating officer requests the court in writing for obtaining sample of hand writing, finger prints, foot prints, photographs, blood, saliva, semen, hair or voice of an accused person, who is a reasonable suspect to be involved in the commission of an offence under this act. It shall be lawful for the court to direct that such samples to be given by the accused person to the police officer either through a medical practitioner or otherwise as the case may be.¹⁶

It is well-known that characteristics are transmitted by parents to their offsprings, i.e., from one to the next generation in the form of genes. Thus “Genes” (naturally gametes) are the only physical link between parents and offsprings. Every individual is a complex combination of specific parental and individual characteristics.

In the proposed research it is quite necessary to deal and explain human genetics because there are so many legal cases regarding paternity disputes and criminal offences which are to be settled or solved to meet the ends or goal of justice. So that the victims could get justice and state could perform their legal

¹³ Section 54 of the Criminal Procedure Code, 1973.

¹⁴ 37th Report of the Law Commission of India, 1967.

¹⁵ 27. Power to direct for samples, etc.-

(1) When a police officer investigating a case requests the Court of a Chief Judicial Magistrate or the Court of a Chief Metropolitan Magistrate in writing for obtaining samples of hand writing, finger-prints, foot-prints, photographs, blood, saliva, semen, hair, voice of any accused person, reasonably suspected to be involved in the commission of an offence under this Act, it shall be lawful for the Court of a Chief Judicial Magistrate or the Court of a Chief Metropolitan Magistrate to direct that such samples be given by the accused person to the police officer either through a medical practitioner or otherwise, as the case may be.

(2) If any accused person refuses to give samples as provided in sub-section (1), the Court shall draw adverse inference against the accused.

¹⁶ Manish Sati, Evidentiary Value of Forensic Report in Indian Courts, Symbiosis Law School, NOIDA, February 11, 2016.

duties towards its people. For example, blood grouping test helps in settling the disputed paternity cases by determining which of the claimants is the genuine parent of the child; by DNA fingerprinting and blood group testing, it is possible to save the innocents allegedly involved in murder and rape cases and to identify the real accused person(s). As already stated that entire structural development and functional organization of a human being (or any other living organism) is basically guided and governed by its genes acquired (inherited) from the parents. It means the basic nature of any (or an) organism resides in his gene but phenotypic expressions of gene very much depends upon nature, the environmental conditions, such as their habitat, nutrition, temperature, light, education and training, etc. It is well established that polymorphism in DNA has a very stable inheritance. This polymorphism in DNA can be revealed by the DNA testing technique. These techniques are very much useful and helpful in forensic science in which “identity of a person with the help of blood stains, semen stains, hair roots is fixed with almost absolute certainty”.¹⁷

The DNA testing techniques allows the identification of rapists in rape cases and of the father or the mother in a doubtful parentage case too. In this way, it is presumed that the study of human genetics is not only helpful and necessary tool in the biology but also in the legal practices in deciding the criminal as well as civil cases related thereto.¹⁸

In human genome the hypervariable locus (FIVR) was first discovered by Wyman and White. HVR is related with tandem of repeats. After the discovery of HVR it was thoroughly studied and illustrated by genetic scientist Prof. Alec Jeffreys of Liesester University of Great Britain. While studying myoglobin gene (which in stored in oxygen in the muscle) he found that mycoglobin mini satellite detects other human mini satellites which are highly polymorphic. In Human beings, there are about 100,000 genes which represent only 5 per cent of the total DNA in chromosomes, the remaining 95 per cent parts of DNA are unique

¹⁷ Manish Sati, Evidentiary Value of Forensic Report in Indian Courts, Symbiosis Law School, NOIDA, February 11, 2016.

¹⁸ Dellaporta, S.L., Wood, J. and Hicks, J.B., A Plant DNA Minipreparation, Version II, Plant Molecular Biology Reporter I (4): 19-21 (1983).

characteristic of human being, which are not understood yet. One of the components of this extra DNA consists of sets of base sequences repeated numerous times is known as mini satellite.

The total genetic make-up of an organism is called “genome” and the genetic make-up of an organism as distinguished from its appearance is called “genotype”. It is expressed as the two alleles at a single locus. There are many families of hyper variable locus (HVR) in the human genome. By means of myoglobin minisatellites many other minisatellites were discovered, some of which are very polymorphic. If a cloned probe is hybridized from the first intron of the myoglobin gene to restriction enzyme digested genomic DNA then highly polymorphic pattern is visible. The human DNA detected by this method is highly individual specific (except in case of monozygotic twins which cannot be distinguished by this probe). These are inherited from parents to off springs.¹⁹

1:1 The relevance and scope of the study of DNA Test:

It is relevant to mention that the DNA technology has been proved to be a boon for innocent suspects, investigating agencies and Judges and bane for real culprits whether alive or dead. In several cases DNA came to rescue the innocent convicts even by post-conviction DNA tests. They were convicted on the basis of available false evidence but DNA technology helped them to prove their innocence. In other words, DNA evidence is also known as justice through advance technology because biological evidence cannot be tampered and it can never tell a lie. In U.S.A. many cases were highlighted by Attorney General, who were earlier convicted but were released after DNA test revealed their innocence. All these exonerated persons had already served an average of many years prison terms. The release of jailed persons on the basis of Advance Scientific Technology has established the importance of DNA tests.

¹⁹ Morrison PJ, Genetics for Surgeons, Spence Raj Londoan, Remedica 2005. Dr. Lalji Singh, Forensic Scientist, Centre for Cellular and Molecular Biology (CCMB), Hyderabad (A.P.), India.

1:2 Meaning of DNA:

The expression DNA means deoxyribonucleic acid which is the fundamental building block for an individual's entire genetic makeup. It is a component of virtually every cell in the human body. Further, a person's DNA is the same in every cell. For example, the DNA in a man's blood is the same as the DNA in his skin cells, semen, and saliva.²⁰ DNA is made up of molecules called nucleotides. Each nucleotide contains a phosphate group, a sugar group and a nitrogen base. The four types of nitrogen bases are adenine (A), thymine (T), guanine (G) and cytosine (C). The order of these bases is what determines DNA's instructions, or genetic code. Human DNA has around 3 billion bases, and more than 99 percent of those bases are the same in all people, according to the U.S. National Library of Medicine (NLM).²¹

Similar to the way the order of letters in the alphabet can be used to form a word, the order of nitrogen bases in a DNA sequence forms genes, which in the language of the cell, tells cells how to make proteins. Another type of nucleic acid, ribonucleic acid, or RNA, translates genetic information from DNA into proteins.

Nucleotides are attached together to form two long strands that spiral to create a structure called a double helix. If you think of the double helix structure as a ladder, the phosphate and sugar molecules would be the sides, while the bases would be the rungs. The bases on one strand pair with the bases on another strand: adenine pairs with thymine, and guanine pairs with cytosine.

DNA molecules are long- so long, in fact, that they can't fit into cells without the right packaging. To fit inside cells, DNA is coiled tightly to form structures we call chromosomes. Each chromosome contains a single DNA molecule. Humans have 23 pairs of chromosomes, which are found inside the cell's nucleus.

²⁰ Don Penven, What You Should Know About DNA, August, 2011 available in <http://www.csitechblog.com/dna-at-crime-scenes/>

²¹ Rachael Rettner, DNA: Definition, Structure & Discovery (<https://www.livescience.com/37247-dna.html>)

DNA is a powerful tool because each person's DNA is different and unique from every other individual's, except for identical twins. Because of that difference, DNA collected from a crime scene can either link a suspect to the evidence or eliminate a suspect, similar to the use of finger-prints. It also can identify a victim through DNA from relatives, even when nobody can be found. And when evidence from one crime scene is compared with evidence from another, those crime scenes can be linked to the same perpetrator locally, state wide, and across the nation.

Therefore, forensically valuable DNA can be found on evidence that is decades old. However, several factors can affect the DNA left at a crime scene, including environmental factors (e.g., heat, sunlight, moisture, bacteria and mold). Therefore, not all DNA evidence will result in a usable DNA profile. Further, just like finger-prints, DNA testing cannot tell officers when the suspect was at the crime scene or for how long.²²

DNA, sometimes called the building block or genetic blueprint of life, was first described by the scientists Francis H.C. Crick and James D. Watson in 1953.²³

1:3 Nature and object of DNA :

It is an established fact that DNA is found in all bodily fluids and tissues. In fact, it is present in every single cell, and each cell has identical DNA. Because of this, DNA evidence collected from the crime scene can be used like a fingerprint to include or exclude a suspect in a particular case. It can also be used to link crime scenes either locally or on a state or national level. In other words, DNA evidence has generally been used to confirm the identity of someone already under suspicion, rather than assisting in the investigation and identification process.²⁴

²² Ibid.

²³ B.K. Mishra, DNA & Indian Legal System, The Shillong Times, Meghalaya in November 26, 2017.

²⁴ National Institute of Justice brochure (#BC 000614)

1:4 Nature of DNA as a Evidence:

The nature of DNA evidence in a trial is such that importance must be given not only to its substantive contents but also to its process of acquisition. The question of whether or not legally or improperly obtained evidence should be allowed to have its day in Court is widely disputed. The Indian Evidence Act, 1872 does not give an exact answer to the question of admissibility, on the other hand Section 27 of the Act provides that if anything is discovered in consequence of information received from a person accused of an offence, in the custody of the police officer, so much information as relates distinctly to the fact thereby discovered may be proved. It contemplates that Section 27 shall apply even though the information may have been obtained by the police through unfair means.²⁵

Various jurisprudential views from various nations have not been able to arrive at a conclusive answer to this problem, which threatens the very basis of the prosecution of parties before the Court.²⁶ The impropriety of acquitting A, who is guilty, on account of the illegal conduct of B, was forcefully put by Cardozo J. when in the case of the **People v. Defoe**²⁷, he observed that:

*“A room is searched against the law, and the body of a murdered man is found. If the place of discovery may not be proved, the other circumstances may be insufficient to connect the defendant with the crime. The privacy of the home has been infringed, and the murderer goes free. The criminal is thus to go free because the constable has blundered”.*²⁸

While Finch J. on the other hand observed that :

²⁵ *Pang Chee Meng v. Public Prosecutor*, (1992) 1 Malayan LJ 137 (SC Malaysia); set' also *R. v. Ramcharan*, 24 WR Cr 36; *In Re Kalu Singh*, AIR 1964 MP 30 1964 (1) Cri LJ198 and *Amiiz v. S.*, AIR 1958 All 293, 300 1958 Cri LJ 462, 469, referred in 2003 Cri LJ, Journal Section at 267.

²⁶ William T. Plumb, Jr., *Illegal Enforcement of the Law*, Cornell Law Quarterly, Vol. XXIV (1938-1939) 370.

²⁷ 242 NY 13, 21, 150; 413 N.E. 585, 587 (1926).

²⁸ *Olmstead v. United States*, (1928) 277 US 438.

*“To be unable to find a murderer guilty, although competent evidence is before the Court to warrant a conviction, for the reason that someone else is guilty of petit larceny in connection with obtaining such evidence, seems a handicap rather than a help to the administration of justice”.*²⁹

However, the procedure used for the procurement of such evidence should and must indeed have some weightage upon the value attached to it as well.³⁰ Different Nations have different methods of validation of such evidences but majorly all the nations have generally recognized these evidences as very reliable.

1:5 Issues relating to DNA Evidence :

The issues related to DNA evidence were pointed out specially in the year 1990 because in the 1990's, as DNA identification moved from Laboratory to the Criminal Courts, the adversary process quickly highlighted a series of issues that had to be resolved before the evidence could be admitted on a regular basis. In the case of **Harjinder Kaur v. State of Punjab And Others**³¹, the court explained,

“16. A review of the above law, would go to show the following propositions are well-settled :

(1) Report of a blood-test is capable of amounting to corroboration of the statement of the complainant. It amounts to corroboration even under the common law. The nature of the corroboration would necessarily vary according to the particular circumstances of the offence charged. The test applicable to determine the nature and extent of the corroboration is the same whether the case falls within the rule of common law or within that class of offences for which corroboration is required by statute. A Criminal Court can make a direction for a blood-test to be taken by taking blood-sample of the complainant, accused and of the child. In

²⁹ Ibid.

³⁰ Saptarishi Bandopadhyay, National University of Juridical Sciences Aranya Bhavan, Calcutta, printed in 2003 Cri LJ Journal Section at 267.

³¹ CrI. Misc. No. M-31938 of 2011, decided on 1 August, 2012 in the Punjab-Haryana High Court.

certain cases, where it is contrary to the interest of a minor, the Court may not make a blood-test direction.

(2) The Court cannot order an adult to submit to blood-test. A blood-test which involves insertion of a needle in the veins of a person, is an assault, unless consented to.

It would need express statutory authority to require an adult to submit to it. This is based on the fundamental that human body is inviolable and no one can prick it.

(3) Where a Court makes a direction for a blood-test, and the accused fails or refuses to comply with the blood-test direction, the Court can in the circumstances of the case, use the refusal or failure of the accused to submit to blood test as corroborative evidence against him. If a party refuses to submit to blood-test, the Court may infer that some impediment existed which pointed out towards the implication of the accused.”

Advances in technology have made DNA testing an established part of investigation and prosecution, especially for cases in which identification is the primary issue. Moreover, these advances have rendered serology, identity testing for blood, saliva and semen are virtually obsolete.³²

Among the many new tools that science has provided for the analysis of forensic evidence is the powerful and controversial analysis of deoxyribonucleic acid, or DNA, the material that makes up the genetic code of most organisms. DNA analysis, also called DNA typing or DNA profiling, examines DNA found in physical evidence such as blood, hair, and semen, and determines whether it can be matched to DNA taken from specific individuals. DNA analysis has become a common form of evidence in criminal trials. It is also used in civil litigation, particularly in cases involving the determination of paternity or identity.

³² National Research Council, DNA Technology in Forensic Science, National Academy Press, 1992 (also known as NRC I), State v. Gentry, 125 Wn.2d 570

1:5:1 DNA sampling in Identification of Criminal Investigations :

DNA is now-a-days a useful tool in criminal investigations and adjudication because crime investigators utilise DNA profiles from two sources: human bodies and small samples of human bodily material found at the same of crime. DNA profiles can be obtained from human bodies by analysing samples removed from those bodies. Forensic procedures that can be used to obtain such samples (whether voluntarily or involuntarily) include blood sampling by injection, pulling out hair at the root and taking swabs from inside the mouth, known as buccal swabs.

In many cases, DNA profiles can be obtained from bodily samples that have become separated from a human body. Contemporary profiling techniques can generally be used on such tiny samples as the root of a pulled hair, saliva on a cigarette butt, a square-centimetre blood stain, skin cells from clothing or three micrograms of semen from a vaginal swab; standard or alternative techniques will sometimes succeed on other, less optimal samples such as shed hair or skin cells from a handled object.³³ Investigators will be interested in such samples if they suspect that they became separated from a person's body (usually either victim or offender) at the time of the commission of a crime, thus providing a potential insight into details of that crime.

The most important use of DNA identification by crime investigators is to compare a profile believed to be from a crime perpetrator (for example, derived from semen in a rape victim's vagina, or blood, hair or skin cells at a crime scene or on a victim's body) with a known person's profile. Other uses of DNA identification include:

- (i) comparing a profile from foreign samples on a suspect's body or possessions with a victim's profile (to test the suspect's prior contact with the victim);

³³ Kaye, D.H. & Sensabaugh, G.F., "Reference guide on DNA evidence", Reference Manual on Scientific Evidence, 2nd Edn., Federal Judicial Center, Washington DC, 2000.

- (ii) comparing a profile from an unidentified person or corpse with a known person's profile (to test identity); or
- (iii) comparing profiles in two crime scene samples (to infer the details of a crime or the common involvement of one person in separate crimes).

DNA matching can be used at various stages of an investigation. If a known person is a suspect at the time of the matching, then a positive match between crime scene DNA and that person will help to confirm the existing suspicion while a negative match will tend to negate that suspicion. However, DNA matching can also be used before suspicion has fallen on a single individual by comparing the unknown sample profile to samples taken from a group of persons, such as all adult males within a locality. A positive match with one person will cast strong suspicion on that person, while a negative match to all persons will cast suspicion away from the entire group. Such mass screenings may occur as part of a single investigation, where the group is drawn from a particular location or shares an occupation associated with the crime. The largest mass screening was in Australia till date in April 2000 investigation following the rape of an elderly woman in the New South Wales town of Wee Waa, during which most of the town's 600 male residents volunteered mouth swabs for DNA testing.³⁴

The most important method of mass comparison is through the use of databases of DNA profiles from known persons, each of which can be easily compared with every crime profile, potentially yielding "cold hits", that is, entirely unsuspected links between known persons and crimes. This method has resulted in a significant number of convictions in jurisdictions such as the United Kingdom, New Zealand and the United States.³⁵ All Australian jurisdictions have acted to create such databases, with samples drawn from volunteers, some crime suspects and certain categories of offender. With common protocols, different databases can be linked to expand the group of known persons whose profiles are

³⁴ Moldofsky, L., "Foolproof fingerprints: On their DNA marks", Time Magazine, 24 April, 2000, p. 47

³⁵ Tracey, P.E. & Morgan, V., "Big Brother and his Science kit: DNA databases for 21st century crime control?", Journal of Criminal Law and Criminology, Vol. 90, No. 2, 2000, pp. 635-90.

regularly screened against crime scene samples.³⁶ This is the idea behind the establishment of the National Criminal Investigation DNA Database administered by Crim Trac.³⁷

1:5:2 DNA Identification in the Criminal Justice System:

DNA profiling and the forensic use of DNA evidence have undergone considerable development since the Australian Institute of Criminology first examined this topic in 1990 in Trends and Issues No. 26. Some of the laboratory techniques described in that report have since been refined so that more precise DNA profiling is now possible, and a greater range of criminal investigation can benefit from the use of such forensic techniques. Moreover, the proposal in that report for a national DNA database has now been advanced, with the establishment on 1st July 2000 of the Crim Trac agency. However, many of the issues raised in relation to scientific reliability, standardisation of profiling techniques, laboratory accreditation and quality control, improved population and data analysis and privacy are still the subject of dispute in legal proceedings.

In this research, the researcher has examined the science of DNA identification and its use during criminal investigations and in criminal proceedings, including criminal trials, appeals and post-conviction proceedings. It would describe, the main benefits and increasing role of DNA identification in the criminal justice system in the following chapters.

1:5:3 DNA Privacy :

Everything has two sides i.e. fair and dark side. In the same way, DNA has another side too specifically in the matter of privacy of a person as it infringes and exposes him or her to public and may ruin prospects for whole of his or her life. So, DNA databases can be effective tools to solve crimes, but they must be managed responsibly. The innocence project supports the collection and databasing of DNA from convicted felons only. It is believed that any policy of

³⁶ Haesler, A., "DNA and Policing", Reform: The Challenge of the New Genetics, Australian Law Reform Commission, Vol. 79, 2001, pp. 27–31.

³⁷ Ellison, C., "CrimTrac's new crime fighting systems switched on", media release, Minister for Justice and Customs, Parliament House, Canberra, 20 June, 2001.

collecting DNA from additional populations violates personal privacy and impedes law enforcement.

There are three reasons as to why the databases should be limited :

- (i) It is not known how secure DNA databases are. If hackers or lab employees ever compromised the privacy of this information, the incredibly sensitive and personal biological information contained within DNA test results could end up in the wrong hands.
- (ii) To collect and store DNA samples from broader populations- such as all people arrested or people convicted of misdemeanours-puts enormous strain on underfunded and understaffed DNA labs across the country. When labs are overburdened, mistakes are made. Forensic labs should be focused on working on crimes and not testing samples from vast numbers of innocent people.
- (iii) Sometimes crime scene samples produce only partial results that match a larger percentage of the population. If hundreds of innocent people match a partial sample, crucial law enforcement resources are spent investigating innocent suspects and the possibility of charging and convicting an innocent person is greatly increased.

1:5:4 DNA Profiling :

Comparison of human DNA molecules does not require analysis of the entire DNA molecule, as about 99.9 per cent of DNA is common to all people. DNA comparison need only focus on a portion of the remaining 0.1 per cent of human DNA that is sufficiently variable to be unique each to individuals. Such variable DNA-termed “non-coding” (or “junk”) DNA-plays no direct role in the development of human characteristics.³⁸

³⁸ Trent, R.J., “DNA and the courts”, Judicial Officers’ Bulletin, Vol. 12, No. 7, Judicial Commission of New South Wales, Sydney, 2000, pp. 52, 56.

Modern comparative techniques compare only a small set of features of non-coding DNA. Such sets of features are known as DNA profiles and can be represented as an ordered series of numbers. That DNA profiles are easily quantified, represents a further advantage over other unique human features, such as appearance and finger-prints as it allows for automated analysis. The features comprised in a DNA profile must be sufficiently variable throughout the population to accept the likelihood that the profile is unique in that population, but also sufficiently regular to be amenable to cheap and efficient mass analysis. While several varieties of DNA profiling have been used in the past³⁹, the future of DNA identification in Australia is likely to be dominated by the type of profiling in present use. Any significant future changes in profiling would render contemporary investigative data bases obsolete.

Laboratory technicians do not “read” a DNA profile from a bodily sample. Rather, they construct a profile by inference from the outcomes of a series of procedures performed on that sample. Contemporary profiling techniques are increasingly automated, but the elimination of artefacts of the profiling process requires careful judgments by properly trained scientists.⁴⁰ Thus, a DNA profile generated from a sample by contemporary procedures must be understood not as a fact about a sample but rather as an interpretation of that sample.

1:6 DNA Technology Advancements :

It is also relevant here to mention that recent advancements in DNA technology have much improvised law enforcement’s ability to use DNA to solve cases. Old analysis methods required large biological samples and these old

³⁹ The Future of Forensic DNA Testing: Predictions of the Research and Development Working Group, National Commission on the Future of DNA Testing, United States Department of Justice, Washington DC., National Institute of Justice 2000; Butler, J.M. & Becker, C.H., Improved Analysis of DNA Short Tandem Repeats With Time-of-Flight Mass Spectroscopy, National Institute of Justice Science and Technology Research Report, October, United States Department of Justice, Washington DC, 2001.

⁴⁰ Roberts, H., “Interpretation of DNA evidence in courts of law: A survey of the issues”, Australian Journal of Forensic Sciences, Vol. 30, 1998, pp. 29–40; Kaye, D.H. & Sensabaugh, G.F., “Reference guide on DNA evidence”, Reference Manual on Scientific Evidence, second edition, Federal Judicial Center, Washington DC 2000.

methods often failed to result accurately when samples were degraded or contaminated.

Newer DNA analysis techniques can yield results from biological evidence invisible to the naked eye. Today, police departments are re-examining unsolved rape and homicide cases and looking for usual and unusual sources of DNA. Recently, a \$111,000 Department of justice grant for investigator and forensic analyst overtime led to the solving of nine rapes and 22 homicides in Kansas City.

New DNA analysis methods also can help identify missing persons. Who were missing for years, DNA advances have helped identify hair, bones and teeth and provide much needed closure for grieving families. Because of scientific advances in DNA technology that were used to identify victims of the World Trade Center attacks, DNA results can now be obtained from severely degraded samples.

1:7 Evolution of DNA :

The evolution of DNA technology from the laboratory to forensic science, a science applied to legal or courtroom purposes, has involved both the scientific and legal communities. On the scientific side, DNA testing technology developed from relative obscurity twenty years ago to ultra-modern labs with the announcement that the entire human genome has been mapped.

1:7:1 Access to DNA Testing :

Despite the widespread acceptance of DNA testing as a powerful and reliable form of forensic evidence that can conclusively reveal guilt or innocence, many prisoners do not have the legal means to secure testing on evidence in their case.

(i) Barriers to the DNA Testing : Various states have some form of law permitting inmates access to DNA testing. The other eight States have no law granting such access.

Even in many of the States that grant access to DNA testing, the laws are limited in scope and substance. Motions for testing are often denied, even when a DNA test would undoubtedly confirm guilt or prove innocence and an inmate offers to pay for testing.

(ii) Federal incentives for granting access to DNA testing- Federal law, the 2004 Justice For All Act, grants access to DNA testing for federal inmates claiming innocence and also allocates various justice-related funding to any State that grants DNA testing access to inmates claiming innocence. To meet the requirements of the federal law, States should pass or strengthen laws granting access to DNA testing.

(iii) Clear and comprehensive laws can ensure justice- Some States have passed statutes that include barriers to testing that are insurmountable for most prisoners. These include restrictions against inmates who plead guilty or whose lawyers failed to request DNA testing at trial. In many cases, the questionable evidence used to convict a defendant at trial-like eye-witness identification or snitch testimony-is used by Judges as grounds to deny a DNA test. These barriers keep innocent people from securing DNA tests that could prove their innocence.

An effective post-conviction DNA access statute must :

- i) Allow testing in cases where DNA testing can establish innocence including cases where the inmate pleads guilty.
- ii) Not include a “sunset provision” or expiry date for post-conviction DNA access.
- iii) Require States to preserve and account for biological evidence.
- iv) Eliminate procedural bars to DNA testing (allow people to appeal orders denying DNA testing; explicitly exempt DNA related motions from the restrictions that govern other post-conviction cases; mandate full, fair and prompt proceedings once a motion seeking testing is filed).
- v) Avoid creating an unfunded mandate, and instead provide the money to back up the new statute.
- vi) Provide flexibility in where and how DNA testing is conducted.

1:7:2 DNA inherited from Mother and Father:

The systematic analysis of the DNA reveals that genetics is the science pertaining to genes. It is the science of the hereditary and evolutionary similarities and differences of related organism. Gene is the basic unit of heredity. A gene is a sequence of DNA nucleotides on a chromosome. A scientist named Gregor Johann Mendel made experiments on heredity and published his result in 1885. Before that material basis of inheritance was thought to be fluid and it was considered that material determining heredity cannot be separated, it was considered that any mixing would change the genes. Gregor Johann Mendel was the person who discovered that mixing would not alter genes. His test showed that characteristics of father were transmitted to children and grandchildren. The test was carried out in garden peas. A round pea and a wrinkled pea were cross-bred and it was found that wrinkled peas appeared in second generation although it was not present in first generation. The characteristic of wrinkled pea was present in first generation but was not expressed and it was expressed in the second generation. It was established that genetic information was particulate and unchanging. This particulate nature of molecule allows DNA fingerprinting. It was proved that we do not inherit characteristics. We only inherit information to produce them. It has also been established that half genetic material is inherited from mother and the other half from father. The sperms and eggs which are present in male and female reproductive glands respectively called gonad produce gametes, i.e., sperm or ovum. When sperm fertilises an egg cell then an individual is formed. If it is a female it will have two copies of all genetic material and can produce eggs that have only one copy of each gene. If it is a male it will also have two copies of each gene as a female and can pass only one of the two to each of his progeny.⁴¹

The gene specifies blood group which is called ABO. There are four major ABO blood groups, i.e., A, B, AB and O (or AA and AO; BB and BO; AB; OO).

⁴¹ James–Nordby’s Forensic Science, 2nd Edition., Lawrence, Thomas, Jamel’s, DNA : Forensic and Legal Applications, 2005 Edition; R.P. Wheale, R. M. Mchally’s Genetic Engineering, 2nd Edition; *Kunhiraman v. Manoj*, (1991) 3 Crimes 860 (Ker.); Mange. E. J.-Mange, A.P. on Basic Human Generics, 2nd Edition.

The genetic classification is called phenotype. These phenotypes are created by DNA information contained in the sperm and egg and jointly they produce phenotype in a new individual. This genetic combination is called genotypes. The genotype has been defined as a genetic make-up of an organism as distinguished from its appearance or phenotype, and it is expressed as the two alleles at a single locus.

As stated above different forms of genes are called alleles, and gene can take three different forms and an individual can have only two of these three forms. For easy reference, these forms are indicated as 1A, jB and i. The alleles can be distinguished at the DNA level by its molecular sequences which are called nucleotides. These molecular sub-units are different from each other and can be distinguished.

DNA pattern of father consists of two DNA fragments. The larger piece, which moves more slowly during fragment separation, is at the top of the pattern. It has 9-repeat alleles. This is clear from 9 alleles in the left and right marker lanes. The smaller fragment; which moves faster has 5- repeat alleles. As already stated its size can be determined by comparing it to known sizes of right and left marker patterns.

DNA is in the form of cells containing 46 chromosomes. The sperm and egg have only 23 chromosomes each. Conception takes place when 23 chromosomes of father's sperm and 23 chromosomes of mother's egg unite together. The child carries 23 pairs of chromosomes. If half of the child's DNA is in similarity with that of the alleged father then the alleged father is declared the child's biological father.⁴²

1:8 Barriers to realizing the Potential of DNA Evidence :

Despite the exciting promise of DNA technology, a number of barriers remain, to realizing its full potential. One of these barriers is the frequent failure of law enforcement to identify and collect appropriate DNA evidence from the

⁴² Ibid.

crime scene. Many law enforcement agencies have not been properly trained to recognize and collect potential DNA evidence, and this situation leads to an unnecessary disadvantage for the investigation prosecution, specially in sexually assault cases. For example, a recent FBI survey revealed that of all sexual assault cases, less than 10 per cent had DNA evidence submitted to Crime Laboratories.

Other barriers include the failure to effectively evaluate DNA evidence for analysis, lack of communication between enforcement and crime personnel, limited resources, and the use of incompatible systems for DNA analysis. The major barrier in India is that of corruption, faking of forensic reports, production of false reports for evidence and most importantly the political influence of the accused as was seen in sensational **Madhumita Shukla case**⁴³ of Uttar Pradesh.

1:9 Admissibility of DNA Evidence:

The question of admissibility of DNA evidence is pivotal because it is the most direct means to encourage compliance with the legislative requirements governing the proper collection of DNA evidence and directly weighs the legal rights of the accused against the interest of the State in the presentation of the evidence. The Court has a general discretion to exclude evidence on the ground that it is more prejudicial than probative. It has the discretion to exclude the evidence which was obtained in circumstances which rendered it unfair to use it against the accused. In exercising discretion available, on the ground of fairness or public policy, the Courts weigh competing public interest, the public interest in bringing to justice those who commit criminal offences, as against the public interest in the protection of the individual from unlawful and unfair treatment. In cases where DNA evidence is obtained in violation of the prescribed forensic procedures, a Court can admit impugned evidence only if the desirability of admitting the evidence outweighs the undesirability of admitting it. Probative value of tainted evidence by itself is no justification for its admission. In Attorney General's Reference, No. 3 of 1999, in re⁴⁴ the House of Lords, held that there is

⁴³ Madhumita case: "Amarmani, wife get life-term sentence : Latest Headlines, News-India Today", India Today 24 October, 2007.

⁴⁴ (2001) 2 WLR 56.

no principle that unlawfully obtained evidence is not admissible. The question of admissibility is, however, a matter for regulation under national law⁴⁵ and depend and differ from case to case and place to place.

1:10 Ethical Problems relating to DNA :

The DNA issue involve some ethical problems too as it affects the religious feelings of the person. The genetic engineering of humans has raised many controversial ethical issues. While negative genetic engineering (gene therapy) does indeed raise a debate, the use of genetic engineering for human enhancement arouses the strongest feelings on both sides.

Genetic engineering is tested on animals, often including primates. Some animal rights activists find this inhumane. Genetic engineering must be used to cure peoples with diabetes. It is possible to extract genes from cells which are called beta cells and then to insert the insulin producing genes into a bacterium. Then the bacterium will start producing insulin. Genetic modification of embryos can pose an ethical question about the rights of the baby. One belief is that every fetus should be free to not be genetically modified. Others believe that parents hold the rights to change their unborn children. Still others believe that every child should have the right to be born free from preventable diseases.

Molecular Biologist **Lee M. Silver** believes that unlike **Aldous Huxley's Brave New World**⁴⁶, where a totalitarian government controls all of the genetic enhancements (they actually use eugenics instead of direct genetic modification) in society, the use of gene therapy to design children will be spread through what he calls "free market eugenics". Wealthy families will opt to design their child with genetic advantages because other families are doing so, and everybody wants to provide their newborn child with the best opportunities in life, with a leg up on the competition.

The greatest fear for Silver is that we will design so many children with germline gene therapy that the families which are wealthy enough to design their

⁴⁵ Isha Bothra, Symbiosis Law School, Pune.

⁴⁶ "Brave New World Book Details", AR Book Finder, Available in Wikipedia.genome/ethics

children, will pass down these enhanced traits to future generations. This gene therapy will obviously cost money, and the less wealthy families will be left to procreate their children in natural manner and would introduce their children into the world disadvantaged from their first breath.

The impact of this fact on society will be that there will be a new alignment of classes and so no longer we will separate people by their ethnic differences, the new division will be between what Silver calls ‘the naturals’ and ‘the GenRich’, or genetically enhanced. The major worry here is that the ‘genetic gulf’ between these two classes will become so wide that humans will become separate species.⁴⁷

These ethical values which may arise with the use of genetic material of human being will be a big problem, therefore, appropriate legal spectrum indeed is necessary at national and international level to check the abnormal and excessive disturbance of nature and be a threat to the very existence of society.

1:11 Review of Literature:

DNA stands for deoxyribonucleic acid, the uniqueness of identity that living beings receive from their ancestors. Except identical twins, no two people have the same DNA pattern. DNA fingerprinting also has certain distinctive features.

In 1987, the DNA fingerprinting was utilised as a tool for criminal investigation, to establish blood relations. Forensic scientists would find “anonymous DNA” at the crime scene and compare it with the DNA of suspects for possible matches. Before the use of DNA, identification was mainly based on finger prints, foot prints, blood, or other evidence that a suspect may have left behind after committing a crime. Method of matching a suspects’ DNA with DNA found at a crime scene has provided both law enforcement agencies and court officials with a great assurance of the identity of offenders.

⁴⁷ Sarmichain, Human genetic engineering and classes, January 2011.

DNA fingerprinting has been very useful for law enforcement, as it has been used to exonerate the innocent. Unlike blood found at a crime scene, DNA material remains usable for an endless period of time. DNA technology can be used even on decomposed human remains to identify the victims.

Today, there are number of laws which govern clinical research in India out of which few are as followed : The Drugs and Cosmetics Act, 1940; The Medical Council of India Act, 1956 (Amended in 2002); The Central Council for Medicine Act, 1970; The Guidelines for exchange of Biological Material (MOH Order, 1997); The RTI Act, 2005; and 271th Report of the Law Commission in India, 2017 (Human DNA Profiling– A draft Bill for the Use and Regulation of DNA-Based Technology): Apart from the above these are so many other relevant articles and books dealing with the topic.

Since there are shortcomings in the existing legal provisions with regard to identification of individuals for specified purposes such as victims of disasters, missing persons, etc., the Department of Biotechnology came up with a draft Bill titled “The Use and Regulation of DNA-Based Technology in Civil and Criminal Proceedings, Identification of Missing Persons and Human Remains Bill, 2016.” On 27 September 2016, the draft Bill was forwarded to the Law Commission of India for examination and its revision, if required.

There is no exact date of birth of the DNA technology in the world. However, DNA profiling, as we know it today, was developed thanks to two independent breakthroughs in molecular biology that occurred at the same time on different sides of the Atlantic. In the USA the polymerase chain reaction (PCR) was invented by Kary Mullis, while in the UK 'DNA fingerprinting' was being discovered by Professor Sir Alec Jeffreys at the University of Leicester.

In its earliest incarnation this technique was performed by restriction of 0.5–10µg extracted DNA using the restriction enzyme HinFI, followed by Southern blotting hybridisation designed to bind to multiple 'minisatellites' present in the restricted DNA.

This multi-locus probing (MLP) technique would result in probes binding to multiple independent DNA fragments at the same time giving rise to the traditional 'bar-code' pattern that is often visualised when we think of forensic DNA analysis, even today. Differences in the number of times the probe sequence is repeated in each DNA fragment forms the basis of the individual patterns observed on the autoradiogram image. Although, there is dearth literature on the subject since the research is broadly based on the verdicts given by Supreme Court and various High courts. However the available literature is traced down from the work of the following and the cases of the courts.

For example, **Alex Samuel & Dr. Swati Parikh**, in their book **DNA Tests in Criminal Investigation and Paternity Disputes, A Modern Scientific Technique**, **R.S. Dwivedi for Dwivedi & Co., edn. 2009**. have explained that DNA profiling is a technique by which an individual can be identified at molecular level. The use of DNA evidence in criminal investigation has grown in recent years. DNA testing has helped law enforcement identify criminals and solve difficult crime such as rape, murder and murder with rape etc. The potential of DNA typing has made possible the resolution of immigration problems and complicated paternity testing when the father is not available. Rapid identification of individuals in mass-disaster (man-made such as explosions) using DNA typing has also been possible. Computerized DNA database for the identification of criminal offenders have been created in some countries. DNA is a powerful investigative tool because, with the exception of identical twins, no two people have the same DNA. In other words, the sequence or order of the DNA building blocks is different in particular region of the cell, making each person's DNA unique. No doubt, DNA has great importance in criminal investigation cases such as murder, rape, disputed paternity, man-made disaster etc., still there is no specific provisions under Indian Evidence Act, 1872 and Code of Criminal Procedure, 1973 to manage forensic science issues. This research paper examined the science of DNA identification and its use during criminal investigations and in criminal proceedings, including criminal trials, appeals and post conviction proceedings. It describes the main benefits and costs of the increasing role of

DNA identification in the criminal justice system with special emphasis to India. We hope that the challenges of DNA technologies will be solve in future.

In the same way **Mr. B.R. Sharma**, in his book **Forensic Science in Criminal investigation and Trials, Universal Law Co. Fourth Edition, 2003** have intended to assist the criminal justice system to disseminate real justice. It intends to dispense with the inhumane, immoral and illegal traditional evidential tools used in criminal investigations.

Similarly, **Dr. Lalji Singh**, in his book **Forensic Scientist, CCMB, Hyderabad (A.P.), India** describes that chromosomes of a criminal provide clinching evidence of his involvement in a crime and are increasingly becoming the delight of forensic experts but the method itself, called DNA fingerprinting, is yet to gets its pride of place in Indian law, says the scientist who has solved many famous cases, the DNA way. DNA fingerprinting can be used as a vital input, and sometimes, it is the only decisive clue in some of the most complex cases, where all other evidence is lost or destroyed.

In the same way **Dr. P.C. Shekharan**, in his book **Forensic Science in Criminal Investigation, Encyclopedia of Police in India** concluded that the medico legal expert should visit the death scene before the autopsy if it is possible. Although, death investigation differs in different countries, there is always a crime scene investigation team. If the medico legal expert does not have the opportunity to visit the death scene himself, he would check the documents (notes, sketches, photographs, etc) which crime scene investigation team prepared. Many medico legal deaths may be resolved by death scene investigation. A medico legal expert should never forget, that if the death scene investigation is not performed before the autopsy, that autopsy will be an imperfect autopsy.

Similarly, **Dr. Durga Pada Das**, in his Journal “The Unreported Judgments” Journal Section, Volume 2005 has stated that an ordinary finger print (thump impression) is a reliable technique in crime detection but DNA finger printing is much more reliable, because ordinary finger prints are not always

available in the crime scene, as shrewd criminals commit crimes by using hand gloves. Every person has a unique and distinct DNA Characteristics and it will not match with any other person

In the famous **Narayan Dutt Tiwari, Former C.M. of U.P. and Uttrakhand** in the paternity dispute case which require DNA testing, the Court accepted the DNA evidence as relevant evidence. The Indian Courts are now taking DNA evidences as an expert's opinion like other forensic expert, ballistic expert, biological expert, chemical expert, document writing expert, lie-detector expert, serological expert, toxicological expert, etc.

The **Hon'ble Justice Ranjana Desai**⁴⁸ observed: In light of this attempted analogy, we must stress that the DNA profiling technique has been expressly included among the various forms of medical examination in the amended explanation to Sections 53, 53A and 54 of the Code of Criminal Procedure. It must also be clarified that a 'DNA profile' is different from a DNA sample which can be obtained from bodily substances. A DNA profile is a record created on the basis of DNA samples made available to forensic experts. Creating and maintaining DNA profiles of offenders and suspects are useful practices since newly obtained DNA samples can be readily matched with existing profiles that are already in the possession of law-enforcement agencies. The matching of DNA samples is emerging as a vital tool for linking suspects to specific criminal acts. It may also be recalled that the as per the majority decision in *Kathi Kalu Oghad*, the use of material samples such as fingerprints for the purpose of comparison and identification does not amount to a testimonial act for the purpose of Article 20(3). Hence, the taking and retention of DNA samples which are in the nature of physical evidence does not face constitutional hurdles in the Indian context. However, if the DNA profiling technique is further developed and used for testimonial purposes, then such uses in the future could face challenges in the judicial domain.

⁴⁸ *State of Bombay v. Kathi Kalu Oghad & Ors.*, AIR 1961 SC 1808

1:12 Objectives of the Research :

The objectives of the research are as follows:

- (i) Whether the DNA evidence is generally accepted by the scientific community?
- (ii) Whether the testing procedure is generally accepted as reliable, if performed properly?
- (iii) Whether the test was performed properly in a case?
- (iv) Whether the conclusion reached in a case is acceptable?
- (v) Whether DNA technology is a science and is accepted in world community?
- (vi) Is there any technology to establish Rule 1 and explain it further?
- (vii) Whether the technology has been properly applied in the case?
- (viii) Whether proper testing procedure was used in the case and is generally acceptable as reliable?
- (ix) Whether all relevant the tests were performed properly in the case?
- (x) Whether the conclusion reached in the case is acceptable as proper?

1:13 Research Hypothesis :

The present subject for research is based on the hypothesis that the law governing the use and research on DNA is appropriate both at national and international level. Therefore, endeavors has been made to prove and disprove the statement with the help of cases and the opinion of various courts.

The first forensic or legal application of DNA testing occurred in 1986 in England by Sir. J. Jeffrey in the famous **Collin's case**.⁴⁹ Since then, DNA technology has continued to be rapidly evolved. DNA technology had such a dramatic impact on crime detection and such has been the magnitude of its success that even International Crime Prevention and Detection Organizations like

⁴⁹ *R v. Collins* [1987] 1 S.C.R. 265 1987 SCC 11.

INTERPOL, have also accepted it and are now whole heartedly, supporting the new crime investigation tool. DNA technology focuses on unique properties of an individual's genetic code. Its purpose is to determine if there is a match between these unique characters in samples from unknown sources (i.e. The suspect) and the crime scene evidence being tested.

DNA is an abbreviation of 'Deoxyribonucleic Acid', which is found in all bodily fluids, tissues etc. It is found in every single cell of a person's body and each cell has identical DNA. The DNA technology focuses on unique properties of an individual's DNA Genetic Code. This technique springs from the idea that no two human beings except the monozygotic twins have same DNA. It is now established that two persons in six million people may have common DNA, but this is just a probability.⁵⁰ The researcher has tried to streamline the above developments in the recent times in the complicated cases and tried to find out the possibilities in this regard.

1:14 Research Methodology :

The methodology adopted for the study is completely doctrinal method involving content analysis. Judicial pronouncement and decisions for original sources have been studied and analysed through relevant books, articles, empirical studies, reports etc. to get the true picture of the problem of DNA. The standard forms of quotations and references have been used in the research work in this regard.

The imperative study has suggested the present need and a better DNA for the purpose of detection and decision of a complicated case. The methodology has included collect data on the topic of study for analysis of public opinion and to reach at a particular result.

The methodology which has been adopted for the present research work is mainly based on doctrinaire as well as empirical analysis. The study is based on

⁵⁰ Alex Samuel & Dr. Swati Parikh, DNA Tests in Criminal Investigation and Paternity Disputes, A Modern Scientific Technique, R.S. Dwivedi for Dwivedi & Co., edn. 2009.

primary as well as secondary source of information. Efforts have been made to study the :

- (1) Law, rules and regulations.
- (2) Judicial pronouncements of the Supreme Court and High Courts.
- (3) Legal Commentaries and reports.
- (4) Empirical studies and surveys for the DNA.

And in order to make the study broad-based, researcher has used the empirical method such as :

- (1) Collect data and material from the library of Delhi University;
- (2) From library of Kota University, Kota;
- (3) From the library of the Institute of Development Studies, Jaipur.
- (4) From library of Indian Law Institute and ISIL, Delhi.

1:15 The Plan of the Thesis :

The research study comprises eight chapters. The chapterization is as follows:

Chapter-I : Introduction

Brief introduction relating to the concept of DNA evidence and DNA testing has been discussed in this chapter which is necessary to understand the research work and the selection of this topic. The basic understanding about the research is sought by the researcher in this chapter.

Chapter-II : Juristic Dimensions and Historical Perspective of DNA

The researcher in this chapter has discussed the Juristic Dimensions such as how does DNA be used as an evidence in the Courts of Law and what is the situation in this regard in India and other countries. The value of DNA evidence does not depend upon its ability and capability to identify a person with uniqueness, this do not favour it in determining the guilt of an accused. But, precedents show that it is a reliable method in clarifying the identity of a culprit, it

can otherwise be indirectly used for the confirmation of the guilt of an accused. This stimulates one to think about the importance of the evidence coming as “DNA identification”.

The historical background as to how the DNA was invented and what was the purpose and potential of testing it and studying it will also be discussed in this chapter.

Chapter–III : Role of DNA in Personal and Public Life

The researcher has analysed the importance of the DNA in day to day working such as how the DNA testing and other DNA test affect public in socio, economic and legal perspectives. DNA database and DNA evidence have also been discussed and their necessity and demerit have been explained. With the help of various cases the concept has been described in this chapter.

Chapter–IV : Constitutionality of the DNA as a Evidence

The researcher has analysed the provisions pertaining to DNA evidence in The Constitution of India. The constitutionality of the issue is most desired requirement of any legal issue/issues. Hence, an effort has been made in this chapter to evaluate the constitutionality of DNA evidence in the present changing scenario of the Indian society. Thus, modern DNA analysis has revolutionized the criminal justice system. It has been used to prove – without a doubt – that suspects were involved in crimes and to free people who were wrongly convicted. The DNA sample is taken by swabbing the inside of a person’s cheek.

Chapter–V : Forensic Analysis in Criminal Investigations, Scope, Extent and Limitations of DNA

The researcher has analysed the scope of DNA since DNA is the part of forensic science. It becomes relevant to study the different dimensions of the use of DNA evidence, for example, in the matter of criminal investigation and trial. This science may not only help finding and nabbing real culprits and criminals, but also save innocent people from being harassed, as this science is capable of finding clinching evidence through scientific methods. Thus in this chapter

researcher has made an attempt to describe the scope and limitations of the DNA testing and DNA as an evidence.

Chapter–VI : Human Genetic Material and its Ethical & Legal Issues

The researcher has discussed the genetic material alongwith ethical and legal issues in view of judicial proceedings relating to civil and criminal cases. Evidence is elementary to any criminal proceeding not only for proving one's guilt but as a way of defence. With the progress of science and technology, crimes have become more complex in nature. It is of common fact that the role of law to curb offences and to meet the justice. Therefore, eventually it has led to the need of scientific evidence and testimony of experts in criminal trials and prosecutions. It is clear that though expert evidence and scientific evidence are essential since both law and science meet each other at cross-roads, science has increasingly become a catalyst in dissemination of justice, a goal that law seeks to achieve. Hence, an attempt has been made in this chapter to analyse the issues fairly and properly to reach at a definite conclusion in such sensitive matter.

Chapter–VII : Judicial Trends regarding DNA

The researcher has analysed the judicial decision regarding DNA in legal procedure. Judicial approach regarding DNA evidence has been dealt with thoroughly. It has been observed that courts have travelled a lot in interpreting the DNA evidence and its role. Since the advancement and sophistication has changed the whole course of investigation and has become fact rather than mere hypothesis, the researcher will try to make an attempt regarding the course and journey of courts that how they have interpreted the same. There are occasions where the courts have interpreted and observed circumstantial evidence as trustworthy than direct evidence.

Chapter–VIII : Conclusion and Suggestions

The researcher has made conclusion in this chapter and given fruitful suggestions and recommendations regarding the betterment of the use and relevance of DNA evidence in the Indian Judicial/legal system.

CHAPTER-II

JURISTIC DIMENSIONS AND HISTORICAL PERSPECTIVE OF DNA

For reaching at a definite conclusion of a problem, we have to go into it's depth i.e. from where, by who, when it came into existence. In the same manner, in legal field for study and analysis of a judicial concept, we have to go to it's legal jurisprudence which is considered to be origin of all legal issues. The same rule is applicable in the matter relating to (Deoxyribo Nucleic Acid) DNA evidence and hence, an attempt has been made in this chapter to go through the juristic and historical dimensions of the newly born Giant of law.

In this respect, it can be said that the story starts from the point of time when Greagor George Mendel (1822-1884), generally called "father of genetics"⁵¹, who was a scientist Monk in Austria, for the first time he applied mathematics and controlled testing for explaining the way in which certain characteristics are transferred from a parent to its offspring. He started his experiments with very basic DNA of 20 varieties of peas in the monastery garden by crossing two differing varieties having single characteristic, such as tall and short, and recorded the results. It was inferred from his results that each offspring inherits full set of characteristics from each parent, and not only that but traits, which were not present in the offspring may be seen in the next generations. His ultimate finding was that heredity actually proceeds to well-defined set of mathematical probabilities. These findings could be found in his publication in the year 1886.⁵²

It was in 1875 that a German embryologist Oskar Hertwing observed for the first time a new life coming into existence. He saw a sperm entering into an egg cell and joining its nucleus and which lead the cell to divide into two and more. And after four years, it was observed that while the fertilized cell starts

⁵¹ Weiling F Professor, Historical study: Johann Gregor Mendel, 1822-1884. Am J Med Genet 1991.

⁵² Ibid.

dividing thread like materials (chromosomes) present inside the nucleus start duplicating themselves. And each new duplicated thread administers to each new divided cell, which later on were called as “Chromosomes”.⁵³

The name Chromosome has been derived from Greek word ‘*Chroma*’, which means colour. And it was during observational experiment that these chromosomes were stained with dye for identifications they looked coloured, hence the name. These observations Walter Fleming was another who conducted these observations. Mendel’s mathematical hypothesis about the heredity could not reach these German scientists and they could not connect these threads (chromosomes) to heredity. In 1902, Walter Sutton, an American biologist who indicated the connection between chromosomes and heredity.⁵⁴

It led to the research in this field and through this it was established by the year 1915 that chromosomes were made of still smaller units which were named as ‘Genes’. This word was derived from Greek word ‘*Genea*’ which means ‘kind’ and consequently this branch of biology was called ‘Genetics’.⁵⁵

Chemical analysis of chromosomes’ location in the nucleus show as that it consists of protein, nucleic acid, Ribonucleic acid (RNA) and Deoxyribonucleic acid (DNA). Till the time functions and composition of RNA and DNA were not known, it was firmly believed that protein played an important role everything bearing life. RNA and DNA were assumed not to play any vital role in the activity of cell. But by 1940 there was enough evidence to conclude that DNA was main ingredient which plays important role in the process.⁵⁶ On the other hand, majority of the scientists still believed that protein was the main ingredient and till then role of DNA was not considered to be of much use.⁵⁷

Then, in 1952 scientists at Carnegie Institute in Cold Spring Harbor, New York proved beyond any doubt that this DNA which is mainly responsible for

⁵³ Brind Amour, Katherine, Garcia, Benjamin, “Wilhelm August Oscar Hertwig (1849-1922)”, Embryo Project Encyclopedia, available at <http://embryo.asu.edu/handle/10776/1707>.

⁵⁴ O’Connor, C. & Miko, I., Developing the chromosome theory, Nature Education (2008) 1(1):44
⁵⁵ <http://ncert.nic.in/ncerts/l/lebo105.pdf>

⁵⁶ The genome as a developmental organ by Ehud Lamm, Tel Aviv University, Cohn Institute for the History and Philosophy of Science and Ideas, Ramat Aviv 69978, Israel

⁵⁷ <https://publications.nigms.nih.gov/thenewgenetics/chapter2.html>

heredity. They used bacteriophage (or simply phage), which is a virus that attack bacteria cells, the simplest of all living beings. This phage virus contains a core of DNA encircled by protein and as it is unable to reproduce on its own, it enters a bacterial cell, takes over the bacterial cell producing mechanism and start producing phages in place of the original cell. It was established that before the phage entered the bacterial cell it gives up its protein covering and only DNA of phage virus entered the cell's nucleus. By this experiment it was proved that DNA plays a key role in reproduction of phage and not the protein as considered earlier.⁵⁸

At the same time Maurice Wilkins, at the University of London, was trying to find out the molecular structure of DNA through X-ray crystallography. This technique uses X-rays passing through purified crystals of DNA which would eventually fall on a photographic plate. By it he obtained a picture which showed cloudy pattern of points and rings. In fact the picture could not tell much but Wilkins presumed that it showed same type of spiral structure (helical).⁵⁹

The X-ray photograph of DNA crystal was shown by Wilkins to another 22 year old American biochemist James D. Watson when they met at a scientific meet at Naples in the year 1951. The photograph was clear enough to show DNA crystal and as James D. Watson was also studying chemistry of DNA, he borrowed the picture. James D. Watson shifted from Copenhagen to Cavendish Laboratory at Cambridge University and there he met another DNA enthusiast Francis Crick. They started to work together. With the help of Wilkins photograph and other materials collected by them, they built chemical models of DNA molecule.⁶⁰

While the Watson-Crick duo were preparing their own models, a different researcher at California Institute of Technology, named Linus Pauling⁶¹ was also working in building DNA models. In 1951 Pauling showed an alpha helix model

⁵⁸ EMBO J 28, 821–829 (2009); published online 8 April 2009

⁵⁹ http://sites.bu.edu/manove-ec101/files/2017/09/Watson_The_Double_Helix.pdf

⁶⁰ <https://www.sciencehistory.org/historical-profile/james-watson-francis-crick-maurice-wilkins-and-rosalind-franklin>

⁶¹ Linus Pauling received Nobel Prize for Chemistry in 1954 and another prize for Peace in 1962.

and protein structure and in 1952 he had forwarded another model of DNA molecule which showed three helical (spiral) strands, which was later proved bogus.⁶²

In 1953 James D. Watson and Francis Crick received Nobel Prize for Physiology and Medicine, which was conjointly shared by Maurice Wilkins for discovery of double helical shape of DNA and life molecule of heredity. Watson and Crick proffered how spiral stair-like model of DNA could duplicate itself. This discovery was considered as a revolution to trigger test-tube babies, surrogate mothers, transgenic supercrops, the cloning and of course DNA fingerprinting and matching for identification in Forensic Science.⁶³

However, James D Watson asserted, when he visited India in December, 1997 that the genetics should serve the people and not the Governments. It can help people in many ways such as scientists can enrich the genetic make-up of our descendants through gene therapy procedures. But he showed his concerns “as to whether our children or their Governments decide what genes are good for them”.⁶⁴ Similarly, Sir Alec Jeffreys of Leicester University developed the process and methods of identification of DNA through matching on 15 September, 1984.

Thus, in an adversarial system of criminal trial, it is the prerogative duty of the State to prosecute a person accused of an offence. Criminal law considers an accused as innocent until his guilt is established beyond reasonable doubt. Therefore, it is the burden of the State to prove the case beyond reasonable doubt. At the same time, the defendant has the right to defend himself against the charge and to get out himself from the clutches of the charge leveled against him. The State may use any means to discharge the responsibility, duties entrusted to her. The evidence collected through novel scientific techniques comes before the court lacking scientific conformity.’ Important aspects of such forensic techniques have not been studied and accepted by the scientific community and the judiciary.

⁶² Ibid

⁶³ Ibid

⁶⁴ Times of India, December, 1997, page 11 -An interview of James D Watson.

So, in almost all occasions, the physical materials of an accused are necessary for forensic crime detection. The police regularly collect saliva, blood, urine, semen and other biological materials for this purpose. No doubt, the process IS as accurate and potentially useful in establishing crime, despite it making an intrusion into a person's privacy. Since the use of DNA profiling became more acceptable, DNA databases began to develop. DNA databases store and maintain DNA profiles as well as DNA evidence used to produce the profiles. The fact that biological evidence that is used to produce DNA profiles is kept and stored in DNA databases which is why critics of the databases argue that they may threaten individual's privacy rights. The DNA samples are used not only to identify individuals, but it can also be used to produce information in relation to health, paternity, and other personal issues". In response to these and other privacy concerns related to DNA profiling, the persons dealing with DNA databases contend that the databases do not contain any significant genetic information. However, there are potential privacy threats due to the fact that the original DNA samples are generally kept within databases. Further, information could be derived from those samples in the future or new technologies could lead leak in of information being revealed from the profiles. In addition to the attacks based on privacy there are other constitutionally and legally based issues on the use of DNA and the like novel scientific techniques. This chapter of research focuses mainly on the policy, powers and the legality of acquiring samples of the person suspected of having committed an offence. It also considers the constitutionality of compelling the suspect for forensic sampling. The analysis of the constitutional and legal provisions in different jurisdictions shows that, although despite the constitutional and legal protections there are many situations in which police may be able to secure forensic samples without these safeguards.

2:1 The Indian Scenario :

Regarding Indian position, it can be said that in India there is no specific law on the subject of DNA evidence but DNA testing got legal validity in 1989.⁶⁵

⁶⁵ *Anil Kumar v. Turaka Kondala Rao*, 1998 Cri LJ 4279 (AP).

India **Kurthiraman v. Martoj's**⁶⁶ case was the first paternity dispute case and required DNA testing and Court had accepted the DNA evidence. The Indian Courts are now taking DNA evidences as an expert's opinion like other forensic expert, ballistic expert, biological expert, chemical expert, document writing expert, lie-detector expert, serological expert, toxicological expert, etc.

Today, the DNA evidence has conclusively taken a special birth and acceptance in Indian Legal system as Courts in India are passing orders for DNA tests in complex cases. It is now high time for the Government to take necessary steps in bringing a legislation regarding DNA evidence and necessary amendments should also be made in various relevant Acts and Codes such as in Indian Evidence Act, Family Courts Act, Guardians and Wards Act, Constitution of India, Code of Criminal Procedure, etc. in order to make effective use of DNA evidences and taking of biological samples from the person of suspect(s) and of victim(s). The DNA legislation should be a craft worthy piece of legislation as it helps very effectively in solving a criminal case. It would be a very powerful tool in detection of an accused and it will also keeps a check on the crime rate with the creation of DNA Database. The Courts although are giving orders for DNA tests and also relying on the DNA evidence yet in absence of a specific law the Courts are feeling handicapped in some of the cases. Now, the time to deny legislation on DNA evidence is over. The traditional techniques for criminal investigation are becoming futile because of several flaws in them. Now, it is the high time to accept, include and adopt the latest scientific techniques and scientific developments by enacting a new legislation and by amending the other relevant laws. The latest techniques of investigation should be adopted in order to satisfy the requirement of the fast growing society.

Some positive steps have been taken by the Government of India after a long time by proposing to adopt DNA tests in matters relating to paternity disputes under Section 112 of the Evidence Act. The Law Commission of India in its 185th report has recommended Indian Evidence Act (Amendment) Bill, 2003 which makes provision for DNA tests in paternity disputes by the consent of the

⁶⁶ (1991) 3 Crimes 860 (Ker).

man, and in case of child by the permission of the Court; and amendments in Sections 53, 53-A of Code of Criminal Procedure, 1973, is also passed by the both Houses of Parliament of India and it has got the assent of the President of India on 25.06.2005.⁶⁷ In this Amendment provisions are laid down for DNA Test of biological materials in examination of accused.

In the legal scene, DNA fingerprinting connotes something more than scientific. Actually the DNA finger printing technology was shaped for diagnostic purposes; therefore it is necessary to check whether it is suitable in forensic field.⁶⁸ Moreover, as a complex technique involving various scientific steps, chances for committing errors are very high. Considering these things courts are very cautious and vigilant in admitting the DNA evidence.

Determination of weight as well as admissibility of the DNA evidence is the difficult task for a fact-finder; therefore, before venturing into this process, it is pertinent to know the role of DNA typing testimonies in criminal prosecutions. As highly technical and reliable forensic evidence, it will be very useful for the law enforcement authorities to finger a culprit without any third degree methods. However, its use in a criminal prosecution would be outstanding. As far as the criminal trial is concerned, the value of DNA evidence is almost the same as the other evidence that comes before a fact finder. Its ability and capability to identify a person with uniqueness do not favour it in determining the guilt of an accused.

However, precedents show that it is a reliable method in clarifying the identity of a culprit, it can otherwise be indirectly used for the confirmation of the

⁶⁷ The Code of Criminal Procedure (Amendment) Act, 2005 (Act No. 25 of 2005).

⁶⁸ Scientists identified some key differences between “DNA diagnostics” and “forensic DNA analysis”. They are as follows: (1) In medical DNA analysis the scientists will get fresh and enough samples for testing but in the case of forensic testing, scientists often get samples that are degraded, contaminated and from unknown sources. (2) In DNA diagnostic: scientists were required only to Identify whether each parent has passed to a child the RFLP pattern inherited from his or her mother or father, on the other hand in forensic testing scientists were required to take a very risky job, i.e. to determine whether two completely unknown samples are identical See, Eric S. Lander, “DNA Fingerprinting on Trial”, 339 Nature 501(1989); Barry C. Scheck. “DNA And Daubert”, 15 Cardozo L. Rev. 1959 (1994).

guilt of an accused. This stimulates one to think about the importance of the evidence coming as “DNA identification”.⁶⁹

The issue of admissibility and weight of DNA evidence centre on two prominent things,

- (1) the general acceptance of the technique in the scientific community, and
- (2) the application of the technique in the particular occasion.

As per Section 45 of the Indian Evidence Act, 1872, when the Court has to form opinion upon a point of foreign law or of science or art, or as to identity of handwriting or finger impressions, the opinions that point of persons specially skilled in such foreign law, science or art, or in questions as to identity of handwriting or finger impressions are relevant facts. Such persons are called experts:

- (a) The question is, whether the death of A was caused by poison. The opinions of experts as to the symptoms produced by the poison by which A is supposed to have died are relevant.
- (b) The question is, whether A, at the time of doing a certain act, was, by reason of unsoundness of mind, incapable of knowing the nature of the Act, or that he was doing what was either wrong or contrary to law. The opinions of experts upon the question whether the symptoms exhibited by A commonly show unsoundness of mind, and whether such unsoundness of mind usually renders persons incapable of knowing the nature of the acts which they do, or of knowing that what they do is either wrong or contrary to law, are relevant.
- (c) The question is, whether a certain document was written by A. Another document is produced which is proved or admitted to have been written by

⁶⁹ Various scientific literatures criticizing the procedures of extracting and analyzing the DNA and interpretation of the test results were published in reputable scientific journals. See, William Thompson, L. Simon Ford, “The Meaning of a Match: Sources of Ambiguity in the Interpretation of DNA Prints”, in Farley & Harrington (eds.). *Forensic DNA Technology* (1990), p.93; Christopher Anderson, “DNA Fingerprinting on Trial”, 342 *Nature* 844 (1989); William Thompson & Simon Ford, “Is DNA Fingerprinting Ready for the Court?,” *New Scientist*, Mar. 31. p.38 (1990).

A. The opinions of experts on the question whether the two documents were written by the same person or by different persons, are relevant. Comments Conflict of opinion of Experts When there is a conflict of opinion between the experts, then the Court is competent to form its own opinion with regard to signatures on a document; **Kishan Chand v. Sita Ram**⁷⁰. Expert opinion admissibility Requirement of expert evidence about test firing to find out whether double barrel gun is in working condition or not, not necessary; **Jarnail Singh v. State of Punjab**.⁷¹ The evidence of a doctor conducting post mortem without producing any authority in support of his opinion is insufficient to grant conviction to an accused; **Mohd Zahid v. State of Tamil Nadu**⁷², opinion to be received with great caution. The opinion of a handwriting expert given in evidence is no less fallible than any other expert opinion adduced in evidence with the result that such evidence has to be received with great caution.⁷³

Further, as per Section 46 of Indian Evidence Act, 1872, it is stated that facts, not otherwise relevant, are relevant if they support or are inconsistent with the opinions of experts, when such opinions are relevant. Thus, the ingredients of Section 45 and Section 46 highlights that-

- (1) The court, when necessary, will place its faith on skills of persons who have technical knowledge of the facts concerned.
- (2) The court will rely the *bona fide* statement of proof given by the expert concluded on the basis of scientific techniques.
- (3) The evidence considered irrelevant would be given relevance in the eyes of law if they are consistent with the opinion of experts.

Thus, we see that expert evidence helps the courts to draw logical conclusions from the facts presented by experts which are based on their opinions derived by their specialized skills acquired by study and experience. Hence,

⁷⁰ AIR 2005 P&H 156

⁷¹ AIR 1999 SC 321

⁷² 1999 Cr LJ 3699 (SC).

⁷³ *Ram Narain v. State of Uttar Pradesh*, AIR 1973 SC 2200.

experts are routinely involved in the administration of justice particularly in criminal courts. The DNA report is not admissible under Section 293 (4) as Criminal Procedure Code, 1973 as an exclusive evidence in the opinion of the Andhra High Court.⁷⁴

Although the legal system has had considerable experience in dealing with confusing scientific expert testimony, DNA identification evidence makes the court more daunting. One could say, without any doubt, that it was DNA evidence that has banished the courts more than any other scientific evidence. The reason is simple, because DNA typing as evidence poses some special challenges due to its complex nature, requiring a complicated series of scientific procedures, multi disciplinary approaches and variation in the reliability and degree of acceptance in the scientific community.⁷⁵ The courts regarding the admissibility of DNA evidence have prescribed different standards. The detailed analysis of the standards show that during the last 18 years courts were endeavoring to a guideline for evaluating DNA identification evidence.⁷⁶

The courts in United States are following three major standards for evaluating the scientific DNA evidence: the “general-acceptance” test, “relevance” test and the “Daubert Test”.⁷⁷ These tests were adopted and applied

⁷⁴ *Parsineni Venkateswaraha v. State*, (2010) 1 Crimes (SN) 885 (AP).

⁷⁵ William C. Thompson, “DNA Typing: Acceptance and Weight of the New Genetic Identification”, Va. i. Rev. 45(1989).

⁷⁶ The “general-acceptance” test was formulated by the District Court of Columbia in *Frye v. United States*, 293 F.1013 (D.C. Cir. 1923) (Frye standard mandates that a novel technique must pass through an experimental stage in which the scientific community scrutinizes it. Only after the technique has been tested successfully in this stage and has passed into the demonstrable stage it will receive judicial acceptance); the “relevance” test was laid down by the U.S. Court of Appeal in *Coppolino v. State*, 223 Scr.2d 6E (Fla. App. 1968) (Court explained that the court’s discretion in admitting evidence is wide enough to admit scientific evidence lacking general acceptance of the! scientific community); and the “daubert” test was laid down by the U.S. Supreme Court in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, (1993) 125 L.Ed. 26. 469. (Court formulated a four factor test to help the trial judge, in determining the relevance and reliability of scientific evidence: (a) Whether the theory or technique can be or has been tested; (b) Whether the theory or technique has been subjected to peer review and publication; (c) The known or potential error rate of a technique; (d) Whether the theory or technique has received “general acceptance” in the scientific community).

⁷⁷ The latest pronouncement regarding the admissibility of scientific evidence was laid down by the Canadian Supreme Court in *R v. Mohan*, [1994] 2 S.C.R. 9. (Sopinka J., formulated four criteria. They are (1) relevance (2) necessity in assisting the trier of fact (3) the absence of any exclusionary rule and (4) a properly qualified expert).

by the courts in Canada.⁷⁸ In England, courts are using the “helpfulness” as a standard for evaluating DNA evidences.⁷⁹ An additional standard adopted by the courts in Australia is known as the “prejudicial effect” test. Under this standard, courts will weigh the prejudicial effect of the scientific evidence with its probative values.

There is a conflict of opinion among courts in United States regarding the application of standards for evaluating DNA evidence. This conflict can be traced back to the very initial stage of the introduction of DNA evidence. Some courts applied the general acceptance test, while others adopted the relevance test. This conflict has not completely resolved even after the final pronouncement of the U.S. Supreme Court in **Daubert case**⁸⁰. Although the trend in the States appears to be towards the Daubert view, there still are jurisdictions that adhere to Frye test.⁸¹ This chapter discusses the legal and ethical issues on DNA typing when it is used as evidence for forensic purposes. It also specifically discusses the admissibility of various novel techniques in forensic DNA typing.

The history of the judicial acceptance of the theory and technique of forensic DNA evidence can be conveniently divided into different stages i.e. unchallenged admissibility and critical admissibility.

⁷⁸ R v. Turner, (1975) 1 Q.B. 834 (a particular piece of scientific expert evidence must be “helpful” to the trier of fact. If it is helpful then it is admissible, regardless of whether its theory or technique that forms the basis of the testimony is reliable or the relevant scientific community accepts it. Thus courts in England have taken a liberal attitude in admitting scientific expert testimony).

⁷⁹ R v. Lewis, (1987) 88 F.L.R 104 (Court held, if the prejudicial effect of forensic evidence outweighs its probative value, it should be excluded); see also. R v. Tran, (1990) 50 A. Crim. R. 233 (Court excluded DNA evidence on the basis that the prejudicial effect of the evidence far outweighs its probative value). Regarding this McInerney J. observed: If scientific testing in the particular case is unreliable or if it has a tendency to produce a misleading or confusing impression for the jury, or if the weight to be afforded in the results is so minimal as to preclude the jury being satisfied beyond reasonable doubt that the Crown has established the fact which it seeks to prove, then clearly I have a duty to exclude it from; the jury - whether it is a result of ruling that the evidence is inadmissible or whether it is excluded in the exercise of my discretion

⁸⁰ *Daubert v. Merrell Dow Pharmaceuticals, Inc.* (1993) 125 LEd. 2d. 469.

⁸¹ *Logerquist v. McVey*, P.3d 113 (Ariz. 2000) (Court held, Frye test is applicable when an expert witness reaches a conclusion by deduction from the application of novel scientific principles, formulae, or procedures developed by others. It is inapplicable when a witness reaches a conclusion by inductive reasoning based on his or her own experience, observation, or research. In the latter case, the validity of the premise is tested by interrogation of the witness; in the former case, it is tested by inquiring into general acceptance); *People v Miller*, 670 N.E. 2d 721,731 (111. 1996) (Court followed the Faye test for evaluating the admissibility of DNA evidence).

2:2 Unchallenged Admissibility of DNA Evidence :

The initial stage when the DNA typing evidence was introduced to the legal system was very pathetic. At this stage the forensic DNA theory and technique intruded into the legal system uncritically. Almost all cases decided in this period admitted DNA evidence without any critical evaluation. The DNA evidence adduced by the prosecution was not at all countered by the defence or disturbed to prove, then clearly Jury have duty to exclude it from; whether it is a result of ruling that the evidence is inadmissible or whether it is excluded in the exercise of my discretion.

Judges gave blind reliance to the evidence derived through this technology. For instance, a judge in the New York County court while he was handling his first DNA case, commented:

If DNA fingerprinting proves acceptable in criminal courts, will revolutionize the administration of criminal justice. Where applicable, it would reduce to insignificance the standard defence. In the area of eyewitness testimony, which has been claimed to be responsible for more miscarriages of justice than any other type of evidence, again, where applicable, DNA fingerprinting would tend to reduce the importance of eyewitness testimony. And in the area of clogged calendars and the conservation of judicial resources, DNA fingerprinting, if accepted, will revolutionize the disposition of criminal cases, In short, if DNA fingerprinting works and receives evidentiary acceptance, it can constitute the single greatest advance in the “search for truth”, and the goal of convicting the guilty and acquitting the innocent, since the advent of cross-examination.⁸²

The judge in Wesley placed enormous significance on his belief, based on the expert testimony, that DNA profiling simply could not produce an erroneous result. As he understood it, the test would necessarily produce either a correct answer, or no answer at all. He wrote: A matter of extreme significance... is that it is impossible under the scientific principles, technology and procedures of DNA Fingerprinting (outside of an identical twin), to get a “false positive”- i.e., to

⁸² *People v. Wesley*, 533 N.Y.S. 2d 643, 644, 652 (Albany County Ct. 1988).

identify the wrong individual as the contributor of the DNA being tested. If there were insufficient DNA for the test, or if the test, or any of its steps, were performed improperly, no result at all would be registered—in other words, the autoradiograph would be blank.⁸³

After this case, State filed motions in two cases for an order to extract blood from the defendants to compare the DNA with the DNA contained in the biological evidence. While dealing with the matter, court considered the admissibility of DNA fingerprinting a contested issue. Court recognized that a Frye hearing is necessary, because DNA typing as evidence came before the New York court for the first time. After an extensive hearing, court found that the DNA testing was not only generally accepted in the scientific community but it was universally accepted. The major drawback in this case was that the court gave more weight to the newly introduced scientific evidence without any critical evaluation or independent verification of the technique.⁸⁴

The **Declaration of Helsinki, 1964**, set the guidelines adopted by the **18th World Medical Association General Assembly**. It contains 32 principles, which stress on informed consent, confidentiality of data, vulnerable population and requirement of a protocol, including the scientific reasons of the study, to be reviewed by an Ethics Committee. The **Universal Declaration of Human Rights 1948** adopted by the United Nations General Assembly expressed concern about rights of human beings against involuntary maltreatment. The **International Covenant on Civil and Political Rights, 1966 (ICCPR)** has provided that “*No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment. In particular, no one shall be subjected without his consent to medical or scientific treatment*”. It also refers to various “minimum guarantees”

⁸³ *People v. Wesley*, 533 N.Y.S. 2d 652 (Albany County Ct. 1988).

⁸⁴ *Andrews v. State*. 533 So. 2d 841 (Fla.Ct.App.1988) (Court held that DNA fingerprinting evidence was admissible. The court reviewed the history of the admissibility of scientific evidence to determine which standard applied to the admissibility of the novel DNA typing evidence, and determined that the reliability or the relevancy approach was appropriate. Applying this test court found that the DNA evidence was relevant and helpful to the fact-finder. The significance of this case was that the defense did not contest the evidence given by the state); see also, *Cobey v. State*, 559 A.2d 391 (Md. App.. 1989).

in Article 14(3)(g) such as, “everyone has a right not to be compelled to testify against himself or to confess guilt”.

In 1988, the Human Rights Committee (HRC), a group of independent experts who issue authoritative interpretations of the ICCPR, released General Comment 16 on the right to privacy (Art. 17). In this General Comment, the Human Rights Committee noted that “the right to privacy is not absolute”.

The Indian Research Fund Association (IRFA) was founded 1911. This was re-named as Indian Council of Medical Research (ICMR), in 1949, under the Ministry of Health and Family Welfare to develop research culture and infrastructure to foster community support. In the year 1980, ICMR released a document called “Policy Statement on Ethical Considerations involved in Research on Human Subjects”. This was the first policy statement giving official guidelines for the establishment of Ethics Committees (ECs) in all medical colleges and research centres.

Comprehensive Ethical Guidelines for Biomedical Research on Human Subjects were finalised by Indian Council of Medical Research in the year 2000, which researchers in India have to follow while conducting research on human subjects. The Drugs and Cosmetics Act, 1940 and the Medical Council of India Act, 1956 (Amended in 2002) provide that all clinical trials in India should follow these guidelines. These guidelines were revised in the year 2006, influenced by the Belmont Report and have the same three basic ethical principles: Respect for person, Beneficence, and Justice. These ethical principles are fortified by inducting the following twelve general principles of:

- (i) essentiality;
- (ii) voluntariness, informed consent and community agreement;
- (iii) non-exploitation;
- (iv) privacy and confidentiality;
- (v) precaution and risk minimisation;
- (vi) professional competence;
- (vii) accountability and transparency;
- (viii) maximisation of the public interest and of distributive justice;

- (ix) institutional arrangements;
- (x) public domain;
- (xi) totality of responsibility; and
- (xii) compliance.

2:3 Critical Admissibility of DNA Evidence :

In the second wave of cases, the DNA fingerprinting evidence faced critical evaluation. The defence lawyers with the help of scientific literature, criticized the theory and technique used for DNA identification.⁸⁵ Defendants pointed out many problems in the Variable Number of Tandem Repeats (VNTRs) based Restriction Fragment Length Polymorphism (RFLP) analysis. Therefore, at this stage courts evaluated DNA evidence with utmost care and precaution. Courts adopted different standards for the evaluation of DNA evidence.

For determining the admissibility of novel DNA evidence, the majority of jurisdictions apply the test developed in **Frye v. United States**.⁸⁶ What Frye decision stipulates was that ‘In order to admit a new technique, it must sufficiently establish to have gained general acceptance in the relevant field to which it belongs. Thus, in the case of DNA evidence, the proponent must satisfy the court that both the theory and technique have gained general acceptance among the prominent DNA experts.’ Once the DNA typing procedure has sufficiently established to gain general acceptance in the particular field to which it belongs, it presumably has gone through an extended period of use and testing within the scientific community. The court can take judicial notice of a particular technique, if it has been held by an appellate court that the technique has successfully survived the Frye mandate.⁸⁷

⁸⁵ Various scientific literatures criticizing the procedures of extracting and analyzing the DNA and interpretation of the test results were published in reputable scientific journals. See, William Thompson, L Simon Ford, “The Meaning of a Match: Sources of Ambiguity in the interpretation of DNA Prints”, in Farley & Harrington (eds.), *Forensic DNA Technology* (1990), p.93; Christopher Anderson, “DNA Fingerprinting on Trial”, 342 *Nature* 844 (1989); William Thompson & Simon Ford, “Is DNA Fingerprinting Ready for the Court?”, *New Scientist*, March 31, 1990, p.38.

⁸⁶ 293 F. 1013 (D.C. Cir. 1923).

⁸⁷ *State v. Woodall*, 385 S.E. 2d 253 (W.Va., 1989) (Court stated that if a complex scientific theory or technique has been once evaluated and settled as “generally accepted” by an appellate court, trial court can take judicial notice of that particular theory or technique without a further evaluation).

The test for the admissibility of novel scientific evidence enunciated in **Frye v. United States**⁸⁸ has been the most frequently invoked one in American case law. A majority of states profess adherence to the Frye rule, although a growing number have adopted variations on the helpfulness standard suggested by the Federal Rules of Evidence.

Frye predicates the admissibility of novel scientific evidence on its general acceptance in a particular scientific field: “While courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs”. Thus, admissibility depends on the quality of the science underlying the evidence, as determined by scientists themselves. Theoretically, the court’s role in this preliminary determination is quite limited. It should conduct a hearing to determine whether the scientific theory underlying the evidence is generally accepted in the relevant scientific community and to determine that the specific techniques used are reliable for their intended purpose.

In practice, the court is much more involved. The court must determine which scientific fields experts should be drawn from. Complexities arise with DNA typing, because the full typing process rests on theories and findings that pertain to various scientific fields. For example, the underlying theory of detecting polymorphisms is accepted by human geneticists and molecular biologists, but population geneticists and statisticians might differ as to the appropriate method for determining the population frequency of a genotype in the general population or in a particular geographic, ethnic, or other group. The courts often let experts on a process, such as DNA typing, testify to the various scientific theories and assumptions on which the process rests, even though the experts’ knowledge of some of the underlying theories is likely to be at best that of a generalist, rather than a specialist.

When a process is new and complex, a court should recognize that the expertise of more than one discipline might be necessary to explain it. That is the

⁸⁸ 293 F. 1013 (D.C. Cir. 1923).

case when the admissibility of DNA evidence is judged as a matter of first impression. Among the issues raised is the validity of the assumptions that-

- (1) except for identical twins, each person's DNA is unique,
- (2) the technique used allows one to determine whether two DNA samples show the same patterns at particular loci,
- (3) the statistical methods used and the available population databanks allow one to assess the probability that two DNA samples from different persons would, by chance, have the same patterns at the loci studied. Even if those assumptions are accepted, there is the important question of whether, and
- (4) the laboratory's procedures and analyses in the case in question were performed in accordance with accepted standards and provide reliable estimates of the probability of a match.

Assumption 1– that, with the exception of identical twins, each person's DNA is unique– is so well established in human molecular genetics that a court is justified in judicially noticing it, even in the context of a Frye hearing.

Assumption 2– concerns the validity of procedures for extracting DNA from samples of blood, semen, and other materials and analyzing it for the presence and size of polymorphisms. With regard to application in scientific research, the validity is sufficiently well established in the case of Restriction Fragment Length Polymorphism analysis with Southern blots that judicial notice is also appropriate. With regard to the application in forensic science, however, additional questions of reliability are raised. For example, forensic DNA analysis frequently involves the use of small, possibly contaminated samples of unknown origin, such as a dried blood stain on a piece of clothing. Some experts have questioned the reliability of DNA analysis of samples subjected to "crime scene" conditions. In addition, the details of the particular techniques used to perform DNA typing and to resolve ambiguities evoke a host of methodological questions. It is usually appropriate to evaluate these matters, case by case in accordance with the standards and cautions contained in earlier portions of this report, rather than generally excluding DNA evidence. Of particular importance once such a system

of quality assurance is established would be a demonstration that the involved laboratory is appropriately accredited and its personnel certified. Some aspects (such as the validity of the theory underlying RFLP analysis) might be so well established that judicial notice is warranted. Others (such as quantitative correction of band shifting with a single monomorphic fragment) might not be sufficiently well established to justify admissibility.

Assumption 3— related to the adequacy of statistical databanks used to calculate match probabilities—rests on unproven foundations. Many experts question the adequacy of current databanks for making probability estimates, and the use of multiplicative modes of combining probabilities are also open to serious question. The solution, however, is not to bar DNA evidence, but to ensure that estimates of the probability that a match between a person's DNA and evidence DNA could occur by chance are appropriately conservative.

The validity of **assumption 4**— that the analytical work done for a particular trial comports with proper procedure—can be resolved only case by case and is always open to question, even if the general reliability of DNA typing is fully accepted in the scientific community. The DNA evidence should not be admissible if the proper procedures were not followed. Moreover, even if a court finds DNA evidence admissible because proper procedures were followed, the probative force of the evidence will depend on the quality of the laboratory work. More control can be exercised by the court in deciding whether the general practices in the laboratory or the theories that a laboratory uses accord with acceptable scientific standards. Even if the general scientific principles and techniques are accepted by experts in the field, the same experts could testify that the work done in a particular case was so flawed that the court should decide that, under Frye test, the jury should not accept the evidence.

The Frye test sometimes prevents scientific evidence from being presented to a jury unless it has sufficient history to be accepted by some subspecialty of science. Under Frye, potentially helpful evidence may be excluded until consensus has developed. By 1991, DNA evidence had been considered in hundreds of Frye hearings involving felony prosecutions in more than 40 States.

The overwhelming majority of trial courts ruled that such evidence was admissible; there have been some important exceptions, however.

The first scientifically thorough Frye hearing concerning DNA typing was conducted in **People v. Castro**⁸⁹, in which a New York trial court concluded that the theory underlying DNA typing is generally accepted by scientists in genetics and related fields, that forensic DNA typing has also been accepted and is reliable, but that the technique as applied in the particular case was so flawed that evidence of a match was inadmissible (although evidence of an exclusion was admissible). The Castro court stated that the focus of the Frye test as applied to DNA typing (or any other novel scientific evidence of similar complexity) must include its application to the particular case. It held that flaws in the application are not simply questions as to the weight to be given the evidence by the jury, but go to admissibility as determined by the judge. Castro determined that there were serious flaws in the laboratory's declaration of a match between two samples, for a number of reasons, including the presence of several anomalous bands. The court did not credit the laboratory's explanation of the reasons for the anomalies and criticized its failure to perform adequate follow-up testing. In addition, the court concluded that the laboratory's population-frequency databank could not provide an accurate estimate of the likelihood that the defendant was the source of the DNA. The court's analysis and findings were careful, and they have generally been approved by experts in the field.

In November 1989, the Supreme Court of Minnesota, deciding **State v. Schwartz**⁹⁰, became the first case where Appellate Court rejected the use of DNA evidence analyzed by a forensic laboratory. In answering a certified question, the court noted that "DNA typing has gained general acceptance in the scientific community". Nevertheless, the court went on to hold that admissibility of specific test results in a particular case hinges on the laboratory's compliance with appropriate standards and controls and on the availability of its testing data and results. It held that, "because the laboratory in this case did not comport with these

⁸⁹ (1985) – 211 Cal. Rptr. 719, 38 Cal. 3d 301, 696 p. 2d 111.

⁹⁰ 447 N.W.2d 422 (1989).

guidelines, the test results lack foundational adequacy and, without more, are thus inadmissible”. One matter that troubled the court was the failure of the testing laboratory to reveal underlying population data and testing methods. The court noted that the reliability of a test implies that it could be subjected to an independent scientific assessment of the methods, including replication of the test. Because such independent assessment had not occurred and could not take place, owing to the laboratory’s secrecy, the court held that the results were inadmissible. In addition, the court was concerned that the testing laboratory (1) had admitted having falsely identified two of 44 samples as coming from the sample subject during a proficiency test performed by the California Association of Crime Laboratory Directors and (2) had not satisfied relevant validation protocols used by the FBI. In that regard, Schwartz makes a good case for requiring laboratories to meet particular standards before they may provide analysis of evidence to juries. Schwartz also held that the use of population-frequency statistics must be limited, because “there is a real danger that the jury will use the evidence as a measure of the probability of the defendant’s guilt or innocence, and the evidence will thereby undermine the presumption of innocence, erode the values served by the reasonable double standard, and dehumanize our system of justice”. The decision in Schwartz was influenced by Minnesota’s unique position in limiting the use of probability estimates in trials.

A New Minnesota statute not considered in Schwartz specifically requires judges to admit population-frequency data generated by DNA testing. Thus, it is not clear how influential Schwartz will be in its home state. Nevertheless, the Minnesota judges’ skepticism about statistical analysis is shared by other judges. Particularly in regard to DNA typing, the manner in which probabilities should be calculated requires great care.

In **Cobey v. State**⁹¹, the Maryland Court of Special Appeals reached a conclusion opposite to Schwartz, holding that evidence of DNA analysis from the same laboratory that figured in Schwartz was admissible and finding that the laboratory’s databank was sound. The Cobey court was impressed by the absence

⁹¹ 80 Md. App. 31 (1989), 559 A.2d 391.

of expert testimony contradicting that in favor of admissibility. It did caution, however, that “we are not, at this juncture, holding that DNA fingerprinting is now admissible willy-nilly in all criminal trials”. In 1989, Maryland became one of a growing number of states to enact a law recognizing the admissibility of DNA evidence.

However, now a number of jurisdictions have abandoned Frye in favour of a more liberal approach like relevancy.

In a leading English case **R v. Doheny and Adams**⁹², the Court of Criminal Appeal observed the need for procedures to be adopted with respect to the reception and presentation of DNA evidence and issued directions concerning that evidence. The directions could be considered as valuable guideline in admitting DNA evidence and in examining specific cases for admitting the statistical aspects in DNA evidence:

1. The scientist should adduce the evidence of the DNA comparisons between the crime stain and the defendant’s sample together with his calculations of the random occurrence ratio.
2. Whenever DNA evidences to be adduced the Crown should serve on the defence details as to how the calculations have been carried out which are sufficient to enable the defence to scrutinize the basis of the calculations.
3. The Forensic Science Service should make available to a defence expert. If requested, the databases upon which the calculations have been based.
4. Any issue of expert evidence should be identified and, if possible, resolved before trial. This area should be explored by the court in the pre-trial review.
5. In giving evidence the expert will explain to the jury the nature of the matching DNA characteristics between the DNA in the crime stain and the DNA in the defendant’s blood sample.
6. The expert will, on the basis of empirical statistical data, give the jury the random occurrence ratio - the frequency with which the matching DNA characteristics are likely to be found in the population at large.

⁹² [1997] 1 Cr. App. R. 369.

7. In case that the expert has the necessary data, it may then be appropriate for him to indicate how many people with the matching characteristics are likely to be found in the United Kingdom or a more limited relevant subgroup, for instance, the Caucasian, sexually active males in the Manchester area.
8. It is then for the jury to decide. Having regard to all the relevant evidences, whether they are sure that it was the defendant who left the crime stain, or whether it is possible that it was left by someone else with the same matching DNA characteristics.
9. The expert should not be asked to give his opinion on the likelihood that it was the defendant who left the crime stain nor when giving evidence should he use terminology which may led the jury to believe that he is expressing such an opinion.
10. It is inappropriate for an expert to expound a statistical approach to evaluating the likelihood that the defendant left the crime stain, since unnecessary theory and complexity deflect the jury from their proper task.
11. In the summing-up careful, directions are required in respect of any issues of expert evidence and guidance should be given to avoid confusion caused by areas of expert evidence where no real issue exists.
12. The judge should explain to the jury the relevance of the random occurrence ratio in arriving at their verdict and draw attention to the extraneous evidence which provides the context which gives that ratio its significance, and to that which conflicts with the conclusion that the defendant was responsible for the crime stain.
13. In relation to the random occurrence ratio, a direction along the following lines may be appropriate, tailored to the facts of the particular case. "Members of the jury, if you accept the scientific evidence called by the crown, this indicates that there are probably only four or five white males in the United Kingdom from whom that semen stain could have come. The defendant is one of them. If that is the position, the decision you have to reach, on all the evidence, is whether you are sure that it was the defendant

who left that stain or whether it is possible that it was one of that other small group of men who share the same DNA characteristics.⁹³

The recommended procedures form a useful benchmark against which to measure the way in which the DNA evidence can be admitted. The guidelines in this decision were issued by the court for two appeals having a common issue in which in one appeal, the appellant Doheny was convicted of rape and buggery and in other appeal the appellant Adams was convicted for buggery. In each case the prosecution relied on the evidence derived from a comparison between DNA profiles obtained from a stain left at the crime scene and the DNA samples collected from the blood of each accused. The forensic scientist used two different methods to calculate the match probability between the blood sample and the semen stain; a multi locus probe and a single locus probe. The results of the two different tests were then multiplied together along with the occurrence ratio of the accused's blood to give a final occurrence ratio. The defence contended that it was wrong in multiplying both the results of the multi locus probe test with single locus probe test and the court agreed with the contention.

2:4 DNA Sampling Exonerates the Wrongly Convicted :

In this regard, it is relevant here to mention that since its advent in the 1980s, scientific DNA sampling has also proven the innocence of hundreds of individuals wrongly convicted of crime, including 18 people on death row. In many of these cases, DNA sampling led to identification of the true perpetrator of the crime.

Wrongful convictions result from eyewitness misidentification (a factor in 72 percent of the cases), improper forensic science (50 per cent of cases), false confessions and incriminating statements (25 per cent of cases) and unreliable informant testimony (18 percent of cases). DNA sampling will greatly reduce such errors.⁹⁴

⁹³ Supra Note p. 57.

⁹⁴ Mandatory DNA Testing Is a Double-Edged Sword Posted September 19, 2013 In Crime Government By Janet Raasch

2:5 The First DNA Case in India :

The DNA typing started its journey through the Indian legal system in 1988. It is a matter of pride that in India the first use of DNA evidence in a paternity trial was in Kerala in 1988 during the maintenance case of **Kunhiraman v. Manoj**⁹⁵ that is from the very next year of its first admission in United States. The first trial resulted in the admission of the technique. The facts in connection with the case were that the petitioner's mother Vilasini and the counter petitioner Kunhiraman was neighbours. Vilasini was working as an agent in an insurance company known as Peerless. As a part of her job, she went to the house of Kunhiraman for canvassing him to take a policy of the company and he readily obliged. She further stated that Kunhiraman took more interest in her and offered to help her by canvassing policies for her from others. In connection with insurance work when one day Vilasini went to meet Kunhiraman, he was alone in the house and he forced her to sexual intercourse on a bare promise that he would marry her. This sexual connection became regular and when she became pregnant, Kunhiraman denied all the facts and changed his attitude towards marrying her. After the birth of Manoj she filed a maintenance suit under Section 125 of the Code of Criminal Procedure before the Chief Judicial Magistrate, Thalassery. In the absence of a legal marriage between Vilasini and Kunhiraman, the court found difficulty in applying section 12 of the Indian Evidence Act in order to fix the legitimacy of the child. Therefore, court found that the legitimacy of Manoj and the responsibility of Kunhiraman as the Father of Manoj could be established only through scientific evidence. For that, court ordered to conduct the novel scientific technique known as the DNA typing for determining the paternity of Manoj.

Manoj, Vilasini and Kunhiraman went to the Centre for Cellular and Molecular Biology, Hyderabad for giving their blood samples for conducting DNA typing. After conducting the test Centre for Cellular and Molecular Biology (CCMB) reported that Kunhiraman and Vilasini are the biological parents of Manoj. The senior scientist Dr. Lalji Singh gave his opinion supported with adequate reasons explaining the details of the procedure while conducting the test.

⁹⁵ 1991 (2) K L.T. 190

But when the case came for trial, Kunhiraman raised objection by stating that even though DNA test conducted in western countries was fool-proof, the DNA test conducted by Centre for Cellular and Molecular Biology was not fool-proof because the process and techniques developed in Centre for Cellular and Molecular Biology were in their own way and not having the reliability available for 'the test in the western countries. Therefore, court permitted the parties to examine the expert witnesses for determining the reliability of the report of the Centre for Cellular and Molecular Biology. Lalji Singh was examined and in his chief examination he briefly explained the DNA typing technique and then he detailed the procedures followed by him while conducting the test for the particular case. He claimed that the process that he had followed in this case was recognized and the papers published by him on the subject were also recognized. Regarding his experience he stated that he had experience in molecular biology since 1976 and he has worked for 13 years in the University of Edinburg. When he was cross examined, he admitted that there were certain differences between the method propounded by Centre for Cellular and Molecular Biology and the DNA Fingerprinting technique conducted in other countries. Regarding this the relevant statement given by him deserves to mention here:

There are some differences between the method propounded by me and DNA fingerprinting technique. There is only difference in the probe. There are so many probes. Jeffrey's probe is patented "... There is no law passed so far recognizing this test in our country. We have formulated certain standards". Standard is not prescribed by any other authority. In United States several private institutions conduct this test. In India in my knowledge there is no other such institutions. Centre for Cellular and Molecular Biology is the authority to speak about the test. "I don't rely on specific authority precautions are taken there would be better results ... If the test is not properly conducted there is possibility of erring".⁹⁶

Due to the novelty in the technique, court appointed another expert to get a second opinion regarding the reliability of the technique and the capacity of the

⁹⁶ From the deposition of the witness on M.C. Case No. 17 of 1988.

scientist who conducted the test. For that, court examined Dr. Umadathan, the medico-legal advisor to the Kerala Police. He produced certain scientific articles on DNA fingerprinting to show that the technique was a valid one. Relevant portion of his deposition is as follows:

DNA profile study is considered as conclusive method for determining the paternity and maternity of an individual. Except in the case of identical twins possibility of the persons having the same DNA pattern is impossible.... Lalji Singh is a competent molecular biologist. He has conducted a lot of scientific studies and research in the field of DNA profile test and he is an authority of the subject. I have with me photocopies of some articles reported in various scientific journals.... So in my opinion the test result is conclusive. A standard procedure is seemed adopted in this case. Regarding the auto radiography proved in this case, Dr. Lalji Singh's opinion will prevail over my opinion.⁹⁷

After hearing the scientific testimonies of the witnesses, court came to the conclusion on the admissibility of the novel DNA evidence as follows:

The evidence of expert is admissible under Section 45 of the Indian Evidence Act, 1872. So also, the grounds on which the opinion is arrived at are also relevant under Section 51 of the Indian Evidence Act, 1872. Pw4 is an expert in the matter of Molecular Biology and the evidence tendered by him is quite convincing and I have no reason why it should not be accepted. Just like the opinion of a Chemical Analyst or like the opinion of a Finger Print Expert, opinion of Pw4 who is also an expert in the matter of Cellular and Molecular Biology is also acceptable. For the reasons stated above I accept Ext. P5 report and come to the indubitable conclusion that the counter petitioner is the biological father of the second petitioner.⁹⁸

When the case came before the High Court, the court confirmed the finding of the lower court and ruled that the result of DNA test could be taken as

⁹⁷ Ibid.

⁹⁸ From the Judgment on M.C. Case No. 17 of 1988

conclusive in deciding paternity and that it was also useful in other areas like hair, semen, teeth and dead bodies.⁹⁹

2:6 Flaws in the Appreciation of DNA Evidence by the Indian Judiciary :

As a first case, there were various errors in the appreciation of the DNA evidence. Errors were made by all, the petitioner, the counter-petitioner and by the Court. The scientific DNA expert testified on the basis of his report as a final say and the court admitted it as if it were words from the Holy Scripture. As a novel scientific evidence, the trial court ought to have taken certain standards in admitting the evidence. Court only examined a witness who was the medico-legal advisor to the State police for evaluating the credentials of the DNA expert and his evidence. Before seeking his advice the Court ought to have verified his competency in giving opinion about the reliability of the technique and regarding the competency and capacity of the DNA scientist and the procedures. Actually Dr. Umadathan was not a competent person to appraise the correctness of the DNA test conducted by a senior scientist having experience in DNA technology. Dr. Umadathan was only a medico-legal expert and not a DNA fingerprinting expert. He himself has admitted that Dr. Lalji Singh's opinion would prevail over his opinion.¹⁰⁰

Similarly, a major error occurred in the appreciation made by the court regarding the validity of probe used by the Centre for Cellular and Molecular Biology (CCMB) lab in the particular occasion. Dr. Lalji Singh himself has admitted while he was cross-examined that because of the probe developed by Jeffreys was patented, he developed a probe known as Bkm. Therefore, it was necessary to check the validity of the probe developed by him. No materials were insisted by the court or the counter-petitioner requiring Lalji Singh to give evidence regarding the validation studies conducted or scientific materials to prove that the newly developed Bkm probe had been properly accepted by the scientific community including DNA experts stating that the probe was valid for use in DNA typing. Similarly, no questions were put by the counter-petitioner

⁹⁹ *Kunhiraman v Manoj*, 1991(2) K.L.T. 190 at 195.

¹⁰⁰ *Ibid.*

regarding the accreditation of the Centre for Cellular and Molecular Biology (CCMB) laboratory or the competency of the DNA expert in conducting DNA typing in consonant with Indian population. From the scientific articles produced by the medico-legal expert, court will get only a general picture about the scientific validity of DNA typing. Instead, court ought to have required from the DNA expert to produce the details of the existence and maintenance of the standards in Centre for Cellular and Molecular Biology, the details of care with which the DNA typing technique had been employed, existence of specialized literature written by some other scientists on DNA typing in the Indian context, general acceptance of the techniques developed by the Centre for Cellular and Molecular Biology Lab and the probative significance of the DNA evidence with special emphasis on Indian population. These standards were still to be evaluated where the High Court of Kerala considered the admissibility of the novel DNA evidence in India. Without properly considering these issues, it is intriguing how court came to the conclusion that the DNA fingerprinting and the science of DNA technique could be considered at par with traditional fingerprinting and other scientific subjects provided in section 45 of the Indian Evidence Act. These and other flaws show that the possibility of serious miscarriage of justice would not be ruled out altogether. But the glaring example of N.D. Tiwari, the former Chief Minister of U.P. and Utrakhand and Governor rocked the country and in the last realized that he is the father of the child.¹⁰¹

There are various accreditation bodies constituted all over the world to inspect and accredit the crime laboratories. The most prominent among them are the American Society of Crime Laboratory Directors (ASCLD), National Association of Testing Authorities in Australia (NATA), Standards Council of Canada (SCC) and European Network of Forensic Science Institutes (ENFSI). There are other Agencies in this regard, who are working in this area. Few of them are as follows :

¹⁰¹ Flaws in the Appreciation of DNA Evidence by the Indian Judiciary Surendra kumar (http://www.academia.edu/23442092/Flaws_in_the_Appreciation_of_DNA_Evidence_by_the_Indian_Judiciary_Surendra_kumar)

2:6:1 American Society of Crime Laboratory Directors :

The American Society of Crime Laboratory Directors was officially formed in 1974. Fortunately, during the same period of the birth of the American Society of Crime Laboratory Directors (ASCLD), the Law Enforcement Assistance Administration (LEAA) of United States took initiative and gave adequate fund to the Forensic Science Foundation to conduct a national voluntary proficiency-testing programme. The reports of the proficiency-testing programme pointed out serious concerns about the quality of work performed in some of the nation's crime laboratories. This agitated the newly formed American Society of Crime Laboratory Directors to take immediate action and to establish standards for the operation of forensic laboratories. As a result, the first committee of the American Society of Crime Laboratory Directors was appointed and the committee considered and worked on various programs that could be used to evaluate and improve the quality of laboratory operations.

The committee considered individual certification, a self-assessment programme and an accreditation program based on external peer review as a possible means of achieving the goal. By June 1981, the committee had been renamed as American Society of Crime Laboratory Directors Committee on Laboratory Accreditation. In 1982, during an informal meeting of the Board, the Chairman announced receipt of the first applications for accreditation from the eight laboratories of the Illinois State Police and as at the end of March 2004, there were 259 laboratories accredited by American Society of Crime Laboratory Directors/Laboratory Accreditation Board. The directors of all accredited laboratories are members of the Delegate Assembly of the board. On February 4, 1988, American Society of Crime Laboratory Directors/ Laboratory Accreditation Board was incorporated as a non-profit corporation in the State of Missouri.¹⁰²

2:6:2 The Crime Laboratory Accreditation :

Programmes of the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) are voluntary

¹⁰² http://shodhganga.inflibnet.ac.in/bitstream/10603/6648/15/15_chapter%207.pdf

programmes in which any crime laboratory may participate to demonstrate that its management, personnel, operational and technical procedures, equipment and physical facilities meet established standards. Accreditation is one part of a laboratory's quality assurance programme, which also include proficiency testing, continuing education, and other programmes to help the laboratory provide better overall service to the criminal justice system. American Society of Crime Laboratory Directors/Laboratory Accreditation Board now offers accreditation under two programmes. Any Crime Laboratory seeking accreditation, whether for the first time or renewing accreditation, may elect to seek accreditation under either the American Society of Crime Laboratory Directors/Laboratory Accreditation Board Legacy Programme or the American Society of Crime Laboratory Directors/Laboratory Accreditation Board International Programme. The American Society of Crime Laboratory Directors/Laboratory Accreditation Board Legacy Programme is the programme under which laboratories have been gaining accreditation for more than twenty years. Information on the Legacy Programme may be obtained by selecting the Legacy link. The American Society of Crime Laboratory Directors/Laboratory Accreditation Board-International Program is a new programme, which was approved by the Delegate Assembly by mail ballot in 2003. The American Society of Crime Laboratory Directors/Laboratory Accreditation Board International programme is based on the International Organization for Standardization (ISO) 17025 standards and the American Society of Crime Laboratory Directors/Laboratory Accreditation Board-International Supplemental Requirements. The Supplemental Requirements are based on the essential elements of the American Society of Crime Laboratory Directors/ Laboratory Accreditation Board Legacy program and the International Laboratory Accreditation Cooperation (ILAC) G-19 standards. Information on the International Programme may be obtained by selecting the International link.¹⁰³

2:6:3 The National Association of Testing Authorities, Australia :

The National Association of Testing Authorities in Australia (NATA) is one of the oldest and excellent accreditation providers in the world. It was

¹⁰³ Ibid

founded in 1947. The accreditation of forensic science laboratories is one among other scientific laboratories for which National Association of Testing Authorities offers accreditation. In order to get accreditation under National Association of Testing Authorities, it insists the labs to comply with International Organization for Standardization (ISO) 17025 standard. In 1994, National Association of Testing Authorities and American Society of Crime Laboratory Directors signed an agreement for joint inspections and accreditation of the forensic science laboratories in Australia. However, by 2000 to the increase in the number of technical staff in Australia, compelled the labs in Australia to apply in National Association of Testing Authorities only for their accreditation. The inspection of the labs for the accreditation is conducted by one National Association of Testing Authorities staff officer and one or more technical assistants. National Association of Testing Authorities gives accreditation for the labs dealing with controlled substances, toxicology, forensic chemistry, criminalistics, and forensic biology including DNA typing, ballistics, document examination, fingerprints, crime scene investigation and paternity testing. If a lab is accredited by National Association of Testing Authorities, it requires the accredited laboratory to conduct annual proficiency testing and review of those tests by the Proficiency Review Committee established by the Forensic Science Accreditation Advisory Committee.¹⁰⁴

2:6:4 Standards Council of Canada :

In Canada, the accreditation process started in 1994, when the Canadian Society of Forensic Science formulated a committee to study the accreditation of forensic laboratories. This committee functioned with consensus with the Standards Council of Canada and in 1999 a guideline known as 1999 CN-P-1578 was enacted. For the accreditation of laboratories the body follows the ISO standards. After the inspection of the laboratories, the accreditation will be granted by the Chair of Standards Council of Canada and the members of the task Group laboratories. The period of accreditation will be for 4 years. A re-

¹⁰⁴ NATA procedures for accreditation February 2017 (https://www.nata.com.au/nata/phocadownload/publications/Guidance_information/NATA-Procedures-for-Accreditation.pdf)

assessment will be conducted one year after the accreditation is granted and biennial visits will be conducted after the first year of accreditation.¹⁰⁵

2:6:5 European Network of Forensic Science Institutes :

The European Network of Forensic Science Institutes was established 10 years ago to keep the European Forensic Science at the forefront of the world. European Network of Forensic Science Institutes functions through its committee known as the Quality and Competence Committee (QCC). The European Network of Forensic Science Institutes members are the directors of the member laboratories.¹⁰⁶

A board had been constituted and in that board there are three standing committees known as the Standing Committee for Quality and Competence, Standing Committee for Expert Working Groups and the Standing Committee for European Network of Forensic Science Institutes Open Activities. In 2003, among 50 members of the European Network of Forensic Science Institutes only five have an accredited laboratory. The laboratories of the Forensic Science Service in England are accredited by the United Kingdom Accreditation Services to International Organization for Standardization 17025 and by the British Standards Institute to the International Organization for Standardization 9001 standards.

But unfortunately, it can be pointed out that in India no such historical development of the concept and institutions has developed and scanty efforts and agencies are working in this matter as it has apathy by the Government and its Agencies and so we depend upon the analogy and observations of other country's system and results. The DNA evidence have great potential and can be a revolutionizing concept in Judiciary but because of the various complexities the applicability of DNA evidence is critical are requires due diligence and high accuracy.

¹⁰⁵ <https://www.scc.ca/en/forensic>

¹⁰⁶ Ibid

CHAPTER–III

ROLE OF DNA IN PERSONAL AND PUBLIC LIFE

The recently developed embryo of law is playing an important role and dominating the public and personal life of the citizens and affecting the public opinion too in favour or against, both. It may make or mar the career and prospect of a person if he or she falls it's prey. Hence, an effort has been made in this chapter to study the role of DNA evidence in personal and public life.

In this regard, it is relevant here to mention that the case which brought the Deoxyribo Nucleic Acid (DNA) controversy to the fore was the rape and murder of Priyandarshini Mattoo. In January 1966, Priyadarshini Mattoo, was allegedly raped and strangled in her house in New Delhi. A fellow student, Santosh Kumar Singh, incidentally the son of a Senior IPS Officer was the main accused and was ultimately acquitted. At trial, **CBI v. Santosh Singh**¹⁰⁷, Court of the Additional Sessions Judge, New Delhi, the prosecution case relied on the DNA test of the vaginal swab, which was positive whereas the defence challenged the validity of the test stating that it was not conducted according to prescribed rules. The defence alleged that because the crime scene, etc., had not suggestive of sexual intercourse, the presence of semen was not possible and had to have been planted.¹⁰⁸ At the time of the post-mortem, the underwear of the deceased had earlier been returned with the assertion that there were no semen stains but subsequent analysis at the laboratory at Hyderabad revealed that there were in fact semen stains; the mix-up, however, led to the belief that the evidence had been tampered with. Thus, the case arose pros and cons of the use of this evidence.

3:1 Value and Admissibility of DNA Evidence in Court Trials :

Regarding the value and admissibility of DNA evidence in trial, it can be said that when the British took over the administration of India, they felt that for better administration, the criminal law and rules of evidence should be properly

¹⁰⁷ (2010) 9 SCC 747.

¹⁰⁸ Bhadra Sinha, "Sensational murder case approaches judgment day", Newspaper on Indian Express on 7th July, 2004.

and clearly codified and unified. The task of codifying the offences was entrusted to first ever Indian Law Commission constituted under Charter Act of 1833 under the Presidentship of Lord Macaulay. They drafted Indian Penal Code.¹⁰⁹

Evidence Law for India was first drafted by Sri Henry Summer Maine which was found wanting and later on Sir James. Fritzhames Stephen prepared the final draft which was adopted and enacted as the Indian Evidence Act, 1872 (Act 1 of 1872). Sir James was one of the most eminent jurists of the nineteenth century whose genius is portrayed in the provisions of the Indian Evidence Act, which have withstood the vicissitudes of time for over a century and a quarter. Sirkar, in his famous commentary on Evidence Act has time and again visualised his Intellect and genius, and as regard to redrafting of Sections 24 to 27 has stated that these sections could not perhaps be redrafted by a person who was not as eminent as Sir James Stephen.¹¹⁰

The Indian Evidence Act, 1872 has clearly defined ‘evidence, ‘proved’, disproved’, ‘not proved’, presume and ‘conclusive proof, besides other basic terms concerning rules of evidence. The definitions of terms, various principles and other relevant things in fact defined the parameters within which those terms etc. may be applicable. Those definitions also restricted imaginative interpretations, besides regulating adduction of these rules.

One bad thing which these codifications of substantive and procedural codifications had done was that these made the Indian Courts as only law courts and not the Courts of equity and justice. This was the reason that under Government of India Act, 1935, and subsequently under the Constitution of India, our Judges do not take oath to deliver justice, instead they take oath to uphold law. There is a lot of difference in delivering justice and upholding the law.

Mr. Stephen in his speech¹¹¹ (18th April, 1871) said that, “The main feature of the Bill consists in distinction drawn by it, between the relevancy of facts and

¹⁰⁹ They drew this Penal Code deriving materials from English and Indian laws and also from Livingston’s Louisiana Code and Code Napoleon. The Code came into force in 1862.

¹¹⁰ Sirkar, Law of Evidence, 15th Edn., 1999, p. 534.

¹¹¹ http://shodhganga.inflibnet.ac.in/bitstream/10603/148732/9/09_chapter%203.pdf

the mode of proving relevant facts”. In regard to *quid probandum* (as thing to be proved), the law requires as a condition to the admissibility of certain evidence an open and visible connection between the principal and evidentiary facts. This connection must be cogent, proximate and reasonable, and not conjectural and remote.¹¹²

In India, prospective cases are decided on the basis of adduced evidence in the case. The verdicts given by higher courts are also on the same evidence, In criminal trials, courts in India are fully empowered to convict an accused if the facts are proved in accordance with law of Evidence and also if the evidence adduced conforms to the definition and description of offence contained in any of the Penal statutes, irrespective of the fact that the adduced evidence is practically and rationally viable or not, or in the other case, the adduced evidence is fabricated and manufactured as a result of collusion of complainant and the investigating agencies or any other such likely parties. This approach portrays the long standing legacy in the members of Bench that they have only to uphold the law.

Another important point is that though Indian Constitution has given a clear cut scheme where all the three wings of the State (including judiciary) are equal and independent, the Courts in India, specially lower judiciary, sometimes behave as if they are part and parcel of Executive. This is not an allegation, but scores of judgments may be cited to elicit the point. A Jury plays a very important role in criminal trials, hut unfortunately it was abolished in 1955. Whenever the Jury trials are in vogue, such as in England and America, the decision of culpability of an accused is taken collectively by the Judge and Jury. However, Jury or no Jury, the basic duty of Court is to deliver justice, besides upholding law, which is again presumed to be just.

There cannot be two opinions that the victim is as much entitled to get justice from a Court of Law as an accused. The accused had been fighting the war throughout to get justice singlehandedly and the only weapon of defence he has is,

¹¹² Gazette of India, 18th April, 1871, p. 42 (Extra-Supplement).

the accusations must be proved beyond reasonable doubt. On the other hand, the victim has the investigating agency (with all the allied agencies such as Forensic personnel etc.), the prosecutors and ultimately the most powerful wing, State-the Executive on his or her side.

Long standing experiences have shown that the investigating agencies and the prosecuting setup have, time and again, failed to prove the guilt beyond reasonable doubt, for scores of reasons including inefficiency, corruption and neglect of its staff. The evaluation of their performance is gauged through percentage of convictions. Questions were raised by media, other agencies and authorities for lower rate of convictions. To enhance their general image and simultaneously to meet the demands of accountability, many means and ways have been devised to get more and more convictions. First and foremost of these means is fabricating or padding evidence at the stage of investigation or trial. This practice is also adopted elsewhere in other countries but in our country it is a common trend.

Secondly, they have tried other ways to tame judiciary through indirect means. For example on various pretexts, the Executive have managed to hold district or division-wise monthly compulsory meetings between District Magistrate and Superintendent of Police with the members of Bench of that district, the prosecutors and Government Counsels in attendance to see overall progress of trials (the pretext being that the meeting ensures service of summons etc. to the witnesses for speedy trials). The percentages of convictions are also the matter of informal discussions in these meetings. The result is obvious that in due course the judicial officers gradually begin to think that they do not have an independent entity and they are part of Executive. Such meetings are also common with higher-ups. Consequence is that the courts have started considering “law-and-orders’ and like situations in deciding cases (where laws-and-order is purely concern of Executive). It has been made a settled law that lapses in the investigation are of no consequence and for these lapses, the accused cannot derive any benefit. In the disguise of giving justice to the victim, State is being facilitated. Growing criminality, terrorism or law-and-order situations are purely

State subjects, but unfortunately some judgments make these basis to convict an accused, holding that the Judge (Court) is part of society and cannot shut his eyes to what is happening around him. This approach negates the basic rule of criminal jurisprudence that let many culprits be acquitted so that no innocent be wrongly convicted on the basis of which its by-product that prosecution is duty bound to prove its allegations beyond reasonable doubt has been formulated. (Basis of this rule being that the laws presumes the accused innocent unless proved guilty beyond reasonable doubt).¹¹³ Thirdly, the Judges take oath to uphold the law of the land and not the law-and-order or increasing criminality by foregoing or bypassing the established rules more and more convictions are coming. The definitions of “proved” or “conclusive proof” are changing day by day. The situation is more satisfying for the investigating agencies and the prosecution, because on one hand, their responsibility to prove the guilt beyond reasonable doubt is being decreased proportionally, and on the other, inefficiency is being camouflaged (not to mention rampant corruption).

The only weapon that the prosecution must prove the guilt beyond reasonable doubt, in the hands of helpless accused, majority of whom lack sufficient funds to engage efficient persons to defend themselves, is slipping out of his or her hands. It seems there is no match between the two adversaries. Very feeble voices from Human Right Organisations are making no impact on the deaf ears. These voices are not only brushed aside but comments like, “they are over ground faces of underground” are coming to suppress those voices.

The paradigm shift made by judiciary has jeopardized its antecedents and on the other hand boosted the image of State organs. To save the face of judiciary, some wise Judges started the movement of judicial activism’. Different C.Js. have accepted this (including rampant corruption in lower judiciary) and publicly vowed to make their own house in order. Some steps are taken but overall situation is no different. In U.P. alone 27 lower judicial officers of dubious antecedents have been removed from service and some are on the way. Perhaps

¹¹³ *State of Punjab v. Karnail Singh*, 2003 Cr LJ 3892; AIR 2003 SC 3609; *Sucha Singh v. State of Punjab*, 2003 Cr LJ 3876; AIR 2003 SC 3617.

the situation would not improve unless interaction of judicial officers with Executive Officers are not restricted. If drastic steps are not taken, before it is too late, presence of independent thinkers like Subba Rao. J., could not be expected, who held that Parliament shall not make any law, from that date of judgment, which abrogates fundamental rights of citizens of India¹¹⁴, which was overruled by a larger Bench at the instance of State). For overall independence of judiciary, its complete delinking with State machinery is a must.

3:2 DNA as a Evidence in Criminal cases :

DNA evidence plays an important role in administration of adjudicating the criminal cases because it affects the personal life of the accused or accused persons as well as the victim's too. So, in this scenario advent of DNA matching and identification evidence has become new feather in the cap of investigating and prosecuting agencies. These agencies in collusion with a section of scientific community are propagating and publicising that positive DNA evidence is the conclusive proof of guilt of the accused and there is no need for any corroborating evidence. If a match is declared positive by the testing laboratory of the sample found at the scene of occurrence and that of the accused then there is no need to consider any other kind of evidence.

The prosecution has perceived that this is the simplest way to shed their responsibility to prove the guilt of the accused beyond reasonable doubt. These interests have motivated them to publicize the conclusiveness of DNA evidence. Though, in civil cases position may be different, because the matching probabilities depends solely on conditions of the samples. As in civil cases, usually samples are taken by professionals or hospitals from the child in question and one of the two or both parents for ascertaining the parentage, heredity or legitimacy etc. normally by the orders of courts. These samples are extracted by professionals to whom Court orders. Therefore, in almost in every situation, it may be presumed normally that samples reach the laboratories in uncontaminated and undegraded form.

¹¹⁴ *Golaknath v. State of Punjab*, 1967 AIR 1643, 1967 SCR(2) 762.

On the contrary in criminal cases, at least one sample i.e. the sample lifted from the crime scene or even samples of vaginal swabs (in rape cases) are lifted at least hours, and in some cases days or months later. The moment any kind of body tissue is detached from body various kinds of bacteria, virus and other kinds of environmental influences start attacking the tissue (Besides self putrefaction). In these conditions, the sample at the scene of occurrence cannot be saved from degradations and contaminations. It is not at all possible to pick the sample from the scene as soon as it was left, it would be as good as if the culprit is arrested on the spot.

In criminal or for that matter in civil cases wherever the situation requires identification, DNA techniques are being applied world over. In rape, murder, kidnapping, illegal abortions, abandonment of child, inheritance, immigration assassinations, infanticides and exchange of babies, DNA profiles are being used. The few popular cases which used DNA profiles are- Rajiv Gandhi case, Premananda Swami case and Tandoor case of Delhi etc. in India and American cases were blue dress Clinton-Lawinsky case, and O.J. Simpson case etc. In Rajiv Gandhi assassination case Dhanu and Sivasan were identified by DNA profiling. The spot on the blue dress of the intern Lewinsky was identified as the seminal fluid of Clinton. Due to these world famous cases DNA profiling and identification had gained much free publicity which helped to create a notion that profile match results are infallible.¹¹⁵

Acceptance of DNA profile evidence has raised considerable controversy and concerns even in countries from where it has originated. Concerns have been aroused about the veracity of methods of tests, possibilities of laboratory errors, the standardisation of databases the method of calculating the probabilities used to convey the weight of evidence and the ability of the legal professionals to understand the intricacies of methodology and technology of this branch of science. No doubt, provisions of Evidence Act allow opinions of experts to be accepted by the Courts. Mapping, matching, comparing, correlating, conforming or contrasting the connection between two samples, i.e. one known from the

¹¹⁵ http://www.wbja.nic.in/wbja_adm/files/dna%20profiling%20%20cfl.pdf

accused (or suspect) and one unknown picked up from the scene of occurrence of crime, and holding that they originated from the same person, is the requirement of law. Forensic expert may be produced before the Court, with his report, who may hold this similarity and as such gives his opinion. Against that, strength and potency of physical, ocular or even circumstantial evidence in a trial lies in the recognition and identification of person involved physically and exactly and the results are drawn accordingly. If we compare the results of DNA and fingerprint evidence results, we find a fundamental difference between the two. A fingerprint expert gives a definite opinion, usually stating that he is certain that the sample belongs to the accused. On the contrary, a DNA expert gives an opinion in the form of numerical statement known as match probabilities". As such results based on DNA profiles (probability) would always put a question mark on the interpretation whether the samples did originate from the same source really and factually. The element of absoluteness can never be attributed to DNA results and as such proved conclusively of its evidentiary value, It seems that the zeal with which DNA testing technology is being publicized, it is going to stay (it is likely that scientific community overcomes the drawbacks and shortcomings in the testing processes in near future). Whenever DNA evidence is produced before a Court, following interpretations may be the likely results :

- (1) That there was insufficient material (lower amount of DNA in sample. degraded or contaminated sample) to arrive at a conclusion, or
- (2) That the DNA profiles of two samples show, they have come from different sources, or
- (3) That there is a probability that both the samples have originated from the same source, viz., the accused, or
- (4) That whether the inculcating, DNA as a evidence is corroborated with other evidence produced by the prosecution, or
- (5) That whether the inculcating DNA evidence contradicts any evidence produced in defence by the accused (as alibi etc.).

The first two interpretations of the DNA report are of no consequence for either of the parties. In case the report (and evidence) shows the match and

inculpability of the accused, the responsibility of court in interpreting and appreciating DNA evidence enhances-Guidelines are needed to specifically assess how common or rare is the DNA profile in question with general population, what processes (and kits etc.) were used in making those profiles. drawbacks and shortcomings of the processes, conditions of samples, what were the probabilities of human or equipment errors and lastly what were the probabilities that the expert' has reached correct or incorrect conclusion based on given data.

If the court reaches the conclusion that all was well and the match result were perfect and genuine well and good, the next step to interpret DNA evidence is to assess how far this evidence corroborates with other evidence produced by the prosecution or the defence. As an illustration, a hypothetical case may be taken. Suppose the DNA evidence points out that the sample collected from the scene of crime matches perfectly with the sample extracted from the accused A. The natural inference would be that A was present at the scene of crime at 7.30 p.m. on the given date. If on the contrary there is physical and digital evidence that the accused was present in a departmental store at 7.30 p.m. on the same date 200 kms. away in a shopping complex where witnesses and the recorded CDs of security camera have seen and recorded his or her presence. Accused A cannot be convicted on the basis of DNA evidence because either the DNA testing result was faulty or some other person has the same DNA profile.

In the case of **CBI v. Santosh Kumar Singh**¹¹⁶, DNA evidence was sought to prove that the dead woman was raped by the accused. The accused pleaded that it was a malicious attempt to implicate him through DNA match on the ground that the medical and other evidence present at the scene of crime did not suggest a sexual assault, presence of semen, sperm in vaginal swab or underwear of the deceased and vaginal smear are absent. It was pleaded that possibilities exist that samples are tampered with and burden is on State to prove that samples were not tampered. However, the underwear was sent for testing which found, white stains on it, against that during post mortem no stain was there on the underwear. Absence of stains at post-mortem and presence of stain at the

¹¹⁶ 2007 Cri LJ 964, 133 (2006) DLT 393

laboratory created doubt and consequently DNA evidence was rejected as inadmissible despite State's assurances to the Court that correct laboratory procedure controls and protocols were followed by the laboratory conducting the DNA test.

However, in this regard, it can be pointed out that in series of cases Supreme Court of India has held that credibility of otherwise credible ocular evidence, if contradicts or is inconsistent with medical evidence (expert-DNA evidence), it is better to discard medical (DNA) evidence and rely on ocular evidence.¹¹⁷ In the light of clear-cut view of Apex Court the DNA evidence has to be discarded if it contradicts or inconsistent with the ocular evidence. Besides this, in inconsistency or contradictory situation, another point to ponder is its corroboration with other evidence produced. The DNA evidence cannot be looked in isolation.

Despite the issues raised in other countries (even from where it has originated), Indian Courts seem to be inclined to accept the DNA evidence. Some controversy exists in paternity disputes for admitting DNA evidence among Indian Courts (dealt later on in this Chapter) but criminal law courts readily accept DNA evidence. But fortunately, there have been no convictions solely on the basis of DNA evidence. In a sensational case, where rape and murder of several teenage girls was committed, in the Ashram of Godman Premananda alias Ravi, by him and his accomplices, they were convicted on the basis of DNA profiling evidence.¹¹⁸ Madras High Court considered following questions-

- (xi) Whether the DNA evidence is generally accepted by the scientific community?
- (xii) Whether the testing procedure used in this case is generally accepted as reliable, if performed properly?
- (xiii) Whether the test was performed properly in this case?
- (xiv) Whether the conclusion reached in this case is acceptable?

¹¹⁷ *Leela Ram v. State of Haryana*, AIR 1999 SC 3717; *Surinder Singh v. State of U.P.*, 2003 Cri LJ 4446; AIR 2003 SC 3811; *State v. Sughar Singh*, 1978 Cr LJ 141 : AIR 1978 SC 191; *State v. Suraj Singh Yadav*, 2004 Cri LJ 2132 (All).

¹¹⁸ *Chandradevi and Others v. State of Tamil Nadu*, Manu/TN/2335/2002.

These four wisely framed questions were answered in the manner- the court relied to the extent to which courts in USA relied on DNA analysis for answering the first question (it is submitted that conditions of laboratories, education and training of scientists and most importantly independence and behaviour of experts in both the countries are not alike). The remaining three questions were answered in the affirmative by the Court, resulting in the conviction of the accused.

It is one of the most important points that generally, investigators, lawyers, prosecutors and the Judges have no scientific background. Majority of them are Arts students in their academic carriers, hence when a DNA evidence or expert comes before the Court, majority of them are stunned and usually take it on its face value what is being said or deposed. The position is not very different in other countries too in the legal arena.

In another case where degraded 5 micrograms of sample was tested for DNA profiling and DNA expert was produced. Karnataka High Court had acquitted the accused on various other grounds, including putting a question mark on the DNA results because the requisite quality and quantity was not present thus, the matching positive results were discarded.¹¹⁹

A single Judge of Gujarat High Court, in a recent judgment had made observations about the admissibility of DNA evidence, while rejecting all the prayers of the accused for passing an interim order. From the casual perusal of the judgment, it is evident that the Court was not only fully convinced of the authenticity of DNA testing (perhaps not knowing the full details about the testing), but also the antecedents of the laboratory which was to perform the test. The accused was pleading alibi and on that ground, he offered to give DNA sample from his body to the Investigating Officer which could be sent to the laboratory to get it matched with the sample found at the crime scene. But the accused was not ready to rely solely on the antecedents of Government owned laboratory. For that reason two prayers were made.

¹¹⁹ *M.V. Mahesh v. State of Karnataka*, 1996 Cri LJ 771 (Kant).

The two alternative prayers made by the accused were- firstly, seeking a direction from Court that both the samples may also be given to an independent expert at the cost of accused (a list was submitted to be approved by the Court and prosecution) and, secondly, that the expert engaged by the accused may be allowed to be present at the Government laboratory to watch, where tests were made for matching (even from outside glass window). It was submitted by the accused that DNA evidence has always been susceptible to error and on this ground various foreign courts have overturned the verdicts in rape cases from 1992 to 1996. It was further submitted by the accused that as there was no law in this country to regulate and establish standards for DNA testing and in this light if the laboratory consumes all the crime exhibit' (sample from spot) and in case the accused challenged the match results and the process adopted, there would be no likelihood of a second test afterwards. All the prayers were rejected and instead two directions were given, for taking the samples from the accused and another direction was that in case the whole 'crime exhibit' is used by the laboratory it should inform the Court (not mentioning what the court would do in that eventuality as the revision was finally disposed off). Even the plea taken by the accused that he cannot be compelled to give sample otherwise, was not discussed.¹²⁰

3:3 Compelling an Accused to Give Sample :

It had been a point of controversy whether the Court can compel an accused to give sample for DNA testing and matching. The point came before Supreme Court in Kundu's case (though a civil case). The Apex Court had held that no person can be compelled to give his blood or any tissue as sample for DNA testing and matching.¹²¹

Following Kundu's case, Andhra Pradesh High Court held that court cannot compel a person to submit himself to DNA test.¹²²The case followed below mentioned, besides others (totalling 5), directions of Apex Court.

¹²⁰ *Chandan Panalal Jaiswal and another v. State of Gujarat*, 2004 Cri LJ 2992.

¹²¹ *Gautam Kundu v. State of West Bengal*, 1993 Cri LJ 3232 (SC) : AIR 1993 SC 2295.

¹²² *Syed Mohd. Ghouse v. Noorunnisa Begum*, 2001 Cr 12 2028; *Najabhai v. State of Gujarat*, 1972 Cri LJ 1605.

- “(i) that courts in India cannot order blood test as a matter of course;
- (ii) wherever applications are made with such prayers in order to have inquiry, the prayer for blood test cannot be entertained, and
- (iii) no one can be compelled to give sample of blood for analysis”.

The single Judge did not mention Kundu’s case while delivering the Judgment in **Chandan Panalal’s case**¹²³ discussed above.

However, in another case Supreme Court of India has also held that if a person has committed an offence, then why will he volunteer to give specimen of blood knowing fully well that it will convict them? It was observed that such a law (Article 21 of Constitution of India) which prohibits taking blood samples forcibly without the wishes of an individual, for medical examination is rather protecting the offenders, which from no angle of vision can be the purpose of law. Even in some foreign countries ‘forceful’ blood examination is permitted to serve the ends of justice. The Apex Court was of the view that it cannot be said that proof coming out from DNA be “self-incriminator” because it is already present in the body.¹²⁴

In case above analogy is accepted then a question would arise: Whether compelling an accused to give sample from his or her body would infringe the fundamental right enshrined in Article 20 (3) of Constitution of India? Article 20 (3) reads as-“(3) No person accused of any offence shall be compelled to be a witness against himself”.

Sections 313 (3), 315 (1) with Proviso (a) (b) and Section 316 of Code of Criminal Procedure, 1973 have been framed by the Legislature to ensure that the fundamental right guaranteed under Article 20 of Constitution of India is not infringed by the Executive in any way. Protection against self-incrimination is a well defined right. Article 20 (3) of Constitution of India embodies a fundamental principle of British jurisprudence and so also part of Federal Constitution of

¹²³ *Chandan Panalal Jaiswal v. State of Gujarat*, 2005 9 SCC 113,

¹²⁴ *Sharda v. Dharampal*, AIR 2003 SC 3450.

United States of America.¹²⁵ Basic principle of criminal law is being presumption of innocence of the accused, casting the burden of proof on the prosecution to prove the guilt.¹²⁶ As soon as an accusation is made against an individual, protection under “Articles 20 (3) and 21 of Indian Constitution is the manner, means and the form in which the right is enforced, or the person is subjected to”.¹²⁷

Andhra Pradesh and Allahabad High Court in some of the old cases¹²⁸ have suggested to expand, the scope of Section 53 of the Code of Criminal Procedure for taking samples from the body of the accused. Against that Delhi High Court¹²⁹ has held that no such directions can be issued. Succumbing to pressure from Executive, Indian Legislature has passed an Amending Act in 2005 to amend Sections 53 and 53A and 54 which empowers the Executive to extract samples from the accused forcibly for DNA profiling. The Amendments would come in force on the date of a Notification issued by the Central Government. Due to public pressure the Notification has not yet been issued.

The English doctrine that the accused could remain silent throughout the trial and in the end he could open his defence, has been adopted in Section 313 of the Code of Criminal Procedure. The right of accused to be protected from all around against voluntary self incrimination has been taken care of.

Section 27 of infamous Prevention of Terrorism Act, 2002 (now repealed) provided for forcefully taking samples from the body of accused on the application of Investigating Officer. The Human Rights Organisation and the Commission had forcefully fought continuance of the Prevention of Terrorism Act, 2002 and this was one of their arguments that compelling a person to give samples from his body is self-incriminatory. Shah, J., observed that Court is bound to give effect to constitutional protection provided under Article 20(3) of Indian Constitution.¹³⁰

¹²⁵ AIR 1965 SC 1251.

¹²⁶ AIR 1964 SC 1552 at 1556.

¹²⁷ *Kartar Singh v. State*, 1994 Cr LJ3139 (SC) : 1954 Cri LJ 865 (SC).

¹²⁸ *Ananth Kumar v. State*, 1977 Cr LJ 1797; *Jamshed v. State*, 1976 Cri LJ 1680 (All)

¹²⁹ *X v. Z*, AIR 2002 Del 217.

¹³⁰ *Smt. Nandani Satpathy v. State*, 1978 Cr LJ 968.

In light of above discussions, observations made in **Sharda's case**¹³¹ should be taken. It could be submitted that on the analogy, that proof coming from DNA cannot be self-incriminatory” because it is already present in the body, another inference could be drawn using the same analogy that the guilt is present in the mind (part of body) and if in future any technology is developed to read and record the thoughts present in the mind including guilt, there would be no need of any evidence for convicting the accused. Accused would be compelled to subject himself for mind reading and recording test and just after the results of test a judgment of conviction may be written.

Since the times when the State had come in actual existence, its beholders had tried everything to encroach on the Fundamental Rights’ of individuals, called their subjects. The fight prolonged for centuries by, these hapless subjects to protect their fundamental rights and in the end when democratic form of Governments came in existence, they thought that their fight for rights was over because in these systems there is well- established Judicial System to ensure that such rights are well protected. It is evident that their fight is not over yet. Unless the fundamental rights are not regularly infringed, what was the justification to constitute a statutory Human Rights Commission in a democratic setup, despite presence of a strong judicial mechanism.

The individual is stunned because the judicial activism in the changing scenario is developing two-pronged approaches,- One relating to civil cases and the other towards criminal cases. Sometimes well-established definitions are interpreted in new ways and meanings of ‘benefit of doubt’, ‘independent corroboration’, proof etc. are changing on day to day basis, thereby affecting the basic underlying principle of criminal jurisprudence as to innocence of the accused till proved guilty beyond reasonable doubt. The argument forwarded to support this change is that victim is also entitled to justice. It must be ensured that in the garb of giving justice to the victim, interpretations (new) are not made in such a way which cover up laxity of prosecution. In case it happens, it would be a very dangerous adventure which could lead to development of an altogether new

¹³¹ *Sharda v. Dharampal*, AIR 2003 SC 3450.

paradigm-let more innocents may be convicted than to allow a real criminal to go scot free.

3:4 DNA as a Evidence and Views of Foreign Courts :

Since the decided cases of foreign courts helps us too in guiding some matter, in the same way the view of courts on value and velocity of DNA evidence may also help us to reach at a conclusion. Hence, it is necessary to study the views of foreign courts on this issue. In this regard, it can be said that other branches of Forensic Science were used in the West for a long time but addition of DNA technique was a new addition. As back as in 1849 John Webster had murdered Parkman and his murder puzzle was solved by anthropological experts. David Owen in his “Hidden Evidence” has many case studies where various cases were solved through conventional Forensic methods.

The first instance when a DNA test was used for matching samples arose when on November 22, 1983, Lynda Mann 15 was found murdered. It was found from medical evidence that she was raped before murder, as semen was found inside the body. Again on July 31, 1987, Dawn Asheroft was also found raped and murdered in the similar circumstances. After a long manhunt, leads indicated towards a dishwasher who was apprehended and subjected to long and lengthy questioning by police. The dishwasher confessed to the murder of Dawn Asheroft but denied to have any connection with the murder of Lynda Mann. To prove the “guilt” of the accused suspect the police took his samples and the semen found from the body (vaginal swab) of victim and sent them for DNA matching. When the results came police was stunned to know that accused’s samples did not match with vaginal swabs from the woman and the dishwasher was innocent.¹³²

The dishwasher, (name not given) despite his confession of murdering one of the girls had to be acquitted but later on one Cohn Pitchfork was arrested whose DNA matched’ with the semen and was eventually convicted.

¹³² Alissa Proctor, Mike Dale and Joel Williams, “Evidence: The True Witness”, available in <http://library.thinkquest.org>

It was not the first case but numerous foreign courts have overturned the guilty verdicts in rape and murder cases (specially between 1992 and 1996). The British police has an online, database of more than 3,60,000 profiles that they compare to crime samples and it is claimed that more than 500 positive matches' come up a week¹³³ seems to be a really high rate, does not it?

Despite legislations to make the standards and protocols in DNA matching techniques, laboratories employing highly skilled technicians and developed methods for collecting samples, DNA analysis was not accepted by the U.S. Court in the very famous case of O.J. Simpson, the football player. O.J. Simpson was acquitted on the ground that DNA samples were not collected and handled properly. A slight negligence, carelessness or ignorance in handling, collecting, preserving and transporting may render the sample if not useless altogether, it will certainly affect the final results and O.J. Simpson verdict has proved it (more foreign cases are dealt under foregoing headline).

3:5 Admissibility of DNA as a Evidence :

Regarding the admissibility of DNA evidence in India, the Indian Courts have taken the view that “The identification is hundred per cent precise, experts opine”¹³⁴, as such DNA test gives perfect identity and admissible in evidence. Regular use of DNA evidence before the courts was started in USA from 1988-1989. In the early stages, the U.S. Courts for admissibility of DNA evidence applied the standard fixed in Frye case.¹³⁵ This case was always considered where DNA and other scientific evidence has to be evaluated for admissibility. This test was commonly called ‘Frye standard’.¹³⁶ Thus, for example, the first question the Frye standard asks a Court to determine is, whether the scientific evidence in question has gained general acceptance in the particular field to which it belongs’. Otherwise cogent, rational and reasonable looking Frye standard was challenged by US Justice Department on the ground that this standard ignored the particular piece of evidence and concentrated on the general reliability of the scientific test

¹³³ “How DNA Evidence Works”, Howstuffworks.online.

¹³⁴ *Pantangi Balarama Venkata Ganesh v. State of A.P.*, 2003 Cr LJ 4508 at 4517 (AP).

¹³⁵ *Frye v. United States*, 293F 2d 1013 (DC Cir 1923).

¹³⁶ Thompson, “Evaluating and Admissibility of New Genetic Identification Tests: Lessons from DNA War”, *J. Crim. L and Criminology* (1993) 22, 26.

as a whole. It was challenged as being vague because many became concerned with the reliability of such evidence. The attackers on Frye standard mentioned that DNA testing tended to unfairly discredit relatively new tests, and not considering the fast changes occurring in scientific community, such as the constant changes in types of DNA testing. It was said that Frye standard could block admissibility of DNA testing. Giving an example it was mentioned that as Polymerase Chain reaction (PCR) based DNA testing could easily be said as “not generally accepted” in the scientific community.¹³⁷

The United States Justice department very well knew that there are anomalies in DNA testing processes and a big chunk of scientific community does not consider, DNA evidence as infallible and as such it could not be proved as ‘generally accepted by scientific community’ before Courts of law, thus, they cleverly attacked the ‘Frye standard’. Prosecuting agencies world over consider DNA evidence (matching results) as an easy alternative for shedding their responsibility of proving the guilt beyond reasonable doubt. And as long as Frye standard remained, they would not succeed in getting easy convictions. Due to pressure rules of Evidence were amended in United States and Rule 702 came into existence. Courts were made to follow the new rules. (In the same manner as Sections 53, 53A and 54, Code of Criminal Procedure have been amended in India).¹³⁸

They succeeded in 1993 when the US Supreme Court had modified the Frye Standard, concluding that for a scientific evidence to be admissible it must :

- (a) be shown to be scientifically valid (not “generally accepted”) and,
- (b) be relevant to at least one issue in the case.¹³⁹ It was held that Frye standard was superseded by the enactment Federal Rules of Evidence 702.¹⁴⁰ The first conviction based on DNA evidence came in **Spencer v. Commonwealth**¹⁴¹, a celebrated case on the point.

¹³⁷ Edward Connors ET. AL., “Convicted by Juries Exonerated by Science Case studies in the USA of DNA Evidence to Establish Innocence After Trial”, U.S. Dept of Justice, NCJ, XII (1996).

¹³⁸ Ibid.

¹³⁹ *Daubert v. Merrell Dow Pharmaceuticals*, 509 US 579 (1993) at 592.

¹⁴⁰ Ibid at 588.

¹⁴¹ 384 SE 2d 775 (1989).

In the last century America had been in the forefront in using novel scientific methods for unfolding riddles of crime and afterwards these were produced as evidence in Courts. Frye case governed previously the standard of admissibility of these novel scientific evidence subjecting it to general acceptability in a particular scientific field. It was held “While Courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field to which it belongs”. Meaning thereby that the admissibility depends on the quality of the science underlying the evidence, as determined by scientists themselves and it also depends on whether the specific techniques used are reliable or not.

Following the Frye case, another American Court noted that three-pronged tests are needed to determine whether DNA evidence adduced should be admitted:

- (i) Is there a theory, which is generally accepted by the scientific community, which supports the conclusion that DNA forensic testing can produce reliable results?
- (ii) Are there techniques that currently exist that are capable of producing reliable results in DNA identification and which are generally accepted among the scientific community?
- (iii) Did the testing laboratory (and the personnel involved in picking, handling, transporting and storing samples) perform the accepted scientific techniques (with standards) in analyzing the forensic samples in that case?¹⁴²

In the same year (1989) when the first conviction was recorded in **Spencer v. Commonwealth of Austria**¹⁴³, the Supreme Court of Minnesota became the first appellate court to reject the DNA evidence (**State v. Schwartz**¹⁴⁴). The Court observed that the reliability of a test implies that it could be subjected to an

¹⁴² *People v. Castro*, 144 Misc 2d 956. 545.

¹⁴³ *Spencer v. Commonwealth of Austria*, [1907] HCA 82; 5 CLR 418; (1907) ALR 253. Some say that *Florida v. Andrews*, 533 So. 2d 841 (Fla. Dist. Ct. App 1988) was the first case where a conviction was based on DNA evidence in US legal history.

¹⁴⁴ 447 N.W.2d 422 (1989)

independent scientific assessment of the methods, including replication of the test. Due to laboratory's secrecy such independent assessment could not occur, hence the results are not admissible. It further held that the admissibility of a specific test results in a specific case completely depends on the laboratory's compliance with appropriate standards and controls and also on the availability of its testing controls and ensuing results. Court finally held that test results lack fundamental adequacy, thus inadmissible.

The Court is competent to question the novel technique's potential for error and also antecedents such as qualifications of expert to decide whether the scientific evidence is admissible or not. The Columbian Supreme Court held that DNA evidence is not admissible.¹⁴⁵ The Court held that the F.B.I's. method for calculating the "probability" of a coincidental match cannot be accepted. It was observed that the scientific foundation of these probability calculations bears on the admissibility and not simply the weight of the evidence. It was observed that, "there is a controversy within the scientific community on this issue, which has gathered further study it is after these studies and others when the Court should be called upon to admit DNA evidence".

When it was pointed out to C.K. Buch, J. of Gujarat High Court that "an evaluation of Forensic DNA evidence has always looked to various scopes of error including the laboratory errors" and foreign Court have overturned convictions between 1992 to 1996, he observed. "According to me, the years of these overturned cases, are relevant, in the light of facts pointed out by Mr. Oza....".¹⁴⁶ Unfortunately, he did not mention his reasons for rejecting the plea nor has mentioned what facts Mr. Oza or the other has pointed to him. Perhaps Federal Rules of Evidence (USA) have been mentioned and ensuing decision of US Supreme Court in **Daubert's case**¹⁴⁷ in which Rule 702 was mentioned.

It should be noted that even Rule 702 did not repudiate the Frye standard. Rule 702 reads as-

¹⁴⁵ *United States v. Porter*, F06277-89 (1991).

¹⁴⁶ *Chandan Panalal v. State*, 2004 Cri LJ 2992 at 2993 (Para 9).

¹⁴⁷ *Daubert v. Merrell Dow Pharmaceuticals*, 509 US 579 (1993) at 592.

“If science, technical or their specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education, may testify thereto in form of an opinion or otherwise”.

In general terms, the application of the Rule is called rule of “helpfulness”. Rule 702 cannot be read alone but with Rule 402 of Federal Rules, which requires the Court to determine the admissibility of evidence by balancing it with force of probability against its potential for misapplication by the Jury (or the Judge). Hence, the Court is duty-bound to consider the soundness and reliability of the process or technique used in generating evidence, and then to determine its admissibility, it should also be determined for the admissibility of evidence that the admitted evidence would not overwhelm, confuse or mislead the Court.

The landmark judgment of US Supreme Court in **Daubert v. Merrell Dow Pharmaceuticals**¹⁴⁸ did not overrule Frye standard, rather it had only held that the process must be shown to be scientifically valid. The prosecuting agencies in the US started pleading that the Supreme Court has overruled the Frye standard. Supreme Court only observed that this validity of process has to be generally accepted among the scientific community. There must be a difference between “general acceptance” and sectorial acceptance. There is a big chunk of Biochemists and DNA scientists who do not consider DNA matching evidence for identification as totally fool proof. Because of this reason even the staunchest perpetrators do not hold DNA matching evidence as hundred per cent authentic and always put a rider to the claim that unless samples were upto the mark and the testing was done in accordance with standards fixed, protocols followed and the controls used at every stage, it is perfect. If flaws are found and that is usual case, if probed and shown to the Court, this evidence cannot be admitted in evidence. That is what had happened in O.J. Simpson’s and other cases.

3:6 Position in India as to admissibility of DNA as a Evidence :

The position in Indian context may be judged from various angles, such as:

¹⁴⁸ 509 US 579 (1993) at 592.

- (a) presence of laboratories and qualified personnel;
- (b) existence of laws governing DNA testing and matching;
- (c) existence of fool-proof techniques for matching DNA samples;
- (d) Judges, lawyers, prosecutors, investigators and ordinary doctors practicing in medicine having full knowledge of techniques involved; and
- (e) general awareness of public.

It would be better to discuss each of these angles in the Indian scenario before one is in a position to judge whether admissibility of DNA evidence be encouraged or not.

There are only 4 Central Forensic Science Laboratories (CFSL) and about 20 FSLs (run by the States). Centre for DNA Finger Printing and Diagnostics (CDFD), Andhra Pradesh Forensic Science Laboratory (APFSL), Centre for Cellular and Molecular Biology (CCMB), Rajiv Gandhi Centre for Biotechnology (RGCB) are the major institutes where DNA testing is being done. As far as Indian scenario is concerned, DNA testing and matching technique is in its infancy. Cost of imported laboratory equipments, kits and reagents is so high that few laboratories could afford to meet them.¹⁴⁹

The most important point is an enormous dearth of really qualified manpower in this highly specialized field. Shortage of carriage, techniques for picking or preservation etc. of samples, and lack of qualified personnel would naturally affect the quality work and result.

Except Mr. Lalji Singh, there is no name worth a mention and in these circumstances Centre for DNA Finger Printing and Diagnostics, Director, Syed Ehtesham Hasnain's boast, "Local evidence can be removed or created but DNA can't lie. DNA is very robust," seems to be hollow.¹⁵⁰ Such boasts have influenced the court's mind and Mr. Hasnaifl's claim that "the rate of conviction

¹⁴⁹ Ibid

¹⁵⁰ <http://in.news.yahoo.com>

has gone up significantly wherever DNA fingerprinting has been taken as evidence in the Courts”,¹⁵¹ is for publicity.

The Central Forensic Science Laboratories are governed by Ministry of Home Affairs. Every research and other projects have to be approved by the concerned Ministry at Delhi. The process of approval usually takes 2 to 3 years and till the final approval comes from Delhi either the project would have become obsolete or the person who has submitted the project has lost the interest. In fact, the microbiology labs involved in DNA testing are always fund starved. Besides, the really qualified and bright people seek foreign jobs because here they do not get any incentive, have to work on very low pay-scales with a little chance of promotion and overall under not too suitable working conditions. It is better to give these labs the status of an autonomous body established as has been given to Defence Research and Development Organization (DRDO) and the Council of Scientific and Industrial Research (CSIR). This would also give credence to the reports prepared by them because at present they are functioning under the Executive under whom the investigating agencies are also functioning.

In India it is the prosecution which usually insists on a DNA match test and the accused is the one which opposes the effort. On the contrary in USA, it is prosecution which opposed the DNA-match test. In a very recent case a 46 year old Thomas A. Doswel, was involved in a rape case. Doswel had been undergoing an imprisonment for 26 years. After 18 years, he pleaded to the court that the vaginal swab be sent for DNA match test but the prosecution opposed it vehemently. However, setting aside the prosecution’s plea, Court ordered for the test.¹⁵²

The above mentioned latest case tells one more thing- difference between Governments owned and controlled labs and autonomous labs. The prosecution rely in our country on places from where they are in a position to get an obvious sympathy, but it is not the situation in United States. In my experience of about forty years in trial courts, I have very rarely seen unfavourable report to

¹⁵¹ Ibid.

¹⁵² <https://www.innocenceproject.org/cases/thomas-doswell/>

prosecution, coming from Ballistic, Chemical or any other Forensic labs, unless the accused are powerful enough to manage a report in their favour. I have seen many managed reports from these labs.

In the light of above discussions, it would be naivety to accept DNA matching and identification results as conclusive proof. Even the Courts in the country from where it had originated (USA) exercise highest caution in admitting DNA evidence.

When United States Courts started putting a question mark on the admissibility of DNA evidence, US Government enacted many laws to give legitimacy to DNA evidence. DNA Identification Act 1994 was passed and Rule 702 was amended in the Evidence laws. DNA typing standards were fixed and watched by DNA Advisory Board (constituted under Act of 1994). Canada has also enacted a legislation by the same name which became official on June 30, 2000. United States has enacted DNA Technology Act, 2003 to overcome the backlog of samples collected from crime scene and convicted persons, through increased research and development of new techniques for matching samples and for other purposes. Previously enacted, DNA Analysis Backlog Elimination Act, 2000 was not found sufficient. These Acts provide establishment of a National Forensic Science Commission to make recommendations to Attorney General to enhance protection as provided in sub-paragraph (G) to ensure-

- (i) the appropriate use and dissemination of DNA information,
- (ii) the accuracy, security and confidentiality of DNA information,
- (iii) the timely removal and destruction of obsolete or inaccurate DNA information,
- (iv) further measures to protect privacy.

Britain enacted Criminal Justice and Public Order Act to make provisions for forcible testing of blood samples.

More and more voices are coming from within the Indian community (legal) to enact various kinds of laws which may legitimise DNA evidence and give credence to it so that this kind of evidence may be made admissible. It is

suggested that Section 112 etc. of Evidence Act and Criminal Procedure Code needs drastic changes to make acceptance of DNA evidence viable by Indian Courts. To their delight, Indian courts have started declaring DNA evidence as admissible (cases mentioned previously), though no suggested amendments have come in force yet. 185th Law Commission Report observes that law of evidence needs to undergo radical changes with standardization of new technologies. It is rightly said that Judges, lawyers, prosecutors and investigators must be educated in better understanding of DNA evidence. Once it is done, it would certainly help in the inferential nature of DNA evidence and new found notions that DNA evidence would connect the accused to the scene of crime “beyond a shadow of doubt” would perhaps be considered as only a myth and handled with very strict caution. Sometimes it is the half knowledge that distracts. Sections 53, 53A and 54 of the Criminal Procedure Code, 1973 have been amended (not yet come into force), incorporating the suggestions of Malimath Committee, in regard to DNA samples to be extracted from the accused for creating evidence.

It must always be kept in mind that the entire DNA processing is in its developmental stage, thus a fool-proof result from DNA profiling, matching and identification cannot be expected from such-techniques. As could be seen in the previous Chapters, there are always margins of error at every step or stage and in most of the cases these errors cannot be detected by even most advanced laboratories from today’s standards, what to say of less-equipped laboratories. Matching DNA in frozen tissues of Siberian woolly mammoth that walked in Tundra 20,000 years ago, with that of modern elephant is one thing and matching a sample left at the scene of crime with a suspect is another. This is so because if in any of the future researches it was found that the matching process adopted for identification of mammoth DNA with modern elephant (or any other hundreds of historical DNA matches made today) was wrong and modern elephant has got nothing to do with mammoth, it would not affect anybody (except the antecedent of the scientist who claimed the match).

Science has a habit of running rings around itself, as today’s theories could be tomorrow’s big mistakes. Once the theory of relativity propounded by Einstein

was considered infallible and “generally accepted” by scientific community, but this theory now is being challenged on various grounds, including observations of slowing down of speed of light and uniformity of space in cosmos, etc. They are planning to rewrite the text-books. Whether theory of relativity remains intact or thrown away, it has not affected anybody materially or physically.

But till a future date when ‘new’ researches make today’s DNA testing, matching and identification process declared to be a sheer mistake’, thousands of individuals world over may be hanged to death or languished in jails undergoing terms of convictions on the basis of Conclusive DNA evidence. Nobody would be in a position then to return the lives or prime years of one’s life passed in confinement.

Indian Courts and lawyers (including prosecutors) do not generally have a scientific temper because larger majority of them were Arts students-in their academic careers. If one goes through the judgment delivered in **Chandan Panalal Jaiswal’s**¹⁵³ case, it would be evident that Hon’ble C.K. Bitch, J., had been so impressed by the DNA expert Dr. Mehta, who was called to assist the Court in understanding DNA processing techniques, that the learned Judge had rejected all pleas of defence, sometimes without assigning any reasons.

Ignorance of law is no excuse. Every person is presumed to know all the law which is in force. Legal functionaries, whether working as members of Bench or Bar, are similarly supposed to know all the fields of Science or Arts in which they are required to deal with for justice delivery system. Lawyers and Judges have been dealing for a long time with various kinds of experts,- autopsy surgeons, ballistic and toxicology experts and other kinds of Forensic experts, including Engineers (mostly in civil cases) etc. etc. Courts have never allowed any other person to ‘Examine’ or ‘Cross-Examine’ these experts produced before Courts, other than a lawyer. This is the general practice throughout the world. Unless a lawyer has complete knowledge of the subject involved and knows what the expert is deposing about, he or she would be unfit to deal with the expert

¹⁵³ 2004 Cri LJ 2992.

witness. The accepted law is that the opinion of the expert witness is admissible in evidence (Section 45 Evidence Act) and say if in cross-examination, his opinion based on the data and ensuing results are not shaken, the party engaging the lawyer is bound to suffer.

DNA techniques of profiling and matching for identification are relatively new. Even doctors practicing in medicine do not know much about the techniques. They are the ones who are usually directed by the Courts to take samples from required persons. In case extraction, handling, preserving and sending the extracted samples are not performed properly and professionally, observing all protocols and standards fixed, sample would become useless for matching because of contaminations setting in.

It is also necessary that the general public is made to understand the genuineness of the processes involved in DNA testing. This is important because the general awareness about the antecedents of DNA testing would render the institutions (Investigating agencies, prosecuting agencies and laboratories) function diligently and at least try to give credence to what they are doing.

3:7 Admissibility of DNA Finger-Printing Test Reports under Section 293 of Code of Criminal Procedure, 1973 :

In a recent case, a single Judge of Kerala High Court has held that DNA finger printing test report is admissible in evidence even without examining the Scientific Expert, under Section 293, Code of Criminal Procedure, 1973 as per **Geeta's case**.¹⁵⁴ But in **Pantangi Balaram's case**¹⁵⁵ Andhra Pradesh High Court has also held the same thing about the admissibility "of DNA expert" (at p. 4518) but for another reason and under different circumstances. In Pantangi Balaram's case DNA Expert was examined and cross-examined. These two cases have to be discussed in detail.

In **Geeta's case** it was contended that the DNA finger-print test report cannot be admitted in evidence under Section 293 of Code of Criminal Procedure,

¹⁵⁴ *Geeta v. State of Kerala*, 2005 Cr LJ 2780 (Ker).

¹⁵⁵ *Pantangi Balarama v. State of A.P.*, 2003 Cr LJ 4508 (AP).

1973, without examining the Expert, on the ground that Section 293 (4), Code of Criminal Procedure specifically mentions-

Section 293 (4) of Code of Criminal Procedure, 1973, “This Section applies to the following Government scientific experts namely:

- (a) any Chemical Examiner or Assistant Chemical Examiner to Government;
- (b) the Chief Inspector of Explosives;
- (c) the Director of Finger Print Bureau;
- (d) Director, Haffkine Institute, Bombay;
- (e) the Director (Deputy Director or Assistant Director) of a Central Forensic Science Laboratory or a State Forensic Laboratory; and
- (f) the Serologist to the Government”.

Hence “any document purporting to be a report under the hand of a Government scientific expert to whom this section applies...”, occurring in sub-section (1) of Section 293 does not include an expert from “DNA Finger Printing and Diagnostic Centre”, Hyderabad. This contention was rejected by the Court on the basis of an authority of a judgment by Supreme Court in **Mast Ram’s case**.¹⁵⁶ Incidentally, Supreme Court dealt with the Report of Ballistic Expert signed by a Jr. Scientific Officer of Central Forensic Laboratory, Chandigarh. It may be pointed out that ‘Reports of Central Forensic Laboratories (or State) are covered under Section 293 (4)(e). As such reports of Forensic Laboratories cannot be put at par with the reports of any other kind of laboratories because the Section 293 specifically mandates to use “the reports” “as evidence”’.

Apart from this, there is an ocean of difference between expressions “may be used as evidence” (293 (1)) and admissible in evidence.

However, the judgment accepts as prevailing “confusion” in admitting the DNA test report as admissible evidence and as such recommended a suitable change to be made by the “Legislature”. In spite of this ensuing confusion, the Court held, the DNA test report to be admissible in evidence under Section 293,

¹⁵⁶ *State of H.P. v. Mast Ram*, 2004 Cr LJ 4973 (SC).

Code of Criminal Procedure, 1973 without examining the expert who has prepared the report.

The learned Judge had rejected the argument that Mast Ram's case ruling cannot be applied to the facts of present case (because ruling related to a Forensic Science report) on the ground that in **Suganthi Suresh Kumar v. Jagadeeshan**¹⁵⁷, the Apex Court had held that a High Court cannot overrule the decision of the Apex Court. It may be submitted that overruling is another thing and distinguishing a judgment on different facts and point of law is another.

V.L. Ethiraj, an eminent Criminal Lawyer of previous century had suggested to the Law Commission that- "Dump all law journals in the Bay of Bengal", because following the doctrine of "stare decisis" has sometimes taken the Courts far away. Now the Indian Constitution, and previously Section 212 of the Government of India Act, 1935 stipulates that the law declared by the Federal Court and the Privy Council shall be binding on all Courts in British India. At times this provision becomes a licence for over-interpretation. According to a jurist, "in fact the principle of stare decisis has unsettled statute law in derogation of the Constitution of India, because proclivity of some Judges to display their learning and erudition in flamboyant English (besides philanthropist approaches) has on several occasions resulted in confusion to the commoner"¹⁵⁸, Sometimes the commoner is perplexed because Hon'ble Judges instead of upholding the law, for which they are administered oath, their decisions do not conform to it on the various grounds including that they cannot shut their eyes to happenings in the society. In these situations, 'stare decists' does not seem to be best route because on almost every point of law there are ample materials in existence for and against, in the form of decisions of superior Courts. It is a matter of skill, personal liking and wit to distinguish the other set of decisions.

It is the common and settled law that when there is a clear and unambiguous statute, there is no need to follow the rulings of higher Courts. Until

¹⁵⁷ AIR 2002 SC 681 : 2002 Cri LJ 1003.

¹⁵⁸ "Stare decisis" in Criminal Law: an Article by P.N. Prakash, 2004 Cr LJ (Journal Section) 231. Words in bracket are mine.

the DNA laboratories tests reports are included in sub-section (4) of Section 293, Code of Criminal Procedure (by the decision) they are supposed to be out of ambit of the provisions of that section. In the present case, the DNA test report has been held to be admissible on the ground that the petitioner was not in a position to bear the expenses for calling and producing the 'expert', therefore, the DNA test report has to be accepted and admitted in evidence without producing the 'expert' to prove the report.

Now, we should come to the other case. In that case **Pantangi Balarama**¹⁵⁹, Andhra Pradesh High Court held that DNA test performed by the 'Expert' and 'his evidence, giving perfect Identity', is admissible in evidence. Brief facts of the case were, besides many other things, a shirt was recovered from a car through which assailants allegedly escaped. A pink coloured blood stained shirt was found in the abandoned car. These blood stains were tested for matching DNA with that of accused.

When the Court was shown "an article written by one Lalji Singh. Centre for Cellular and Molecular Biology, Hyderabad", the Court rightly observed,-
"We have no hesitation in accepting the proposition. But it cannot be said that in this particular case, human error has crept in unless it is shown by cross-examination". That is what has been emphasised in the preceding pages that the lawyers must be well versed and educated in the field of DNA matching and identification. If it was so, the decision could have been otherwise. It was slackness on the part of defence because they did not cross-examine the expert properly who was claiming the result value of "99.9999 per cent". The blood contained in the spots on the shirt must have been dry and in a very smaller amounts. Besides, nobody knew how long the shirt had been exposed to the environment before it was allegedly recovered. Even after its recovery it must not have been properly sealed (according to sealing standards fixed in this behalf). In these conditions, the blood present in the form of spots on the shirt must have reached the laboratory in highly contaminated condition. It should have been asked what kind of test the expert has performed and what protocols and

¹⁵⁹ *Pantangi Balarama v. State of A.P.*, 2003 Cr LJ 4508 (AP).

precautions had he taken, so on and so forth. As could be judged from the facts mentioned in the judgment, the sample must not have been suitable for testing. But the defence failed to show all this and elements of error to the Court concerned.

3:8 DNA Evidence and Proof Beyond Reasonable Doubt :

There are many slips between the cup and the lip, as the saying goes. In law, convictions can only be based on “reliable evidence direct or circumstantial” and it is not even safe to treat expert evidence or a confession as sufficient evidence for conviction, though, it may be relied upon alongwith external or internal evidence.¹⁶⁰

The words “Proved” and “Disproved” etc. have been defined in Section 3 of Indian Evidence Act, 1872. The other cognate expressions occur in the Act as,- “Proving”, “to prove” “must prove” “proof”, “produced in proof”, “admissible in proofs”, “conclusive proof”. The expressions,- “disproved” “not proved”, “not to be proved” are also found defined or used in the Act.¹⁶¹

Ordinarily, there is demarcation line between “legal proof” and “moral proof”. Though, rules enshrined in the Indian Evidence Act apply to both civil as well as criminal cases, but the amount and standard of proof in both these kinds of cases are different. In civil cases, a mere preponderance of probability is sufficient and the benefit of every reasonable doubt need not necessarily go in favour of defendant¹⁶², but in criminal cases persuasion of guilt must amount to “such a moral certainty as convinces the mind of the Tribunal, as reasonable men, beyond all reasonable doubt”.¹⁶³ This is so because in case such a strict and high standard

¹⁶⁰ *Ram Chandra v. State of U.P.*, 1957 Cr LJ 559 (SC): AIR 1957 SC 381.

¹⁶¹ Proved- A fact is said to be proved when, after considering the matters before it, the Court; either believes it to exist, or considers its existence so probable that a prudent man ought, under the circumstances of the particular case, to act upon the supposition that it exists.

Disproved- A fact is said to be disproved when, after considering the matters before it, the Court either believes that it does not exist, or considers its non-existence so probable that a prudent man ought, under the circumstances of the particular case, to act upon the supposition that it does not exist.

Not proved- A fact is said not to be proved when it is neither proved nor disproved

¹⁶² *Edara Venkata Rao v. Edara.* (1942) 2 MW 427.

¹⁶³ Taylor Evidence, Section 112. Also see Starkie Evidence 817.

of proof is not framed, a serious consequence may arise for erroneous condemnation of not only the accused but also the society.

All legal luminaries have accepted that it is most difficult to define “reasonable doubt”. However, some have tried to define the phrase. A reasonable doubt must be a doubt arising from the evidence or from want of it, and cannot be an imaginary doubt or conjecture unrelated to evidence.¹⁶⁴

It is settled law, world over including India, that burden to prove the guilt of the accused beyond all reasonable doubt rests upon the State and a conviction cannot be sustained unless this burden has been fully discharged. A conviction cannot be sustained on the basis of suspicion, a mere belief in accused’s guilt or even a strong probability (how high it may be) of guilt.

A mere whim, a surmise or a myth (as of DNA evidence being infallible) or suspicion cannot furnish sufficient foundation for a guilty verdict. Thus, whimsical or vague doubt, fanciful, indefinite or possible doubt etc. cannot make basis for declaring guilt as proved.¹⁶⁵

In the stricter sense, legal proof is not the absence of reasonable doubt. Test of proof is, in fact, the estimate which “a prudent man”¹⁶⁶ makes of the probabilities in regard to what must be his duty, as a result of his estimate. The important point in regard to judicial evidence is the amount of uncertainty, which is not of a question of calculation, but of prudence. Section 3 of Evidence Act, while defining “proved” mentions a “prudent man” and his utter satisfaction as a standard to the definition of “proved”. And test of legal proof is not absence of reasonable doubt, though often it is the way in which proof is normally explained. During all this process of ascertaining whether a fact has been proved, prudence of “prudent man” is central. Who is a “prudent man” and who is prudent enough to declare a person to be a ‘prudent man’? It is a question to be pondered.

Anybody can make an estimate of probabilities in a given set or series of facts, but to constitute a legal proof beyond reasonable doubt, it must be the

¹⁶⁴ Whartan’s, *Criminal Law Evidence* (Vol. 1) 31.

¹⁶⁵ Underhill’s, *Criminal Evidence*, page 13.

¹⁶⁶ Section 3 of the Evidence Act.

estimate of probabilities of a “prudent man”. Citing two old cases (Donnellan and Bellaney) it was said that different Tribunals at different times do not measure the estimate of probabilities in precisely the same way.¹⁶⁷

In **Doriellaf’s case** the Court did not accept the plea that the victim could have died due to a fit rather than being poisoned and as such did not give benefit of doubt to the accused. In BaLarieys case, the Court had accepted the plea that the accused could have given poison to his wife by accident and that constitutes a reasonable doubt to the guilt of accused.

If the chances of guilt and innocence could be numerically expressed and they are as nearly as possible equal, neither of them could be said to have been convicted but the all important principle that every case is independent of every other and that no decision on facts forms a precedent for any other decision, restricts such an endeavour.

“If two juries were to try the very same case, upon the same evidence and with the summing up the same arguments by counsel, they might probably arrive at opposite conclusions and yet it might be impossible to say that either of them was wrong. Of the moral qualifications for the office of a Judge, few are more important than the other on strength of mind which is capable of admitting the unpleasant truth that it is often necessary to act upon probabilities and to run some risk of error”.¹⁶⁸ That is an unbearable position to specifically point out towards a “prudent man”.

More so, there is a great deal of difference between “sufficiency of evidence” and ‘competent evidence” or “satisfactory evidence”. A “competent evidence” (or “satisfactory evidence”) means that, where the nature of thing to be proved requires fit and appropriate proof in the particular case. Generally DNA evidence is being put in this category by those who consider it to be infallible. “Satisfactory evidence” requires a proof which ordinarily satisfies “an unprejudiced mind beyond reasonable doubt”. It may be pointed out that in the

¹⁶⁷ Woodroffe and Ameer Ali, Law of Evidence in India, Vol. I, 2017, p. 60.

¹⁶⁸ Ibid, p.103

Indian Evidence Act there is no place for “sufficiency of evidence”. A final verdict has not yet come, but Indian Courts have to determine in what category DNA evidence has to be put.

In foreign countries, Courts widely use a statistical theorem called, Bayes Theorem to assess the probabilities of DNA match. The said theorem is-

$$\text{Prior ODDS} \times \text{Likelihood Ratio} = \text{Posterior Odds}$$

The accused’s guilt is conditioned with the strength of DNA evidence produced. This is done in the manner that “prior odds” (the other evidence produced before the Court by the prosecution minus DNA evidence), for estimation of guilt of the accused, are compared with the DNA evidence.

If the expert witness has been successful to present the “likelihood ratio” (match probability) to the Court, the Court’s task is to multiply the prior odds with the likelihood ratio (meaning thereby that other evidence minus DNA evidence) to judge the probability of accused’s guilt. The resultant posterior odds is the assessment or estimation of the probability that the accused is guilty or not when other evidence produced during the trial are clubbed with DNA match evidence. In case “prior odds” are extremely low, then the DNA match evidence will automatically be reduced dramatically. As said before, for example, if there is a strong evidence of alibi, it would constitute a good “prior odd” and DNA evidence would be of no use. It would give a strong reason to give him benefit of doubt.

The above discussion also confirms that DNA match evidence cannot be seen or considered in isolation, as suggested by some enthusiasts that the DNA evidence is conclusive proof and there is no need to consider or produce any other kind of evidence to prove the guilt (direct or circumstantial, etc.). In other words it may be said that DNA evidence may be considered as corroborative evidence provided other factors such as sample collection, its transportation, preservation etc. and the testing method and process adopted is found not wanting (as was found in O.J. Simpson and scores of other cases). This is well-settled position of law in other countries, particularly from where it has originated and Courts adhere to this rule.

If we consider a hypothetical case where there is no other inculpatory evidence against the accused, except DNA match evidence, the accused has to be given benefit of doubt on stronger reasons. These reasons in such a case, for giving the accused benefit of doubt and considering that the guilt has not been proved beyond reasonable doubt, may be pointed out in two ways. Firstly, the Bayes Theorem would be inapplicable as there would be no “prior odds” for conditioning with the “likelihood odds” (which is DNA match evidence) to estimate the probability of accused’s guilt. More so because the DNA match evidence in itself is based on probabilities and without corroboration it would be beyond the scope of prudence of a “prudent man” to take the evidence ‘proved’ as defined by Evidence Act, to make it basis for conviction.

Secondly, following two questions would arise when a positive DNA match results are produced as evidence (without any other evidence).

- (a) Given that the accused is innocent, what is the probability that the DNA fingerprint of the accused matches with the fingerprint of the sample collected from scene of crime?
- (b) Given that the DNA fingerprints match between samples from crime scene and the accused, what is the probability of accused’s innocence?

The DNA report and the depositions of DNA expert, if any, is competent only to answer question (a), but cannot in anyway answer question (b). It is the domain of the Court to answer question (b). In practice (specially in our country) the prosecution tries to extract answer of second question (b) from the expert. That is called and mentioned as “prosecutor’s fallacy”, which would be dealt later on.

Another point to ponder is,- even if there is another set of evidence which does not indicate accused’s culpability to the crime beyond reasonable doubt and prosecution produces DNA evidence additionally the Court has to reach to its decision extracting the result not from conclusive facts or two sets of “proved” facts beyond reasonable doubt, but from two probabilities. In the recent series of judgments, Indian Supreme Court has established the law that where ocular evidence is in conflict with Medical evidence which is pointing alternative

possibilities or probabilities the Medical evidence has to be discarded.¹⁶⁹ In the same case, two citations have been made to emphasise the meaning and interpretation of proof and reasonable doubt. It was observed by Vankatachalia, J. in his illuminating judgment¹⁷⁰ which has been adopted in the present case, “A person has, no doubt, a profound right not to be convicted of an offence which is not established by the standard of proof beyond reasonable doubt. Though this standard is a higher standard, there is, however, no absolute standard. What degree of probability amounts to proof is an exercise particular to each case”.

It was argued that it would be erroneous to accord undue primacy to the hypothetical answers of medical witness (read DNA expert) to exclude eye-witnesses’ account which had to be tested Independently and not treated as the “variable” keeping the medical evidence as the “constant”. Witnesses, as Bentham said, are the eyes and ears of justice, thus, the probative value of such evidence becomes eligible to be put into the scale for cumulative evaluation.

When there are two sets of evidences (such as ocular and expert’s opinion), they may be judged for their probative value either independently or they may be made inter-dependent. Bayes Theorem would be applicable when these two sets are considered interdependently as they are multiplied to extract “posterior odds”. Or in other words two independent sets are made interdependent.

One piece of evidence to be confirmed by another piece would make both the pieces interdependent. A learned author puts it in this way,- “The simple multiplication rule does not apply if separate pieces of evidence are dependent. Two events are dependent when they tend to occur together, and the evidence of such events may also be said to be dependent. In a criminal case, different pieces of evidence directed to establish that the defendant did the prohibited act with the specified state of mind are generally dependent”.¹⁷¹

¹⁶⁹ *Ramakant Rai v. Madan Rai*, 2004 Cr LJ 36 (SC).

¹⁷⁰ *State of U.P. v. Krishna Gopal*, AIR 1988 SC 2154: 1989 Cr LJ 288.

¹⁷¹ Glanville Williams, “The Mathematics of Proof II”, *Criminal law Review*, by published in Sweet and Maxwell, 1979, p. 340 (342), - as cited by Venkatachalia, J. in case above mentioned.

It was observed that, “Law cannot afford any favourite other than truth. To constitute reasonable doubt, it must be free from an over- emotional response”.¹⁷² It was observed on one hand that “concepts of probability and the degrees of it, cannot obviously be expressed in terms of units to be mathematically enumerated as to how many of such units constitute proof beyond reasonable doubt. There is an unmistakable subjective element in the evaluation of the degrees of probability and the quantum of proof. Forensic probability must, in the last analysis, rest on a robust common sense and ultimately, on the trained intentions of the Judge”.¹⁷³

It may be submitted that common sense and intuition, howsoever, in a developed form, cannot convert a suspicious probability into proof. Lives of individuals cannot be dealt with mere intuitions.

On the other hand, it was held in series of cases, and this has become a settled law that, “Realities or Truth apart the fundamental and basic presumption In the administration of criminal law and justice delivery system is the innocence of the alleged accused and till the charges are proved beyond reasonable doubt on the basis of clear, cogent, credible or unimpeachable evidence, the question of indicting or punishing an accused does not arise, merely carried away by heinous nature of the crime or the gruesome manner in which it was found to have been committed. Mere suspicion, however, strong or probable it may be no effective substitute for legal proof.....”¹⁷⁴

DNA match results performed for the purposes of identification IS based on probabilities which must be probed by the defence through cross examination of expert or the witnesses related with the investigating agencies. There is always an element of doubt wherever probabilities are involved because probability always swings between 0 and 1 and a probability never reaches value of 1. In case this is handled properly and professionally, its conclusive proof or even proof can be shattered as there are chances of error on almost every step from sample collection, testing, matching process and the final result.

¹⁷² Supra at p. 295.

¹⁷³ *Ramakant Rai's case*- Supra p. 43.

¹⁷⁴ *Ashish Batham v. State of M.P.*, 2002 Cri LJ 4676 (SC).

The High Court of Karnataka acquitted the accused on the ground that requisite amount of DNA of high molecular weight was riot present so as to make the test results sufficiently conclusive and accurate. The Court further observed that DNA test was not foolproof.¹⁷⁵

3:9 Role of Prosecutor's and DNA expert about Prosecutor's Fallacy:

It is also relevant here to mention that there is prosecutor's fallacy in the issue involved DNA evidence and they hesitate to proceed in such cases. So, in trials numerous kinds of scientific witnesses are produced before Courts for their opinions. In criminal trials these experts are the witnesses for the prosecution generally and prosecutors, while asking questions in their Examination-in-Chief, go beyond what is required by law with a view to impress and influence the Court as to finality of the decision through the opinion. In fact the prosecutors extract answers from the scientific and medical experts which are matters to be decided by the Judge.

The DNA expert interprets the matching results from a ratio, known as 'likelihood ratio'. Balding and Donnelly conclude that it is not possible for the DNA expert and also not appropriate for him to assess the other evidence in a case. It is often assumed that if the defendants were innocent the perpetrator is an assumption does not suit to the prosecutor and he tries to demolish this assumption through the expert witness by putting such questions answers of which are final decisions in the garb of their opinions, though law does not permit them to do so. As a result, it is not within the domain of the expert witness to express an opinion as to whether the defendant was the source of the DNA crime sample. It was suggested by authors that a careful analysis of depositions of the expert is required.¹⁷⁶

The controversy of Prosecutor's Fallacy came up before a Court of Appeal in two cases where D was convicted for rape and A was convicted for buggery (committing sodomy). In both of these cases, the prosecution produced DNA

¹⁷⁵ *M.V. Mahesh v. State*, 1996 Cr LJ 771 (Kant).

¹⁷⁶ David J. Balding and Peter Donnelly, "The Prosecutor's Fallacy and DNA Evidence", 1994 Cri Law Review 711-721.

evidence and relied on the results derived from the comparison between the stains left at the scene of occurrence and blood samples provided by the accused-appellants. Both the convicted went in appeal challenging the shortcomings in the DNA evidence and the manner in which it was presented to jury. It was asked in the ‘Examination-in-Chief’ of DNA expert. what was the likelihood of the offender being anyone other than D, the scientist answered that it was about 1 in 40 million he went on to affirm that he was sure that D was the offender. Despite the Judge reminding the jury of the other evidence, the overall effect of the summing-up that if scientist’s evidence is accepted. D was guilty. It was held that it was for the jury (Court) to decide whether it was the accused who had left the stains at the crime scene or it might have been one of the other persons who shared with him the same DNA profiles.¹⁷⁷

An important principle can be derived from abovementioned ruling that the DNA expert must restrict himself to explain the nature of DNA match and give random occurrence ratio and go to the extent that how many people with matching characteristics are likely to be found in the country or in a more limited sub-group, beyond that the evidence must be inadmissible and unacceptable. The prosecutors are required to restrict themselves from asking questions pertaining to these matters while examining the expert.

3:10 DNA Technology and its Perspectives :

The word “Satyameva Jayate” is inscribed on the Indian psyche and legal system with no real manifestation in the outer world. The quest for truth is always overtaken by fact and logic. Realness has no reality/real place in the justice system. At times, the loop hole is considered by the conscience of realist and is given due importance. The evolution of DNA technology from the laboratory to forensic science, a science applied to legal or courtroom purposes, has involved both the scientific and legal communities. On the scientific side, DNA testing technology developed from relative obscurity twenty years ago to front-page news with the announcement that the entire human genome has been mapped. The first

¹⁷⁷ *R. v. Doheny and Adams*, (1997) 1 Cr App R 369.

forensic or legal application of DNA testing occurred in 1986 in England by Sir. J. Jeffrey in the famous Collin's case. Since then, DNA technology has continued to be rapidly evolved. DNA technology had such a dramatic impact on crime detection¹⁷⁸ and such has been the magnitude of its success that even International Crime Prevention and Detection Organizations like - INTERPOL¹⁷⁹, have also accepted it and are now whole heartedly, supporting the new crime investigation tool. DNA technology focuses on unique properties of an individual's genetic code. Its purpose is to determine if there is a match between these unique characters in samples from unknown source (i.e. the Suspect) and the Crime Scene Evidence being tested. DNA is an abbreviation of 'Deoxyribonucleic Acid', which is found in all bodily fluids, tissues etc. It is found in every single cell of a person's body and each cell has identical DNA. The DNA technology focuses on unique properties of an individual's DNA Genetic Code. This technique springs from the idea that no two human beings except the monozygotic twins have same DNA. It is now established that two persons in six million people may have common DNA, but this is just a probability.

So, there are different techniques which have been developed by scientists, the Restriction Fragment Length Polymorphism (RFLP) Technology was the first technique developed for forensic identification. Genetic research has located certain areas on the DNA, which varies from an individual to an individual. Restriction Fragment Length Polymorphism examines those differences.

In mid 1980's Polymerase Chain Reaction (PCR) Technique was developed by forensic scientist, which infact was great leap in this direction. In this process DNA or its fragments can be replicated any number of times. It has advantage over RFLP as it takes less time to process and give result, it is also helpful to test small degraded samples of blood or other biological fluids which are then multiplied millions of time thereby making it possible to analyze smaller units of DNA, and could give more accurate result. In 1990's Short Tandem Repeats (STR's), smaller segments of DNA that vary among individuals, were

¹⁷⁸ Evett. Lan. Wand Bruce (1998).

¹⁷⁹ By following Resolution No. 8 of 67th General Assembly (Cairo 1995) available in www.interpol.int/public/forensic/dna/default.asp

adopted by Federal Bureau of Investigation (FBI) as the national standard for forensic identification.

Mitochondrial DNA are still under development which examines maternally inherited DNA. A newer technique, Single Nucleotide Polymorphisms (SNP's) involves examining specific areas of DNA. These are expected to be able to match crime scene and suspect DNA at hundreds of different points, potential allowing more accurate matches and avoiding the need for probability and statistical evidence.

Invention of DNA technology has been found to be extremely useful in civil as well as criminal proceedings. Some of the areas in which DNA technology has rendered great help are:

(a) Law relating to parentage related issues- Paternity and maternity- Parentage identification deals with paternity/maternity, legitimacy of the child etc. in child abandonment cases DNA test is necessary to prove child's maternity. Property disputes, inheritance, maintenance, rape and many other issues. DNA is necessary to reach the finality and justness of the issue. It is, however, not clear whether DNA test can be used in cases governed by Section 112 of the Indian Evidence Act, 1872.

The Rule of Law based on the dictates of the Justice has always made the Courts incline towards upholding the legitimacy of the child, unless the facts are so conclusive and clinching as to necessarily warrant a finding that the child could not at all have been begotten to the father and as such the legitimacy of the child is rank justice to the father. Courts have always desisted from lightly or hastily rendering a verdict and that too, on the basis of slender material, which will have the effect of branding a child as a bastard and his mother as unchaste women.¹⁸⁰ In view of the provision of Section 112 of the Evidence Act, 1872, there is no scope of permitting the husband to avail of blood test for dislodging the presumption of

¹⁸⁰ *Smt. Dukhtar Jahan v. Mohammad Farooq*, AIR 1987 SC 1049.

legitimacy and paternity arising out of the section.¹⁸¹ Blood group test to determine the paternity of a child born during wedlock is not permissible.¹⁸²

The Hon'ble Supreme Court in **Gautam Kundu v. State of West Bengal**¹⁸³, laid some guidelines regarding permissibility of blood tests to prove paternity:

1. That the Courts in India cannot order blood test as a matter of course.
2. Whenever applications are made for such prayers in order to have roving inquiry, the prayer for the blood test cannot be entertained.
3. There must be a strong prima facie case in that the husband must establish non-access in order to dispel the presumption arising under Section 112 of Indian Evidence Act, 1872.
4. The Court must carefully examine as to what would be the consequences of ordering the blood test.
5. No one can be compelled to give sample for analysis.

As compared to position in England, where keeping pace with modern thinking on the continuing and shared responsibility of parenthood, the Family Reforms Act, 1969 was replaced by the Family Reforms Act, 1987 which enabled the judiciary to determine the parentage rather than paternity.

(b) Adultery- Section 497 of Indian Penal Code, 1860 deals with adultery. In cases of adultery, if the married woman got conceived, suppressed this fact of pregnancy from her husband so on so forth, the husband could easily get confirmed of such pregnancy of his wife through her paramour. Further to know the chastity of the women and the sacredness of the nuptial contact, the DNA is very much needed to ascertain the truth or otherwise of such suspected pregnancy and infidelity of the wife, the husband can take the very extreme step of killing her. Hence to avoid such unfortunate incidents, DNA test can prove helpful.

¹⁸¹ *Gautam Kundu v. Shaswati Kundu*, Criminal Revision No. 800/92 (Cal).

¹⁸² *Tushar Roy v. Shukla Roy*, 1993 Cri LJ 1659 (Cal).

¹⁸³ AIR 1993 SC 2295.

(c) Inheritance and Succession- Under Hindu Marriage Act, 1955 an illegitimate child (legitimized by the virtue of Section 16) inherits the property of his parent's property in which the father is the coparcener.¹⁸⁴ Thus, under such circumstances to establish the legitimacy or illegitimacy of such children and to inherit the property, the DNA test is the only perfect medical evidence for inheritance or non-inheritance of the properties.

(d) Maintenance- Section 125 of the Code of Criminal Procedure, 1973 states that it's the duty of the man to maintain his wife, legitimate or illegitimate children, parents as long as they can't maintain themselves. So the man can take the defence that the children doest belong to him. So in these situations DNA test provide the ultimate conclusive remedy to determine the paternity and maternity of the child, so that he can claim maintenance.

3:11 DNA Evidence and Issues :

In the 1990's, as DNA identification moved from Laboratory to the Criminal Courts, the adversary process quickly highlighted a series of issues that had to be resolved before the evidence could be admitted on a regular basis. Advances in technology have made DNA testing an established part of investigation and prosecution, especially for cases in which identification is the primary issue. Moreover, these advances have rendered serology, identity testing for blood, saliva and semen virtually obsolete.¹⁸⁵

3:12 Sources of DNA :

DNA is found in all bodily fluids and tissues. In fact, it is present in every single cell, and each cell has identical DNA. Because of this, DNA evidence collected from the crime scene can be used like a finger-print to include or exclude a suspect in a particular case. It can also be used to link crime scenes either locally or on a state or national level.¹⁸⁶ In other words, DNA evidence has

¹⁸⁴ *Perumal Gounder v. Pachappan*, AIR 1990 Mad 110.

¹⁸⁵ Weeds and Hicks (1997).

¹⁸⁶ National Institute of Justice Brochure (#BC 000614).

generally been used to confirm the identity of someone already under suspicion, rather than assisting in the investigation and identification process.¹⁸⁷

- (i) **What DNA as a Evidence (mostly) replaced-** Trace evidence- Trace evidence includes items such as hair, fibers, paint chips, glass shards, shoe prints, gun-shot residue, arson-explosives and physical matches. Using this type of evidence, forensic scientists have been able to identify the source, only on the basis of its general appearance and structural features.

Unlike DNA, trace evidence rarely provides definitive identification. As a result, trace evidence is primarily useful only in cases that don't have DNA evidence, otherwise substantial resources can be wasted by crime laboratories screening for trace evidence that will not be analyzed.

So, DNA evidence is more fool proof and is more reliable than trace evidence and DNA evidence can be said to produce conclusive evidence.

- (ii) **Sources of DNA evidence-** An investigator may collect clues for DNA test from some sources of evidences shown in the list where possibilities of existence of human cells may be there.

Evidence	Possibility of location of DNA on the evidence	Source of DNA
Baseball bat or similar weapon	Handle end	Sweat, skin, blood-tissue
Hat, banana or mask	Inside	Sweat, hair, dandruff
Eyeglasses	Nose or ear pieces, lens	Sweat, skin
Facial tissue, cotton swab	Surface area	Mucus, blood, sweat, semen, ear wax
Dirty laundry	Surface area	Blood, seat, semen
Tooth-pick	Tips	Saliva

¹⁸⁷ Aspen (1999).

Used cigarette	Cigarette-but	Saliva
Tape or ligature	Inside/outside surface	Skin, sweat
Bottle, can, glass	Sides, mouth pieces	Saliva, sweat
Used condoms	Inside/outside surface	Semen, vaginal rectal-cells
Blanket, pillow, sheet	Surface area	Seat, hair, semen, urine saliva

“Through and through”

Bullet	Outside surface	Blood tissue
Bite mark	Person’s skin or clothing	Saliva
Finger nail, partial finger nail	Scrapings	Blood, seat tissue

3:13 Potential for collecting DNA Evidence :

The potential for collecting DNA evidence from the victim, suspect and the crime scene is almost unlimited. Moreover, the DNA molecule is long lived and likely to be detectable for many years in bones or bodily fluids. The best example of this can be seen in the famous **Tandoor Murder case**¹⁸⁸ in which DNA test verified the mutilated body in the tandoor was of Naina Sahni, the victim. This means that old cases can now be solved and possibly prosecuted using current forensic technology.¹⁸⁹ Similarly in **Trikambhai v. State of Gujarat**¹⁹⁰, the Gujarat High Court convicted solely on the basis of circumstantial evidence with corroboration of button and saliva on bidi found at the place of offence.

Barriers to realizing the potential of DNA evidence :

Despite the exciting promise of DNA Technology, a number of barriers remain, to realizing its full potential. One of these barriers is the frequent failure of law enforcement to identify and collect appropriate DNA evidence from the

¹⁸⁸ *Sushil Sharma v. State (Delhi Administration)*, 1996 Cri LJ 3944.

¹⁸⁹ Weeds and Hicks (1997).

¹⁹⁰ 2000 Cri LJ 4363 (Guj.)

crime scene. Many law enforcement agencies have not been properly trained to recognize and collect potential DNA evidence, and this situation leads to an unnecessary disadvantage for the investigation prosecution, specially in sexually assault cases. For Example, A recent Federal Bureau of Investigation survey revealed that of all sexual assault cases, less than 10% had DNA evidence submitted to Crime Laboratories.¹⁹¹ Other barriers include the failure to effectively evaluate DNA evidence for analysis, lack of communication between enforcement and crime personnel, limited resources, and the use of incompatible systems for DNA analysis. The major barrier in India is that of corruption, faking of forensic reports, production of false reports for evidence and most importantly the political influence of the accused as was seen in sensational Madhumita Shukla case of Uttar Pradesh.¹⁹²

3:13:1 Failure to effectively evaluate DNA as a Evidence :

It is necessary to remember that failure to evaluate DNA evidence, may result into disastrous consequences. So, when analyzing DNA evidence, processing a pure sample, such as blood or saliva, swab is only a small part of process. Much of the evidence with DNA potential is not pure but rather collected from crime scene (from clothing or bedding etc.). The problem with this type of evidence is that it requires effective evaluation by law enforcement in order to provide information to assist crime lab personnel in their analysis. Unfortunately, law enforcement has traditionally received very little training in how to evaluate potential evidence in this way.

3:13:2 Lack of Communication between Law Enforcement and Crime Laboratory :

Just as police officers often fail to understand how effectively collect and evaluate evidence for analysis a traditional lack of communication and interaction with crime lab personnel has also limited the contribution of DNA technology. Absence of forensic science expert or crime lab personnel at the crime scene at the

¹⁹¹ Weeds and Hicks (1997).

¹⁹² Madhumita Shukia Murder Case where State Politician Amarmani Tripathi was the accused.

time of collecting DNA evidence also adds up to one of the barriers of DNA technology.

3:13:3 Limited Resources :

In addition to these problems that result primarily from a lack of appropriate training and communication, both law enforcement agencies and crime laboratories suffer from limited resources that further hinder the contribution of DNA technology. This situation is especially pronounced for sexual assault, as these cases typically make up the majority of the DNA work performed. This is evident from the fact that in India there are only 4 Central Forensic Science Labs, 20 State Forensic Labs, and 3 Central Document Examination Labs.¹⁹³

3:13:4 Use of incompatible systems for DNA analysis:

To further complicate matters, even when evidence is appropriately collected, screened and analyzed for DNA, it can be limited in its contribution by the use of incompatible systems. Forensic laboratories have used different DNA testing systems including DQAJ, Polymarker RFLP¹⁹⁴, PCR¹⁹⁵ and STR¹⁹⁶. Labs will sometime even utilize one analytic system for trying scene evidence and another for the suspect's reference standard. Results are therefore frequently found to be incompatible with each other and/or with the state databanks or Combined DNA Index System (CODIS).¹⁹⁷

3:13:5 Overcoming the Barriers :

To overcome the barriers those are hampering the development and extensive use of the DNA Technology in crime investigation and detection, following are the steps which can help in overcoming the barriers in realizing the potential of DNA evidence.

¹⁹³ Survey conducted by DNA Crime Laboratories, 2001.

¹⁹⁴ Restriction Fragment Length Polymorphism.

¹⁹⁵ Polymerase Chain Reaction.

¹⁹⁶ Short Tandem Repeat.

¹⁹⁷ Combined DNA Index Systems a national investigative support database developed by FBI.

Requisite training should be imparted to the law enforcement officers involved in collecting the DNA evidence at the crime scene. They should be taught about collection of the samples from crime scene and preservation of the same. Frequent fresher courses should be held in this connection to impart latest technology in the line.

Steps should be taken to bring forensic science in the forefront of criminal justice administration. So, the presence of Forensic Lab Personnel at the time of collection of DNA evidence at the crime scene should be made compulsory under the Law.

Since there is possibility of delay in collecting DNA samples from the place of occurrence, Submission of the same to the laboratories for test or the samples being tampered during transit, evidence should be lead to rule out these possibilities. DNA tests may preferably be got conducted under the orders of the Court.

A network of standardized Forensic Laboratories should be laid down in the country which should be well equipped and must function with proper documentation authorized by the Legislation.

Provision should be made to make a National DNA Databank, on the basis of Combined DNA Information System (CODIS) maintained by Federal Bureau of Investigation. Initially to start with the samples of DNA of prisoners should be collected as their finger impressions are taken and record maintained by the Government after their convictions under Identification of Prisoner's Act, 1920.

As recommended by the Malimath Committee in its report, that 'DNA expert be included in the list of experts' and also recommended that an amendment should be made in Code of Criminal Procedure, 1973. And the same needs to be done.¹⁹⁸

¹⁹⁸ See Malimath Committee Report.

3:14 The Admissibility of DNA as a Evidence :

In United States of America the famous OJ Simpson's case was decided mainly on the basis of DNA profiling. In India too, DNA Technology is used for solving serious problems of crime detection/investigation and other relevant cases, **Gautam Kundu v. State of West Bengal**¹⁹⁹; **Sajeera v. P.K Salim**²⁰⁰, **Priyadarshini Mattoo's murder case**²⁰¹, **Kasturba Gandhi Police Station case** etc. are some cases in which DNA evidence was relied on. In India there are more than 1500 cases in which DNA testing was taken into consideration for solving the problem of law enforcement. In USA over five-thousand cases resulted in conviction without any investigation thanks to DNA technology.²⁰² This makes it's clear that it aids in the advancement of justice as it helps the police, prosecutors, public in searching the truth, not only this, the technology has been used to exonerate innocent persons in post-conviction stages.

DNA technology has raised two important issues, in front of legal fraternity namely determining admissibility and explaining the standard of weighing evidence, including other related questions like expert's evidence etc, The FRYNE Test²⁰³ in United States of America has solved the problem by laying down three important guidelines popularly called as FRYNE Rule. These are as follows:

Rule 1: Whether DNA technology is a science and is accepted so in world community?

Rule 2 : Is there any technology to establish Rule 1?

Rule 3 : Whether the technology is properly applied?

These rules have established the admissibility of DNA evidence in the legal system. The Courts in United States of America have taken judicial notice of

¹⁹⁹ AIR 1993 SC 2295.

²⁰⁰ 2000 Cri LJ 108.

²⁰¹ *Santosh Kumar Singh v. State through CBI*, 2010 9 SCC 747.

²⁰² National Commission on the future of DNA Evidence, National Institute of Justice Programme (2004).

²⁰³ B.R. Sharma, *Forensic Science in Criminal investigation and Trials*, Universal Law Co. Fourth Edn., 2003.

DNA evidence. Several States in USA have enacted laws that essentially mandate the admission of DNA evidence because of its potential powers of definitive identification. In short, it can be said that it has climbed from circumstantial evidence to real evidence. In United States of America, there are two enactments namely the Innocence Protection Act, 2003 and the Advancement of Justice through DNA Technology Act, 2003²⁰⁴ lay special emphasis to use DNA technology. The first Act favours a persons who is being wrongly convicted, in fact it is a model statute for obtaining post-conviction DNA testing.

3:15 Legal Perspective of DNA Technology :

DNA Technology having established special place in furthering the truth, one need to see its application or impact on law. DNA has been savoir of justice for many and thus, it is very important to improve and use DNA testing in legal aspects.

3:15:1 Social and Ethical Perspectives of DNA Technology :

DNA has various consequential reason to debate and thus its social and ethical aspect is being discussed as below:

(i) Social perspective- Various social issues which need to be sorted out will be The objective and fair utility of the genetic information by all concerned agencies like employers Courts, insurers etc.; Parameters of privacy and confidentiality of the genetic information along with its controls have to be suitably defined; psychological trauma and stigmatization resulting out of an individual's genetic differences. It needs to be seen that how does personal genetic information affect an individual and society's perceptions of that individual; issues related to the use of genetic information in reproductive decision making and reproductive right; matters concerning commercialization of products including property rights and accessibility of data and materials. Like who owns genes and other pieces of DNA? The mindset of all concerned in this regard has to be suitably made clear.

²⁰⁴ <http://in.news.yahoo.com/USA/DNAacts.asp>.

(ii) Ethical perspective- The questions of the social use of genetic information gained through DNA testing also arise and must be debated at an ethical level also. Is it now open to parents to choose the kind of children they will have and if so, what are the consequences of such choices? Stem cells research also raises serious ethical issues.

Nobody wants to know how he will die and when and would rather live without that knowledge. Such a dilemma might only be expected to face characters in a science fiction novel or film until now. Genetic test which promises to foretell our medical future are being sold in growing numbers, thus causing ethical problems.

CHAPTER-IV

CONSTITUTIONALITY OF THE DNA AS A EVIDENCE

The Constitution is the foundation and source of all laws of land and it regulate it's applicability, availability, necessity too. So, if an legal provision or legal issue is against the norms laid down by the constitution, that will not be effective and if already in existence would cease to exist. Hence, constitutionality of the issue is most desired requirement of any legal issue/issues. Hence, an effort has been made in this chapter to evaluate the constitutionality of DNA evidence in the present changing scenario of the Indian society. Thus, modern DNA analysis has revolutionized the criminal justice system. It has been used to prove – without a doubt – that suspects were involved in crimes and to free people who were wrongly convicted. The DNA sample is taken by swabbing the inside of a person's cheek.

The application of DNA testing has been used in India for a long period of time. Sometimes, it has been used to resolve certain question which sometimes becomes very difficult to resolve such as “Has the crime been committed?”, “How and when was the crime committed?”, “Who committed the crime?”. You must be aware of the incidents of the movies when an inspector finds something at the crime spot i.e. blood, hair etc. Now what is the use of these material evidences in the investigation? The answer is very simple that these material evidences help them in determining as to who was actually present at the place where the incident happened. DNA technology has also been used in the civil cases, to determine the biological relationship between a two or sometimes three individual. Usually, it has been used to determine the paternity of a person, where a person denies being the biological parent of a person. DNA parentage testing may help a person in absolving him from the charge of being the biological parent of a person, but it cannot be trusted to prove absolutely that a person is the child's biological parent; however it can provide a probability.²⁰⁵

²⁰⁵ Admissibility of DNA Technology in the Indian Legal System by cogitasocietatis (<https://www.legallyindia.com/views/entry/admissibility-of-dna-technology-in-the-indian-legal-system- html>)

The admissibility of the DNA evidence before the court always depends on its accurate and proper collection, preservation and documentation which can satisfy the court that the evidence which has been put in front it is reliable. There is no specific legislation which is present in India which can provide specific guidelines to the investigating agencies and the court, and the procedure to be adopted in the cases involving DNA as its evidence. Moreover, there is no such specific provision under Indian Evidence Act, 1872 and Code of Criminal Procedure 1973 to manage science and technology issues. Due to lack of having any such provision, an investigation officer has to face much trouble in collecting evidences which involves modern mechanism to prove the accused person guilty.²⁰⁶

Section 53 of the Code of Criminal Procedure 1973 authorizes a police officer to get the assistance of a medical practitioner in good faith for the purpose of investigation. But, it doesn't enable a complainant to collect blood, semen etc for bringing the criminal charges against the accused. The amendment of Code of Criminal Procedure by the Code of Criminal Procedure (Amendment) Act, 2005 has brought two new sections which authorizes the investigating officer to collect DNA sample from the body of the accused and the victim with the help of medical practitioner. These sections allow examination of person accused of rape by medical practitioner and the medical examination of the rape victim respectively. But the admissibility of these evidences has remained in a state of doubt as the opinion of the Supreme Court and various High Courts in various decisions remained conflicting. Judges do not deny the scientific accuracy and conclusiveness of DNA testing, but in some cases they do not admit these evidences on the ground of legal or constitutional prohibition and sometimes for the public policy. There is an urgent need to re-examine these sections and laws as there is no rule present in the Indian Evidence Act, 1872 and Code of Criminal Procedure, 1973 to manage science and technology issues.²⁰⁷

²⁰⁶ Ibid.

²⁰⁷ DNA & Indian Legal System: Code Of Criminal Procedure & Indian Evidence Act Must Be Amended.(<http://www.livelaw.in/wheresthedna-dna-indian-legal-system-code-criminal-procedure-indian-evidence-act-must-amended/>)

Many developed countries have been forced to change their legislations after the introduction of the DNA testing in the legal system. There are certain provisions which are present in the Indian Evidence Act, 1872 such as Section 112 which determines child's parentage and states that a child born in a valid marriage between a mother and a man within 280 days of the dissolution of the marriage, and the mother remaining unmarried shows that the child belongs to the man, unless proved otherwise but again no specific provision which would cover modern scientific techniques. DNA analysis is of utmost importance in determining the paternity of a child in the cases of civil disputes. Need of this evidence is most significant in the criminal cases, civil cases, and in the maintenance proceeding in the criminal courts under Section 125 of the Code of Criminal Procedure, 1973.²⁰⁸

4:1 Case Study- Constitutionality of DNA in Courts :

The introduction of the DNA Technology has posed serious challenge to some legal and fundamental rights of an individual such as 'Right to Privacy', 'Right against self-incrimination', and this is the most important reason why courts sometimes are reluctant in accepting the evidences based on DNA Technology. Right to Privacy has been included under Right to Life and Personal Liberty or Article 21 of the Indian Constitution, and Article 20(3) provides Right against Self-incrimination which protects an accused person in criminal cases from providing evidence against himself or evidences which can make him guilty. But, it has been held by the Supreme Court on several occasions that right to Life and Personal Liberty is not an absolute Right. In **Govind Singh v. State of Madhya Pradesh**²⁰⁹, the Supreme Court held that a fundamental right must be subject to restriction on the basis of compelling public interest. In another case **Kharak Singh v. State of Uttar Pradesh**²¹⁰, Supreme held that Right to Privacy is not a guaranteed right under our Constitution. It is clear from various decisions which have been delivered by the Supreme Court from time to time that the Right

²⁰⁸ Ashok Khan, Where The DNA: & Indian Legal System: Ode of Criminal Procedure and Indian Evidence Act Must Be Amended, October 2017, available in <http://www.livelaw.in/wheresthedna-dna-indian-legal-system-code-criminal-procedure-indian-evidence-act-must-amended/>

²⁰⁹ 1975 SCR (3) 946.

²¹⁰ AIR 1963 SC 1295.

to Life and Personal Liberty which has been guaranteed under our Indian Constitution is not an absolute one and it can be subject to some restrictions. And, it is on this basis that the constitutionality of the laws affecting Right to Life and Personal Liberty are upheld by the Supreme Court which includes medical examination. And it is on this basis that various courts in the country have allowed DNA technology to be used in the investigation and in producing evidence. To make sure that modern technologies can be used effectively, there is an urgent need of a specific legislation which would provide the guidelines regulating DNA Testing in India.

The use of DNA Technology is very frequent in the cases related to paternity issues. It was the Delhi High Court which set the precedent in 2008 for determining paternity in the case of child maintenance suit. In this case, a man filed a suit claiming that he was not the father of the child for whom his wife was maintenance (Ravindra V. Sonam – Names have been kept anonymous by the court due to privacy reasons). The suit was dismissed by the Trial Court, but it was allowed by the High Court and held that “The parentage of the child can only be determined by a DNA test. The liability to pay maintenance under Section 125 Code of Criminal Procedure can be avoided by the petitioner with respect to this child only if it is established that he is not the biological son of the petitioner”. The decision was, on the one hand, criticized by one group of the society stating that it would harm the child in question psychologically, while on the other hand, it has been supported by other group of the society stating that DNA Testing should be allowed in the cases involving child maintenance. Admissibility of DNA technology in civil or criminal suit would remain in question and these evidences should be examined by the courts very carefully.

The recent refusal of the Supreme Court to dismiss the Delhi High Court’s decision ordering Veteran Congress Leader N.D. Tiwari to undergo the DNA test is very important from the viewpoint of the admissibility of such evidence. In this case, Rohit Shekar has claimed to be the biological son of N.D. Tiwari, but N.D. Tiwari is reluctant to undergo such test stating that it would be the violation of his Right to Privacy and it would cause him public humiliation. But the Supreme

Court rejected this point stating that the result of the test would not be revealed to anyone and it would be under a sealed envelope, there is no point of getting humiliated. The Supreme Court further stated that we want young man to get justice; he should not left without any remedy. It would be very interesting to see that how courts in India would allow the admissibility of DNA technology in the future.

Indian Constitution being an organic document caters the need of organic man with its omnipresence in every part of our lives. Fundamental rights are incorporated with a view to foster development of man and to check state action in this field. Fundamental rights in themselves are not absolute, which is in consonance with jurisprudential ideology. So, they cannot be stretched too far or else, the legal system will be in problem.

Article 20(3) of the Indian Constitution provides that no person accused of any offence shall be compelled to be a witness against himself. Article 20(3) of the Indian Constitution is based upon the presumption drawn by law that the accused person is innocent till proved guilty.²¹¹

It also protects the accused by shielding him from the possible torture during investigation in police custody. What Article 20(3) of the Indian Constitution contemplates is forcing testimony thereby incriminating oneself in a crime. Therefore, police cannot forcibly extract confession. The term 'witness' in this clause means source of information thereby incriminating self. But precondition to this is some sort of force or coercion.

One cannot take advantage of his own wrong. Using DNA technology for detecting the culprit is, in no way, against this right. In reality, it facilitates the advancement of justice; any how it is different from confession provided that DNA test is carried under the supervision/guidance of Judiciary which will ensure just, fair and reasonable procedure. In **Raman Lal, Bhogi Lal Shah v. V.K. Guha**²¹², the Supreme Court held that protection under Article 30(3) is only against the person being compelled mean that he need not give information of

²¹¹ Article 20(3) of the Constitution of India, 1950.

²¹² AIR 1973 SC 116.

matters which don't tend to incriminate him. The accusatorial system gives too much importance to the right of the accused. It doesn't care about law enforcement, if the accused is innocent then why he is refused under Article 20(3) of the Indian Constitution, when subjected to DNA test. In order to reach the right conclusion, one must see the right perspective.

Under the garb of Article 21 of the Indian Constitution, the accused cannot be helped to free him. The concept of predominance of the legal spirit as accepted by the general conscience of the common man and the interact speaks that if there is a written law or even if there is no written law, such law must provide for justice which is actually manifested in action and not only on paper. So to be in line with predominance of legal spirit, care must be taken not only of the interest of the accused but the interest of the victim and society at large. Therefore, proper thought should be given while appreciating any form of evidence within the notion of predominance of legal spirit.

Following are the relevant articles of the Indian Constitution, which deals directly or indirectly with the use and application of DNA technology: Article 51(a),(h),(j) Fundamental Duties– Article 20(3) Article 21 Fundamental Rights including Right to Privacy, Right to Information Articles 222, 226 and 227(i), Article 51- Fundamental Duties, The Constitution of India, by Article 51A (h) and (j), declares that, it shall be the duty of every citizen of India “to develop the scientific temper, humanism and the spirit of inquiry and reform”; and “to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement”. The Parliament is legislatively competent to make laws with respect to the Union agencies and institutions for professional, vocational or technical training, promotion of special studies or research, or scientific or technical assistance in the investigation or detection of crime and with respect to coordination and determination of standards in institutions for higher education or research and scientific and technical institutions.²¹³ The constitutional provisions take care of the scientific developments that may take place and may be put to use for the

²¹³ V.D. Mahajan, the Constitution of India, Constitution of India, 9th Edition (Entries 65 and 66 of the Union List).

benefit of the people. The Constitution provides efficient scales for balancing between public and private interests and the Courts have put to use its provisions for an effective social engineering to protect both the cherished human rights recognized by the Constitution and the paramount public interest in a welfare State. Articles 20(3) of the Indian Constitution provides that no person accused of any offence shall be compelled to be a witness against himself. Article 20(3) is based upon the presumption drawn by law that the accused person is innocent till proved guilty. It also protects the accused by shielding him from the possible torture during investigation in police custody. What Article 20(3) contemplates is forcing testimony thereby incriminating oneself in a crime.

Therefore, police cannot forcibly extract confession. The term witness in this clause means source of information thereby incriminating self. But precondition to this is some sort of force or coercion. One cannot take advantage of his own wrong. Using DNA Technology for detecting the culprit is in no way against this right. In reality it facilitates the advancement of Justice; anyhow it is different from confession provided that DNA test is carried under the supervision/guidance of Judiciary, which will ensure just, fair and reasonable procedure. In **Raman Lal Bhogi Lal Shah v. V.K. Guha**²¹⁴, Supreme Court held that protection under Article 20(3) is only against the person being compelled to be a witness against himself. It doesn't mean that he need not give information of matters, which don't tend to incriminate him. The accusatorial system gives too much importance to the right of the accused. It doesn't care about law enforcement, if the accused is innocent then why he is refuted under Article 20(3), when subjected to DNA test. In order to reach the right conclusion, one must see the right perspective. Article 21– Right to life: Our Constitution being an organic document caters the need of organic man with its omnipresence in every part of our lives. Fundamental rights are incorporated with a view to foster development of man and to check state action in this field. Fundamental Rights in themselves are not absolute, which is in consonance with jurisprudential ideology. So they cannot be stretched too far or else the legal system will be in problem. Under the garb of Article 21, the accused cannot be helped to free him.

²¹⁴ AIR 1973 SC 116.

As the Commission the Constitution under Article 51A(h) and (j) casts a duty on every citizen of India 'to develop the scientific temper, humanism and the spirit of inquiry and reform' and 'to strive towards excellence in all spheres of individual and collective activity'. Parliament is competent to undertake legislations which encourage various technological and scientific methods to detect crimes, speed up investigation and determine standards in institutions for higher education and development in technical institutions (Entry 65 & 66 of the Union List). The other relevant provisions of the Constitution are, (i) Article 20(3) which guarantees a right against the self-incrimination; and (ii) Article 21 which guarantees protection of life and liberty of every person.

The concept of predominance of the legal spirit as accepted by the general conscience of the common man and the intellect speaks that if there is a written law or even if there is not written law, such law must provide for justice which is actually manifested in action and not only on paper. So to be in line with predominance of legal spirit, care must be taken not only of the interest of the accused but the interest of the victim and society at large. Therefore, proper thought should be given while appreciating any form of evidence within the notion of predominance of legal spirit.²¹⁵

Right to privacy- Under Article 21 of the Constitution

The issue has been raised time and again whether right to privacy is a fundamental right guaranteed under the Constitution. If the answer is in the affirmative, then the source and the contours of such a right, in view of the fact that there is no provision in Constitution that expressly provides for a right to privacy, needs to be worked out. In **M P Sharma v. Satish Chandra**²¹⁶, an eight-Judges Bench of the Supreme Court denied the existence of such a right while dealing with the case of search and seizure, observing:

....A power of search and seizure is in any system of jurisprudence an overriding power of the State for the protection of social security and that power

²¹⁵ B.R. Sharma, "Forensic Science in criminal investigation and Trials", Universal Law Co. Forth Ed., 2003.

²¹⁶ AIR 1954 SC 300

is necessarily regulated by law. When the Constitution-makers have thought fit not to subject such regulation to constitutional limitations by recognition of a fundamental right to privacy, analogous to the American Fourth Amendment, we have no justification to import it, into a totally different fundamental right, by some process of strained construction.

Similarly, in **Kharak Singh v. State of Uttar Pradesh**²¹⁷, a six- Judges Bench reiterated a similar view observing:

....Nor do we consider that Article 21 has any relevance in the context as was sought to be suggested by the learned counsel for the petitioner., the right of privacy is not a guaranteed right under our Constitution and, therefore, the attempt to ascertain the movements of an individual which is merely a manner in which privacy is invaded is not an infringement of a fundamental right guaranteed by Part III.

In **Ram Jethmalani v. Union of India**²¹⁸, Supreme Court dealt with the right of privacy elaborately and held as under:

Right to privacy is an integral part of right to life. This is a cherished constitutional value, and it is important that human beings be allowed domains of freedom that are free of public scrutiny unless they act in an unlawful manner.... The solution for the problem of abrogation of one zone of constitutional values cannot be the creation of another zone of abrogation of constitutional values.... The notion of fundamental rights, such as a right to privacy as part of right to life, is not merely that the State is enjoined from derogating from them. It also includes the responsibility of the State to uphold them against the actions of others in the society, even in the context of exercise of fundamental rights by those others.

In **R Rajagopal v. State of Tamil Nadu**²¹⁹, the Supreme Court held:

²¹⁷ AIR 1963 SC 1295

²¹⁸ (2011) 8 SCC 1

²¹⁹ AIR 1995 SC 264

The right to privacy is implicit in the right to life and liberty guaranteed to the citizens of this country by Article 21. It is a “right to be let alone”. A citizen has a right to safeguard the privacy of his own, his family marriage, procreation, motherhood, child-bearing and education among other matters.

Similar view has been reiterated by the Court observing that right to privacy is a right of the citizen, being an integral part of Article 21 of the Constitution of India. Illegitimate intrusion into privacy of a person is not permissible as the right to privacy is implicit in the right to life and liberty guaranteed under our Constitution. However, right to privacy may not be absolute, as in exceptional circumstances, particularly, in case of surveillance in consonance with the statutory provisions reasonable restrictions may be imposed on such a right. (Vide: **State of Maharashtra v. Madhukar Narayan Mardikar**²²⁰; **Anuj Garg v. Hotel Association of India**²²¹; **Bhavesh Jayanti Lakhani v. State of Maharashtra**²²²; and **Selvi v. State of Karnataka**²²³.)

“**The Right to Privacy**” by **Charles Warren and Louis D. Brandeis**²²⁴ is a good starting point for a discussion on the legal concept privacy. The article opines that privacy or the right to be let alone, was an interest that man should be able to assert directly and not derivatively from his efforts to protect other interests. The right to privacy has also been held to be a fundamental right of the citizen by the apex Court in **R. Rajagopal v. State of Tamil Nadu**²²⁵; **Mr. ‘X’ v. Hospital ‘Z’**²²⁶; **People’s Union for Civil Liberties (PUCL) v. Union of India**²²⁷; and **Sharda v. Dharmpal**²²⁸.

In **District Registrar and Collector, Hyderabad v. Canara Bank**²²⁹, the Supreme Court held that right to privacy is a personal right distinct from a right to

²²⁰ AIR 1991 SC 207

²²¹ AIR 2008 SC 663

²²² (2009) 9 SCC 551

²²³ Supra note 12

²²⁴ 4 *Harvard L.R.* 193 (1890).

²²⁵ Supra Note 34

²²⁶ AIR 1999 SC 495

²²⁷ AIR 2003 SC 2363

²²⁸ AIR 2003 SC 3450

²²⁹ AIR 2005 SC 186

property. Intrusions into it by the legislature, is to be tested on the touchstone of reasonableness and for that purpose the Court can go into the proportionality of the intrusion *vis-a-vis* the purpose, sought to be achieved as “right to privacy” is part of the right to life enshrined in Article 21 of the Constitution of India. While deciding the said case, the Court placed reliance upon a large number of its earlier judgments, including **Maneka Gandhi v. Union of India**²³⁰. The Court held that an illegitimate intrusion into privacy of a citizen is not permissible as right to privacy is implicit in the right to life and liberty guaranteed under Article 21 of the Constitution.

In **State of Maharashtra & Anr. v. Madhukar Narayan Mardikar**²³¹, the Supreme Court observed that “even a woman of easy virtue is entitled to privacy and no one can invade her privacy as and when he likes.” However, such a right can be subject to restrictions when there are compelling questions of public interest²³². Police can have surveillance on a person only in accordance with the rules framed for that purpose as right to privacy is not absolute²³³.

In **Justice K S Puttaswamy (Retd.) v. Union of India**²³⁴, the Supreme Court while dealing with the case of “Aadhar Card” (UIDAI) observed that there have been contradictory judgments on the issue but the law laid down in **M.P. Sharma**²³⁵ and **Kharak Singh**²³⁶, if read literally and accepted as a law, the fundamental rights guaranteed under Article 21 would be denuded of vigour and vitality. The Court referred the matter to a larger bench for authoritative interpretation of law on the issue.

In the **R.K. Dalmia v. Justice S.R. Tendolkar**²³⁷, the Court held that in order to sustain the presumption of constitutionality the court may take into consideration matters of common knowledge, matters of common report, the

²³⁰ AIR 1978 SC 597

²³¹ AIR 1991 SC 207

²³² *Malak Singh v. State of Punjab*, AIR 1981 SC 760

²³³ *Govind v. State of Madhya Pradesh*, AIR 1975 SC 1378; (see also: *Bhavesh Jayanti Lakhani v. State of Maharashtra*, Supra Note 37; and *Roe v. Wade*, 410 U.S. 113 (1973).

²³⁴ (2015) 8 SCC 735

²³⁵ Supra note 31

²³⁶ Supra note 32

²³⁷ AIR 1958 SC 538

history of the times and may assume every state of facts which can be conceived existing at the time of legislation;...

Further, the case of **M. Nagaraj & Ors. v. Union of India & Ors.**²³⁸ is referred to elucidate the concept of right to dignity in the following manner:

This Court has in numerous cases deduced fundamental features which are not specifically mentioned in Part III on the principle that certain unarticulated rights are implicit in the enumerated guarantees.

While examining the constitutional validity of a law providing restrictions on fundamental rights, the proportionality of measures taken becomes relevant. The ‘compelling State interest’ is just one aspect of the broader ‘strict scrutiny’ test, which was applied by the Court in **Anuj Garg v. Hotel Association of India**²³⁹. The other essential facet is to demonstrate ‘narrow tailoring’, i.e., the State must demonstrate that even if a compelling interest exists, it has adopted a method that will infringe in the narrowest possible manner upon individual rights.

In the case of **People’s Union for Civil Liberties v. Union of India & Ors**²⁴⁰, the Court has endorsed bio-metric identification of homeless persons also so that benefits like supply of food and kerosene meant for persons who are Below Poverty Line reaches to the genuine persons.

In the case of **Lokniti Foundation v. Union of India & Ors.**²⁴¹, the Supreme Court disposed of the writ petition upon being satisfied that an effective process has been evolved to ensure identity verification and approved the Aadhar card based verification of existing and new mobile number subscribers.

In **Binoy Viswam v. Union of India & Ors.**²⁴², the Supreme Court examined the validity of the provisions of section 139AA of the Income Tax Act, 1961, which provided for quoting of Aadhar Number with Permanent Account

²³⁸ (2006) 8 SCC 212

²³⁹ Supra note 36

²⁴⁰ Supra note 41

²⁴¹ Writ Petition (C) No. 607 of 2016 decided on February 06, 2017.

²⁴² WP (C) No.277 of 2017 decided on June 09, 2017.

Number and held as under: that those who are not PAN holders, while applying for PAN, they are required to give Aadhaar number. This is the stipulation of sub-section (1) of Section 139AA, which we have already upheld. At the same time, as far as existing PAN holders are concerned, since the impugned provisions are yet to be considered on the touchstone of Article 21 of the Constitution, including on the debate around Right to Privacy and human dignity, etc. as limbs of Article 21, we are of the opinion that till the aforesaid aspect of Article 21 is decided by the Constitution Bench a partial stay of the aforesaid proviso is necessary. Those who have already enrolled themselves under Aadhaar scheme would comply with the requirement of sub-section (2) of Section 139AA of the Act.

Section 8(j) of the Right to Information, Act 2005 provides that disclosure of personal information which could cause unwarranted 56 Supra note 41 57 Writ Petition (C) No. 607 of 2016 decided on February 06, 2017. 58 WP (C) No.277 of 2017 decided on June 09, 2017. 25 invasion of the privacy of the individual, cannot be furnished unless it is necessary in larger public interest.

Expert Opinion as a Evidence :

In cases where expert opinion is required by the court, it becomes incumbent on the expert to assist the court by putting all the relevant materials together with the exact reasons which led him to come to a conclusion (and not the finding as such) so that the court may draw its own conclusion after going through those materials.

In **Tomaso Bruno v. State of U.P.**²⁴³, it was observed that the courts normally would look at expert evidence with greater sense of acceptability but the courts are not absolutely guided by the report of the experts, especially if such reports are perfunctory and unsustainable. The purpose of an expert opinion is primarily to assist the court in arriving in a final conclusion but such report is not a conclusive one. The court is expected to analyze the report, read it in conjunction with the other evidence on record and form its final opinion as to whether such a report is worthy of reliance or not.

²⁴³ (2015) 7 SCC 178

In **Ramesh Chandra Aggrawala v. Regency Hospitals**²⁴⁴, the court held:

“The law of evidence is designed to ensure that the court considers only that evidence which will enable it to reach a reliable conclusion. The first and foremost requirement for an expert evidence to be admissible is that it is necessary to hear expert evidence. The test is that the matter is outside the knowledge and experience of the lay person...The scientific question involved is assumed to be not within the court’s knowledge. Thus, cases where the science involved, is highly specialized and perhaps even esoteric, the central rule of expert cannot be disputed. The other requirements of the admissibility of expert evidence are; (i) That the expert must be within a recognized field of expertise (ii) That the evidence must be based on reliable principles and (iii) that the expert must be qualified in that discipline ...”

In **Prem Sagar Manocha v. State (NCT of Delhi)**²⁴⁵, the court held: The duty of an expert is to furnish the court his opinion and the reason for his opinion along with all the materials. It is for the court thereafter to see whether the basis of the opinion is correct and proper and then form its own conclusion.

The expert gives an opinion on what he has tested or on what has been subjected to any process of scrutiny. The inference drawn thereafter is still an opinion based on his knowledge. In case, subsequently, he comes across some authentic material which may suggest a different opinion, he must address the same, lest he should be branded as intellectually dishonest. Objective approach and openness to truth actually from basis of any opinion.

While deciding the said case, the Court placed reliance upon a judgment in **National Justice Compania Naviera SA v. Prudential Assurance Co. Ltd.**²⁴⁶ and stated:

“if an expert’s opinion is not properly researched because he considers that insufficient data is available, then this must be stated with an indication that the

²⁴⁴ AIR 2010 SC 806

²⁴⁵ AIR 2016 SC 290

²⁴⁶ (1995) 1 Lloyd’s Rep 445, QB (Commercial Division)

opinion is no more than a provisional one. In cases where an expert witness who has prepared a report could not assert that the report contained the truth, the whole truth and nothing but the truth without some qualification, that qualification should be stated in the report” (**Derby & Co Ltd and Others v. Weldon and Others, The Times, Nov 9, 1990 per Lord Justice Staughton**).

The evidence procured through sophisticated machines must be given due weightage and there can be no justification to reject the opinion of the expert who has examined the case microscopically²⁴⁷. The fingerprint examination is conclusive as it is an exact science.²⁴⁸

While dealing with the provisions of section 112 of the Indian Evidence Act, 1872, on the issue of determining the paternity of the child, the courts held that DNA testing should be made permissible only on the direction of the court as no person can be forced to give his blood without such direction²⁴⁹. The Supreme Court in paternity cases has rejected the prayer for permitting DNA evidence and has relied solely on the non-access principle²⁵⁰.

The Sixteenth Law Commission, in its 185th Report submitted in 2003, proposed certain amendments to section 112 which are still pending for consideration. The Commission also dealt with exceptions like “(1) Impotence or sterility; (2) blood tests proving a man is not the father and (3) DNA tests proving a man is not the father.”

In the case of **Sharda v. Dharampal**²⁵¹, the Court observed that if everyone started using Article 21 as a shield to protect themselves from going through the DNA test then it will be impossible to arrive at a decision. The Delhi High Court also held that DNA testing does not amount to violation of any of the rights²⁵².

²⁴⁷ *Ramanathan v. State of Tamil Nadu* AIR 1978 SC 1204

²⁴⁸ *Jaspal Singh v. State of Punjab*, AIR 1979 SC 1708.

²⁴⁹ *Sadashiv Mallikarjun Khedarkar v. Nandini Sadashiv Khedakar* 1995 Cri. L. J. 4090(Bom)

²⁵⁰ *Kanti Devi v. Poshi Ram*, AIR 2001 SC 2226

²⁵¹ *Supra* note 44

²⁵² *Kanchan Bedi v. Shri Gurpreet Singh*, AIR 2003 Delhi 446

There can be no dispute with regard to the settled legal proposition that statutory provisions and binding legal principles cannot constitute “compulsion” as to violate the basic or constitutional rights of any person. Enforcement of such principles is itself a constitutional obligation.²⁵³

4:2 The Indian Penal Code, 1860 :

Following are the important sections of Indian Penal Code, where there is a direct or indirect indication of the use of the DNA technology and these all relevant sections are used in chapter 2 and 3 of the thesis under the title “Use of DNA Technology in administration of criminal justice system”. In this categories the offences are :

(i) The offences affecting the human body :

- (a) Section 299 – Culpable Homicide
- (b) Section 300 – Murder
- (c) Section 301– Culpable Homicide by Causing Death of a Person other than the Person whose Death was intended
- (d) Section 304-A– Causing Death by Negligence
- (e) Section 304-B– Dowry Death
- (f) Section 306– Abetment of Suicide
- (g) Section 312– Causing Miscarriage
- (h) Section 313 to 315– Causing Miscarriage, Injuries to Unborn Child, Exposure of Infant’s Concealment of Birth of Baby

(ii) Sexual offences :

- (a) Section 375 – Rape
- (b) Section 376A – Intercourse of Man with Wife during Separation
- (c) Section 376B – Intercourse By A Public Servant With A Women In Custody
- (d) Section 376C – Intercourse by Superintendent of Jail, Remand Home
- (e) Section 376D – By Management Staff of Hospital

²⁵³ *Andhra Sugar v. State of Andhra Pradesh*, Air 1968 SC 599; *Siddheshwar Sehkari Sakhar Karkhana Ltd. v. CIT Kolhapur & Ors.*, AIR 2004 SC 4716; and *Harjinder Kaur*, Supra note 1.

- (iii) Offences against marriage :
- (a) Section 497– Adultery

4:3 The Criminal Procedure Code, 1973 :

With predominance of legal spirit in mind, Justice Malimath Committee recommended that DNA expert be included in the list of experts under Section 295(4) of Code of Criminal Procedure, 1973. Section 54 of the Criminal Procedure Code provides for medical examination of the accused in case if there are any injuries. In **Ananth Kumar v. State of Andhra Pradesh**²⁵⁴, the expression ‘examination of the person’ included physical examination, medical test of blood, semen, sputum, urine etc. Thus, under these provisions, DNA test can be done by medical practitioner.²⁵⁵ In **D.J. Vaghela v. Kantibai Jethabai**²⁵⁶, the High Court held that obtaining of blood, semen, saliva, urine etc.; under Section 53 of the Criminal Procedure Code, is not violative of Article 20(3) of the Constitution which permits protection against self–incrimination under Sections 156 and 174 of Code of Criminal Procedure. Predominance of legal spirit demanded that the Court must be empowered to order for DNA testing (medical examination), so as to facilitate justice. Thus, Justice Malimath Committee Report also recommended for amendment of Section 482 of Code of Criminal Procedure, 1973, in the following words: “Every Court shall have inherent power to make such order as may be necessary to discover truth or to give effective order under this Code or to prevent abuse of the process of the Court or otherwise to secure the ends of the justice”.

By using this provision, the Court will be better equipped with more powers of investigation like the Courts of inquisitorial system. DNA testing can also be carried out with the help of this provision. Section 313 of Code of Criminal Procedure, must be amended so as to draw adverse inference against the accused, if he fails to answer any relevant material against him. Therefore, DNA evidence can be used against the accused in light of this provision.

²⁵⁴ 1977 CriLJ 1797

²⁵⁵ Section 112 read with Section 4 of Indian Evidence Act, 1872.

²⁵⁶ 1985 CriLJ 974.

Section 53-A was added vide the Code of Criminal Procedure (Amendment) Act, 2005 w.e.f. 23-6-2006, providing that an accused of rape can be examined by a medical practitioner, which will include taking of bodily substances from the accused for DNA profiling.

It is noteworthy that, they said Amendment substituted the Explanation to Sections 53 and 54, and made it applicable to Section 53A as well, to clarify the scope of 'examination', especially with regard to the use of modern and scientific techniques including DNA profiling. Section 53 authorises the police officials to get medical examination of an arrested person done during the course of an investigation by registered medical practitioner. The Explanation provides that "*Examination shall include the examination of blood, blood-stains, semen, swabs in case of sexual offences, sputum and sweat, hair samples and finger nail clippings by the use of modern and scientific techniques including DNA profiling and such other tests which the registered medical practitioner thinks necessary in a particular case*".

Section 311-A was also added to empower the Magistrate to order a person to give specimen signatures or handwriting.

Judgments Dealing with Self-incrimination of Persons vis-à-vis Article 20(3) of the Constitution

A judgment rendered by an eleven-Judges Bench of the Supreme Court in **State of Bombay v. Kathi Kalu Oghad & Ors.**²⁵⁷ dealt with the issue of self-incrimination and held:

Self-incrimination must mean conveying information based upon the personal knowledge of the person giving the information and cannot include merely the mechanical process of producing documents in court which may throw a light on any of the points in controversy, but which do not contain any statement of the accused based on his personal knowledge. Example was cited of an accused who may be in possession of a document which is in his writing or which contains

²⁵⁷ AIR 1961 SC 1808

his signature or his thumb impression. It was observed that production of such document with a view to comparison of the writing or the signature or the impression of the accused is not the statement of an accused person, which can be said to be of the nature of a personal testimony. I may quote another relevant observation of this Court:

When an accused person is called upon by the Court or any other authority holding an investigation to give his finger impression or signature or a specimen of his handwriting, he is not giving any testimony of the nature of a 'personal testimony'. The giving of a 'personal testimony' must depend upon his volition. He can make any kind of statement or may refuse to make any statement. But his finger impressions or his handwriting, in spite of efforts at concealing the true nature of it by dissimulation cannot change their intrinsic character. Thus, the giving of finger impressions or of specimen writing or of signatures by an accused person, though it may amount to furnishing evidence in the larger sense, is not included within the expression 'to be a witness.

Thus, the Court concluded that giving thumb impressions or impressions of foot or palm or fingers or specimen writings or showing parts of the body by way of identification are not included in the expression 'to be a witness' as the latter would mean imparting knowledge in respect of relevant facts by an oral statement or a statement in writing, made or given in court or otherwise.

In **Smt. Selvi & Ors. v. State of Karnataka**²⁵⁸, a three-Judge Bench of the Supreme Court considered whether involuntary administration of certain scientific techniques like narco-analysis, polygraph examination and Brain Electrical Activation Profile (BEAP) tests and the results thereof are of a '*testimonial character*' attracting the bar of Article 20(3) of the Constitution. The Court held:

It was observed that the scope of '*testimonial compulsion*' is made clear by two premises. The first is that ordinarily it is the oral or written statements which convey the personal knowledge of a person in respect of relevant facts that

²⁵⁸ AIR 2010 SC 1974

amount to ‘*personal testimony*’ thereby coming within the prohibition contemplated by Article 20(3). In most cases, such ‘*personal testimony*’ can be readily distinguished from material evidence such as bodily substances and other physical objects. The second premise is that in some cases, oral or written statements can be relied upon but only for the purpose of identification or comparison with facts and materials that are already in the possession of the investigators. The bar of Article 20(3) can be invoked when the statements are likely to lead to incrimination by themselves or furnish a link in the chain of evidence. It was held that all the three techniques involve testimonial responses. They impede the subject’s right to remain silent. The subject is compelled to convey personal knowledge irrespective of his/her own volition. The results of these tests cannot be likened to physical evidence so as to exclude them from the protective scope of Article 20(3). This Court concluded that compulsory administration of the impugned techniques violates the right against self-incrimination. Article 20(3) aims to prevent the forcible conveyance of personal knowledge that is relevant to the facts in issue. The results obtained from each of the impugned tests bear a testimonial character and they cannot be categorized as material evidence such as bodily substances and other physical objects.

In **Ritesh Sinha v. State of U.P.**²⁵⁹ the questions arose as to whether a Voice Spectrographic Test without the consent of a person offends Article 20(3) of the Constitution and in case they said provision is not violated, whether a magistrate, in absence of any statutory provision or inherent power under the provisions of the Criminal Procedure Code 1973 (Cr. P.C.) has competence to direct a person to be subjected to such a test without his consent.

The Court held that taking such test would not violate the mandate of Article 20(3) of the Constitution as has been held by the Supreme Court in *Selvi*²⁶⁰. However, there had been different views on the second question.

²⁵⁹ 2013) 2 SCC 357; See also *Murlidhar Meghraj v. State of Maharashtra* AIR 1976 SC 1929. *Kisan Trimbak Kothula & Ors. v. State of Maharashtra* AIR 1977 SC 435; and *State of Maharashtra v. Natwarlal Damodardas Soni* AIR 1980 SC 593.

²⁶⁰ *Supra* note 12

The Hon'ble Justice Ranjana Desai observed: In light of this attempted analogy, we must stress that the DNA profiling technique has been expressly included among the various forms of medical examination in the amended explanation to Sections 53, 53A and 54 of the Cr. P.C. It must also be clarified that a 'DNA profile' is different from a DNA sample which can be obtained from bodily substances. A DNA profile is a record created on the basis of DNA samples made available to forensic experts. Creating and maintaining DNA profiles of offenders and suspects are useful practices since newly obtained DNA samples can be readily matched with existing profiles that are already in the possession of law-enforcement agencies. The matching of DNA samples is emerging as a vital tool for linking suspects to specific criminal acts. It may also be recalled that the as per the majority decision in *Kathi Kalu Oghad*,²⁶¹ the use of material samples such as fingerprints for the purpose of comparison and identification does not amount to a testimonial act for the purpose of Article 20(3). Hence, the taking and retention of DNA samples which are in the nature of physical evidence does not face constitutional hurdles in the Indian context. However, if the DNA profiling technique is further developed and used for testimonial purposes, then such uses in the future could face challenges in the judicial domain.

However, another judge Hon'ble Justice Aftab Alam observed: There are, indeed, precedents where the court by the interpretative process has evolved old laws to meet cotemporary challenges and has planted into them contents to deal with the demands and the needs of the present that could not be envisaged at the time of the making of the law. But, on the question of compelling the accused to give voice sample, the law must come from the legislature and not through the court process.

However it is to be noted that due to the difference of opinion in the bench, the matter is pending consideration before the larger bench.

²⁶¹ *State of Bombay v. Kathi Kalu Oghad & Ors.*, AIR 1961 SC 1808

In **Kalawati v. State of H.P.**²⁶² and **Ramanlal Bhogilal Shah v. D.K. Guha**²⁶³, the Supreme Court held that Article 20 (3) does not apply at all to a case where the confession is made by an accused without any inducement, threat, or promise. In view of the provisions of sections 24-27 of the Indian Evidence Act, 1872, and Section 162 of the Code of Criminal Procedure 1973, it is an obligation on the judiciary to ensure that confession of the accused is not procured by an inducement, threat, promise, or fear.²⁶⁴ Section 24 of the Evidence Act, 1872 is an extension of right to silence guaranteed under Article 20(3) of the Constitution, as it clarifies that any information given by an accused under inducement, threat or promise is irrelevant under criminal proceedings, going by the maxim *nemo debet prodere se ipsum*, i.e., no one can be required to be his own betrayer.²⁶⁵ An accused has a right to refuse to produce self-incriminating documents²⁶⁶.

The Supreme Court in **Bhabani Prasad Jena v. Convenor Secretary, Orissa State Commission for women**²⁶⁷, whilst pressing upon the significance of DNA testing in the process of administration of justice held:

when there is apparent conflict between the right to privacy of a person not to submit himself forcibly to medical examination and duty of the court to reach the truth, the court must exercise its discretion only after balancing the interests of the parties and on due consideration whether for a just decision in the matter, DNA test is eminently needed.

In **Krishan Kumar Malik v. State of Haryana**²⁶⁸, the Supreme Court explained that even in the absence of section 53A Cr. P.C., DNA profiling could be permissible under law. The Court observed:

Now after the incorporation of section 53A in Criminal Procedure Code with effect from 23.06.2006.....it has become necessary for the prosecution to

²⁶² AIR 1953 SC 131

²⁶³ AIR 1973 SC 1196

²⁶⁴ *State of U P v. Deoman Upadhyaya*, AIR 1960 SC 1125

²⁶⁵ Shiv Narayan Dhingra, "Right to Silence of the Accused Under Constitution of India", 41 JCP 32 (2007)

²⁶⁶ *State of Gujarat v. Shyamlal Mohanlal Choksi*, AIR 1965 SC 1251

²⁶⁷ AIR 2010 SC 2851

²⁶⁸ (2011) 7 SCC 130

go in for DNA test in such type of cases, facilitating the prosecution to prove its case against the accused. Prior to 2006, even without the aforesaid specific provisions in Cr. P.C., the prosecution could have still resorted to this procedure of getting the DNA test.....to make it a fool proof case.....

In **Sudhir Chaudhary & Ors. v. State (NCT of Delhi)**²⁶⁹, the Supreme Court held that an accused can be directed to give a voice sample as it was not the testimony but rather it constituted identification data. 4.19 In **Leena Katiyar v. State of U.P. & Ors.**²⁷⁰, the Allahabad High Court held that even in absence of any inherent power or statutory authorisation, the Magistrate is competent to direct an accused to give voice sample for identification in view of the provisions of section 165 read with section 65B of the Indian Evidence Act, 1872. But the Gujarat High Court, in **Natwarlal Amarshibhai Devani v. State of Gujarat & Ors.**²⁷¹, took a contrary view observing that in absence of any provision enabling the Magistrate to order Voice Spectrographic Tests, the Court was not competent to direct an accused to give the voice sample.

In **Naveen Krishna Bothireddy v. State of Telangana**²⁷², the Andhra Pradesh High Court upheld the order passed by the trial court directing the accused to undergo medical tests/ potency test or erectile dysfunction (ED) test, observing that such tests do not violate the mandate of Article 20(3) and Article 21 of the Constitution.

The Courts have persistently held that in case the accused does not want to undergo such tests the Court is at liberty to draw adverse inference under Illustration (h) of section 114 of the Indian Evidence Act, 1872²⁷³. However, in **Rohit Shekhar v. Narayan Dutt Tiwari & Ors.**²⁷⁴, the Delhi High Court held that “a person can be forced to undertake the test for the reason that the valuable

²⁶⁹ (2016) 8 SCC 307

²⁷⁰ 2015 Cri LJ 4683

²⁷¹ 2017Cri LJ 1911

²⁷² 2017 (1) ALT (CrL.) 422 (A.P.)

²⁷³ *Ibid*, *Thogorani @ K Damyanti v. State of Orissa & Ors.*, 2004 CrL. LJ 4003; *Sulabai v. Jagannath & Anr.*, 1972 Cr.LJ 1392; *Venkateshwarulu v. Subbaya*, AIR 1951 Mad 190; *Subayya Gounder v. Bhoopala*, AIR 1959 Mad 396; and *Harjinder Kaur*, supra note 1.

²⁷⁴ 2012 (2) RCR (CrL.) 889

right of the party cannot be taken away by asking the said party to be satisfied with comparatively weak adverse inference”.

In **Goutam Kundu v. State of West Bengal**²⁷⁵, the Supreme Court observed:

- (1) that courts in India cannot order blood test as a matter of course;
- (2) wherever applications are made for such prayers in order to have roving inquiry, the prayer for blood test cannot be entertained;
- (3) there must be a strong prima facie case in that the husband must establish non-access in order to dispel the presumption arising under Section 112 of the Evidence Act; and
- (4) the court must carefully examine as to what would be the consequence of ordering the blood test; whether it will have the effect of branding a child as a bastard and the mother as an unchaste woman. (5) No one can be compelled to give sample of blood for analysis.

In **Kanti Devi v. Poshi Ram**²⁷⁶, the Court dealt with the issue of determining the paternity of a child and held: The result of a genuine DNA test is said to be scientifically accurate. But even that is not enough to escape from the conclusiveness of Section 112 of the Act, e.g. if a husband and wife were living together during the time of conception but the DNA test revealed that the child was not born to the husband, the conclusiveness in law would remain un rebuttable. This may look hard from the point of view of the husband who would be compelled to bear the fatherhood of a child of which he may be innocent. But even in such a case the law leans in favour of the innocent child from being bastardised if his mother and her spouse were living together during the time of conception. Hence the question regarding the degree of proof of non-access for rebutting the conclusiveness must be answered in the light of what is meant by access or non-access as delineated above.

²⁷⁵ AIR 1993 SC 2295

²⁷⁶ AIR 2001 SC 2226

However, in **Nandlal Basudev Badwaik v. Lata Nandlal Badwaik**²⁷⁷, the Court held that depending on the facts and circumstances of the case, it would be permissible for the Court to direct the DNA examination to determine the veracity of the allegation(s) made in a case. If the direction to hold such a test can be avoided, it should so be avoided. The reason is that the legitimacy of the child should not be put to peril.

4:4 The Indian Evidence Act, 1872 :

The Indian Evidence Act, 1872 does not directly specify the use or applicability of DNA technology. But some of its sections take into consideration the use of the DNA technology as a matter of evidence.

Section 9 of the Indian Evidence Act, 1872 deals with ‘facts necessary to explain or introduce a fact in issue or relevant fact’. Section 45 provides as to how the Court has to form an opinion upon a point of foreign law or of science or art, or identity of handwriting [or finger impressions] etc. Section 51 refers to grounds when opinion becomes relevant. Section 112 provides that birth during the continuance of a valid marriage is a conclusive proof of legitimacy with only exception that the parents had no access to each other during the period of conception. Under section 114 the Court may presume the existence of any fact which it thinks likely to have happened, regard being had to the common course of natural events, human conduct and public and private business, in their relation to the facts of the particular case.

If the evidence of an expert is relevant under section 45, the ground on which such opinion is derived is also relevant under section 51. Section 46 deals with ‘facts bearing upon opinions of experts’. The opinion of an expert based on the DNA profiling is also relevant on the same analogy. However, whether a DNA test can be directed or not has always been a debatable issue.

Other sections, which take into consideration the use and application of DNA technology directly or indirectly, are as under:

²⁷⁷ AIR 2014 SC 932; See also: *Dharam Deo Yadav v. State of U.P.*, (2014) 5 SCC 509; and *Dipanwita Roy v. Ronobroto Roy* (2015) 1 SCC 365

Section 9 of the Indian Evidence Act, 1872– deals with “Facts...which establish the identity of anything or person whose identity is relevantare relevant in so far as they are necessary for that purpose”.

Section 45 of the Indian Evidence Act, 1872– deals with the expert evidence “When the court has to form an opinion upon a point of foreign law or science or art or as to identify the handwriting or finger impressions, the opinion upon point of that person specially skilled in such foreign law, science, or art in question... such persons are called experts”.

Section 46 of the Indian Evidence Act, 1872– Facts bearing the opinion of an expert.

Section 51 of the Indian Evidence Act, 1872– deals with grounds of opinion.

Section 112 of the Indian Evidence Act, 1872– deals with the provision of the legitimacy of the child born. At the same time illegitimacy of a child if “no access” between husband and wife is established.

Section 114 of the Indian Evidence Act, 1872– Court may presume existence of certain facts –The Court may presume the existence of any fact which it thinks likely to have happened, regard being had to the common course of natural events, human conduct and public and private business, in their relation to the facts of the particular case.

Evidence of Expert Application of DNA testing is now well established in developing countries. In India in several cases the judgement has been given either based on the result of DNA testing alone or with other corroborative evidence, although many courts in India have accepted DNA test. It has not been included in Indian Evidence Act. It is, therefore, left to the discretion of the judges whether the DNA test under section 45 of the Indian Evidence Act to be accepted or not.²⁷⁸

²⁷⁸ DNA identification Act which allowed DNA Data bank to be created and amended the Criminal code to provide a mechanism for the judge to order persons convicted of designated offences to provide blood, buckle or hair samples from which DNA profile will be derived– has been passed in Canada Britain has Criminal Justice Act provides for forcible testing of blood testing.

The first paternity dispute in India²⁷⁹, which solved by DNA fingerprinting test, was the case No. M.C. 1 of 1988 in the Court of the Chief Judicial Magistrate of Telicherry (Thalassery). The Chief Judicial Magistrate held that: The Evidence of Expert is admissible under Section 45 of the Indian Evidence Act, 1972. So also, the grounds on which the opinion is arrived at are also relevant under Section 51 of the Indian Evidence Act, PW 4 is an expert in the matter of molecular biology and the evidence tendered by him is quite convincing and I have no reason why it should not be accepted. Just like the opinion of a chemical analyst, or like the opinion of a fingerprint expert, opinion of PW4, who is also expert in the matter of cellular and molecular biology, is also acceptable". This verdict was challenged in the High Court but the High Court upheld the verdict of the Telicherry Court stating that the results of DNA test by itself could be deciding paternity).

4:5 The Code of Civil Procedure, 1908 :

Section 151 of Code of Civil Procedure saves the inherent power of the Courts to investigate up to any extent as may be necessary for the ends of justice ought to prevent abuse of the process of the Court. So, DNA test can be used in cases related to Succession and inheritance issues between the parties.

4:6 The Identification of Prisoner's Act, 1920 :

The Justice Malimath Committee has recommended for amending Section 4 of Identification of Prisoner's Act, 1920 on lines of Section 27 of the Prevention of Terrorism Act, 2002 (POTA). Section 27 of Prevention of Terrorism Act provides that the police officer while investigating any case can request the Court of Chief Judicial Magistrate or the Court of Chief Metropolitan Magistrate, as the case may be, in writing for obtaining samples of handwriting, finger-prints, blood, saliva etc. from any accused person. If these recommendations are implemented it will be possible for the investigating agencies to go for DNA testing in identifying the culprit.

²⁷⁹ Pandit, M.W. and Dr. Lalji Singh "DNA testing Evidence Act and Expert witness", Indian Police Journal, December 2000.

The crime scenario in the 21st century has become very complex. The modus operandi of crime has become scientific; hence it is essential to use science and technology in apprehending the criminals. Improved testing technologies are emerging, that provides efficient and effective DNA evidence possessing which promise to widen the use of DNA evidence and thus aids in search of truth by exonerating the innocent. The development of DNA technology furthers the search for truth by helping police and prosecutors in the fight against violent crime. Through the use of DNA evidence, prosecutors are able to conclusively establish the guilt of a defendant. So, the importance of DNA technology in the administration of justice in any form of society and in any part of the world cannot be denied.

With reference to India, there is no adequate legislation enacted by the Government on technology. It is imperative to incorporate DNA technology in an Indian legislation or to draft an exclusive independent enactment on the use of DNA technology in Indian Courts. In India, the Code of Criminal Procedure, 1973, Indian Evidence Act, 1872 are too old. An exclusive law or Act (other than the amendments in the provisions of Code of Criminal Procedure and the Indian Evidence Act) as in America, England and New Zealand and in Canada should be legislated by our Parliament, so that this technique could be effectively used as valuable evidence in the administration of Criminal and Civil Justice.

The Parliament has already established Advisory Committee to look into some of these aspects. One hopes this is sorted out at the earliest so that we can proceed with full swiftness on this path in the furtherance of truth. Then only the real meaning of “Satyamev Jayate” can be really manifested. It is appropriate to quote Austrian Jurist Eugene Ehrlich, “*Positive Law, which is enacted, cannot be effective law, if it were at odds with the cultural pattern of people (Living Law)*”.²⁸⁰

In March 2003, the Law Commission of India, headed by Justice M. Jagannadha Rao, submitted its 185th report to the Union Ministry of Law and

²⁸⁰ Alex Samuel & Dr. Swati Parikh, DNA Tests in Criminal Investigation and Paternity Disputes (A Modern Scientific Technique), R.S. Dwivedi for Dwivedi & Co., edn. 2009.

Justice on the review of the Indian Evidence Act, 1872. The Commission has made several recommendations regarding the amendment of the various provisions of the Evidence Act. The prominent feature of the report as far as this topic is concerned is that it had given its valuable time to assess the pros and cons of the inclusion of the novel DNA fingerprinting under Sections 9, 45 and 112 of the Evidence Act.

The Commission, under Section 9, discussed the admissibility of DNA identification in detail. From very initial stage itself, the Commission was reluctant in including DNA identification evidence under Section 9. After conducting a brief discussion of the theoretical background about DNA fingerprinting and its extent of application in the legal scene, the Commission came to the conclusion that DNA identification evidence could be used for establishing the lack of identity of the accused in a criminal case and not for positive identification. Quoting some relevant passages from the foreign authorities and decisions, Commission observed as follows:

It is, therefore, fairly established that if the DNA result does not match, then the identity of the person is not established. But, the contrary is not true. Where the test result is that the DNA does not match, it cannot lead to a conclusion of identity of the person.... DNA may be more useful for purposes of investigation but not for raising any presumption of identity in a court of law.

The Commission was against the reliability of the probabilistic aspects of the DNA fingerprinting evidence. The Commission referred the landmark English decision **R v. Adams**²⁸¹ in which the practical aspects of the Bayes theorem was exclusively dealt with and concluded that it could not be considered in the area of legal fact finding. The Commission quoted the following passage from the said decision in order to support its stand:

Quite apart from these general objections, as the present case graphically demonstrates, to introduce Bayes Theorem, or any similar method, into a criminal

²⁸¹ [1996] 2 Cr. App. R. 467 at 481-2.

trial plunges the jury into inappropriate and unnecessary realms of theory and complexity deflecting them from their proper task.²⁸²

The Commission has also made some special reference to the statements provided in Phipson's law of evidence and the report of the Australian Law Reform Commission²⁸³ and came to the conclusion that it is not necessary to give special emphasis regarding the admissibility of DNA fingerprinting evidence in the Indian Evidence Act. Relying on a recent Supreme Court decision **Kamti Devi v. Poshi Ram**²⁸⁴, the Commission said, Indian judiciary is against giving any weight to the DNA evidence.

It is submitted that the view taken by the Law Commission is correct because the Commission rightly realized from the foreign authorities the problems which may create while interpreting the DNA test results before a court of law. In India, the forensic DNA fingerprinting is in its budding stage and it is not time to have a complete deference to such developing scientific technique in criminal adjudication process. Similarly, Indian judges are not expected to make any good evaluation of the complex scientific technique like DNA fingerprinting without proper training. However, one important error has made by the Commission in appreciating the observation of the Supreme Court in **Kamti Devi v. Poshi Ram**²⁸⁵ case.

In Kamiti Devi, Justice K.T Thomas appreciated the novel scientific technique like DNA fingerprinting. However, he denied the test not because of any reliability issue but due to the rigour rule provided in Section 112 of the Indian Evidence Act. Therefore, this decision has no direct impact while considering the admissibility of DNA identification evidence under Section 9 or 45.

The current pace in which scientific advancement gives certainty to the issues of claims confronted before the legal system in almost all phenomena of the

²⁸² Ibid, as cited in the Law Commission's report, at p. 48.

²⁸³ Phipson, Evidence, 15th ed., 2000; Australian Law Reform Commission (Issues Paper 26. Protection of Human Genetic Information - 14 Evidence Issues).

²⁸⁴ 2001 (5) SCC 311.

²⁸⁵ Ibid.

real world. Realizing this, Tom Wolfe recently wrote, “We now live in an age in which science is a court from which there is no appeal”. If science is proficient to contribute the legal system something with certainty, then why law is reluctant to accept the claims of science which provides objective and reliable truths. The conclusive presumption provided in Section 112 is an instance in which law rejects the truths supplied by the science with certainty. It is an accepted truth all over the world that the novel scientific technique like DNA fingerprinting could solve the issues of paternity. The recent pronouncement of the Supreme Court in **Kamti Devi v. Poshi Ram**²⁸⁶ clearly shows the courts faith on DNA test in determining the paternity of a person. But court rejected the evidence derived through such test because of the rigour rule provided in Section 112 of the Evidence Act, Justice K.T. Thomas observed the matter as follows:

We may remember that section 112 of the Evidence Act was enacted at a time when the modern scientific advancements with deoxyribonucleic acid (DNA) as well as ribonucleic acid (RNA) tests were not even in contemplation of the legislature. The result of a genuine DNA test is said to be scientifically accurate. But even that is not enough to escape from the conclusiveness of section 112 of the Act e.g. if the husband and wife were living together during the time of conception but the DNA test reveals that the child was not born to the husband, the conclusiveness in law remain irrebuttable. This may look hard from the point of view of the husband who would be compelled to bear the fatherhood of a child of which he may be innocent.²⁸⁷

Following the ruling in Kamti Devi, in 2002, the Kerala High Court took the same view in **Sajitha v. State of Kerala**²⁸⁸, and held the presumption provided in Section 112 of the Indian Evidence Act should be rebutted with the help of the technique provided in Section 112 and not by depending novel scientific advancements like DNA test.

²⁸⁶ 2001 (5) SCC 311.

²⁸⁷ Ibid.

²⁸⁸ 2002 (3) K.L.T. 762.

It is submitted that there is no justification in continuing the rigor rule provided in Section 112 of the Indian Evidence Act. Therefore, it is high time for the legislature to realize the realities in the advent of the scientific world. It is suggested that the Parliament may take immediate steps to amend the rigid rule under Section 112 either by changing the conclusive presumption as 'rebuttable legal presumption' or insert an exception in Section 112 empowering the courts or the parties for conducting DNA test or any other blood test in order to disprove the presumption of paternity.²⁸⁹

A just step has been made by the Indian Law Commission in this area by proposing an amendment in Section 112 of the Evidence Act. The Commission recommends that Section 112 should be recast as follows:

“Section 112: The fact that any child was born during the continuance of a valid marriage between its mother and any man, or within two hundred and eighty days,

- (i) after the marriage was declared nullity, the mother remaining unmarried, or
- (ii) after the marriage was avoided by dissolution, the mother remaining unmarried, shall be conclusive proof that such person is the legitimate child of that man, unless
 - (a) it can be shown that the parties to the marriage had no access to each other at any time when the child could have been begotten; or
 - (b) it is conclusively established, by tests conducted at the expense of that man, namely,
 - (i) Medical tests, that, at the relevant time, that man was impotent or sterile, and is not the father of the child, or

²⁸⁹ In England, they have inserted express provisions by way of Sections 22 and 23 of the Family Law Reform (Amendment) Act, 1987 on the recommendation of the Law Commission.

- (ii) Blood tests conducted with the consent of that man and his wife and in the case of the child, by permission of the court, that that man is not the father of the child, or
- (iii) DNA genetic printing tests conducted with the consent of that man and in the case of the Child, by permission of the Court, that that man is not the father of the child, and

Provided that the Court is satisfied that the test under sub clause (i) or sub-clause (ii) or sub-clause (iii) has been conducted in a scientific manner according to accepted procedures, and in the case of each of these sub-clauses (i) or (ii) or (iii) of clause (b), at least two tests have been conducted, and they resulted in an identical verdict that that man is not the father of the child.

Provided further that where that man refuses to undergo the tests under sub clauses (i) or (ii) or (iii), he shall without prejudice to the provisions of clause (a), be deemed to have waived his defence to any claim of paternity made against him.

Explanation I: For the purpose of sub clause (iii) of clause (b), the words ‘DNA genetic printing tests’ shall mean the tests conducted by way of samples relatable to the husband and child and the words “DNA” mean ‘Deoxyribonucleic Acid’.

Explanation II: For the purposes of this section, the words ‘valid marriage’ shall mean a void marriage till it is declared nullity or avoidable marriage till it is avoided by dissolution, where, by any enactment for the time being in force, it is provided that the children of such marriages which are declared nullity or avoided by dissolution, shall nevertheless be legitimate.

It seems that the recommendation needs urgent implementation. However, from the comments made by the Commission, it appears that the Commission does not intend to apply the DNA tests to positively prove that the person is the father but only to prove that the alleged person is not the father. Similarly, the Commission has rightly provided that a person refusing to consent to DNA tests will be compelled to waive his defense that he is not the father. This will solve the matter finally.

4:7 Evidentiary Aspects of DNA and Cases relating to Paternity Disputes:

In India, DNA fingerprinting and analysis has been widely used in paternity cases.²⁹⁰ In this several interesting issues will be dealt with. Prominent among these is the effect of the new developments in forensic in the form of DNA profiling/fingerprinting and the case for an amendment to Section 112 of the Indian Evidence Act dealing with conclusive proof in paternity cases. The other major issue with respect to paternity cases, on which there is much conflicting case, law deals with whether the Courts can direct one of the parties to give a sample of DNA and the effect of refusal to undergo a DNA test. This has obvious constitutional implications.

Section 112 of the Indian Evidence Act, 1973 and DNA as a Evidence:

Section 112 of the Indian Evidence Act, 1973 deals with the proof of legitimacy of offspring if they are born during wedlock or within a certain period of the dissolution of marriage. In many ways it is a unique section. On the one hand, it establishes the fact of marriage as conclusive proof of the legitimacy of the children and at the same time mentions that the conclusive proof of legitimacy (i.e. marriage) can be avoided if the parties could not have begotten the child as the spouses had no access to each other.²⁹¹ The obvious purpose behind such a section would be to prevent the unnecessary bastardization of illegitimate children and the condemning of their mothers and unchaste. However, with the advent of DNA fingerprinting analysis some problems have arisen. The problem that is being referred to came up for consideration by the Supreme Court in case of **Kamti Devi v. Poshi Ram**²⁹². In the facts of this case the respondent was the husband of the appellant. Fifteen years after marriage the appellant gave birth to a child. The respondent filed a civil suit for declaration that he was not the father of

²⁹⁰ *Arukumar v. Turaka Kondalal Rao*, 1998 Cri LJ4279, where a single locus probe RFLP AND STR analysis was carried out to prove the paternity of the child.

²⁹¹ Section 112 of Indian Evidence Act – Birth during Marriage. Conclusive Proof of Legitimacy:” The fact that any person born during the continuance of the valid marriage between his mother and any man, within two hundred and eighty days after his dissolution, the mother remaining unmarried, shall be conclusive proof that he is the legitimate son of that man, in AIR 2001 SC 2226 it can be shown, that the parties to the marriage had no access to each other at any time when he could be begotten.

²⁹² 2001 (5) SCC 311.

the said child. Though the issue was not directly in issue in the instant case, the Supreme Court opined that even a DNA test that indicated that the respondent was not the father of the child would not be enough to rebut the conclusiveness of the marriage as proof of legitimacy of the child. The Court held that the only way of rebutting the conclusive proof provision would be to adduce evidence of non-access.

So, in light of the fact that Section 112 of the Indian Evidence Act, 1973 was drafted at a time when even the discovery of DNA had not been contemplated, the section should be amended. What would be ideal is that another outlet apart from proof of non-access be provided in the form of evidence of a DNA test to rebut the conclusive proof provision in Section 112 of the Indian Evidence Act, 1973. The Bombay High Court has also lamented the absurdity of having only proof of non-access when DNA evidence can decide the matter in a more scientific manner.²⁹³

The *raison d'être* under the Indian Evidence Act, 1973 is against the legitimization of a child and is based on public policy and that a child should not suffer on account of lapses of parents. It is also the normative legislative intention that when certain fact is considered as conclusive proof of another fact, the judiciary generally disables the party in disputing such proof. The only exception provided in Indian Evidence Act is in the form of an outlet to a party, who wants to escape from the rigor of that conclusiveness. In such cases, it's the DNA test, which helps the Courts to decide on the contentious issue, based on aspect of conclusiveness.²⁹⁴

²⁹³ *Sadashiv Mallikarjun Khedarkar v. Nandini Sadashiv Khedarkar*, 1995 Cri. LJ 4090 (Bom) at 4093 R.J. Vidyanath J. Observed as under – ‘There may be instances where the husband and wife are living together and the wife may have gone astray and then delivered a child through illicit connection. But in the view of legal presumption under Section 112 of Indian Evidence Act the husband cannot be allowed to prove that the child is not born to him since husband and wife are living together, even if it is proved that wife had some illicit relationship with another person. What should be done in such a case is a question that has cropped up in my mind ... but if we go by rigor or presumption under Section 112 of the Evidence Act no husband can be permitted to prove that the child born to the wife is not his, if the husband and wife were together even if wife is proved to be living in adultery’.

²⁹⁴ *Gautam Kundu v. State of West Bengal*, (1993) 3 SCC 418.

Many a times, questions have been raised before the Courts in cases of DNA fingerprinting, creating a hindrance to the investigating agencies, and they are: whether a suspect, or for that matter anybody can be forced to give a blood sample for testing? And whether such a testing would be considered a violation of Article 20(3) of the Constitution of India, which protects every citizen from providing self-incriminating evidence? And whether an order forcing an individual for DNA testing would be violation of his right to privacy? And if the person refuses to submit himself/herself to such test whether adverse the Court can draw inference or presumption?

Justice Jagganatha Rao, Chief Justice of the Kerala High court pointed the lacunae in this regard in 1995 in a verdict of the paternity dispute, Justice Rao pointed out in his judgments two facts:²⁹⁵

- (i) DNA testing is, as yet, not considered a conclusive proof under Section 112 of the Evidence Act, 1973, and
- (ii) Law has not been passed by the Parliament for such testing.

Section 112 of the Indian Evidence Act, 1973 uses the words, “conclusive proof and refers to non-access as the sole exception. Therefore, as the language of the section stands, no other evidence is permissible except non-access, to prove that a person is not the father. This was held in several decided cases and also recently by the Supreme Court in **Kanti Devi v. Poshi Ram**.²⁹⁶ That case concerned DNA evidence but the Supreme Court refused to permit the evidence on the ground that except non-access no other evidence is permissible to prove that a person is not the father. Judgment of the Supreme Court in 1993 also highlighted the fact that there is no provision in Indian laws to force or compel people to undergo blood tests or any other type of DNA testing.

Bombay High Court in the case of **Sadashiv Malikarjun Kheradkar v. Smt. Nandini Sadashiv Kheradkar**²⁹⁷, held that the Court has power to direct

²⁹⁵ “Though the Indian Evidence Act Proposed Bill 2003 apart from the sole exception of ‘non-access’ other exceptions by way of blood-group tests, but subject to very stringent conditions.

²⁹⁶ AIR 2001 SC 2266: 2001 Cri LJ 2615.

²⁹⁷ 1995 Cri LJ 4090

blood examination but it should not be done as a matter of course or to have a roving inquiry. The Bombay High court even felt that there should be a suitable amendment by the Legislature and after nothing that nobody can be compelled to give blood sample, it was held that the Court can give a direction but cannot compel giving of blood sample.

In a recent case of **Mrs. Kanchan Bedi v. Shri Gurpreet Singh Bedi**²⁹⁸, where the parentage of the infant was in question, and the application filed by the mother for conducting DNA the father contending that it would violate his rights vehemently opposed test. Hon'ble Vikramjit Sen, J. held that: "it appears to me to be difficult to resist that the law, as it presently stands, does not contemplate any impediment or violation of rights in directing persons to submit themselves for DNA test, especially where the parentage of a child is in controversy for the grant of maintenance. It was further held that where the parentage of a child is in controversy for the grant of maintenance, parties submitting themselves for the DNA test is not violation of rights. He relied on the decision of the Hon'ble Supreme Court in the case of **Geeta Daha v. NCT of Delhi (DB)**²⁹⁹, where a Division Bench of Hon'ble Supreme Court had ordered that a DNA test be conducted on a fetus of a rape victim. Hon'ble Vikramjit Sen, J. distinguished this case from the case of **Gautam Kundu v. State of West Bengal**³⁰⁰, where it was held that "wife cannot be forced to give blood sample and no adverse inference against her for this refusal". In **M/s. X v. Mr. Z**³⁰¹ case, a single Judge of Delhi High Court had allowed a similar application and had directed that at the cost of husband, the Pathology Department of All India Institute of Medical Sciences should conduct the DNA test. The DNA test was to be conducted of a fetus.

4:8 Direction to Give Sample and Adverse Inferences :

Another established principle of criminal jurisprudence is that *Nemo Tenetur Scipsum Accusare*— *No Man Can Be Condemned To Criminate Himself*. So, in a very important and recent judgment delivered by the Hon'ble Supreme

²⁹⁸ AIR 2003 Delhi 446

²⁹⁹ 1997(1) JCC 101

³⁰⁰ 1993 Cri LJ 3233: AIR 1993 SC 2295

³⁰¹ 96 (2002) DLT 254, I (2002) DMC 448.

court of India in the case of **Sharda v. Dharampal**,³⁰² where the core question was, whether a party to a divorce proceeding can be compelled to a medical examination. In this case the Respondent, on the ground that such an order violates his right to privacy, opposed an order for DNA test. The three Judge Bench of the Hon'ble Supreme court held that: "If for arriving at the satisfaction of the Court and to protect the right of a party to the lies who may otherwise be found to be incapable of protecting his own interest, the court passes an appropriate order, the question of such action being violative of Article 21 of the Constitution of India would not arise. The court having regard to Article 21 of the Constitution of India must also see to it that the right of a person to defend himself must be adequately protected". It further held that if respondent avoids such medical examination on the ground that it violates his/her right to privacy or for a matter right to personal liberty as enshrined under Article 21 of the constitution of India, then it may in most of such cases become impossible to arrive at a conclusion. It was also said that if despite an order passed by the Court, a person refuses to submit himself to such medical examination, a strong case for drawing an adverse inference would be made out. Section 114 of the Indian Evidence Act enables a Court to draw an adverse inference if the party does not produce the relevant evidences in his power and possession.

Some controversial issues have also arisen with respect to whether a person can be compelled to give DNA samples as evidence. These problems have arisen particularly with reference to the dictum of the Supreme Court in **Gautam Kundu v. State of West Bengal**³⁰³. The interpretation of this case and others has led to some conflicting decisions in the High Courts.

In **Syed Mohammad Ghouse v. Noorunnissa Begum and Ors.**³⁰⁴, the Andhra Pradesh High Court held that the respondent in this case was under no compulsion to submit to a DNA test. The order of the family Court directing the DNA test was set aside and the Court relied on **Kundu's case**.³⁰⁵ In **Gautam**

³⁰² AIR 2002 Delhi 217

³⁰³ 2003 AIR SVW 1950; AIR 2003 SC 3450

³⁰⁴ 2001 Cri LJ 2028

³⁰⁵ *Gautam Kundu v. State of West Bengal*, 1993 Cri LJ 3233; AIR 1993 SC 2295

Kundu v. State of West Bengal³⁰⁶, the Supreme Court had made the following observations with respect to directions to give a blood test:

1. “That Court in India cannot order blood test as a matter of course”.
2. “Wherever applications are made for such prayers in order to have roving inquiry the prayer for blood test cannot be entertained”.
3. “There must be a strong prima facie case in that the husband must establish non-access in order to dispel the presumption arising under Section 112 of the Evidence Act”.
4. “The Court must carefully examine as to what would be the consequence of ordering the blood test: whether it will have the effect of branding a child as a bastard and the mother as an unchaste woman”.
5. “No one can be compelled to give sample of blood for analysis”.

However, there have been several High Court cases that have distinguished Kundu’s case while dealing with cases of DNA testing and paternity. In **Kanchan Bedi v. Gurpreet Singh Bedi**³⁰⁷ the defendant denied that any marriage had taken place between him and the plaintiff, and therefore he was not the father of the child. A DNA test was demanded to determine the paternity of the child and the direction of the Court with respect to the DNA test was challenged. Kundu’s case was distinguished on facts and on the ground that the future of a minor infant was in question and the Court’s *parens patriae* jurisdiction had been invoked in this regard.

Again, in **Sajeera v. P.K. Sahn**³⁰⁸ a direction to undergo a DNA test was given. However, in this case it was already admitted by the mother that the child was born out of wedlock and there had been an illicit relationship. Moreover, the Respondent had expressed willingness to undergo the test at the petitioner’s cost and there was no question of compulsion.

³⁰⁶ Ibid.

³⁰⁷ 2003 (103) Delhi LT 165

³⁰⁸ 2000 Cri LJ 1208 (Ker). No question of compulsion arises in the case of preserved fetus and direction to conduct paternity test can be made— *Alika Khosla v. Thomas Mathew*, Manu/DE/1842/2001.

Another related issue is of the refusal to undergo a DNA test in paternity cases. It has been held by the Supreme Court that refusal to undergo a paternity (DNA) test would bar a party from challenging the paternity of the child. **Dwarika Prasad Satpathy v. Bidyut Prava Dixit.**³⁰⁹ This decision of the Supreme Court has been followed in the case of **K. Selvaraj v. P. Jayakumari**³¹⁰ and, it was also stated that an adverse inference can be drawn if the party refuses to undergo a DNA test. The point of adverse inference is also referred to in another case **Sadashiv Mallikarjun Kheradkar v. Nandini Sadashiv Mallikarjun Kheradkar.**³¹¹ This seems to be a preferable interpretation and strikes a balance between the two extremes. The Court does not have the power to direct the giving of a sample, but if it is not given the Court may draw an adverse inference.

An ordinary finger print (thumb impression) is a reliable technique in crime detection but DNA finger printing is much more reliable, because ordinary finger prints are not always available in the crime scene, as shrewd criminals commit crimes by using hand gloves.

Thus, it is known that every person has a unique and distinct DNA characteristics and it will not match with any other person.³¹² By employing the basic structure of DNA finger printing, many complicated legal problems have been solved. Since the success of the DNA profiling techniques and application of DNA testing in judicial trials the process of DNA has now gained popularity in India. Hence, the Law Commissions 185th report, the provision of various Acts have been amended to accept, the DNA evidence in courts of law and to enable the wonderful abilities of DNA profiling.

³⁰⁹ 2000 Cri LJ 4748 (Kerala), 2000 Cri LJ 1 : AIR 1999 SC 3348

³¹⁰ 2000 Cri 1995, Cri LJ 4090 (Bom).

³¹¹ 1995 Cri LJ 4090 (Bom).

³¹² The Unreported Judgments (Journal Section) Volume 2005 (2), Article by Dr. Durga Pada Das.

CHAPTER-V

FORENSIC ANALYSIS IN CRIMINAL INVESTIGATIONS, SCOPE, EXTENT AND LIMITATIONS OF DNA

Since DNA is the part of forensic science, it becomes relevant to study the different dimensions of the use of DNA evidence, for example, in the matter of criminal investigation and trial. Hence, an attempt has been made in this chapter to analyse the scope, extent and limitations of forensic analysis of DNA in criminal investigations. In this regard, it can be said that the word “Forensic” is a derivative of Latin word “Foresis”, which means belonging to market places or forum. In old Rome, forum or public meeting places were the sites where legal cases were tried. The Oxford Dictionary says ‘Forensic’ means ‘pertaining to law courts’ and according to another it means “crime-solving relating to the application of science to decide questions arising from crime or litigation”.³¹³

In the post historic era, it was Chinese who first used Forensic science to solve criminal cases. Documents show that in seventh century AD, a Magistrate in Tang dynasty-Ti Jen-Chieh used to solve criminal cases using Forensic Science. These facts have been recorded in old Chinese records.³¹⁴

The term Forensic Science includes application of all sciences, as well as jurisprudence. In fact, it is science through which material evidence is collected, preserved and analysed to be produced in a court of law. In that way, this science has been helpful in detection of crime during investigation process and seldom used to determine civil rights. Though Forensic awareness in India or for that matter in Asian countries is very poor among investigators (police), lawyers and judiciary, what to say of common men for various reasons. The main reason being lack of scientific temper due to lack of knowledge and not due to the financial constraints, as suggested by some.

³¹³ Encarta World English Dictionary.

³¹⁴ <http://inkstonepress.com/book-by-book/judge-dee/>

Courses in Forensic Science are available in only four or five Indian Universities, whereas about 90 Universities in U.S. impart education in this field. Most of the investigators, prosecutors, independent lawyers and members of judiciary neither have any training, education or even knowledge in the field of Forensic Science, nor there are many consultancy services available in the country which may help these people. This lack of information has given wild concepts among these people.

Recommendations are coming from all quarters, including National Human Rights Commission of India to boost the awareness, through all available means, so that, according to the Commission, Forensic Science may help in preventing violation of human rights as in its absence the other tools for collection of evidence becomes torture, custodial violence or other type of inhuman treatment.³¹⁵

This science may not only help finding and nabbing real culprits and criminals, but also save innocent people from being harassed, as this science is capable of finding clinching evidence through scientific methods.

Answers to crucial and very important matters in criminal investigation could be scientifically found for the following questions-

- (a) Whether a crime has actually been committed?
- (b) Mode of committal of crime.
- (c) Actual time of occurrence.
- (d) Pinpointing the person or persons who committed the crime.

For finding answers to above mentioned questions, Forensic Science takes help from Chemistry, Medicine, Surgery, Photography, Physics, Mathematics, Biology (including Molecular Biology and Genetic engineering etc. as in case of DNA identification) etc. Besides this, science has developed its own methods and branches which may include Anthropology, Hair and Fibres Studies, Fingerprint, Odontology, Entomology, Pathology, Toxicology, Forensics of questioned

³¹⁵ Report of the National Human Rights Commission in India, 2012.

documents and hand writing, Forensic engineering and Ballistics, Forensic neuropathology, Forensic electronics including computer data processing and newest of them all is DNA fingerprinting and matching for identification.³¹⁶

As DNA profiling and matching is still in its developmental stage and as there are other time tested methods, these methods should be tried in place of DNA. The courts may wait till the DNA Forensics attains perfection and any decision made in haste is bound to lead towards disaster.

5:1 Branches of Forensic Science :

Brief details of some of the branches of Forensic Science are as follows :

(i) Ballistics- This branch studies makes and functions of fire arms and ammunition, the firing modes and travel of bullets through different mediums. Through this branch, it could be found whether a particular bullet or cartridge case was fired from a particular weapon and this is ascertained through matching the fingerprints' of barrel or chamber of the weapon or the bullet (found inside the victim's body or otherwise) or the used case of the cartridge.

(ii) Anthropology- Unknown and unidentified human remains are studied under this branch to identify the victim, mode and cause of death and leading evidences are collected to pinpoint the culprit. Nearly one and half century ago, Dr. Jafferries Wyman, who was professor of Anatomy at Harvard University, studied the remains and bones of a person named Parkman, who went to collect his money from Webster and was not seen alive thereafter. Dr. Jafferries testified that bones matched a person of size and age of Parkman. Besides dentures of Parkman was recognised by his dentist, resulting in conviction of Webster.³¹⁷

(iii) Entomology- In criminal investigation sometimes insects and arthropods play a great role in determining the time of death or the movements of corpse, suspects, vehicles, victims or other items from one place to another.

³¹⁶ <https://www.csfs.ca/wp-content/uploads/2016/05/booklet2007.pdf>

³¹⁷ <http://library.thinkquest.org/17049/gather>

Due to this reason, this branch has been sub-divided into three branches-urban, stored products and medico-legal. The insects and other arthropods have set living and reproducing cycles, the time of death or the movement can be ascertained through the insects found on them. In case time of death is more than 72 hours, entomology can scientifically determine the accurate time.³¹⁸

(iv) Fingerprints- Even the old pre-historic carvings and paintings on the rocks show that fingerprints could be used. Such evidence is available at many places.

Odds against two persons having same set of fingerprints are 64 billion to 1. Total number of persons who lived on this earth is a little more than 100 billion (calculated till 1991). Hence, matching fingerprints for identification of a person is one of most accurate means.

Against that odds two persons having similar DNA are much less, compared to fingerprints. Twins have similar DNA profiles but their fingerprints do not match.

(v) Hairs and Fibres- Any individual may be identified through hairs or fibres of his garments etc.

(vi) Odontology- One may be surprised to know that odds against two persons with full set of 32 teeth, producing identical bite marks are 2.5 billion to 1. Teeth are very peculiar structures and even after death they are most durable, because they resist putrefaction for very long time. Teeth provide a very good source of identification and decay in cases of aircraft crashes or other eventualities of mass destruction. Sometimes criminals mutilate the features of their victims and even chop the fingers to conceal the identity of victims. Almost in every case teeth are found intact. People may have carious teeth, fillings, discolouration of teeth, cavities and different fixation and arrangements, through which a person may be identified. In Scandinavian countries, it is mandatory for everyone to give his dental record to be preserved with the State.

³¹⁸ Ibid.

With the examination of teeth, age and sex of the person may also be ascertained. Mouth is divided into four quadrants, - each having 8 teeth, 2 incisors, 1 canine, 2 premolars and 3 molars. The age of eruption of each one of these has within a time frame starting from childhood. Therefore, by barely examining which teeth have erupted and which have not, one can tell the age of the person.

Similarly looking for Y Chromosome (male) in the pulp extracted from inner sides of the teeth, sex of the person may be determined.

This branch of odontology is in quite advanced stage in Japan, where whole mouth parts are being studied for crime detection. Such experts are called Odontostomatologists. Japanese experts have found that lip prints are also as unique as fingerprints. Lip marks could be lifted from glasses through which somebody had drunk something. This sub-branch is called Cheiloscropy. They claim that these lip marks may be lifted from the body of victim who had been subjected to kissing in passion cases.

5:2 Techniques of Examination :

New techniques for systematic examination of teeth and bite marks has been developed and called RACMIZATION³¹⁹. This new technique does not depend on eruption or fusion of teeth falling in sequence. The new techniques are:

(i) Pathology- This is the scientific study of alterations in human body due to disease or any other cause, such as death. When a dead body is first found, a medical examiner is called to ascertain whether the cause of death was due to murder, suicide or accident, and if it is found that the cause of death was due to some crime, the dead body is sent to a pathologist. The pathologist examines the body and due to alterations and various tests, if required, may infer various things including time and mode of death etc.

(ii) Controversial documents- Under this branch controversial documents are studied for forgeries, whether they are hand written or typed. The specific pen or

³¹⁹ Indian Police Journal, January-March, 2001 Vol. XLVIII, No. 1.

typewriter may be pointed out which had written or typed the whole or part of it or whether something was added afterwards.

(iii) Toxicology- Any substances which is harmful for human consumption, Including poisons, are studied under this branch, and Forensic Science ascertains whether the offence was committed through the use of those substances. For this purpose, human body fluids, tissues and various organs are scientifically tested. Different kinds of drugs, alcohol and poisons are the subject-matter of this branch.

(iv) DNA Profiles and Identification- In the foregoing chapters it would be dealt in detail.

(v) Other New Branches- Other new branches in the field of Forensic Science are emerging. They are,- Computer, cellular telephony, digital Image processing, miniature devices and their identification, femtochemistry, accoustics, environmental crimes and wild life forensics etc.³²⁰

Besides that, new techniques are being developed in ‘preventive forensics’ to check the commission of crime.

Hence, for producing better quality of evidence Forensic scientists use old and most modern techniques, from post-mortems to sophisticated DNA fingerprinting and analysis. Following methods are generally used-

- (i) Measurements
- (ii) Mathematical calculations
- (iii) Photography
- (iv) Infra-red and ultra-violet rays and ultrasound waves
- (v) Chromatography
- (vi) Microscopy
- (vii) Electrophoreses
- (viii) Spectrography
- (ix) Laser scannings

³²⁰ Indian Police Journal, January-March, 2001 Vol. XLVIII No. 2.

- (x) Spectrophotometry
- (xi) Neutron Activation Analysis
- (xii) X-ray diffraction Analysis
- (xiii) DTA and NMR Palaeography
- (xiv) PCR etc. techniques (for DNA analysis)

As far as Indian scenario is concerned, lack of real trained personnel and equipment is a hindrance in development of this science. First Chemical Examiner Laboratory was established at Madras in 1849 and since then chain of laboratories were established at Calcutta (1853), Agra (1864) and Bombay. After independence Government of India has established Forensic Science laboratories in different parts of the country which are run by Home department. Different States have also established their own laboratories.³²¹

A few laboratories where DNA profiling and matching could be done, have been established and one is at Hyderabad etc. (at Centre for Cellular and Molecular Biology Hyderabad, AP Forensic Science Laboratory, Rajiv Gandhi Centre for Biotechnology (RGCB) but they function in the same irresponsible manner as most of other Government departments do. Causes are many and complex. The low pay scale and system of promotions restrict sincere and highly qualified persons from joining these laboratories. Due to steep rise in crime rate and meagre presence of these laboratories, the work load is very heavy due to which quality in work automatically deteriorate. Lack of funds for purchasing latest equipment is another reason for bad performance. For allocation of funds for different projects, sanction of Central or State Governments have to be taken, which in normal course takes 2 to 3 years and by that time the project becomes obsolete because of rapid advancement in the field. Overall bureaucratic red tapism takes its toll in the performance, integrity and efficiency of these laboratories.

³²¹ R.K. Tiwari, K.V Ravikumar, History and Development of Forensic Science in India, Bureau of Police Research & Development, Ministry of Home Affairs Government of India, New Delhi, Volume 46, Issue 4, Year 2000.

Where these laboratories are directly functioning under the police departments, their analysis and reports are seen with suspicion. What is urgently needed is giving those laboratories an autonomous status and reforms in service conditions of scientists. Unless these steps are not taken, it would be useless to change the existing law or legislate new ones, as suggested by many. Amendments in Criminal Procedure Code or Evidence Act would only enhance problems and no redressal could be expected in the present state of affairs.

As DNA fingerprinting, profiling and matching for identification of individuals are concerned. Donald E. Riley suggests that thoroughly independent samples must be sent to more than one laboratory, because the test is so sensitive and “the proven error rate” is so high that “false convictions based on DNA evidence have been established”.³²²

Purchasing DNA testing kits is a very costly affair and Indian laboratories are using outdated kits which have no or fewer controls because of which their results should not be accepted on that ground alone.

5:3 Admissibility of DNA Evidence in Court- The Genetic Witness :

In this regard, it can be said that out of the 3.3 billion base pairs that make up a human blueprint, approximately 3 million differ between any two individuals.³²³ It is this difference that DNA testing relies on to distinguish one individual from another. DNA is found in almost every cell of a human being. Therefore, traces of blood, hair, semen, etc. at crime scenes are all sources of DNA.

The first step in the procedure for forensic DNA testing is sample collection wherein a sample of DNA-containing material is isolated.³²⁴ However, the manner in which samples are handled may contribute to contamination by human and non-human DNA. For instance, the California Association of Crime

³²² Donald E. Riley, DNA Testing, University of Washington, An Online Journal, p. 23.

³²³ Wilson Wall, Genetics and DNA Technology, Cavendish Publishing Limited, London 2002, at pp, 24-25.

³²⁴ Generally Leonard J. Deftos, “Daubert & Frye: Compounding the Controversy over the Forensic Use of DNA Testing”, Whittier Law Review, 1994, at p.958.

Lab Directors sent blind samples to three commercial laboratories in 1988 and out of 50 samples, two firms each declared a false match that could have resulted in the conviction of an innocent person. Another problem is degradation of the sample from which DNA is to be extracted. Moisture along with high temperature can greatly damage DNA structure; DNA in a wet-blood stain starts degrading within two days and a semen stain starts degrading within a week. After sample collection actual DNA must be extracted from the forensic sample. Inadequate extraction of DNA and extraction of contaminating DNA may interfere with the quality and evidentiary value of the results. Then the DNA is cut into small fragments by using specific restriction enzymes; partial digestion of the sample or altered specificity of the enzyme can shroud the test result and make data interpretation difficult or even impossible. The digested pieces of DNA are then inserted into a square-shaped gel and subjected electrophoresis and the DNA pieces line up into bands and migrate towards one end, with the smaller pieces travelling faster through the gel. However, migration for a given size of DNA may not always be uniform (called band-shifting) and this could even lead to false exclusion of a suspect.³²⁵

The DNA is then transferred to a membrane; pockets may interfere with the transfer and obscure the results. The membrane containing the DNA is then immersed in a liquid containing radioactive DNA 'probes'. These are DNA pieces that are mirror-images to comparably-sized segments of the human DNA forensic sample. Radioactive DNA probes bind to their structural complements and the radio-active marker of the probe makes the probe bound fragment 'light up' allowing easy identification of its position. Genetic differences among individuals that are revealed by these probes are referred to as Restriction Fragment Length Polymorphisms or 'RFLPs'. The DNA sequences to which the probes are directed are called Variable Number of Tandem Repeats or 'VNTRs'. After washing away excess probe, the membrane is placed against X-ray film and on processing, black bands appear where probes had bound themselves to the fragment; this image is called an autoradiograph. Duration of exposure to the film can have a significant effect on the X-ray pattern. The suspect's autoradiograph is compared to the one

³²⁵ Newton E. Morton, "DNA in Court", *European Journal of Human Genetics*, 1993 at p.174.

created by the reference sample obtained from the victim or the crime scene. This is an example of the use of Restriction Fragment Length Polymorphism (RFLP) testing but another method which has gained popularity is that Polymerase Chain Reaction or PCR testing, which requires substantially less DNA. This method was developed by Dr. Kary Mullis in 1984 and is commonly employed for samples that contain degraded DNA. The method requires the DNA to be extracted from the sample amplified using certain enzymes and then analysed. PCR testing is extremely useful in the DNA testing of dried bones, hair shafts and other trace evidence. Unfortunately PCR was not suitable for use with long DNA fragments. In 1991, Thomas Caskey suggested using smaller version of such fragments i.e. Short Tandem Repeats (STRs) instead. This led Peter Gill to develop a technique for amplifying and processing genetic information from several different loci, simultaneously. The new Polymerase Chain Reaction / Short Tandem Repeats technology that emerged was not only simpler and faster but also more sensitive and could be used with very small and degraded samples such as dandruff or decomposed body parts.³²⁶

If the profiles match, then the significance of the match must be assessed through a 'match probability' and not in terms of a straightforward 'yes' or 'no' answer. Further, 'band-shift' often results in bands in one profile being placed at a higher level than in the other. A second problem is that though one profile may match the other at several loci, there may be discrepancies in the number of bands between the two profiles. A case which raised doubts about this calculation was **R. v. Deen**³²⁷, where the prosecution argued that there were ten matching bands whereas the defence argued that there were eight. Therefore, because considerable human judgment is involved, the process is highly subjective. If a match is declared however, the probability of the matching DNA pattern originating from someone else has to be determined. The probability theory supporting the forensic use of DNA is this- every individual has a distinct DNA composition that distinguishes him or her from other individuals. Differences are greatest among

³²⁶ "DNA's Detective Story", *The Economist Technology Quarterly*, March 13, 2004, at 22.

³²⁷ (1995) Crim LR 464 at 466. *The Times*, January 10, 1994 c.f. Mike Redmayne, "Doubts and Burdens DNA Evidence, Probability and the Courts".

non-related individuals, less among relatives and in all likelihood absent between identical twins. To determine the probability that the suspect's DNA could randomly match the reference population, the product rule is used for each of the Variable Number Tandem Repeat (VNTRs) tested. Thus, where the probability of one Variable Number Tandem Repeat match is 10 per cent and another is 5 per cent, the probability of a match for both is their product, i.e. 0.005 or 1/2 per cent. The greater the number of Variable Number Tandem Repeats used, the lesser is the probability of a random match by comparison of the suspect's DNA pattern with a DNA populational database to determine the probability of the suspect's DNA fingerprint randomly matching another. The use of DNA in Court is based on the ratio between the probability of the evidence of suspect and evidentiary sample are identical to the probability that they are different; this is called the likelihood ratio. A likelihood ratio of greater than 100 is a strong indication of positive identification. However, critics claim that such interpretations are frequently incorrect and prejudicial. Because genetic traits have ethnic distributions, the correct approach would be to compare the suspect's sample to that of the appropriate population.

Thus, the match probability declared by a laboratory may be prejudicial to the suspect because neglect of genetic differences lessens the likelihood of a random match. But even within such a population, there is diversity which may lead to neglect of genetic differences between sub-groups. Potential probabilities such as 1 in 738 trillion caused enthusiasts to proclaim that a given individual could be identified from the rest of the world's population, but critics argue that this could be misleading.

DNA fingerprinting is useful for identification of persons in cases of rape, exchange of babies, paternity disputes and immigration. In 1983, there was a case regarding the son of a Ghanian woman; while the woman was a legal resident of the United Kingdom, the boy was refused permission to immigrate to the United Kingdom. DNA testing established that there was only a one in 6 billion probability that the boy was not the woman's son. As the world's population was only about 4 billion, authorities conceded and eventually allowed the boy to

immigrate, assassination, bombings.³²⁸ After the 1995 bombing of the federal building the Oklahoma, a leg was found in the rubble and DNA testing established that it belonged to an African-American woman. This information was then used to make a positive identification,' infanticide, etc. DNA can be used not only to determine culprits but also to identify victims. DNA testing is equally useful in eliminating suspects. It is also used in distinguishing copycat crimes from serial crimes; samples from multiple crime scenes can be tested to determine whether more than one person is involved. Before specifically examining admissibility of DNA evidence in Court, it is necessary to examine the need for and concept of expert evidence.³²⁹

DNA finger-printing has found widespread acceptance as a system of identification because of certain special features and advantages it has, over other older methods of identification such as Bertillonage, Finger printing, and blood and serum analysis. Compared to Bertillonage³³⁰, it has far more scientific basis and methodological reliability.³³¹ While it may be argued that finger-print has marginally more discriminatory power than DNA Analysis³³², the latter is more 'objective' since the subjective element is lesser in DNA analysis as opposed to finger-printing.³³³ Blood group analysis also has nowhere near the discriminatory power of DNA analysis. Blood group analysis can determine definitely that a

³²⁸ Kamrin T. MacKnight, "The Polymerase Chain Reaction (PCR): The Second Generation of DNA Analysis Methods Takes the Stand", Santa Clara Computer and High Technology Law Journal, 2003 at p. 103.

³²⁹ 2006 Cri LJ, Journal Section, at page 48, 49.

³³⁰ Wilson Wall, Genetics and DNA technology Legal Aspects (London Cavendish Publishing, 2002) at p. 2. An early system of identification devised by Alphonse Bertillon based on measurements made of various parts of the body and notes taken of scars, body marks and personality characteristics, which unlike DNA analysis was neither precise nor accurate, referred in 2003 Cri LJ, Journal Section at 280.

³³¹ See Article by Arjun Krishnan, National Law School of India, University, Nagarbhavi, Bangalore, printed in 2003 Cri LJ, Journal Section at page 280.

³³² Wilson Wall, Genetics and DNA Technology Legal Aspects (London Cavendish Publishing, 2002) at p. 8. This is so because while identical twins share exactly the same DNA, they can be differentiated on the basis of their finger-prints, which are unique even amongst twins.

³³³ Wilson Wall, Genetics and DNA Technology: Legal Aspects (Cavendish Publishing, London 2002) at p. 9. Fingerprint comparisons are made subjectively and there are many factors which must be taken into account (such as pressure exerted, size of the print, etc.) before arriving at a conclusion. Since finger-print comparisons are made subjectively, only using certain features, the possibility of similar finger-prints being mistakenly thought to have come from the same person becomes a much more realistic one.

particular sample does not come from person X, but it cannot tell us with absolute certainty whether it does in fact come from another person, Y.

Chemically, DNA is a simple enough molecule and is made up of only 4 different kinds of components.³³⁴ However, because of this simplicity that approximately 3,000,000,000 of these building blocks are required to generate the variety required for the approximately 35,000-40,000 genes that make up the human genome. Such is the complexity of the human genome that only a part of the genome can be utilised for the purpose of DNA finger-printing. Though it is well known that an individual's DNA is unique to him/her, what is often not realised is how much of an individual's DNA is in common with that of other individuals.³³⁵ Therefore, the scientific expert only has a part of the entire sequence of the individual's genome available for him to make his judgment. This clearly has a bearing since the judgment is based not on the whole, but only a part of the possible material and, therefore, all that more difficult.³³⁶

Since the discovery of dermal finger-printing analysis, the analysis of DNA has been perhaps the single most important advancement in the help of forensics. As a system of identification, DNA finger-printing scores well on all counts.³³⁷ This chapter examines the evidentiary aspects of DNA finger-printing

³³⁴ Daniel Burke and Daniel Whiteman, "Argue With Science? The Admissibility Debate Surrounding DNA Identification", in Saint John's Journal of Legal Commentary (1992) at p. 602. The structure of the DNA molecule has been described as a 'double helix', which is essentially a twisted ladder. Alternative phosphate and deoxyribose sugar units comprise the sides of the ladder, while the connectors or "rungs" of the ladder are composed of pairs of "bases" ("base pairs") known as Adenine ("A"), Thymine ("T"), Guanine ("C"), and Cytosine ("C"). The different sequences of the base pairs formulate each person's genetic code.

³³⁵ Ibid at 56. Some areas of the human genome are so highly conserved through evolutionary time that almost the same gene sequence can be found in every animal and most plants with only very minor changes. Therefore, as far as forensic applications are concerned, a great deal of the genome has no application and little discriminatory power. See also Ricardo G. Federico, "The Genetic Witness DNA Evidence" in 1992 Criminal Law Quarterly, at p. 205

³³⁶ In at least one Indian case, *Chandradevi and others v. State of Tamil Nadu*, MANLJ/TN/2335/2002, the Court has relied on expert evidence on DNA evidence that has stated that out of the 3.3 billion base pairs only about 3 million vary from person to person, i.e. 1% of the DNA is useful for analysis.

³³⁷ It is unique for each individual, and is fixed and unalterable for any given individual. Furthermore, it is present in each individual in some measure and technology has sufficiently advanced so that evidence of DNA can be recorded in such a manner that it allows for easy comparison. In a Court of law, it also examines the evidentiary aspects of DNA finger-printing with respect to both civil and criminal cases. See 2003 Cri LJ, Journal Section at p. 281.

and analysis, and how the Courts have dealt with the same. This section looks at how DNA evidence is and should be presented.

5:4 Burden of Proof:

DNA evidence should not be looked at in isolation.³³⁸ This is particularly true of criminal cases where the burden of proof is usually on the prosecution and the case has to be proved beyond reasonable doubt.³³⁹ Even in the cases when the DNA is the evidence. The burden of proof remains upon the prosecution and the additional aspect is to explain the validity and authenticity of sample used for DNA testing.

5:5 DNA and Criminal Cases:

Despite the issues and evidentiary hurdles that have been referred to in the course of this research, Indian Courts have accepted the evidence of DNA experts: Unlike the area of paternity disputes where there seems to be some degree of controversy, in the field of criminal law Courts have readily accepted DNA evidence in India. So far, however, there have been no conflicts solely on the basis of DNA evidence.³⁴⁰

One instance of the application of DNA profiling/finger-printing evidence being used to convict the accused persons can be seen in the case of **Chandradevi v. State of Tamil Nadu**.³⁴¹ This sensational case involved the rape and murder of several teenage girls in the Ashram of a god-man Premananda alias Ravi, by the god-man and his accomplices.

In a lengthy judgment the Madras High Court considered 4 important questions :

³³⁸ 2003 Cri LJ, Journal Section at p. 282.

³³⁹ To illustrate this point the following example may be used- The DNA evidence points to the fact that person X was at the scene of the crime at 9.30 p.m. However, there is also evidence by way of testimony of witnesses and the recording of a security camera that person X was in a shopping complex at the time. Assuming that person X does not have a twin, person X cannot be convicted on the basis of the DNA evidence in light of the other evidence. Either an error has taken place during testing or another person has the same DNA match as person X.

³⁴⁰ In light of the discussions in Section 1.2, this is in fact the ideal situation.

³⁴¹ Manu/TN/2335/2002.

1. Whether the DNA evidence is generally accepted by the scientific community?
2. Whether the testing procedure used in this case is generally accepted as reliable, if performed properly?
3. Whether the tests were performed properly in this case?
4. Whether the conclusion reached in this case is acceptable?

In answering the first question the Court relied on the extent to which Courts in the United States had relied on evidence of DNA analysis. The 2nd, 3rd and 4th questions were all answered in the affirmative and the accused persons were convicted on various counts on the basis of the evidence of experts on DNA finger-printing/profiling and other evidence. However, in another case **M.V. Mahesh v. State of Karnataka**³⁴², the Court acquitted the accused, one of the grounds being that the requisite amount of DNA of high molecular weight was not present so as to make the test results sufficiently conclusive and accurate. The Court further went on to say that the DNA test was not a fool proof one and also commented on the fact that there were no national standards set or established for DNA testing in India.

Such scrutiny of the DNA testing procedure is commendable and any benefit of doubt arising from malpractices or irregularities in the scientific processes involved ought to go to the accused.³⁴³

5:6 DNA and Probability-Some Issues :

As stated earlier, an individual's DNA is unique to that individual. However, much of our DNA is common with the rest of the living world and also with other individuals. This makes differentiation between individuals with absolute certainty very difficult. For this reason much of DNA finger-printing evidence is in terms of probabilities.³⁴⁴

³⁴² 1996 Cri LJ 221 (Kant).

³⁴³ 2003 Cri LJ, Journal Section at 284.

³⁴⁴ 2003 Cr1 LJ, Journal Section at 281.

5:7 DNA Evidence is not Infallible :

Due to the fact that each individual's DNA is unique to him or her; the perception that DNA evidence is infallible is created. These perceptions of infallibility are in fact unfounded. There are two important factors to be taken into consideration in this regard.

Apart from the fact that there may be errors in the testing process, there is also the major question of statistical reliability, it must always be remembered that even where the probability that a sample comes from person X is 1 in 1 crore. One cannot rule out the possibility that the sample came from another person. That is the very nature of probability of evidence.³⁴⁵

5:8 Presentation of DNA Evidence in Court:

There is fundamental difference between how DNA evidence is presented and how other kinds of identification/ identity evidence is presented in a Court of law. The difference has more to do with the fact that unlike DNA evidence, earlier types of identification evidence are not derived from a coherent body of data and statistical reasoning.

It would be useful to compare the evidence of an expert on finger-prints and the evidence of an expert in the case of DNA. A finger-print expert gives an opinion, usually by stating that he/she is certain that the sample belongs to the person/accused. On the other hand, the DNA expert gives an opinion by presenting the evidence in the form of a numerical statement known as a match probability.³⁴⁶

5:9 DNA Test- A Forensic Boon :

Current gold standard of evidence provided by forensic science is DNA testing. DNA stands for Deoxyribonucleic acid. It is the biological blueprint of

³⁴⁵ In the field of probability, it is said that where the happening of a certain event is certain the probability of that event is expressed as 1. As far as DNA evidence is concerned, current scientific methods do not provide for a match probability of 1, referred in 2003 Cri LJ, Journal Section at 281.

³⁴⁶ Ian Evett, Lindsey Foreman, Graham Jackson and James Lambert, "DNA Profiling : A discussion of issues relating to the reporting of very small match probabilities" in (2000) Criminal Law Review 341, referred in 2003 Cri LJ, Journal Section at p. 281.

life. DNA finger-printing profiles are unique to each individual. Hence DNA profiling is routinely used to link individuals to biological evidence found at crime scenes which has generated considerable excitement in the criminal justice community. DNA finger-printing can be applied to identify an individual in criminal as well as civil cases. Therefore, DNA testing is now being accepted in legal cases widely.³⁴⁷

The main advantage of this technique is its ability to analyse small and environmentally challenged samples and to accurately establish their origins with a high degree of certainty. One of the major advantages of DNA typing is that DNA is much resistant to degradation caused by the environmental conditions. Moreover DNA is somatically stable. It generates the same genetic pattern irrespective of the biological material like hair, seminal stains, fresh blood, soft tissue, hard tissue, etc. In fact, this unique feature of DNA makes it a powerful tool in forensic identification. DNA can be successfully obtained from blood and blood stains, vaginal and anal swabs, oral swabs, well worn clothing, bone, teeth, most organs and to some extent urine. Saliva per se has few nucleated cells, but, beer and wine bottles, drinking glasses, beer cans, soda cans, cigarettes, stamps and envelope flaps have all been found to provide varying amounts of DNA. This shows DNA finger-printing can connect the crime scene or from a body to another particular individual. Except DNA other markers get degraded very soon. The main factors of degradation include temperature, time, humidity- which lead to the growth of micro organisms, exposure to ultra violet sunlight and various chemical substances which are often found together in the environment. But DNA is much more resistant to these factors caused by the environmental conditions. It is reported that even if biological material gets degraded, it is possible to conduct DNA testing as it remains stable except it gets broken into smaller fragments. Reports on forensic application of DNA tests are emerging which seem to work with even dried blood stains as sperm making it potentially valuable in criminal investigation.³⁴⁸

³⁴⁷ 2003 Cri LJ, Journal Section at p. 349.

³⁴⁸ 2003 Cri LJ, Journal Section at p. 349.

5:10 Applicability in Indian Judiciary System :

It can be said, in this regard, that the DNA finger-printing a novel method to identify an individual has the applications in the following situations:

In criminal and civil case- (a) Rape, (b) murder, (c) kidnapping, (d) exchange of babies, (e) infanticide, (f) abandonment of child, (g) illegal abortion, (h) paternity related dispute, (i) immigration, (j) inheritance and (k) assassination.³⁴⁹

The DNA FP has been applied in many other popular cases like. (1) Human population - Rajiv Gandhi case, Premananda Swami case, Tandoor murder case, immigration case, Steve bing case, Blue dressclintion Lewinsky case, OJ Simpson case, (2) Plants genetics, and (3) Animal genetics.³⁵⁰

In India more than sixty cases have been solved with the help of DNA finger-printing including paternity disputes. Even Dhanu and Sivsarn alleged assassins of the late Prime Minister Rajiv Gandhi, were identified by DNA profiles. Using this technical, the Federal Bureau of Investigations formally concluded on 17th August 1998, the day of Mr. Clinton's testimony before the grand jury, that the stain on the dress contained Mr. Clinton DNA, saying that there was only one in 787 trillion chance that it was not, later on the formal finding was the truth.³⁵¹

The first criminal conviction based on DNA testing was in the 1986 U.S. case of **Florida v. Andrews**. In **Andrews v. State**³⁵², DNA are compared for the purpose of identifying the perpetrator of a crime. The Trial Court admitted the evidence, and the jury convicted defendant of aggravated battery sexual battery and armed burglary of a dwelling. Thereafter various cases have been solved. But there are few cases where DNA typing of non-human (plant and animal genetics) biological samples have been of use in criminal trials to date have involved identification of an individual identification rather than of determination of the

³⁴⁹ 2003 Cri LJ, Journal Section at p. 349.

³⁵⁰ 2003 Cri LJ, Journal Section at p. 349.

³⁵¹ 2003 Cri LJ, Journal Section at p. 349.

³⁵² 533 SO 2d 841 (Fla. Dist. Et. App.1988).

species of origin. These cases have been unique, with little widespread application (e.g. snowball, the cat and a palavered tree in Arizona, however, the potential for widespread application is great, pet hairs have been transferred from suspects to crime scene and *vice versa*. One can imagine that plant subspecies determination or identification might be very useful for marijuana tracing. One can also imagine that grasses found on the shoes of suspects might be very important and common evidentiary specimen to link suspects to crime scenes. In these cases chances of availability of DNA finger-print is much more than that of finger-print.

A DNA test has confirmed that former Asom Gana Parishad Minister Rajendra Mushahary was the biological father of the child whose mother had alleged that Mushahary had raped her twice and made her pregnant. The police hold to seek the Court's permission for DNA profiling when the investigation into the rape case had reached the dead end only for this unique technique.³⁵³ It is peculiar that demand is going on death penalty for rape but is it not desirable to go for a DNA test in rape cases to reach to a conclusion easily. This will be certainly a good piece of evidence against the accused. It will also eliminate false charges of rape.

It is the technique that investigators used to expose the attempt to pass off the killing of five innocent civilians in Jammu and Kashmir as that of terrorist. To ascertain the identity of the dead the Government obtained DNA samples of the corpses to match them with the blood samples of their relatives.³⁵⁴

DNA finger-printing is at the 'cutting edge' of forensic science. If DNA finger-printing works and receives evidentiary acceptance, it can constitute the single greatest advance in the search for truth and the goal of convicting the guilty and acquitting the innocent since the advent of cross-examination.³⁵⁵

5:11 DNA Data Bank :

The door is opened to the possibility that this technology could be applied to forensic evidence massively. The forensic DNA analysis can be stored in a

³⁵³ Times of India 3.08.2002.

³⁵⁴ Times of India 18.01.2002.

³⁵⁵ 2003 Cri LJ, Journal Section at p. 350.

databank. It can lead to unique and unimaginable results as one can change his name, even his looks, but it is impossible to alter the DNA profile. It will confirm or deny a person's association after police investigation. In the absence of other evidence police can determine or eliminate suspects, with the help of DNA evidence, DNA databank can help in crime prevention by giving the information of potential criminals. DNA databank can be used to link crimes committed by serial offenders if both are found in a case gives a strong proof of the person's involvement. The person suspected for an unsolved crime can avoid hassle from police, if voluntarily gives sample and found negative. It can apprehend the criminals just acting as eye-witness and crime recorder of the offence, hence refrain the offender from criminal activity, DNA databank will reduce the time and expenditure.

In United States of America, a rape and murder was solved by a match between DNA from blood and semen found at the crime scene and a data bank samples from a person imprisoned for burglary. There were also various instances where some alleged persons were acquitted and proved their innocence only by the DNA test. This could not be possible without this data bank and the wonderful technique with us. Now United States of America and United Kingdom have DNA data bank legislation.

Transplantation of Human Organs Act 1994 has recognised the status of gene test. Under this Act, to establish the identity of near relationship of donor and recipient, two multilocus gene probe test is required in case of doubt. But this is not enough at present time in the area of DNA test. By considering the achievements on gene test India must draft a model legislation for its best utility.

In India it is not possible to preserve DNA data of each and every person. It also violates the human rights and privacy concern, hence it must be confined to those who are convicted in sexual offence, theft, murder and in habit of committing these type of offences. Privacy advocates fear that samples from DNA data base will be used in research aimed at identifying criminal gene. Utmost care should be taken to prevent the manipulation of the preserved data. In order to withstand the challenges of court and to be viable in long run DNA data bank

requires legislation without any human rights and privacy violation. India should come forward to draft a legislation in this regard to use DNA test as evidence under guidance of a committee of scientists, jurists, representatives from the rights bodies, security organisations such as the police and defence forces.³⁵⁶

DNA test and presumption under Section 112 of the Indian Evidence Act, 1872. Section 112 of the Evidence Act, 1872 reads thus:

“Birth during marriage, conclusive proof of legitimacy-The fact that any person who was born during the continuation of a valid marriage between his mother and any man, or within during two hundred and eighty days after its dissolution, the mother remaining unmarried, shall be conclusive proof that he is the legitimate son of that man, unless it can be shown that the parties to the marriage had no access to each other at any time when he could have been begotten”.

In the case of **Kamti Devi v. Poshi Ram**³⁵⁷, Apex Court held that the result of a genuine DNA test is said to be scientifically true. But even that is not enough to escape from the conclusiveness of Section 112 of the Act, e.g. if a husband and wife were living together during the time of conception but the DNA test revealed that the child was not born to the husband, the conclusiveness in Law would remain un rebuttable. This may look hard from the point of view of the husband who would be compelled to bear the fatherhood of a child of which he may be innocent. It is sublime public policy that children should not suffer social disability on account of the laches or lapses of parents. For this law leans in favour of the innocent child from being bastardized if his mother and father were living together during the time of conception.³⁵⁸

The section when stretched to its widest compass is capable of encompassing even the birth of a child on the next day of a valid marriage within the range of conclusiveness regarding the paternity of its mother’s husband, but it

³⁵⁶ 2003 Cri LJ, Journal Section at p. 350, 351.

³⁵⁷ AIR 2001 SC 2226.

³⁵⁸ 2003 Cri LJ, Journal Section at p. 251, 252.

excludes the birth happened just one day after the period of 280 days elapsing from the date of the dissolution of that marriage.

Medical jurisprudence³⁵⁹ evidences that there is a lot of chance that maximum period of pregnancy can be above 280 days. The section does not apply to all these critical situations. To establish the legitimacy of children DNA test is the only method. Law according to Section 112 demands 280 days is the only period after dissolution of marriage the mother remaining unmarried, can claim the legitimacy of the child. But what about the maximum gestation periods like 300, 324, 331, 336 355, 389 days as described in page Nos. 540 to 542 of Modi's Medical Jurisprudence. In these cases DNA test is the only medical boon available to solve the dispute.³⁶⁰

5:12 Reliability of DNA :

For the purpose of reliability by way of giving emphasis on following points, we can believe in its reliability and authenticity. For examples, by way of-

- (i) Extensive use of the technique in medical science for a longer period.
- (ii) Nobody argues against its reliability.
- (iii) The probability result is so high and positive that it leads to certainty.
- (iv) A further component of reliability is the frequency with which a technique leads to erroneous results. But in DNA finger-printing as testimony if there was something wrong with the process, it would ordinarily lead to no result being obtained rather than erroneous result.
- (v) Control samples are provided with main sample to avoid error. These prove its reliability.

DNA evidence will be in its success path with strong and robust legislation and reputed laboratories with standardised operational procedures. Laboratory must be well equipped and technicians must be highly skilled. Laboratory must function in collecting samples properly and promptly with proper documentation

³⁵⁹ Modi's Medical Jurisprudence, 22nd Edn., pages 540 to 542.

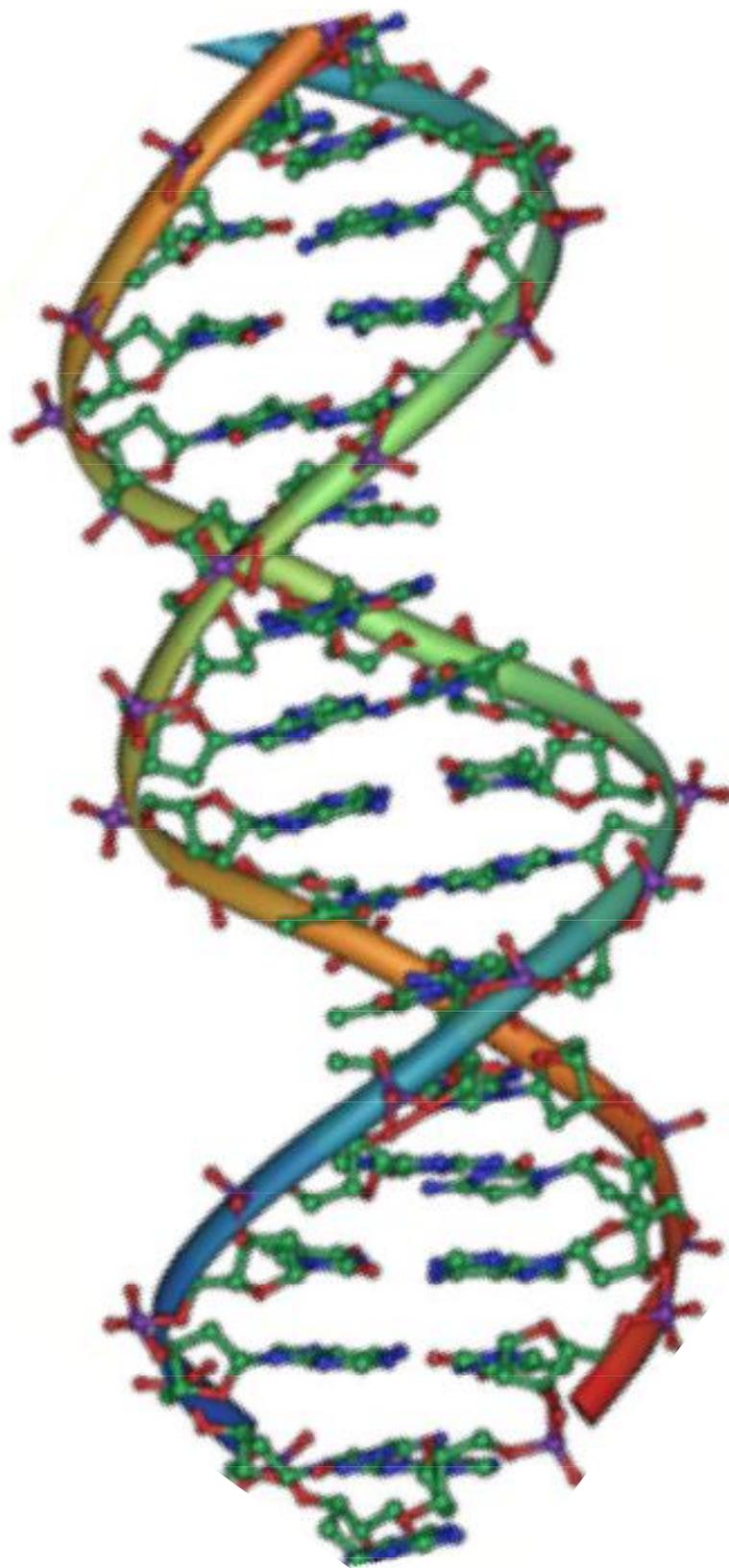
³⁶⁰ 2003 Cri LJ, Journal Section at p. 251.

authorised by law and proposed legislation. These will leave no space for dispute, rather will help in eliminating the scope for disputes. Giving emphasis on this point is that carelessness or ignorance of proper handling process during collection, preservation and transportation of biological samples of the crime scene to the DNA analysis laboratory can render a specimen unfit for analysis. Each sample should be labelled carefully with proper sealing and identification marks. The DNA analysis report was not accepted by the Court of law in case of a very famous football player OJ Simpson and the suspect was acquitted on the ground that samples were not collected and handled properly.³⁶¹

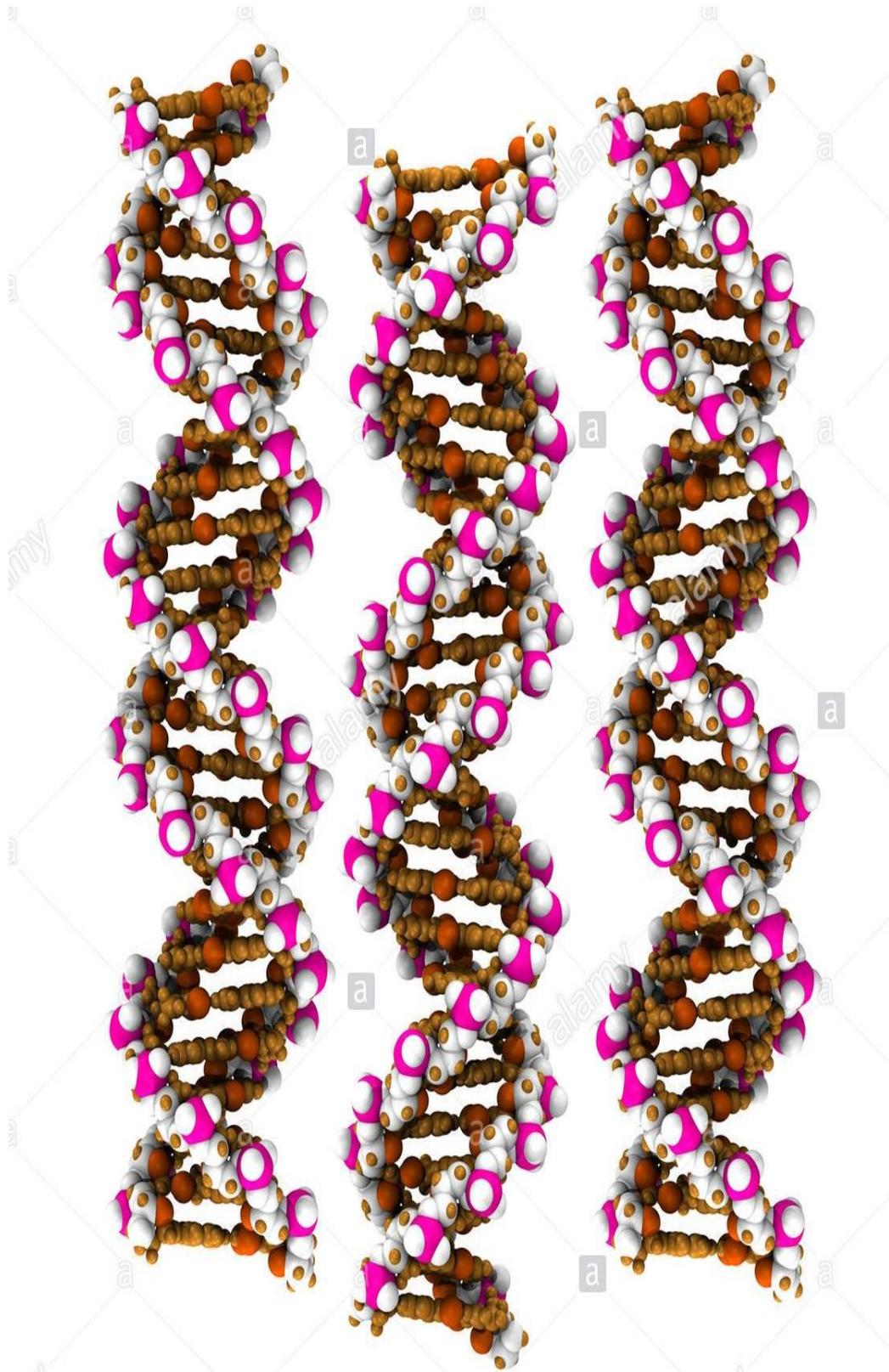
5:12:1 The General Structure of a Section of DNA :

Deoxyribonucleic Acid (DNA) is a nucleic acid - usually in the form of a double helix- that contains the genetic instructions specifying the biological development of all cellular forms of life, and most viruses. DNA is a long polymer of nucleotides and encodes the sequence of the amino acid residues in proteins using the genetic code, a triplet code of nucleotides. (Fig. 1)

³⁶¹ 2003 Cri LJ, Journal Section at p. 251.



In complex eukaryotic cells such as those from plants, animals, fungi and protists, most of the DNA is located in the cell nucleus. By contrast, in simpler cells called prokaryotes including the eubacteria and archaea, DNA is not separated from the cytoplasm by a nuclear envelope. The cellular organdies known as cliloroplasts and mitochondria also carry DNA.



Space-filling model of a section of DNA molecule (Fig. 2)

5:12:2 DNA under Electron Microscope :

The clear position in this regard is that DNA is relevant evidence and its admissibility depend and defer from case to case, person to person. For example, the clear picture of DNA can be explained in the following manner:

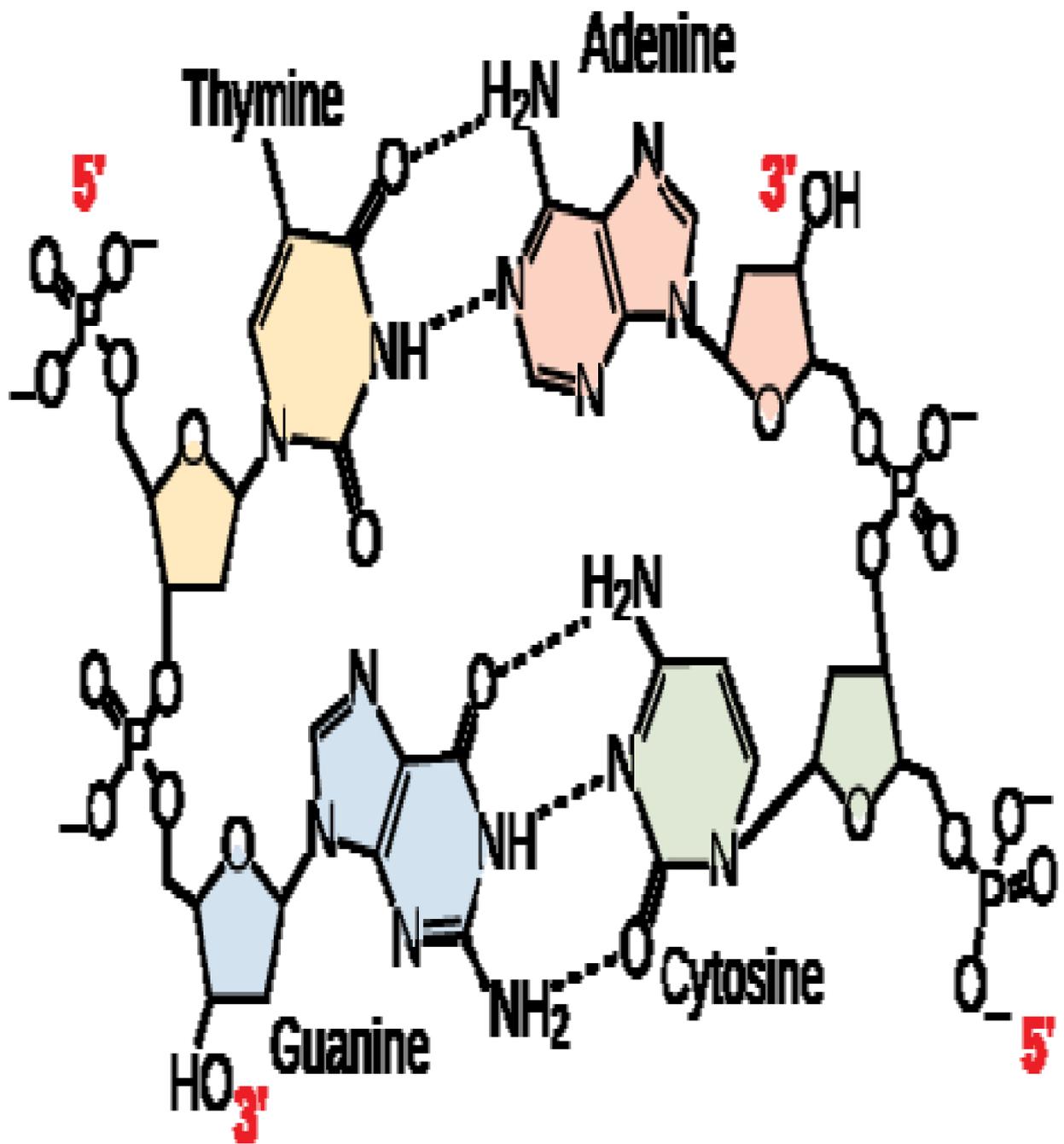
- (i) Genes can be loosely viewed as the organism's "cookbook" or "blueprint".
- (ii) A strand of DNA contains genes, areas that regulate genes and areas that either have no function, or a function which we do not (yet) know; also see last bullet point in this section for the difference between DNA and RNA.
- (iii) DNA is organized as two complementary strands, head-to-toe, with hydrogen bonds between them that can be "unzipped" like a zipper, separating the strands - contrary to a common misconception, DNA is not a single molecule, but rather a pair of molecules joined by these bonds
- (iv) DNA is a chain of chemical "building blocks", called "bases", of which there are four types : these can be abbreviated A, T, C, and G. Each base can only "pair up" with one single predetermined other base: A+T, T+A, C+G and G+C are the only possible combinations; that is, an "A" on one strand of double-stranded DNA will "mate" properly only with a "T" on the other, complementary strand.³⁶²
- (v) The allowable base components of nucleic acids can be polymerized in any order giving the molecules a high degree of uniqueness.
- (vi) DNA is an acid because of the phosphate groups between each deoxyribose. This is the primary reason why DNA has a negative charge.
- (vii) The "polarity" of each pair is important : A+T is not the same as T+A, just as C+G is not the same as G+C (note that "polarity" as such is never used in this context - it's just a suggestive way to get the idea across).
- (viii) For each given base, there is just one possible complementary base, so naming the bases on the conventionally chosen side of the strand is enough to describe the entire double-strand sequence.

³⁶² U replaces T, notably in PBS 1 phage DNA; U replaces T in RNA.

- (ix) The genetic information contained in a strand of DNA is determined by the sequence of bases along its length.
- (x) The cell begins DNA replication by forcibly unzipping the DNA double strand down the middle, and then recreates the “other half” of each new single strand by exposing each half to a mixture of the four bases. An enzyme makes a new strand by finding the correct base in the mixture and pairing it with the original strand. In this way, the base on the old strand dictates which base will be on the new strand, and the cell ends up with an extra copy of its DNA.
- (xi) Mutations are simply chemical imperfections in this process a base is accidentally skipped, inserted, or incorrectly copied, or the chain is trimmed, or added to; many basic mutations can be described as combinations of these accidental “operations”. Mutations can also occur through chemical damage (through mutagens), light (UV damage), or through other more complicated gene swapping events.
- (xii) DNA molecules that act as enzymes are known in laboratories, but none have been known to be found in life so far.

5:12:3 DNA Pairing :

The paired bases are joined by hydrogen bonds. (Fig. 3) This image shows the normal base pairing. And also how on rare occasions, wrong pairing can happen, when thymine goes into its enol form or cytosine goes into its imino form.



5:12:4 DNA in Crime :

Forensic scientists can use DNA located in blood, semen, skin, saliva or hair left at the scene of a crime to identify a possible suspect, a process called genetic finger-printing or DNA profiling. In DNA profiling the relative lengths of sections of repetitive DNA, such as short tandem repeats and minisatellites, are compared. DNA profiling was developed in 1994 by English geneticist Alec Jeffreys, and was first used to convict Cohn Pitchfork in 1988 in the Enderby murder case in Leicestershire, England. Many jurisdictions require convicts of certain types of crimes to provide a sample of DNA for inclusion in a computerized database. This has helped investigators solve old cases where the perpetrator was unknown and only a DNA sample was obtained from the scene (particularly in rape cases between strangers). This method is one of the most reliable techniques for identifying a criminal, but is not always perfect, for example if no DNA can be retrieved, or if the scene is contaminated with the DNA of several possible suspects.³⁶³

5:12:5 DNA in Computation :

Despite its biological origins, DNA plays an important role in computer science, both as a motivating research problem and as a method of computation in itself, called DNA computing, not only for biological origins.

As a simple example, research on string searching algorithms, which find an occurrence of a sequence of letters inside a larger sequence of letters, was motivated by DNA research, where it is used to find specific sequences of nucleotides in a large sequence. In other applications like text editors, even simple algorithms for this problem usually suffice, but DNA sequences cause these algorithms to exhibit near-worst-case behaviour due to their small number of distinct characters.

Databases have also been strongly motivated by DNA research, which requires special tools for storing and manipulating DNA sequences.

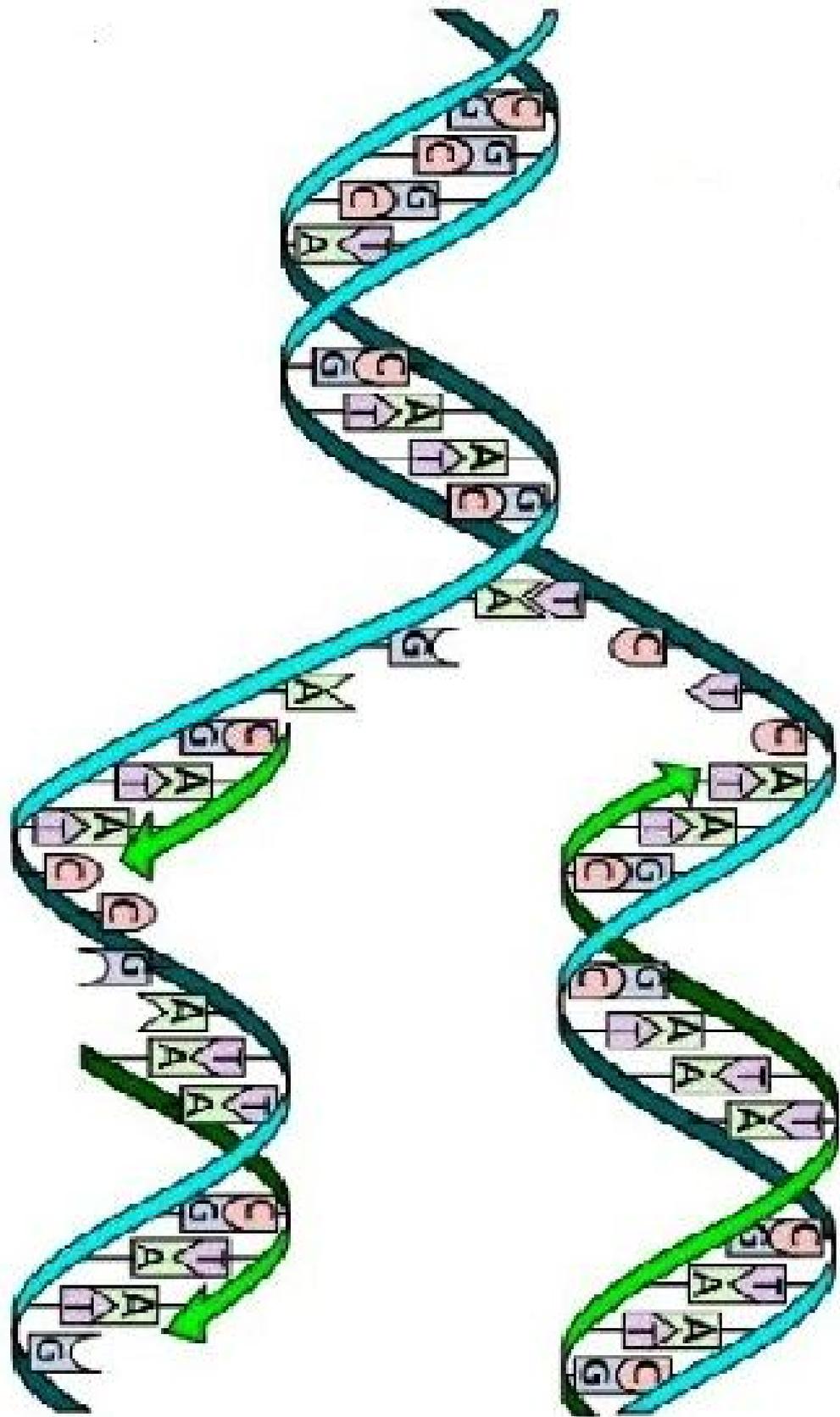
³⁶³ S. Panneerchelvam and M.N. Norazmi, Forensic DNA Profiling and Database, 2003 July, 10 (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3561883/>)

Databases specialized for this purpose are called genomic databases, and have a number of unique technical challenges associated with the operations of approximate matching, sequence comparison, finding repeating patterns, and homology searching.

5:12:6 Sequence Role :

Within a gene, the sequence of nucleotides along a DNA strand defines a messenger RNA sequence which then defines a protein, that an organism is liable to manufacture or express at one or several points in its life using the information of the sequence. The relationship between the nucleotide sequence and the amino-acid sequence of the protein is determined by simple cellular rules of translation, known collectively as the genetic code. The genetic code is made up of three-letter 'words' (termed a codon) formed from a sequence of three nucleotides (e.g. ACT, CAG, TIT). These codons can then be translated with messenger RNA and then transfer RNA, with a codon corresponding to a particular amino acid. There are 64 possible codons (4 bases in 3 places 4^3) that encode 20 amino acids. Most amino acids, therefore, have more than one possible codon. There are also three 'stop' or 'nonsense' codons signifying the end of the coding region, namely the UAA, UGA and UAG codons.

In many species, only a small fraction of the total sequence of the genome appears to encode protein. For example, only about 1.5 per cent of the human genome consists of protein-coding exons. The function of the rest is a matter of speculation. It is known that certain nucleotide sequences specify affinity for DNA binding proteins, which play a wide variety of vital roles, in particular through control of replication and transcription. (Fig. 4)



5:12:7 DNA Replication :

DNA replication or DNA synthesis is the process of copying the double-stranded DNA prior to cell division. The two resulting double strands are generally almost perfectly identical, but occasionally errors in replication or exposure to chemicals, or radiation can result in a less than perfect copy (see mutation), and each of them consists of one original and one newly synthesized strand.³⁶⁴

5:12:8 Strands Association and Dissociation :

The hydrogen bonds between the strands of the double helix are weak enough that they can be easily separated by enzymes. Enzymes known as helicases unwind the strands to facilitate the advance of sequence-reading enzymes such as DNA polymerase. The unwinding requires that helicases chemically cleave the phosphate backbone of one of the strands so that it can swivel around the other. The strands can also be separated by gentle heating, as used in PCR, provided they have fewer than about 10,000 base pairs (10 kilobase pairs, or 10 kbp). The intertwining of the DNA strands makes long segments difficult to separate.³⁶⁵

5:13 The Universal Declaration on the Human Genome and Human Rights :

The Universal Declaration on the Human Genome and Human Rights was adopted unanimously and by acclamation at the 29th session of UNESCO's General Conference on 11th November, 1997. The following year, the United Nations General Assembly endorsed the Declaration.

UNESCO is currently evaluating the impact of the Declaration worldwide, in accordance with the Guidelines for the Implementation of the Declaration (1999), which the General Conference endorsed at its 30th Session. These Guidelines outline the action that different groups must take if the Declaration is to be implemented, and provide guidance as to how these tasks can be achieved.

³⁶⁴ Ibid.

³⁶⁵ N.S. Sharma, *Molecular Structure of Genes and Chromosomes*, International Scientific Publishing Academy, 2005.

At its 27th session, by its Resolution 27 C/5. 15 (15th November, 1993) the General Conference of UNESCO asked the Director-General to prepare an international instrument for the protection of the human genome. The International Bioethics Committee, having been entrusted by the Director-General with the preparatory work for this task, created a Legal Commission, chaired by Mr. Hector Gros Espiell to consider the form and content of the instrument. A first outline, examined by the International Bioethics Committee (IBC), at its 2nd session, led to the preparation of an outline of the Declaration (7th March, 1995) based on universally acknowledged rights and freedoms. The General Conference examined a Report on this subject at its 28th session. On 14th November, 1995, it asked the Director-General to draw up a preliminary draft declaration and to create and convene a committee of Governmental experts to finalize this Declaration (Resolution 28 C/2.2). This Committee met at UNESCO Headquarters from 22nd to 25th July, 1997. Based on the deliberations and work of the International Bioethics Committee (IBC) between 1993 and 1997, the Committee drafted the text of the Draft of a Universal Declaration on the Human Genome and Human Rights (25th July, 1997), which was presented to the General Conference three months later. The 29th Session of the General Conference adopted the Universal Declaration on the Human Genome and Human Rights, unanimously and by acclamation, on 11th November, 1997. By Resolution 29 C/17 entitled 'Implementation of the Universal Declaration on the Human Genome and Human Rights' the General Conference laid out the methods for the follow-up of the implementation of the Declaration. Aware of the significance and scope of this Declaration, the United Nations General Assembly endorsed the Declaration by its Resolution A/RES/53/152 on 9th December, 1998 at its 53rd Session.³⁶⁶

5:14 Confronting the Ethical, Legal and Social Issues :

James Watson, who won the Nobel Prize in Physiology in Medicine in 1962 for discovering the structure of DNA, made a seminal contribution to the H.G.P. when he recognized that knowledge derived from genome studies has

³⁶⁶ Source : UNESCO.htm.

broader medical and societal implications. This led directly to the establishment of a program devoted to the Ethical, Legal, and Social Implications (ELSI) of Genome Research. One goal of the ELSI's program is to address the implications of vastly increased genetic information and protocols on individuals and society. Another ELSI goal is to identify and develop appropriate policy options to confront and contain future Ethical, Legal, and Social Implications problems. Because, it is known that "genetic information" has been misused previously in the United States and other countries. It must necessarily be ensured that such mistakes are never repeated. Both the Department of Energy and the National Institutes of Health are optimistic that the Ethical, Legal, and Social Implications program can contribute to the Integration of H.G.P. results in ways that are less disruptive, painful, or destructive than those in the past.

The list of ethical, legal and social implications issues is long and virtually all of them have legal ramifications. They include the fair use of genetic information; the impact on genetic counseling and medical practice; the effects on personal reproductive decisions; past uses and misuses of genetic information; privacy implications of personal genetic information in various setting, e.g., the work place, schools, or in the context of adoptions; issues of the commercialization and intellectual property, protection of genome results, including DNA sequences; conceptual and philosophical implications; implications of personal genetic variation; and genetic literacy and the understanding of genetic information, particularly information related to complex conditions that involve multiple genes and genetic- environmental interactions. This last category, involving health issues like mental illness, heart disease, diabetes, or cancer, represents the most complex of ethical, legal and social implications issues because the underlying science is poorly understood.

A major challenge in the judicial arena is to introduce the most current and rigorous scientific information related to genomics in a form that is most useful and understandable to Judges and Juries. Molecular genetics, like some other sciences, can be complicated and often confusing, even to those with scientific background and training. Because molecular genetics is also changing

continuously, one can easily pit one scientific “expert” against another, with no clear mechanism to adjudicate between the two. Most scientists are uncomfortable with what they perceive to be the rigid demands of judicial proceedings and shy away from “beyond reasonable doubt” pronouncements. The all-too frequent result is that the scientific perspective is represented by fringe elements of the scientific community that may distort the state of the science. Although such distortion is not unique to genetics, prominent and widely publicized examples have been witnessed during the last several years, and the future unfortunately holds the promise of many more.³⁶⁷

5:15 UNESCO Revised Outline of a Declaration on the Human Genome and its Protection in Relation to Human Dignity and Human Rights:

- (1) The human genome is a fundamental component of the common heritage of humanity and needs to be protected In order to safeguard the integrity of the human species, as a value in itself, and the dignity and rights of each of its members.
- (2) The human genome, which is by nature evaluative and subject to mutations, contains potentialities that are expressed differently according to the environment, education, living conditions and state of health of each family and each individual.
- (3) Each human being possesses a specific genetic identity. An Individual’s personality cannot be reduced to his or her genetic characteristics alone. All individuals have a right to respect for their dignity regardless of those characteristics.³⁶⁸

(A) Aims of Research on the Human Genome

- (4) Everyone has the right to benefit from advances in biology and human genetics, with due regard for their dignity and freedom.
- (5) Research, which is an essential activity of the mind, has the function, in the field of human genetics, of relieving the suffering and improving the well-being of humanity.

³⁶⁷ Aripatrinios and Daniel W. Erell’s Article ‘Introducing the H.G.P.’, published in American Bar Association’s Journal ‘The Judges Journal’, 1997, Vol. 36.3.

³⁶⁸ Ibid.

- (6) No scientific advance in this field can ever be contrary to the respect for human dignity and freedom.

(B) Operations affecting the Human Genome and Human Rights and Freedoms

- (7) No person may be subject to discrimination on the basis of their genetic characteristics.
- (8) No operation affecting a person's genome, can have any purpose other than scientific, therapeutic or diagnostic. Such an operation can only be undertaken subject to a risk/benefit assessment, and the obtention of the prior, free and informed consent of the person concerned or, where appropriate, of his or her duly authorized representatives, the relatives and the family, as the case may be.
- (9) The confidentiality of genetic data associated with a named person and stored or processed for the purposes of research or any other purpose, must be protected from third parties except where the law provides otherwise and where justified by the general interest.
- (10) Everyone has the right to an equitable reparation for any injuries sustained as a result of an operation directly affecting their genome.'

(C) Rights and Obligations of Researchers

- (11) States shall ensure the intellectual and the material conditions favourable to research on the human genome, in so far as this research contributes to the advance of knowledge and to the prevention of disability and disease.
- (12) States shall regulate with due regard for democratic principles and whenever it is necessary for them to do so in order to safeguard human dignity and freedom and protect health or the environment.
- (13) In view of its ethical and social implications, research in human genetics entails special responsibilities as regards the meticulousness, caution and intellectual honesty required of researchers.

(D) Duties and Responsibilities towards others

- (14) States must ensure that the community fulfils its duty of solidarity in regard to individuals, families or population groups that are particularly vulnerable to disease or disability because of their genetic characteristics. States recognise the importance of promoting the creation of multidisciplinary and pluralist independent ethics committees with the task of identifying the ethical, social and human issues raised by research and operations on the human genome.’

(E) International Co-Operation

- (15) States shall undertake to foster the international spread of scientific culture concerning the human genome and to foster scientific and cultural co-operation, particularly between industrialized and developing countries.
- (16) States shall undertake to promote specific teaching and research concerning the ethical, social and medical grounds and implications of biology and human genetics.
- (17) States shall undertake to encourage any other form of research, training and information calculated to make civil society aware of its responsibilities regarding the choices made necessary by advances in biology and human genetics.³⁶⁹

(F) Implementation of the Declaration

- (18) States shall adopt such normative measures as they consider appropriate to meet the purpose of this Declaration.
- (19) The principles set out in this Declaration shall serve as a basis for the normative measures adopted by States. They shall also guide those in-charge of institutions, and any other persons responsible for the application of such measures.
- (20) States shall be duty bound to promote, through education, training and information, respect for the aforementioned principles based on human

³⁶⁹ Aripatrinios and Daniel W. Erell’s Article ‘Introducing the H.G.P.’, published in American Bar Association’s Journal ‘The Judges Journal’, 1997, Vol. 36.3.

dignity and freedom, and to ensure both nationally and internationally that they are recognized and effectively applied.

- (21) The International Bioethics Committee of UNESCO shall ensure the implementation of this Declaration. For this purpose, it may make recommendations or give advice. Nothing in this Declaration may be used by any State, group or person to ends contrary to the rights and freedoms set forth herein.³⁷⁰

Apart from the forensic branches mentioned earlier in this chapter, there are other emerging fields of forensic science are : Computer and Cellular telephony investigation³⁷¹, digital image processing³⁷² identification of miniature devices³⁷³, forensic acoustics-speaker identification³⁷⁴, femto-chemistry³⁷⁵, environmental crime³⁷⁶ and wild life forensics.³⁷⁷ We also have forensic technologies, which can be used in prevention of crimes.³⁷⁸

5:16 DNA Technology in different Countries :

(a) United States- In US, DNA technology has developed as a prosecutorial tool. It developed as a way to prove cases in the courtroom. In 1986, DNA as evidence was introduced for the first time in a Criminal Court. Now, America is implying

³⁷⁰ This is the version of 25th Sept., 1995 of International Bioethics Committee of UNESCO.

³⁷¹ While computers can be received as evidence in financial crimes, frauds, espionage, pornography etc., cellular telephony has also posed challenge to enforcement agencies especially in the current scenario of international terrorism. See Indian Police Journal, January-March 2001, Vol. XLVIII No. 1.

³⁷² Besides application in space programme, digital image processing techniques are now used in solving crimes. See Indian Police Journal, January-March, 2001, Vol. XLVIII No. 1

³⁷³ Identification of miniature devices like chip or sensor implanted in the body of victims is another area of challenge. See Indian Police Journal, January, March 2001, Vol. XLVIII No. 1.

³⁷⁴ CFSL, (CBI) is using the sound spectrographic technique coupled with linguistic analysis for forensic investigation. CFSL, Chandigarh is developing speaker identification system. See Indian Police Journal, January-March, 2001, Vol. XLVIII No. 1.

³⁷⁵ Application of molecular nano-technology can be used to develop chemical compounds having 100 times more effect in 1000 times less doses. See Indian Police Journal, January-March 2001. Vol. XLVIII No. 1.

³⁷⁶ To combat degradation of environment through environment pollution, environment crimes are being defined which need appropriate analytical skills and facilities to effectively investigate the same. See Indian Police Journal, January-March 2001, Vol. XLVIII No. 1.

³⁷⁷ Forensic science laboratories can play a significant role to detect wild life crimes. See Indian Police Journal, January-March, 2001, Vol. XLVIII No. 1.

³⁷⁸ Some of such technologies are being developed and their commercial and industrial viability is being explored which is expected to evolve preventive forensics, e.g. Electronic Supervision System, Ultrasonic Pulse Echo Device etc. See Indian Police Journal, January-March 2001, Vol. XLVIII No. 1, referred in 2003 Cri LJ. Journal Section, at p. 41

huge resources and tremendous amount of attention in DNA Labs. There are more than 130 Labs both at State and local level that can conduct DNA analysis on forensic evidence.³⁷⁹ The National Commission on the future of the DNA evidence was established in 1998 in response to number of cases in which individuals were essentially being freed from prison, who were shown to be convicted wrong by nature of DNA testing. There is some exclusive legislation like: DNA Identification Act, 1994, Transplantation of Human Organs Act, 1994 and Advancement of Justice through DNA Technology Act, 2003. In **Doubert v. Merrell Dozy Pharmaceuticals**,³⁸⁰ the Court laid down that for a scientific evidence to be admissible, it must be shown scientifically valid and must be relevant to at least one issue in the case.

(b) United Kingdom- The U.K. has also recognized the importance of DNA technology and has enacted Data Protection Act, 1998. In U.K. DNA developed as an investigative tool. A boy from Ghana, born in U.K. wanted to join his family in U.K., the authorities denied his entry because they were not satisfied that he was the son of alleged mother. Through DNA test it was found that he was the son of alleged mother and thus he was allowed to stay with his mother.

(c) New Zealand and Canada-To harness the power of DNA test New Zealand enacted Criminal Investigation (Bodily Sample) Act and even Canada also enacted DNA Identification Act, 1998.

(d) India- However, in India, we don't seem to have realized how vast the potential of technology is. DNA technology has made a drastic improvement in the methodology of providing different types of disputes of civil and criminal cases. Established in the middle of 19th century, today in India there are about 21-well established forensic labs, 4 of them being administered by the Central Government. The scientific methods are being adopted in crime investigation in India in an organized way from 1849 onwards.³⁸¹ Despite having DNA

³⁷⁹ National Law Enforcement Summit, Washington. <http://www.usdoj.gov/nij/dna/welcome.html>.

³⁸⁰ 509, US 579, 59 (1993).

³⁸¹ Dr. P.C. Shekharan, Forensic Science in Criminal Investigation, Encyclopedia of Police in India, at p. 1862.

Technology in India, it is not seen used in the administration of Criminal Justice System.

5:17 DNA Contamination and its Consequence :

There are a lot of factors which may degrade and contaminate a DNA sample. DNA is known for being susceptible to damage from moisture, heat, infra red radiation etc. that may degrade the sample DNA. Besides, as a tissue is detached from human body, the tissue becomes prone to two things i.e. microbial attacks start almost instantly and due to putrefaction the DNA starts to disintegrate, second being the environmental effects on the sample. Different kinds of bacteria and virus that attack the separated tissue in the first place degrades the DNA and on the other, it remains with the tissue until it was picked up by the investigating or Forensic team from the scene of occurrence. A simple position may be envisaged in a rape case where seminal fluid or vaginal swab is collected. In almost every case presence of microbes cannot be ruled out.

The purpose of microbial attack on tissue is simple-to eat it up, and in the process lot of DNA is being destroyed. It is scientifically known fact that each human body contains more than 2 kg bacteria in the body (luckily majority of them help the body to perform various functions). The injurious bacteria and viruses face a bitter fight from white blood cells and the immune system of body. Unfortunately there is no fighting system in the detached tissues of the body, called the sample. There is also always a time lag between the detached tissue being left at the scene of crime, and its picking as a sample.³⁸²

5:17:1 Other Sources of Contamination :

Many times it was found that the sample has received other kinds of contaminations till it was actually picked up by the personnel who were involved in its picking and sealing etc. During carriage, during its storage at police stations or laboratories (if the sample has come in contact with other samples or other organic materials) and, even within the laboratory it is prone to contamination.

³⁸² Wayer Qazalbash, D.N.A. Evidence and it's Admissibility, Modern Law House, Allahabad, 2006.

The laboratory may contaminate the sample in three ways : (a) if the sample is mixed or kept near other samples, (b) the sample may be contaminated through the scientists and other workers present in the laboratory. In a human body about 10,000 cells are broken naturally every day. In case, the person is suffering from any ailment or cuts etc. the figure rises enormously. These broken cells may contaminate the sample while handled inside the laboratory. Even a sneeze in the laboratory by any of the workers may contaminate the sample, and (c) a Polymerase Chain Reaction contamination which is caused from the remains in the equipment from the previous Polymerase Chain Reaction.

5:17:2 Consequences of Contamination :

Each type of DNA testing process uses Restriction Fragment Length Polymorphism or Polymerase Chain Reaction technique and hence they are based on either of the two. If the sample is old, degraded or in less amount, Restriction Fragment Length Polymorphism based tests become useless. If the sample has been exposed to warm moist conditions, for even short period of time, the sample becomes unsuitable for Restriction Fragment Length Polymorphism testing.³⁸³

In these conditions, Polymerase Chain Reaction based testing becomes obvious choice which needs less amount and even partially degraded samples. But Polymerase Chain Reaction also has some limitations as far as degradation of the sample is concerned. Polymerase Chain Reaction is influenced by contamination, which may be amplified upto a billion times of its concentration. This presence and amplification of contamination may altogether change the results in case proper handling, protocols and 'controls' are not observed with utmost caution.

Like Restriction Fragment Length Polymorphism, Polymerase Chain Reaction is also not a direct testing process, but more prone to error because of its being highly sensitive in comparison to Restriction Fragment Length Polymorphism. This is well recognized handicap and limitation of Polymerase Chain Reaction, hence, it should be discussed in detail (as generally nowadays every test is PCR based).

³⁸³ Sharma, J.K., Gopalkrishna, V., and Das, B.C., A simple method of elimination of unspecific amplifications in polymerase chain reaction, Nucl. Acids Res., 1992.

5:17:3 Polymerase Chain Reaction Contamination :

Polymerase Chain Reaction is capable of amplifying a single molecule into millions or billions in a span of three hours. As such it is most sensitive. Some people compare Polymerase Chain Reaction process to Xerox copying, where similar copies are made, but this does not signify the true nature of Polymerase Chain Reaction process. In Polymerase Chain Reaction the original DNA sequences are copied and those copies are copied again and again in 'chain reaction'. If contamination is already present in the sample, or in the other case it is added during the process it may be understood if we understand clinical infection.³⁸⁴

Doctors and nurses have known for long that where open wounds (operations) have to be handled, the place must be made sterile. By their standards sterile means eliminating all living beings including bacteria and viruses because a single bacteria or virus is capable of causing massive infection in the open wound. In the same manner a single molecule is capable of contaminating (infecting) a Polymerase Chain Reaction. Even a single extraneous molecule may give misleading results. During an experiment it was surprisingly found that horse DNA sequence was converted into a sequence for a fruit fly because fly DNA had previously been amplified in the same lab.³⁸⁵ The ability of smallest amount of DNA molecule to produce false and misleading results are well-known and has been documented by some.

Some say it is easier to contaminate a Polymerase Chain Reaction than to catch a cold because human bodies have immune systems, whereas Polymerase Chain Reaction do not have such systems.

Polymerase Chain Reaction (PCR) technique has borrowed some practices adopted by clinicians to sterile the equipment and the vicinity, but the clinical sterility does not work with the Polymerase Chain Reaction to times, because the method of heating adopted by the clinicians does not work here. In case pipettes

³⁸⁴ Ibid.

³⁸⁵ Purnima Rupal, Science Reporter January 1994, pp. 24 at p. 26.

and other instruments are heated, even then they are found to contain DNA from previous testings, for DNA usually survives heat sterilization. The clinicians think in terms of creating a 'sterile field' where each and everything present is sterile and entry of even a single object or person, which is not sterile, renders this field no longer to remain sterile. Even the highest trained clinician cannot claim a hundred per cent sterile field, hence they continuously monitor patient for fever or other signs of infections and in each case, administer antibiotics in advance, assuming that the sterility may have failed. But unfortunately there are no symptoms as fever etc. in Polymerase Chain Reaction process, neither antibiotics may be administered in advance. Until and unless disposable instruments are used in each Polymerase Chain Reaction there is no guarantee that the sample has not received contamination from previous Polymerase Chain Reaction (but this is a very costly affair).

As could be seen from above discussion that despite all precautions contamination cannot be ruled out from Polymerase Chain Reaction process. This is well known fact. For this reason some steps are taken to detect and control the contamination. Let us discuss how far these controls are effective.

5:17:4 Controlling and Detecting Contamination :

In the first place, some steps are taken to detect contamination. This step is called 'Negative controls'. This negative control uses blank Polymerase Chain Reactions in which pure sample DNA is being used without adding any other DNA. This blank DNA control test has to be performed at two stages (a) when the DNA is extracted, and (b) when the Polymerase Chain Reaction is being set up. The result of this blank control would show partial or full DNA profiles, which may represent contamination and in this way contamination may be detected, it is also possible that blank may show no profile at all, but in that eventuality, it could not be determined whether there is any contamination or not.³⁸⁶

³⁸⁶ Sharma, J.K., Gopalkrishna, V., and Das, B.C., A simple method of elimination of unspecific amplifications in polymerase chain reaction, Nucl. Acids Res., 1992.

This is reported that many forensic laboratories omit these controls. In case these controls are not performed the results are bound to create hazards.

Till now there is no other technique to detect the contamination in the sample, except the process of 'negative control'. Additionally, it is not a preventive measure to contain the contamination. Even if it is known that contamination is present in the sample, nothing material could be done.

5:17:5 Drawbacks of Negative Controls :

Most important drawback of Negative Controls is that these controls do not offer any protection against occurrence of contamination in the samples before it reached the lab. These controls also cannot rule out presence of contamination in a given sample. The individual samples lack special signs to show if contamination has occurred within it. Contamination is similar to infections in the human body but the difference is that human body shows it through such signs as fever or pain etc., but Polymerase Chain Reaction is not capable of showing any signs, and there is no guarantee that contamination has set in, even if all kinds of controls as a measure of precaution have been taken.

5:17:6 Kinds of Polymerase Chain Reaction contamination :

- (i) The most hazardous type of contamination may be caused by previous Polymerase Chain Reaction. In each Polymerase Chain Reaction process millions or billions of copies of DNA are produced (copies being called Amplicons) and even if one of these copies is mixed with the new sample, this stray old Amplicon can contribute single or multiple alleles to a DNA profile. If any such thing has happened, it will produce an extra dot on a DQ AI or PM typing strip or where STR technique is applied, it may reveal an extra band. It is also possible that in such type of contamination (stray amplicon) an extra band or dot, as the case may be, may or may not be revealed. In either of these two cases a misleading profile is the sure result. Unfortunately till now there is no way to find out whether an extra band or dot has been missed or incorporated on the typing strip.

- (ii) Yet another kind of contamination source is what is called ‘genomic DNA’. Genomic DNA is one that has not yet been amplified in PCR, though, it does not have a high concentration compared to target DNA copies. This remaining genomic DNA is capable of producing entirely false DNA profile. Various laboratories world over have documented this kind of false DNA profiles.
- (iii) The other kind of contamination is called ‘cross-contamination’. As the name suggest, this kind of contamination occurs when the sample comes in contact with another DNA sample. This kind of contamination is most likely to occur where many samples are kept together, the sample or samples having larger amounts of DNA would contaminate samples having lower amounts of DNA. This phenomenon is called cross-contamination. If cross-contamination occurs, the result may take a life of innocent accused. For example, a sample picked up from the scene of occurrence and having lower amount of DNA is being kept or comes in contact with the sample taken from the body of accused (by the order of court), naturally and obviously having larger amount of DNA, it would cross-contaminate the sample from the scene of crime. The result would be a perfect match between the two samples and an otherwise innocent accused would get a sure guilty verdict. The cross- contamination is rarely appreciated and when probability of matching and identification results are prepared, it is no consideration.

Since the use of Polymerase Chain Reactions are reported, there have been may occasions where false results were produced as evidence and actions have been taken on those false results. In United States of America itself, some of the investigators have insisted to discontinue and denounce the technology as being “too sensitive”.

Researchers never take Polymerase Chain Reaction (PCR) results routinely, but vigorous testing and scrutiny is being done to confirm the authenticity of result. It is almost impossible to find out or anticipate the source of contamination because it sometimes occurs from a source least imagined. Against

that, the Forensic laboratories testing samples, do it routinely and do not take precautions as the research laboratories do.

Thus, it can be said after the whole study in the this particular chapter that the DNA testing and the recent advancement in the scientific techniques the use of DNA in the Courts of Law can make a difference of day and night by not only determining the accused accurately and quickly but also by preventing the innocent how get caught in the lengthy and confusing procedure of law. But alongwith all the mesmerising technology and scientific abilities there are various limitations attached to the use of DNA technology and some are very basic such as it is expensive and useless with the support of various other evidences.

CHAPTER–VI

HUMAN GENETIC MATERIAL: ITS ETHICAL AND LEGAL ISSUES

Human Genetics is way too complicated as the humans are most complex living organisms, the genetic structure of human is very much complex. Beside, this natural reason study of human DNA is difficult due to certain other reasons. The DNA evidence has more complications than suggestions and solutions because it has various legal and ethical issues involved in it. So, it should be dealt with “Handle with Care” manner. Hence, an attempt has been made in this chapter to analyse the issues fairly and properly to reach at a definite conclusion in such sensitive matter.

There is an established principle of criminal jurisprudence *Actus non facit reum, nisi mens sit rea* which defines criminal liability of an accused. The maxim literally means no one can be punished unless it is proved that the offence was committed by him and he did the same with intention. Therefore in order to constitute criminal liability, it is essential to have both an ‘actus reus’ (a wrongful act) and ‘mens rea’ (guilty mind).³⁸⁷

If we look into the deeper meaning of the maxim, it can be construed that it is essential that it must be proved that the act was committed by the accused and with a wrongful intention. Thereafter arises the need of evidence as it may always not be essential that the guilt can be proved from the circumstances as such.

Thus, evidence is elementary to any criminal proceeding not only for proving one’s guilt but as a way of defence. With the progress of science and technology, crimes have become more complex in nature. It is of common fact that the role of law to curb offences and to meet the justice. Therefore, eventually it has led to the need of scientific evidence and testimony of experts in criminal trials and prosecutions.

³⁸⁷ Ram Lal Anand, A.S.N. Ayyar, Raghbirlal Bhagatram Sethi, All India Criminal Digest, 1951-60, Vol. 3, Law Book Company, 1963.

The importance of such evidence is further highlighted by the fact that it helps Judges in determining the extent of liability, which may vary from testimonies that were imposed on an offender. As an obviate matter, expert witnesses have an advantage of a particular skill or subject because Judges are not properly equipped to draw inferences from facts in certain technical matters. Although the major drawback which affects the effectiveness is that it depends on the discretion of the Judge to accept such evidence or reject it. This is because these evidences are merely opinion based. Another demerit of it is that it is an indirect or secondary form of evidence, thus it mitigates its value with respect to direct evidence.³⁸⁸

However, due to the evident importance of such evidence, the legislators and the judiciary; alike, has led them to expand rules regarding evidence. The researcher has made an effort to look into the rules and conventions governing such scientific evidence and expert opinion. He not only discusses about the practices followed in India but also traces the history of these forms of evidence and compares Indian Law vis-a-vis American Law and Laws prevalent in England.³⁸⁹

It is clear that though expert evidence and scientific evidence are essential since both law and science meet each other at cross-roads, science has increasingly become a catalyst in dissemination of justice, a goal that law seeks to achieve.

Therefore, in order to fill the gap, the legislators have made such opinions and reports admissible in the Court as evidence, but this is possible only if it satisfies the relevant circumstances. It is also clear that despite that such evidences are being incorporated in legislations they suffer from various loopholes especially in the form of discretionary powers given to a Judge presiding over the Court. As a result of this coupled with other shortcomings such as partisanship, bias, unclear expression and lack of knowledge, the value attached to such evidence is generally low.³⁹⁰

³⁸⁸ 2006 Cri LJ, Journal Section, at p. 208.

³⁸⁹ Ibid. at p. 209.

³⁹⁰ 2006 Cri LJ, Journal Section, at p. 217.

6:1 Understanding Scientific Evidence :

The concept and meaning of scientific evidence as explained in various books, Acts and statutes. For example, according to the Oxford Dictionary³⁹¹, the term ‘scientific’ means “involving science” or “technical”.

The term ‘evidence’ is defined by Andrew Choo³⁹² as, “Evidence is the information with which the matters requiring proof in a trial are proved”.

The Criminal Procedure Code defines it in Section 322(1) as, evidence “means all facts and statements which have been disclosed by enquiry and is not restricted to depositions recorded by the Magistrate.”

According to Section 3 of the Indian Evidence Act, 1872 the primary purpose of evidence is used by the Court for ascertaining truth of fact or point in issue.

From the above stated definitions, one can construe and conclude that scientific evidence means nothing but evidence that is technical in nature. It, thus, can be said to imply that scientific evidence is one that evidence involves a point in issue which is scientific in nature. Scientific evidence is essentially a secondary form of evidence.³⁹³

As per Powell “An expert witness is one who has devoted time and study to a special branch of learning and thus, is especially skilled on the points on which he is asked to state his opinion. His evidence on such points is admissible to enable the tribunal to arrive at a satisfactory conclusion”.³⁹⁴

The United States Supreme Court has defined it that “The term is generally used to designate a person who possesses knowledge and experience not possessed by mankind in general”.³⁹⁵

³⁹¹ Oxford Dictionary, 6thEdn., at 1142.

³⁹² Evidence (Text and Materials), 1stEdn., University Press, 2006, p. 1.

³⁹³ That species of proof which is admitted in the absence of primary evidence (Section 63, Indian Evidence Act, 1872).

³⁹⁴ Per Powell, Ejaz, Medical Evidence and Gist on Non-medical Evidence, Chap. 11, 3rdEdn., Ashoka.

³⁹⁵ *US-Farris v. Interstate Circuit*, CCA Tex, 116 F 2d 768 31A CJS 524

Otherwise a scholar states that “An expert is one who has acquired special knowledge, skill or experience in any science, art, trade or profession; such knowledge may have been acquired by practice, observation or careful studies”.³⁹⁶

Thus, expert is one who has skill, experience or extensive knowledge in his calling or in any branch of learning; one possessing with reference to particular subject, knowledge not acquired by ordinary persons. As it has been stated above that expert evidence is nothing but an opinion but it is clear from the definitions that the phrase cannot be applied to all species of opinion evidence. The witness is not giving expert testimony who without any special intelligence simply testifies as to the impressions produced in his mind or sense by that which he has seen or impressions produced in his mind or sense by that which he has seen or heard, and which can only be described to others by giving impression produced upon the witness.

Therefore, the expert witnesses must have made a special study of the subject or acquired a special experience therein. An expert essentially possesses knowledge way beyond common knowledge. Thus, it can be concluded that in a question of common knowledge, an expert may have no advantage over a non-expert. The difference between an expert and non-expert is that of special knowledge acquired either by experience or study of a subject. The witness must thus be ‘Pertius’ the subject-matter with respect to which he testifies, it is a secondary form of evidence.³⁹⁷

6:2 Conflict between Science and Law :

Science and law fall under the same legal definition of “sciences”, wherein they use a rational approach to solve complex facts of problems.³⁹⁸ Both science and law in the today’s world touch each other at various points. Law regulates science and people dedicates in its research, likewise the science helps law in presenting justice. However, the balancing both is a highly complicated issue. It is

³⁹⁶ *Collector, Jabalpur v. A.Y. Jehangir*, AIR 1971 MP 32, per Section 45 of Indian Evidence Act, 1882, referred in 2006 Cri LJ, Journal Section, at p. 210.

³⁹⁷ 2006 Cri LJ, Journal Section, at p.210.

³⁹⁸ Webster and Manual of Scientific Evidence, referred in 2006 Cri LJ, Journal Section, at p. 210.

important to note that in case of such evidence it becomes critical to determine its value in the legal system. It is thus important to settle between law and science for the purpose of attribution of legitimatise such evidence in a legal proceeding.

The reason of such conflict is successful practical experience that cannot be acquired solely by reasoning. Furthermore, experience in one field cannot interpret into others. Lawyers cannot discuss legal issues with people who do not have a law degree. Likewise a medical doctor cannot intelligently discuss his clinical reasoning to a person who lacks clinical experience.

Another major gap between the two is that science is governed by facts and is based on rational thought, whereas Law, on the other, relies upon picking and choosing of facts, and puts reliance on emotions to bolster arguments.

Also law of science are universal in character. They are not negotiable and are self-enforcing. Scientific findings can be tested anywhere, anytime by anyone who possesses appropriate facilities, whereas, law varies from place to place and time to time. It is very dynamic in character. It is a creation of the society out of a social contract. It aims to protect the interests of individuals and that of society at large also, therefore, varies due to beliefs of societies from time to time and place to place.

Thus, science and law belong to different cultures.³⁹⁹ It would not be incorrect to say that Court is a battleground where people with conflicting goals and aspirations and skill clash in an emotionally charged setting full of traps armed with science in one and law in another hand, However, the Courts have played an active role in this arena and have developed criteria that determine whether legal decisions are compatible with science. However, such determination depends on various factors which are (a) the underlying scientific theory is solid, (b) the theory is related to the issue before the Court, (c) the expert witness fully understands the science, (d) the expert applies the scientific data to support its application, (e) there is sufficient data to support its application, (f) the

³⁹⁹ Peter H. Schuk, Multi-culturism Redux Science, Law and Politics, Yale Law and Policy Review (1994), pp. 1-46.

expert witnesses can effectively communicate with the audience, (g) counsel understands and promotes the opinion correctly, (h) the Judge rules that the opinion is reliable, (i) the theory and expert appear credible, (j) the trier of fact comprehends the theory and expert opinion, (k) the trier of fact remembers the expert's opinion and (l) the trier of fact fits into the testimony.⁴⁰⁰

Thus, it can be construed that in order to settle science with law in a Court so as to effectively use science and scientific knowledge in case of a trial and as evidence, it is important to reconcile the two. Moreover, the use of such evidence is only possible if it is adequately proved that there is nexus between the scientific fact and material facts in question and that the theory propounded and opinion advanced is on a sound footing.⁴⁰¹

6:3 Criminal Justice System and Ethical Issues :

In India, it has often been observed by critical analysis that the criminal justice system protects the rights of guilty and punishes the innocent. Therefore, pointing that the system has thus become ineffective and hence needs reform. With the goal of predominance of rule of law, it has become important to include forensic science and modern technology for criminal investigations.⁴⁰² For this end, medico-legal services must be strengthened⁴⁰³ so as to enable effective administration of justice by enabling the Court to analyze such forms of evidence effectively.

The Malimath Committee has also recommended that in the Supreme Court and High Courts, the respective Chief Justices should constitute a separate criminal division consisting of such number of criminal benches as may be required consisting of Judges who have specialized knowledge in criminal law. Moreover, vacancies in the criminal divisions should be filled up by such Judges only. Also in subordinate Courts, as far as possible, assigning of civil and criminal cases to the same Judge must be avoided.

⁴⁰⁰ Carl Mayer, *Expert Witnessing, Exploring and Understanding Science*, 1stedn. CRC (USA).

⁴⁰¹ 2006 Cri LJ, Journal Section, at pp. 210, 211.

⁴⁰² Malimath Committee Report, para 22, referred in 2006 Cri LJ, Journal Section, at p. 217.

⁴⁰³ *Ibid.*, para 24.

It has been observed that due to the common law right of cross-examination and acts is a deterrent to an expert to testify in the Court. Thus in paragraph 83 of the report, it has been recommended that evidence of experts falling under Sections 291, 292 and 293 of the Code of Criminal Procedure, Court may as far as possible receive under affidavit. Thus, recommendation will not only prevent wastage of time, but also prevent much of inconvenience to an expert who comes to depose. For the same reason, it also has been recommended that the Judge should be vigilant and regulate cross-examination and same should be ensured through training and proper supervision of High Courts.⁴⁰⁴

The committee in its report at paragraph 84 has also recommended that DNA experts should be included in sub-section (4) of Section 293 of the Code of Criminal Procedure. The underlying reason for the same is to give formal recognition to this form of evidence and deposition by an expert in this upcoming field of science.⁴⁰⁵

6:3:1 Expansion of ‘Opinion Rule’ :

The opinion rule as enshrined under Section 45 of the Indian Evidence Act, 1872 plays an important part in this regard. The opinion rule is one of the major rules of the evidence. The law draws an important distinction between matters of fact and opinion and, in essence, provides that witnesses may not give evidence of their opinions, but must confine their testimony to matters of fact.⁴⁰⁶ The rule thus states that the use of witnesses is to inform the tribunal respecting facts.

Therefore, the opinions are not in general receivable as evidence. The facts should be stated and not inferences. The reasons for the same are that witnesses’ opinion is simply not relevant and that unless witnesses are forbidden from stating their opinions, they may unduly influence and even usurp the role of the Court.

⁴⁰⁴ Malimath Committee Report, para 86, referred in 2006 Cri LJ, Journal Section, at p. 217.

⁴⁰⁵ 2006 Cri LJ, Journal Section, at p. 217

⁴⁰⁶ Roderick Munday, Core Text Series : Evidence, 2nd Edn., LexisNexis Butterworths, referred in 2006 Cri LJ, Journal Section, at p. 211

The rule is not free from exceptions, expert opinion and scientific witnessing fits in as an exception. It can be said that the rule has been made flexible and expanded to exclude such evidence from its eclipse so as to enable to overcome this lacuna posed by the common law principle. Thus the rule now accepted in all common law nations including India and the United States is:

“An expert’s opinion is admissible to furnish the Court with scientific information which is likely to be outside the experience and knowledge of a Judge or jury can form their own conclusions without help, then the opinion of an expert is necessary”.⁴⁰⁷

6:3:2 Expert Opinion and Scientific Evidence:

A plain reading of Section 45 of the Evidence Act, leaves no doubt in our mind that the party seeking to adduce evidence of such witnesses, under this provision, should in the first instance show to the Court from the evidence of such witness that the witness is specially skilled in the particular science.⁴⁰⁸ It is thus apparent from the aforesaid discussion that an expert, in order to be competent as a witness, need not have acquired his knowledge professionally, it is sufficient, so far as the admissibility of the evidence goes, if he has made a special study of the subject or acquired experience therein.⁴⁰⁹ The competency of an expert lies in the fact that he possesses necessary qualifications and has devoted sufficient time and study to the subject. Therefore the competency of an expert should be shown before his testimony is admissible.⁴¹⁰ The experts should bring their technical and scientific knowledge to bear upon the matter which is referred to them for their opinion, it is not sufficient for them to give some indications which can be observed even by a layman.⁴¹¹

(i) Expert witness- Thus, an expert witness has to state facts which he has perceived. It is however not his function to draw inferences from the facts perceived by him. On the basis of this analogy in India, it is accepted without

⁴⁰⁷ 2006 Cri LJ, Journal Section, at p. 211.

⁴⁰⁸ 1980 Cri LJ 533 (Kant).

⁴⁰⁹ 1976 LW (Cri) 38.

⁴¹⁰ *Raj Kishore v. State of West Bengal*, AIR 1969 Cal 321 at p. 332.

⁴¹¹ *Ram Prasad v. State of Rajasthan*, 1982 WLN (UC) 69.

examining the expert as a witness in Court, no reliance can be placed on an opinion alone.⁴¹² He, however, can give his opinion of the facts unlike a non-expert. Thereby implying that it is on the Court first to determine the credibility of a witness and that he is an expert in the subject for what his testimony is sought and it must satisfy itself on these counts before allowing any testimony being given. Thus, the report of an expert should not be used by the Courts without examining the expert.⁴¹³

(ii) Ipse dixit- The Court must not take the expert's opinion for granted but it must examine his evidence in order to satisfy itself that there can be no mistake and the responsibility is all the greater when there is no other evidence to corroborate the expert.⁴¹⁴ Thus, the Court is not to believe the 'ipse dixit' of expert. Expert is not only to provide reason to support his opinion but result should be directly demonstrable also.⁴¹⁵

(iii) Interest of justice- The expert in India is also subjected to cross-examination, as he sometimes may deceive and confuse the Court, but it is by this method that he can be broken down in the interest of justice.⁴¹⁶

Hence, it is the duty of the Court to come to conclusion, on a question of fact, on a consideration of the entire evidence including that of experts.⁴¹⁷

(iv) Basic reason-The basic reason for this approach of the Court is that "No expert would claim today that he could be absolutely sure that his opinion was correct, expert depends to a great extent upon the materials put before him and the nature of questions put to him.

The real function of the expert is to put before the Court all the materials together with reasons which include him to come to the conclusion so that the

⁴¹² *Gopinath Shinde's case*, AIR 2000 SC 1691 at 1700, referred in 2006 Cri LJ, Journal Section, at p. 212.

⁴¹³ AIR 1975 SC 905, referred in 2006 Cri LJ, Journal Section, at p. 212

⁴¹⁴ 32 Cri LJ 1001; AIR 1931 Cal 441, referred in 2006 Cri LJ, Journal Section, at p. 212.

⁴¹⁵ 1977 Cri LJ (Note) 57.

⁴¹⁶ Strahan, Bench and Bar, at 65.

⁴¹⁷ *Husseniah v. Yerrah*, AIR 1954 AP 39

Court, although not an expert, may form its own judgment by its own observation of those materials”⁴¹⁸.

Moreover, their evidence can never be conclusive, as it is opinion evidence.⁴¹⁹ It will thus be true to say that evidence of expert can never be conclusive as it is opinion evidence.⁴²⁰ Thus, such evidence may or may not be relied upon.⁴²¹

The evidence of an expert may be disqualified under certain circumstances, they can be enumerated in the following manner:

(v) Lack of knowledge- It has often been observed that lack of sufficient knowledge upon the subject they undertake to testify upon is the greatest blemish of expert evidence. According to Best on Evidence, Section 574 : *“There can be no doubt that testimony is daily received in our Courts as scientific evidence to which it is almost a profanation to apply them.”*

The same has also been rightly pointed out in the case of **State v. Walter**⁴²² that “some so experts will not hesitate to go upon the stand and testify upon matters of the gravest concern with little or no preparation”. Their concern seems to be whether or not they can prevent the lawyers from tangling them up in cross-examination; and if they feel the lawyer does not know anything about the subject they assume the position with slightest hesitation In fact one of the first things which an expert should learn to say is ‘I do not know’ The expert and the examiner should both feel that the contest is not one of wit or wisdom and it makes small difference how much one knows except so far as the knowledge may aid the Court in getting at the truth in order that justice may be done.

Therefore, lack of knowledge is the primary blemish suffered in case of admissibility of expert evidence.

⁴¹⁸ AIR 1979 SC 14, Ejaz, Medical Evidence and Gist on Non-Medical Evidence, Pt. 14, 3rdEdn., Ashoka.

⁴¹⁹ *Xec Ayub Mineriro v. State of Goa*, AIR 1966 Goa 17 (FB).

⁴²⁰ AIR 1967 Goa 17.

⁴²¹ *Jamunabai v. Surendra Kumar*, AIR 1995 MP 274.

⁴²² 65 ME 74.

(vi) Inaccuracy of expression- It is important for an expert witness to use vocabulary which is easily comprehensible and not too technical. The vocabulary must not be the same as that used in a lecture to a scientific body; it should be adapted to the conditions. He is responsible for the injustice if by reasonable methods of expression he could have impressed the truth upon the mind which, under the law, was compelled to weigh the facts. Since the expert who is defending his pet theory cannot shield own-self from falsehood by merely using a word or words which are, in fact, correct but which, in method of expression and meaning, are incorrect.

(vii) Partisanship/Bias- Partisanship or inherent bias is also another ground of inadmissibility of expert evidence. This arises because of the wrong conception of the office of witness. They assume that they are employed to support or oppose certain position in the case. They fail to understand that they are brought to Court so as to enable Judge to disseminate justice and not for the purpose of supporting the party that affords them.

Elliot in his book "Advocate"⁴²³ has rightly pointed out that: "Expert witnesses become so warped in their judgment by regarding the subject in one point of view that even when conscientiously disposed they are incapable of expressing a candid opinion". Therefore, it would not be wrong to say that all experts are very apt to zealously espouse the cause of the party by whom they are called and hence forms a fit ground for inadmissibility of expert opinion.

It is clear that so many checks have been put for admissibility of expert evidence and corroboration becomes necessary for admission of expert opinion. It is for this very reason cross-examination of experts is extremely essential.

6:3:3 Role of Court in determining its value :

The Rule of Law simply means power of law that is law is supreme and all are under law. This basic rule of present jurisprudence casts upon the Court the duty to ensure that no injustice is done to one who comes to the Court for a remedy.

⁴²³ Elliot, Advocate, at 263, referred in 2006 Cri LJ, Journal Section, at 213.

It makes the Court duty bound to examine the expert opinion and scientific evidence very closely, and to find out the basis upon which it was based. This is so because it is only opinion evidence and cannot be relied upon, unless the basis of opinion is found to be firm.⁴²⁴ It has to be evaluated like any other evidence. It is thus for the Court to judge whether the opinion has been correctly reached on the data available and for the reasons stated.⁴²⁵

An expert is a witness of fact. His evidence is really advisory in character.⁴²⁶ Thus, such opinion is not considered generally as conclusive.⁴²⁷ No expert opinion or scientific evidence can be the sole basis of conviction in a criminal case. Therefore, the weight to be attached to the opinion of experts depends on its rationality and scientific worth and not on the length of the practice of expert.⁴²⁸ The same holds good for scientific evidence as it also suffers from the same handicap as the latter, that is, of being secondary evidence.⁴²⁹

Thus, with respect to scientific evidence, in particular, in light of Section 293 of the Code of Criminal Procedure, no value can be attached to a bald report which does not state any reasons in support of conclusions.⁴³⁰ Thus a Court is not bound to accept and act on a report as conclusive evidence of its contents.⁴³¹

The value of scientific evidence and expert evidence is that it assists the Court in reaching a particular conclusion, where technical assistance is necessary. It does not help the Court in interpretation.⁴³² However, it cannot be laid down as a rule of law that where expert assistance is not available, and where a reasonable guess work can be made from whatever evidence, that is on record, the Court would be precluded from doing so only because such evidence is not led in a particular, case.⁴³³ Thus, the credibility of such a witness depends on the reasons

⁴²⁴ *Srichand v. Ramrati Devi*, AIR 1980 All 294 at 296, referred in 2006 Cri LJ, Journal Section, at 213.

⁴²⁵ *State of Orissa v. Kanhu Chand Barik*, 1983 Cri LJ 133 (On) (DB).

⁴²⁶ Ratanlal and Dhirajlal, *The Law of Evidence*, 20thEdn. (2002), at p. 559.

⁴²⁷ *Gopal v. State of Rajasthan*, 1989 RCC 125 (Raj) (DB).

⁴²⁸ *Ram Prasad v. Shyamlal*, AIR 1984 NOC 77 (All).

⁴²⁹ Relationship between 'Experts and Scientific Evidence'.

⁴³⁰ *State of Kerala v. Shaju*, 1985 KLT 33.

⁴³¹ *Bhaskaran v. State of Kerala*, 1967 KLT 165.

⁴³² *Forest Range Officer v. P. Mohamad Ali*, AIR 1994 SC 120.

⁴³³ S.V. Joga Rao, Sir John Woodroffe and Syed Amir Ali's *Law of Evidence*, at 2351, 17thEdn.

stated in support of his conclusions and the data and material furnished which form the basis of his conclusions.⁴³⁴

However, it is a general rule accepted by Courts that expert's opinion, if corroborated, can be relied upon⁴³⁵, even though nowhere does the Evidence Act say that corroboration is essential for the same but the Courts have developed this rule to ensure that the award is free from any collusion.

It must be noted here that the Court in the case of **Arshad v. State of Andhra Pradesh**⁴³⁶, has drawn a distinction with respect to value of data evidence and opinion evidence by experts, it has held that the latter has greater value.

It would be appropriate over here to contemplate a circumstance where there is a conflict between experts and other witnesses giving direct evidence. In this regard is the case of **Dulal Chandra Adak v. Gunadhar**.⁴³⁷ Thus, the position of law which emerges in this regard is that the "Evidence of expert cannot outweigh direct evidence". So, thereby implying that generally in case of such conflict as contemplated above expert evidence, though not rejected, will not hold much weight for the simple reason that it is indirect form of evidence. However in the case of **Arshad v. State of Andhra Pradesh**⁴³⁸, the Court has held that data evidence cannot be rejected, if it is inconsistent to oral evidence. Thereby implying that data evidence submitted by an expert cannot be rejected even if it is inconsistent with direct evidence, however the Court in the same case has laid down that the same is not true for opinion given by expert.

The Court in the case of **Jabbar Singh v. State of Rajasthan**⁴³⁹, has held that evidence supporting eye-witnesses should be preferred to that of experts. It has also been held in this context in a different case that only where there is no

⁴³⁴ State of Himachal Pradesh v. Jai Lal, AIR 1999 SC 3318.

⁴³⁵ *Palania Pillai v. State*, 1991 Cri LJ 1563.

⁴³⁶ 1996 Cri LJ 2893 (AP).

⁴³⁷ AIR 1998 Cal 150.

⁴³⁸ 1996 Cri LJ 2893 (AP).

⁴³⁹ 1994 5CC (Cri) 1745.

direct evidence that expert evidence becomes relevant.⁴⁴⁰ Also when there is direct evidence given and accepted, it is hardly necessary to consider expert opinion, though direct evidence can be appreciated in the light of expert evidence.⁴⁴¹ Thus, it can be concluded that where the testimony of the eyewitness inspires confidence and is trustworthy, normally, expert evidence should not be attached much weight.⁴⁴² The reasons for the same are lack of knowledge, inaccuracy of expression and partisanship⁴⁴³ and therefore the Courts have treated it as the weakest form of evidence.

Forensic science, the familial of the law, is the application of scientific techniques to law. It can be considered as a discipline helpful for the effective enforcement of the laws and rules of conduct. It helps the criminal justice system by providing valuable information, which cannot be detected solely with the help of legal brain. In reality, there is no such separate discipline known as forensic science; it is rather a blend of various scientific branches like biology, physics, chemistry and other related scientific subjects. Though medicine, one of the major related disciplines in the forensic science, does not come under the head because it is a distinct discipline known as legal-medicine or forensic medicine. Similarly, there are many other distinct disciplines known as forensic psychology, forensic pathology, forensic odontology etc. Nevertheless, we can say that forensic science is the genus and all other related disciplines are its species.

Scientific detective writer Sir Arthur Conan Doyle developed it use Forensic Science. He through his fictional character “Sherlock Holmes” shows how the criminal investigators successfully investigate crimes applying the principles of serology, finger printing, questioned documents and firearm identification. There are many other persons as well who can be called as the inventors in developing forensic science.

⁴⁴⁰ *BrijBasi v. Moti Ram*, AIR 1982 All 323 at 331.

⁴⁴¹ *Gulamad v. Kutch State*, AIR 1952 Kutch 4 at 5.

⁴⁴² *Hirottam Das v. Moot Chand*, 1982 All LJ 1049.

⁴⁴³ Admissibility of Scientific Evidence and Expert Opinion, referred in 2006 Cri LJ, Journal Section, at p. 215.

6:4 The Role of the Crime Laboratory and Forensic Scientist :

The crime investigation laboratories or the forensic science laboratories plays prominent role in the collection of evidence and its evaluation. In a crime laboratory there will be two set of persons, one for the collection of evidence (crime scene investigators) and the other set examines the evidence samples collected by the scene investigators. In some countries, there are separate wings for the collection of evidence. Scientists having special qualification in scientific subjects like chemistry, physics, biology etc fill the common posts in the crime laboratories. Nowadays, there are persons having special qualification in forensic science. If they are not specially qualified in forensic science discipline, they will be trained in their related fields. For example, a forensic scientist qualified in biology will get adequate training in the field of DNA typing. Almost in all countries, the posts in the forensic science laboratories except forensic scientist trainees are appointed through promotion, based on their experience and progress. The hierarchical order of the scientists from the lower level to the upper starts from the forensic science trainee to scientist I and scientist II. The Director manages the crime laboratories. And there will be a system Director, laboratory's quality assurance director, crime lab unit supervisor and crime scene unit supervisor. At present the services of the forensic science laboratory can be divided into several units. They are the Physical science unit. Biology unit, firearms unit, document examiners unit. toxicology unit. Finger printing unit, DNA typing unit, polygraph unit, voice print analysis unit, etc.

6:5 Ethical Dimensions in Forensic Science :

Ethics has been defined by Frabkena as “*a branch of philosophy; it is moral philosophy or philosophical thinking about morality, moral problems and moral judgements*”.⁴⁴⁴ However, ethics in its strict sense is different from morality. Ethics is based upon knowledge and thinking; morality is based upon belief and feeling. Ethics is a standard that determines the behaviour of an individual. It is a rule of conduct recognized among the right thinking persons.

⁴⁴⁴ Dr. M. Stephen, Christian Ethics Issues and Insights, Concept Publishing Company, New Delhi First Edition, 2007.

They have the capacity to discern right from wrong. Unethical acts often occur when a person acts in a wrong and unjust manner or when he turns his mind to an improper way in contradiction to the rules or norms prevailing in the society. It is difficult to elucidate the parameters of ethical acts and unethical acts. It depends, to a great extent, on the circumstances in which one has taken or reached a decision.

However, there are borderline situations in which a person strongly believes that he had acted ethically but others may criticize his action as unethical. Similarly, there are situations in which one may justify or strongly believe that the act performed by one is ethical, but in reality they know that there may be some more possible alternatives.

A person's behaviour is shaped from his childhood. Actually children are taught by their parents to behave as good persons and tell truth always but later their conduct will be influenced by different persons in society throughout their life. A person's personality is affected to a great extent when he is with his friends and colleagues.

From this background, we can calculate the attitude of a forensic scientist to ethics. A lawyer's outlook to professional ethics is different from that of scientists. The lawyer's ethics always depends on his duties towards his client and court. A lawyer is not expected or duty bound to tell the truth because he is under a duty to his client when he accepts the vakalatnama to conduct the case. Unlike lawyers, forensic scientists are under an obligation to tell the whole truth before the court of law. However, he has certain duties towards the society, victim, suspect and prosecution. His duty to the society is based on the trust reposed in him by the general public. All forensic labs were run with the public fund and therefore as a government agency they are responsible to give a correct result. For that they must perform efficiently and effectively. Similarly, they are equally responsible to the prosecution, victim and suspect. There are plenty of instances in which scientific opinion or results became important. Sometimes the prosecution's case may entirely depend on the report of the forensic expert or his opinion. Therefore, forensic scientists and laboratories shall guarantee that the

judicial system can rely on the works done by them. In law, forensic witnesses are considered differently from other witnesses. They are expected to function in an impartial and unbiased manner. As a forensic expert working under the control of police and prosecution is not only responsible to them but also to the suspect and victim. While analyzing the crime samples, he is duty bound to establish the points that will be helpful for establishing the culpability of the suspect or for exonerating him from the criminal liability.⁴⁴⁵

6:6 Schools of Ethical Thought :

There are mainly two schools of ethics. The forensic science community generally follows the principles formulated by these schools. According to one school of ethical thought, the justification for an act done by one person depends on the consequences of the act. The school argues that the right course of action is always the one that produces the best outcome.⁴⁴⁶ However, this way of thinking has been criticized by saying that the maximum human happiness principle will come in contradiction with valuable individual interests. For example, in an accident claim instituted by a wife and her three children against the death of her husband, one of the important issues to be decided was whether the death of the husband was caused by accident or heart failure. If the death is due to heart failure, the claimants will not get any sum from the insurance company. Considering the pitiable condition of the wife and three children, the medical witness who examined the victim testified before the court that the cause of death was accident, though it was actually caused by heart failure. Here, the individual interest of the insurance company was seriously affected by the ethical decision taken by the medical expert on the basis of maximum happiness to the maximum number of people.

The other school argues that the ethical thought of a person should be guided by the ethical principles that are absolutely right and not based on some desired end like maximum happiness to the maximum number of people. This

⁴⁴⁵ Frabkena W., *Ethics*, 2nd ed., Englewood Cliffs, N.J. Prentice Hall, Inc, 1973 at p. 4.

⁴⁴⁶ Frabkena W., *Ethics*, supra n.2, at pp. 34-60; Rachels J. *The Elements of Moral Philosophy*, 2nd edn. McGraw-Hill Inc., New York, 1993, pp.90-116.

school suggests that a profession shall formulate its own maxim that will govern its professional action, If after applying that maxim, the men in that profession would not agree that it cannot be equally guided every person, can be considered as non ethical. This principle was criticized by commentators saying that (1) there cannot be any absolute maxim suitable for all situations. Sometimes it may come in contradiction with the natural law; (2) an absolute maxim may come in conflict with another absolute maxim. No one can obey both maxims simultaneously.

From the analysis of the principles laid down by the different schools, it is submitted that the forensic scientist and profession shall have recourse to the general principles outlined by the schools. However, it is not advisable to have absolute deference to those principles. Therefore, it is better to take the general values formulated by those theories and then enact a special ethical code, which matches the profession and persons.

6:7 Quality in Forensic Evidence and Justice :

Regarding the quality in forensic evidence and justice, it can be said that in a tragic evening of 1974, City of Birmingham, in England witnessed two heavy bomb blasts, which presented an unending grief to the kith and kin of 21 victims. The occurrence agitated the British government, which took immediate action to catch the culprits. Law enforcement authorities took this case as a challenge and arrested six Irishmen who had boarded a train at Birmingham station immediately before the blast. Police found the debris of a chemical in their hands, which were proved as nitrates through chemical analysis. From the evidence, the police confirmed that they were the actual culprits of the bomb blast case, applying the reasoning that the nitroglycerine was a common ingredient in explosives. They were charge sheeted and when the case came up for trial, the forensic scientist testified that there was ninety-nine percent probabilities that the substances found on the hands of the accused were nitroglycerine. The scientist established the fact with the help of a test known as “Greiss test”. Jury convicted all the accused. After 16 years, it was determined in an appeal that the “Greiss test” was unreliable and the chemical, nitroglycerine can be found in common things like soap, cigarette packages as well as old playing cards. The prosecution also stated that

the nitrate in soap could give positive results and so contamination could have arisen when the bowls were cleaned before the chemical testing. The conviction was overturned in 1991.⁴⁴⁷

The chemical, nitroglycerine ruined the life of six men. This is not a single instance of miscarriage of justice “The fallibility of forensic evidence can be traced out from leading legal and forensic literatures”. Therefore, it is necessary that forensic evidence must be handled very carefully and all possible efforts should be made to minimize the risks that forensic science can give misleading evidence to the courts. The courts should insist that there must be some guarantee both from the forensic science community in general and individual forensic scientists in particular that quality scientific evidence will reach the court of law.

6:8 Quality Assurance in Forensic Evidence:

Quality is a criterion fixed by the society for determining the standard of a particular thing or service. Quality is generally defined by J.M. Juran as “freedom from deficiencies-freedom from errors that require doing work over again (rework) or that result in field failure, customer dissatisfaction, customer claims, and so on”. However, this definition cannot be taken as suitable for forensic science service.⁴⁴⁸ The meaning of quality may change occasionally. For instance, the quality in forensic lab means “fitness for purpose in the laboratories of the forensic science service and quality of forensic service means one “achieved by the competent forensic practitioners that work under the guidance of a quality system and with the right philosophy of approach”.⁴⁴⁹ Thus, the quality of forensic evidence always depends on various factors like validation of a particular technique, quality of the instruments used for analysis, competency of the persons employed for the analysis, standards provided for avoiding contamination, accreditation of the laboratory, certification to the proficiency of forensic personal and the crime laboratory to conduct tests and to evaluate the continued capacity of

⁴⁴⁷*R v. Mc Ilkenny* [1992] 2 All ER 417; see also Peter J. Neufeld and Neville Collman, “When Science Takes The Witness Stand”, *Scientific American* (1990).

⁴⁴⁸ R. Bramley, “Quality in the Laboratory”, 43 *Science and Justice*, 2003 pp. 104-108.

⁴⁴⁹ M.J. Fereday & I. Koop, “European Network of Forensic Science Institutes (ENFSI) and its Quality and Competence Assurance Efforts”, 43 *Science and Justice*, 2003, pp.99-103.

analysis, technical support personnel and the quality performance of the laboratory. Since 1990's judiciary also insists various factors to be considered for evaluating the quality of forensic evidence. The United States Supreme Court in **Daubert v. Merrell Dow Pharmaceuticals**⁴⁵⁰, formulated major guidelines for evaluating the quality of forensic evidence which are:

1. The known or potential error rate of the technique used for the forensic analysis;
2. The general acceptance of the technique in the relevant scientific community;
3. Has the technique been peer reviewed? ;
4. Whether the scientific theory is testable or tested? ;
5. Standards adopted for the application of the technique in a particular occasion.

These guidelines can be considered effective. However, the judge of the Ontario court in **R v. Johnston**⁴⁵¹ formulated some more effective guidelines. His Lordship insists on considering the following factors:

1. The potential rate of error;
2. The existence and maintenance of standards;
3. The care with which the scientific technique has been employed and whether it is susceptible to abuse;
4. Whether there are analogous relationships with other types of scientific techniques that are routinely admitted in to evidence;
5. The presence of failsafe characteristics;
6. The experts qualifications and stature;
7. The existence of specialized literature;

⁴⁵⁰(1993) 125 L Ed. 2d 469.

⁴⁵¹2011 NLCA 56 (CanLII)

8. The novelty of the technique in its relationship to more established areas of scientific analysis;
9. Whether the technique has been generally accepted by experts in the field;
10. The nature and breadth of the inference adduced;
11. The clarity with which the technique may be explained;
12. The extent to which basic data may be verified by the court and the jury;
13. The availability of other experts to evaluate the technique;
14. The probative significance of the evidence.

Keeping these things in mind, one can consider these factors necessary for the proper evaluation of the quality of forensic evidence.

(A) Validation of a Particular Technique:

In forensic setting the term “validation” simply is a process by which a novel forensic technique is demonstrated to show that it is fit for the purpose. In this process, it involves stating very clearly the purpose of the method, specifying in detail what the method must be able to do to provide results that satisfy the purpose, developing the method, establishing its performance characteristics and limitations, and then showing by experimentation that the method will consistently achieve its purpose.⁴⁵² Actually through validation process, what the inventor of the forensic technique aims is to put the entire merits and demerits of the technique to the scientific world. In a validation process the person who validates the technique will considers a range of issues like sampling, recovery, accuracy, precision, limit of detection, specificity, linearity, working range, repeatability, matrix effects: robustness, environmental susceptibility, and uncertainty of measurement. Almost all validation process of novel forensic techniques will be published in standard forensic science journals. Here it is worthy to consider the validation process of a forensic technique published in a reputed journal of forensic science. If another person or laboratory has already validated a method and if one wishes to adopt that method, there is no need for the

⁴⁵² R. Bramley, “Quality in the Laboratory”, 43 Science and Justice 104-108 (2003)

later to go through the entire validation process, however, the person or laboratory that adopted the method must verify that the method works perfectly in their hands.⁴⁵³

It is also well accepted in the forensic scientific community that once a particular technique or method is validated or verified, the laboratory using that technique must ensure that each and every process in that technique is under the absolute control of that laboratory. For example, in the case of a DNA typing method the typing scientist or the technician must check the proper functioning of the electrophoresis machine, computer system and if there are any measurements, their correctness in interpreting the DNA results etc.

(B) Competency of the Forensic Practitioners:

Competency is the all-round performance of the forensic scientist in his forensic job. M.J. Fereday and I. Koop scientists have explained the term competence in forensic setting. According to them “competence is about performing the role, for example of a forensic scientist, competently”. It is about demonstrating competence in the work place and not the classroom, that is to say about actually doing the job. It is not, directly, about qualifications and training. A highly qualified person need not be “occupationally competent. Competence is a mixture of knowledge, skills and their application and behaviours or attitudes. Fereday distinguishes the application of forensic science from other scientific knowledge. He insists that the special knowledge in the application of forensic science and the understanding of the forensic process is essential for a forensic scientist. According to him, a forensic scientist must be a person capable in applying scientific knowledge to the solutions of forensic problems.” Similarly, Fereday states that the application of “technical skills” means the application of “forensic skills” and it involves the assessment of the requirement of a case and its Quality and Competence Assurance Efforts”. Same stand has taken by R. Bramley by saying that competence is about performance on the job, the required level of performance for the job has to be specified and an independent assessment has to

⁴⁵³ R. Bramley, “Quality in the Laboratory”, 43 Science and Justice 104-108.

be carried out to confirm that this is being consistently attained on casework. Training is the means by which the scientist is taught what is required to meet the performance standard. Qualifications can be a means of recognizing achievement of the standard, but only if based on assessment against the standard in the work place.⁴⁵⁴

He says, it is the “forensic skills” which are key to us. The modern forensic scientist is a “forensic data processor” with the accent on “data processing” and not “data generation”. Fereday also gave more importance to the behaviour of the forensic scientist for determining the competency.

(C) Proficiency Tests:

The relevance of the forensic scientific evidence always depends on the reliability of the test conducted. Before 1970s, there were no scientific procedures to test empirically; to primary responsibility for ensuring the reliability of forensic results almost vested with the individual scientist or with his laboratory. At that time when a scientific evidence came before the court of law, judges had placed two techniques to test the integrity of the evidence (1) by appointing well reputed and competent scientific experts and (2) using its own legal techniques like voice dire and cross examination. This situation has changed when the government in some countries like United States and United Kingdom introduced a new programme known as the “crime laboratory proficiency testing”. The primary purpose of the proficiency tests is to evaluate the efficiency of the individual examiner or a group of examiners or even the performance of the laboratory itself. Ordinarily two types of proficiency tests were conducted (1) an “open proficiency tests” in which the individual who or the laboratory which may going to be tested had prior knowledge that he was going to be tested and (2) the “blind proficiency tests” in which the person who may subjected to the test did not have advance knowledge that he was going to be tested. In this case, the samples for the test would be giver as in the normal case. As far as the forensic scientific laboratories and scientists were concerned, the blind proficiency tests are better than the open

⁴⁵⁴ Science and Justice (2003), pp. 104-108.

proficiency tests. Only through the blind proficiency tests, one can find out the routine testing efficiency of the scientist as well as the laboratory.

The crime laboratory proficiency testing as its full strength was started in 1974, when the National Institute of Law Enforcement and Criminal Justice gave adequate grant to the Forensic Science Foundation for manufacturing and issuing a series of twenty-one tests, covering a broad range of evidence types to the voluntary participating forensic laboratories.⁴⁵⁵ The testing results shows that there are serious problems in examination and interpretation of the samples. The project staff and advisory committee had reported several reasons for these problems. They are mainly, misinterpretation of test results by examiners who were careless or lacked necessary training or experience, mislabelled or contaminated samples, inadequate data bases and faulty testing procedures.

Until 1981, the participation of the crime laboratories in the proficiency testing was only an elective form of quality control. This practice has changed by the establishment of the laboratory accreditation system in 1981 and the examiners certification system in 1993.

(d) Accreditation of the Crime Laboratories and the Accrediting Bodies:

Forensic laboratory accreditation is a process by which the accrediting bodies measure the laboratory or system of laboratories against certain standards formulated by the recognized forensic scientific groups. These standards are written procedures consensually made by the members of the forensic scientific working groups all over the world. In United States, two type of working groups were established by the Federal Bureau of Investigation and National Institute of Justice; (1) Scientific Working Groups and (2) Technical Working Groups. Members of the groups include subject matter experts, forensic examiners, laboratory managers, academicians, researchers, law enforcement officers, legal practitioners and representatives of other appropriate groups.

⁴⁵⁵ Joseph L. Peterson and Penelope N. Markham, "Crime Laboratory Proficiency Testing Results", 1978-1991.

6:9 Certification of Forensic Science Laboratories and Certifying Bodies :

Forensic science recognition given by the prominent forensic organizations, regarding a person's knowledge, skills or ability in the forensic subject or an institution's capability in conducting forensic works. The American Board of Criminalistics defined certification as "a voluntary process of peer review by which a practitioner is recognized as having attained the professional qualifications necessary to practice in one or more disciplines of Criminalistics".⁴⁵⁶ We have various agencies for recognition of the Forensic evidence and among them the prominent are the American Board of Criminalistics and the International Association for Certification.⁴⁵⁷

Proper quality assurance is essential for a laboratory and those persons working in the laboratory to consistently improve their laboratory practices. This will help ensure, and support, the integrity of the results reported from a laboratory, and provide interested parties with information regarding the laboratory's reliability to perform the tests reported. It is through the implementation of a quality system that the integrity of the laboratory results are maintained, and competency proven. A laboratory that is not dedicated to a quality analysis endangers not only their work product, but their integrity as well. Everyone using the laboratory services can be assertive that the reported results are accurate, reliable, and reproducible with the use of a properly administered quality program.

6:10 Certification of Forensic Laboratories in India :

"Accreditation" is to Forensic Laboratories what "recognition is to an Institution. Accreditation is the soul of the Laboratory. So, in this regard, it can be said that a Technical Committee appointed by Chairman, National Accreditation Board for Testing and Calibration Laboratories (NABL), developed NABL Specific guideline on sanction of Forensic Laboratories in June 1998. Accreditation of Forensic Laboratories under National Accreditation Board for

⁴⁵⁶ www.criminalistics.com/ABC/

⁴⁵⁷ For more details about the certification of crime laboratories see, www.theiai.org and www.criminalistics.com/ABC/

Testing and Calibration Laboratories was launched during a special meeting held at India Habitat Centre, New Delhi, on 2nd May, 1999.

(A) Aims & Objectives of NABL are:

1. To promote, coordinate, guide, implement and maintain an accreditation system for laboratories suitable for the country in accordance with the relevant national and international standards and guides.
2. To ensure that all measurements either during calibration or testing by accredited laboratories are traceable to appropriate national or international standards maintained at National Physical Laboratory (NPL) and at Bhabha Atomic Research Centre (BARC) through an unbroken chain of comparisons.
3. To encourage Proficiency Tests or Inter-laboratory comparisons in order to ensure accuracy, reliability and reproducibility of test results.
4. To ensure that the accredited laboratories adhere to all the conditions of accreditation, by periodic surveillance.
5. To organize Awareness Programmes on all aspects of laboratory accreditation for the laboratories by various means including seminars, workshops and laboratory-industry-accreditation body meets etc.
6. To acquire traveling standards and artifacts for conducting studies on measurements by the accredited laboratories and thereby to help improve reliability and reproducibility of results.
7. To establish and maintain strong linkages with international and regional for a such as International Laboratory Accreditation Conference, European Accreditation Cooperation for Laboratories, Asia Pacific Laboratory Accreditation Cooperation etc. and to take active participation in Plenary Sessions, Committee Meetings etc. in order to keep pace with the latest developments and for promoting Bi-lateral,
8. To undertake all the activities, which shall promote undertaking, Bi-lateral or Multilateral Recognition Agreements between National Accreditation Board for Testing and Calibration Laboratories and laboratory

accreditation bodies in other countries so that test results of National Accreditation Board for Testing and Calibration Laboratories accredited laboratories become acceptable in all countries.

9. Proficiency Testing Programme- The National Accreditation Board for Testing and Calibration Laboratories will conduct an inter-laboratory proficiency testing of all laboratories that are members of the National Accreditation Board for Testing and Calibration Laboratories.
10. Inter-laboratory proficiency testing programme while 9 others are nearing completion. This enables the laboratory to know confidentially from NABL its performance in terms of Z score, which is an indication of departure-of the result from the assigned value. Therefore, laboratory gets a chance to improve its performance in subsequent studies.⁴⁵⁸

6:11 Rules of Evidence- England and USA :

Position in England and USA (vis-a-vis Indian Law) regarding the rules of Evidence and use of DNA as an evidence can be understood by brief description given as under:

(i) England- Like India in England also expert opinion is accepted as an exception to the 'Opinion Rule'. An expert opinion is admissible to furnish the Court with scientific information which is likely to be outside the experience and knowledge of a Judge or jury.⁴⁵⁹ Experts there are allowed to testify on any number of matters, the Courts are generally receptive to new varieties of expertise⁴⁶⁰, however not all fresh developments are welcomed.

Like India it is for the Judge to determine whether the particular witness can demonstrate sufficient competence within his field to be treated as an expert and to be permitted to give evidence of his opinion. This implies that the witness will show the Court that he possessed relevant professional qualifications. But unlike India, Courts are not strict on this point. A classic example of this is the

⁴⁵⁸ www.irjmsh.com

⁴⁵⁹ Per Lawson LJ, Turner, (1975) QB 834 at 841.

⁴⁶⁰ Per Lord Taylor J, Stockwell, (1993) 97Cr App Rep 109.

case if Silverlock⁴⁶¹, where a solicitor who whiled away his leisure hours in the private study of handwriting was allowed to testify as an expert in handwriting. Also when deciding whether to allow a particular witness to testify as an expert, the Courts will not necessarily refuse to admit an expert whose approach to his subject is contentious in the same sense that it does not coincide with the received wisdom in the field.⁴⁶² Thus, in England it is with ease that expert evidence is admitted however according to authors⁴⁶³ this should not be of worry as the omissions are rectified when it comes to cross-examination of such witness.

An expert may only give an opinion in matters that fall within his particular field of skill. If a question falls outside the scope of a witness's particular expertise, the opinion ought not to be received.⁴⁶⁴ Also the experts' field of expertise must fall outside the ordinary knowledge of Court. Therefore, an expert's opinion will not be received on matters where it is felt that the Court is perfectly capable of drawing inferences for itself.⁴⁶⁵

Opinion of expert is accepted as evidence on the ultimate issue in a case. The Courts have departed from the common law doctrine of 'ultimate issue rule', thus, the law has gradually distanced itself from it. In *Stockwell*, the Court of appeal declared that whilst there was a school of thought which considered that such a rule existed, 'if there is such a prohibition, it has long been more honoured in the breach than observance'. The rule today, then, is 'better regarded as a 'matter of form rather than substance'. This is, however, not accepted in India. Therefore, the doctrine of 'ultimate issue rule' is still accepted. Also in England experts may not only give his opinion but may also testify to matters of fact.⁴⁶⁶

(ii) United States of America: In the USA, it is accepted that Federal Rules of Evidence have been held to have superseded the test for admissibility of scientific evidence which required that the technique in question must have been generally

⁴⁶¹ (1894) 2 QB 766, also see *Oakley*, (1979) Crim LR 657, referred in 2006 Cri LJ, Journal Section, at 215.

⁴⁶² *Robb*, (1991) 93 Cr App Rep 161.

⁴⁶³ Roderick Munday, *Evidence*, 2nd Edn., LexisNexis TM Butterworths.

⁴⁶⁴ *Nightingale v. Buffin*, (1925) 18 BWCC 358

⁴⁶⁵ *R v. Land*, (1999) QB 65 L.

⁴⁶⁶ 2006 Cri LJ, Journal Section, at 215.

accepted as reliable in relevant scientific community The trial Judge must ensure that any and all scientific evidence admitted is not only relevant, but reliable.⁴⁶⁷

In addition, the New Jersey Superior Court has held in the case of **Procida v. Mc. Laughlin**⁴⁶⁸, that, scientific evidence is admissible if the proposed technique has sufficient scientific basis to produce uniform and reasonably reliable results and will contribute materially to the ascertainment of truth. Thus, the method must generally be accepted as reliable⁴⁶⁹, the determination of general acceptance is primarily a question of fact for trial Court to determine.⁴⁷⁰ Therefore, the party offering the novel form of evidence has the burden of demonstrating that such evidence has been accepted as reliable by the scientific community.⁴⁷¹

With respect to expert opinion and its admissibility, the Court in the case of **Potomac Elec. Power Co. v. Smith**⁴⁷², has held that “In order to qualify as an expert witness, a minimum level of competence in the subject involved must be shown”. Thus, qualifications of the witness must be affirmatively shown by the proponent of these evidences.⁴⁷³ The Court may disqualify such a witness where it is shown that retention of an expert witness creates a conflict of interest.⁴⁷⁴

Bias or interest of witness does not affect his criterion, but only the validity which is to be given to his testimony.⁴⁷⁵ Position in United States also differs on another ground that being, a skilled witness is permitted to state a fact not generally known, although it may involve an element of inference.⁴⁷⁶ But the statement must not contain too much of objectionable reasoning or conjecture.⁴⁷⁷ Therefore, it can be said that absolute certainty is not required of an expert before

⁴⁶⁷ *Daubert v. Merrell Dow Pharmaceuticals, Inc.* Cal., 509 US 579.

⁴⁶⁸ 195 NJ Super 396.

⁴⁶⁹ *Matter of Dass v. Mark S.*, 593 NYS 2d 142.

⁴⁷⁰ NY Matter of M.Z.; 590 NYS 2d 390.

⁴⁷¹ *Mich-Kluckv. Borland*, 162 Mich App 695.

⁴⁷² 558 A 2d 768.

⁴⁷³ *Conde v. Velsicol Chemical Corp.*, 804 F Supp 972.

⁴⁷⁴ *Wis-Secura Ins. Co. v. Wiscosin Public Service, App.*, 457 NW 2d 549.

⁴⁷⁵ *Rodriguez v. Pacificare of Texas Inc* Md, 980 F 2d 1014.

⁴⁷⁶ *Cropper v. Titanium Pigment Co.*, (1931) C.C.A. 8th Circ.47 Fed. (2) 1038, 1043, 78 ALR 737.

⁴⁷⁷ *Kent v. Mahaffey*, 10 Ohio Cir. Ct. 204.

he can testify, mere estimation cannot constitute basis for expert opinion evidence.

Thus, it must aid the court in understanding their problems.⁴⁷⁸ An opinion creates no fact⁴⁷⁹, it merely raises the issue of fact.⁴⁸⁰

The value or influence to be given to opinion evidence is, within the bounds of reason⁴⁸¹, entirely a question for the determination of the jury, the Court when trying a question of fact, or other of the facts.⁴⁸² Thus, the trier of facts should give opinion evidence such weight as it believes it is entitled to receive.⁴⁸³

Opinion evidence is entitled to weight only when consistent with probability and reason.⁴⁸⁴ Thus of all forms of evidence, opinion evidence is said to be the weakest and least reliable.⁴⁸⁵ However, it loses much of its weakness when supported by factual testimony.⁴⁸⁶

6.12. The Human DNA Profiling Bill 2016 :

The Bill 2016 was drafted by the Department of Biotechnology and was submitted to the Government of India. The Bill proposed to form a National DNA Data Bank and a DNA Profiling Board, and for using the data for various purposes specified in the Bill. The proposed DNA Profiling Board would have consisted of molecular biology, human genetics, population biology, bioethics, social sciences, law and criminal justice experts. The Board was to define standards and controls for DNA profiling. It was also to certify laboratories and handle access of data stored by law enforcement agencies. Similar bodies at State levels were also to be formed.

⁴⁷⁸ *Johnson Group Inc v. Beecham Inc*, 952 F 2d 1005.

⁴⁷⁹ *Leupe v. Leupe*, 21 Cal. 2d 145.

⁴⁸⁰ *Carmichael v. Delta Drilling Co.*, 243 SW 2d 227

⁴⁸¹ *S.M. Aycrigg et al., Plaintiffs v. United State of America*, 136 F Supp 244

⁴⁸² *United States of America v. Douglas W. Johnson*, 576 A 2d 1331.

⁴⁸³ *Corp. v. Borland Inr'l, Inc.*, 56 F Supp 831.

⁴⁸⁴ *Corp. Dobbins*, 616 F 2d 458 (10th Cr. 1980).

⁴⁸⁵ *People v. Platt*, 124 Cal. App. 2d 123 (1954).

⁴⁸⁶ Pa.-In re Meyers, 189 A 2d 852, referred in 2006 Cri LJ, Journal Section, at p. 216.

The National DNA Data Bank, was supposed to collect data from offenders, suspects, missing persons, unidentified dead bodies and volunteers. It was to profile and store DNA data in criminal cases like homicide, sexual assault, adultery and other crimes. The data was to be available also to the accused or the suspect for proving his non-involvement in the crime or at least to establish that he was not present on the place of occurrence at the relevant time.

The Bill was criticised for not addressing the concerns of privacy by a large number of organisations and public spirited persons on similar grounds and made various representations to the statutory authorities. The Bill did not make special provisions in respect of funding of the Board and how the required funds will be made available to the investigating agencies to collect proper reports of samples. Moreover, the Bill did not specifically provide as to on what stage the samples could be collected.

A. The A.P. Shah Committee Report :

In October 2012, an expert committee headed by Hon'ble Justice Ajit Prakash Shah presented its report, suggesting that there should be safeguards to prevent illegal collection and use of DNA data; further providing safeguards to prevent the proposed body from misusing the same. That there should a mechanism using which citizens can appeal against the retention of data. The report also suggested that there should also be a mechanism of appeal under which citizens under trial can request for a fresh sample to be taken. The samples were to be taken after consent in case of victims and suspects. 6.5 The Committee noted that although the Bill allowed volunteers to give samples, there was no proper procedure to obtain consent and there was no mechanism under which volunteer can withdraw his data. That before giving the data to a third party, the person must be notified and consent must be sought, if the third party was not an authorised agency. The purpose for which data was being collected should be stated publicly, and the data should be destroyed after the purpose has been served and the time frame has expired. The report said that the bodies collecting, analysing, and storing DNA data should be made to release an annual report, detailing their practices and organisational structure. These observations alleviate

the underlying concern about one's right to privacy when DNA databases are created.⁴⁸⁷

B. Malimath Committee Report :

Section 293(4) of Cr. P.C. enlists the scientific experts under the Code. The Committee recommended that DNA experts should be included in the list of experts under clause (g).

It recommended amendment of Cr. P.C. conferring all criminal courts at all levels with the inherent power to pass appropriate orders as maybe necessary to give effect to any order under Cr. P.C., or to prevent abuse of the process of any court or otherwise secure the ends of justice as provided under section 482 Cr. P.C. exclusively for the High Court.

The Committee also recommended an amendment section 4 of Identification of Prisoners Act, 1920 in line with section 27 of the Prevention of Terrorism Act, 2002 which empowers the Court to direct the accused/suspect in writing to give: (1) samples of hand writing, finger-prints, foot-prints, photographs, blood, saliva, semen, hair, voice to the police officer either through a medical practitioner or otherwise, as the case may be. (2) If any accused person refuses to give samples as provided in sub-section (1), the Court shall draw adverse inference against the accused.⁴⁸⁸

Thus, it may be concluded that there are indeed, major differences between Indian notion and other countries such as English and American. However, the basic postulates are the same. It is thus correct to say that opinions of expert and scientific evidence are generally not conclusive or binding, except, under some authorities, where the subject is one for experts or skilled witnesses alone and concerns matters of which a layman can have no knowledge and where no conflict exists in such indirect evidence with direct evidence. Scientific evidences are very resourceful and accurate but still the uses of such evidences are not welcomed

⁴⁸⁷ "Report of the Group of Experts on Privacy" (Chaired by Justice A.P. Shah, Former Chief Justice, Delhi High Court), submitted to the Planning Commission on 16 October 2012.

⁴⁸⁸ Malimath Committee Report on Reform of Criminal Justice System, 2003

properly in India. Although, it is increasing but there are various ethical and legal issues which disable the complete acceptance and undoubted validity of such evidences.

CHAPTER–VII

JUDICIAL TRENDS REGARDING DNA

The ‘Evaluation’ and ‘adjudication’ is the ‘right’, ‘responsibility’ as well as ‘liability’ of the judiciary. For every legal issue involved in controversy in civil or criminal matter, is to be dealt with accordingly. Since the DNA evidence is a sensitive and complicated issue recently developed, hence, its appreciation, evaluation and application need special and higher care of caution and attention. Hence, in this chapter, an effort has been made to study the approach of the Indian judiciary expressed in several legal cases.

In this respect, it can be said that the general approach of the Indian Judiciary has been not to exclude the illegally obtained evidence on the ground that the method of collection adopted by the authorities does not affect its reliability and hence, it is admissible on account of its relevance at the trial, with a few exceptions.⁴⁸⁹

In the recent case of **Yam Prasad Pradhan v. Sonam Pradhan**⁴⁹⁰, the instant petition, preferred under Articles 226/227 of the Constitution of India, is directed against the order dated 15.06.2016, wherein and hereunder the Civil Judge, South at Namchi directed the plaintiff, the defendant, against whom the paternity is claimed by the plaintiff and mother of the plaintiff for the Deoxyribonucleic acid test. The defendant, as aforesaid, has come up with this instant petition questioning the legality and validity of the impugned order on several grounds, inter alia, the direction to undergo DNA test for examining claim of paternity is per se illegal and violative of constitutional and legal rights of the defendant/ petitioner herein.

The learned Senior Counsel appearing for the petitioner, contended that the petitioner herein has a reputation in the society, undergoing a DNA test may undermine his reputation and name. Thus, undergoing a DNA test, as directed by

⁴⁸⁹ 2003 Cri LJ, Journal Section at p. 267.

⁴⁹⁰ Writ Petition (Civil) No. 31 of 2016, decided on 17.03.2017, in High Court of Sikkim at Gangtok.

the Civil Court, is violative of fundamental, constitutional, legal and natural rights. It is further contended that the Civil Court ought to have decided the Title Suit for declaration, on examination of other witnesses instead of directing the DNA test. It is lastly argued that the evidences adduced by both the parties are sufficient to decide the dispute raised in the suit.

On the other hand, the learned Senior Counsel, who was appointed by the Sikkim State Legal Services Authority, to help the plaintiff/respondent herein and assist the Court, submits that if the defendant undergoes the DNA test, the truth will come out and the claim of the respondent herein of being the son of the petitioner herein will be clearly examined with stronger and cogent reasons. In the facts of the case, other oral evidences adduced by the parties may not be substantial and conclusive. Reliance was placed on a decision of the Supreme Court in **Narain Dutt Tiwari v. Rohit Shekhar and Another**.⁴⁹¹

The Court heard learned Senior Counsel appearing for the parties, examined the pleadings and documents appended thereto carefully.

In the case on hand, initially the learned Judge declined to direct the DNA test, however, after having examined all the available evidences, it appears that she had come to a strong prima facie conclusion that the DNA test was essential to determine the truth in respect of the paternity and accordingly directed the same by the impugned order.

In the light of aforesaid principles of law as laid down by the Supreme Court, it is well established that the DNA test may not be directed on the drop of a hat. In a case like this, where the plaintiff/ respondent herein is seeking declaration/determination of parentage and also on examination of evidences, learned Civil Judge found strong prima facie case in favour of direction of DNA test, the impugned order is proper. As regards the reputation of the petitioner being damaged is concerned, the DNA test will establish the reputation of the petitioner, if the claim of the plaintiff/ respondent herein is not established.

⁴⁹¹ (2012) 12 SCC 554.

In such view of the matter, the court was of the considered view that the impugned order directing DNA test of the defendant/petitioner herein and plaintiff/respondent herein and mother of the plaintiff/ respondent herein, after proper examination, is neither erroneous nor illegal and also not violate of the petitioner's fundamental, legal or natural rights.

As a result, interference is not warranted and the writ petition is dismissed. However, it was made clear that the State Authorities, Doctors and Forensic Laboratory Experts dealing with the DNA test shall maintain the confidentiality and the report be submitted in a sealed cover to the Court.

In the case of **Sunil Kumar and Ors. v. State**⁴⁹², the three appellants and three different criminal cases, namely, Sunil Kumar (appellant in Crl.A. No.37/2017); Arvind (appellant in Crl.A. No.46/2017) and Dinesh (appellant in Crl.A. No. 95/2017) were subjected to a joint trial in SC No.58069/2016 before the court of Additional Sessions Judge-03 (North), Rohini Courts, Delhi arising out of FIR No.676/2012 registered by P.S. Narela.

Pursuant to their joint trial, by the impugned judgment dated 19th August, 2016, the Additional Sessions Judge found the appellants guilty of commission of the offence punishable under Section 302 read with Section 34, Indian Penal Code with which they were charged. As a consequence, by the order dated 24th September, 2016, the appellants stood sentenced to life imprisonment with fine of Rs.20,000/- and in default of payment of fine, they shall further undergo simple imprisonment for one year and in case of the fine amount being realized, the same was directed to be distributed equally among the two brothers of the deceased, namely, Rama Yadav and Ram Achal Yadav.

Aggrieved by their conviction by the judgment dated 19th August, 2016 as well as the sentence upon them, the appellants have preferred these separate appeals challenging the judgment and order on sentence.

⁴⁹² Crl. A. 37/2017, Crl. M.B. No. 60/2017, Crl. A. 46/2017, Crl. M.B. No. 73/2017, Crl. A. 5/2017 and Crl. M.B. No. 151/2017 decided on 9.03.2017, in the High Court of Delhi.

Given the fact that the same evidence is being referred to by the appellants and identical questions of law and fact are raised, in the case has been heard together and propose to decide all three appeals by this common judgment. The case rests within a narrow factual compass.

Based of statement and Rukka, the Head Constable Jasbir Singh proceeded to the police station and handed over the Tehrir to the duty officer for handing over to Inspector Mahavir Singh at the spot.

So far as seizure of the four broken plastic glasses and four cigarette butts of the Gold Flake make are concerned, the same were separately seized in plastic boxes and were kept in a pulanda by Inspector Naresh Kumar. The cigarette butts and plastic glasses were produced in court and proved on record.

It is noteworthy that in the brief facts, while detailing allegations of Rama Yadav with regard to Munshi Yadav going, missing and recovery of his dead body, there is no reference to the cigarette buns or the plastic glasses alleged to have been recovered from the spot.

We find that Inspector Naresh Kumar has not mentioned recovery of either cigarette butt or of any plastic glasses against this requirement. Prior to the post-mortem, the dead body was identified by Ram Achal Yadav and Rama Yadav on which theft signatures/thumb impression were affixed by Inspector Naresh Kumar.

The report of the biological examination as contained in Ex. PW 18/A was that the saliva was detected on the cigarette butts.

The sole circumstance that the prosecution has sought to rely in support of the appellants' guilt was that the DNA from the appellants' samples matched the DNA of the saliva on the cigarette butts seized from the spot. It is to be noted that this circumstance by itself, does not establish an unbroken chain of circumstances which points unerringly towards the only hypothesis of the guilt of the appellants. The prosecution had to first establish by credible evidence that the cigarette butts were actually seized from the spot, as alleged. Apart from that, the prosecution

had to led authentic and credible evidence that the deceased had smoked cigarette with the appellants shortly before he was murdered. In the instant case, the prosecution had led positive evidence of the complainant Rama Yadav, brother of the deceased that the deceased never smoked cigarettes. This fact stands proven in the testimony of his own real brother.⁴⁹³

Furthermore, the prosecution is unable to establish claimed recoveries of the cigarette butts or the broken plastic glasses from the spot.

The recovered glasses do not support the prosecution case that they were used for consumption of alcohol by the appellants with the deceased. No DNA has been isolated from these plastic glasses. If they had been used for consumption of alcohol, the laboratory would have isolated the DNA samples from these glasses as well.

The recovery of the cigarette butts has been challenged by the appellants which is supported by the fact that the investigating officer has not mentioned recovery of any such articles.

On a consideration of the totality of the evidence led by the prosecution, it would appear that the appellants have been able to cast substantial doubt in the evidence led by the prosecution.

Certainly, the prosecution has not been able to make out an unbroken chain of circumstances pointing unerringly towards the only conclusion i.e. the guilt of the appellants.

In view of the above, the impugned judgment dated 19th August, 2016 and order on sentence dated 24th September, 2016 are hereby set aside and quashed and the appellants are acquitted of the charges which were framed against them in SC No. 58069/16 arising out of FIR No. 676/2012 registered by P.S. Narela. It is directed that the appellants be forthwith released from custody, if not wanted in any other case.

⁴⁹³ Ibid.

In the case of **Paramsivam v. State through Inspector of Police**⁴⁹⁴, the present appeal has been filed against order whereby Appellant was convicted for offence of murder and kidnapping or abducting in order to murder under Sections 302 and 364 of Code. Held, prosecution brought on record evidences that accused had abducted deceased. Therefore, it was accused alone knew what happened to him as deceased was found murdered within short time after abduction. Accused had failed to give any explanation and Court rightly draw presumption that accused had murdered deceased. Recovery of various articles of deceased from accused was strong incriminating circumstance connected Appellants with crime. Prosecution was successful in bringing on record circumstantial evidences i.e. existence of motive, circumstances in which deceased was last seen alive in company of Appellants-accused. Therefore, Appellants are responsible for death of deceased. Thus, guilt of Appellants-accused had been proved beyond all reasonable doubt. Impugned order of conviction was sustainable and required no interference. The Appeal was dismissed.

Brief facts of the case were that:

This appeal is directed against judgment dated 27th April, 2009, passed by the High Court of Judicature at Madras in Criminal Appeal No. 441 of 2007. By the impugned judgment appeal preferred by the Appellants-accused Nos. 1 to 3 has been dismissed and conviction of accused Nos. 1 to 3 under Section 364, Indian Penal Code and accused No. 1 under Section 302, Indian Penal Code and accused Nos. 2 and 3 under Section 302 r/w 34 Indian Penal Code and the sentence of life imprisonment and fine imposed upon them have been confirmed.

Upon analysis of evidence, the court is of the view that prosecution has succeeded in proving the facts that the accused Nos. I to 3 took away deceased Mani alias Parai Mani. What happened thereafter to deceased is especially within the knowledge of the Appellants-accused Nos. 1 to 3. It was for the Appellants-accused Nos. I to 3 to explain what happened to Mani alias Parai Mani after they took him away but they failed to explain the same. Mani alias Parai Mani was

⁴⁹⁴ Criminal Appeal No. 593 of 2010, decided on 01.07.2014, in the Supreme Court of India.

found dead immediately thereafter. Therefore, it is clear that the accused Nos. 1 to 3 who abducted deceased Mani alias Parai Mani intentionally withhold the information from the Court and, therefore, there is every justification for drawing inference that Appellants-accused Nos. 1 to 3 murdered Mani alias Parai Mani. Stand of the Appellants is a bare denial of prosecution case. In the absence of any explanation, the inevitable inference is that Appellants were responsible for the death of deceased Mani alias Parai Mani. Thus, the guilt of the Appellants-accused Nos.1 to 3 has been proved beyond all reasonable doubt. There is no merit in this appeal and the same is accordingly dismissed.

In the case of **Vikas Yadav v. State of L.P. and Ors.**⁴⁹⁵, the brief facts of the case are that the Trial judge sentenced Appellants 1st and 2nd Accused to life imprisonment as well as fine of one lakh each under Section 302 of Indian Penal Code, 1860. They were sentenced to undergo simple imprisonment for ten years and fine for their conviction under Section 364 read with Section 34 of Indian Penal Code, 1860 and rigorous imprisonment for five years and fine each under Section 201 read with Section 34 of Code, in default, simple imprisonment for three months. All sentences were directed to run concurrently. The 3rd Accused who was tried separately because of his abscondence was convicted for the offences under Sections 302 and 364 read with Section 34 of Code, 1860 and Section 201 of Indian Penal Code, 1860. The State preferred an appeal for enhancement of sentence of imprisonment of life to one of death for the offence under Section 302 of Indian Penal Code, 1860. The High Court imposed a fixed term sentence, i.e., 25 years for the offence under Section 302 of Code, 1860 and 5 years for offence under Section 201 of Indian Penal Code, 1860 with the stipulation that both the sentences would run consecutively.

After hearing the counsels of both parties and evidences on record while disposing off the appeal, the court held as follows:

- (i) Though the power exercised under Article 71 and Article 161 of the Constitution is amenable to judicial review in a limited sense, yet the

⁴⁹⁵ Criminal Appeal Nos. 1531-1533 and 1528-1530 of 2015, decided on 03.10.2016, in the Supreme Court of India.

Court cannot exercise such power. As far as the statutory power under Section 433A of Code of Criminal Procedure, 1973 is concerned, it can be curtailed when the Court is of the considered opinion that the fact situation deserves a sentence of incarceration which be for a fixed term so that power of remission is not exercised.⁴⁹⁶

- (ii) The power to grant remission is an executive power and it cannot affect the appeal or revisional power of the court. The powers are definitely distinct. However, the language of Section 433A of Code of Criminal Procedure, 1973 empowers the executive to grant remission after expiry of 14 years and it only enables the convict to apply for remission.
- (iii) The prosecution had preferred an appeal under Section 377 of Code of Criminal Procedure 1973 before the High Court for enhancement of sentence of imposition of life to one of death. On a reading of the said provision, there can be no trace of doubt that the High Court could have enhanced the sentence of imposition of life to death. The High Court thought it appropriate instead of imposing death sentence to impose the sentence as it had done. Therefore, the sentence imposed by the High Court could not be found fault on that score.
- (iv) A convict is not permitted to submit an application under Section 433A of Code of Criminal Procedure, 1973 because of sentence imposed by a Court. There is no abrogation of any fundamental or statutory right. If the imposition of sentence is justified, as a natural corollary the principle of remission does not arise. The principle for applying remission arises only after expiry of 14 years if the Court imposes sentence of imprisonment for life. When there is exercise of expanded option of sentence between imprisonment for life and death sentence, it comes within the sphere or arena of sentencing. The said exercise of expanded option is permissible.⁴⁹⁷

⁴⁹⁶ Ibid.

⁴⁹⁷ Ibid.

- (v) The High Court took note of the facts that the deceased and sister of 1st and 2nd accused were in an intimate relationship aiming towards permanency; that the family members of sister including 1st and 2nd accused were opposed to this relationship. 2nd and 3rd accused had not been invited to the wedding and had no reason for being there, other than perpetration of the crime; that the deceased was abducted from the wedding venue by the accused with the common intention to murder him; that in furtherance of their common intention the deceased was thereafter murdered by the Appellants: that immediately after the incident, the three accused absconded; that the body was having a lacerated wound on the head, a fracture in the skull, laceration and hematoma in the brain immediately below the fracture; that 1st and 2nd accused deliberately misled the police; that the 3rd accused absconded for over three and half years. From these findings recorded by the High Court it was vivid that crime was committed in a planned and cold blooded manner with the motive that had emanated due to feeling of some kind uncalled for and unwarranted superiority based on caste feeling that has blinded the thought of “choice available” to a sister-a representative of women as a class. The High Court unequivocally held that it was a “honour killing” and the said findings apart from being put to rest, also gets support from the evidence brought on record. The circumstantial evidence by which the crime had been established, clearly lead to one singular conclusion that the anger of the brother on the involvement of the sister with the deceased, was the only motive behind crime.
- (vi) The conduct during the trial had also been emphasized by the High Court because it was not an effect to protect one-self, but the arrogance and the impunity shown in which they set up false defense. In fact, as had been recorded by the High Court, the public prosecutor was also not spared. The criminal antecedents of 1st accused was referred to in detail by the High Court.
- (vii) The High Court, while dealing with 1st and 2nd accused had opined that they had misused the process of law while in jail and in their conduct there

was no sign of any kind of remorse or regret. As far as the 3rd accused was concerned, the High Court had taken his conduct in jail which had been chastened and punishment was imposed once. The High Court had taken note of the fact that 3rd Accused was the employee of the father of 1st accused and he was a married man with five children and on account of his incarceration, his family was in dire stress. A finding had been returned that he was not a person of substantial means and has lesser paying capacity. On the basis of these facts and circumstances, the High Court had drawn a distinction and imposed slightly lesser sentence in respect of 3rd accused. The imposition of fixed term sentence on the Appellants by the High Court could not be found fault with.

- (viii) The Trial Court imposed the life sentence and directed all the sentences to be concurrent. The high Court declined to enhance the sentence from imprisonment for life to death, but imposed a fixed term sentence. It curtails the power of remission after fourteen years as envisaged under Section 433 of the Code of Criminal Procedure, 1973. The High Court had not directed that the sentence under Section 201/34 of Indian Penal Code, 1860 shall run first and thereafter, the fixed term sentence will commence. A direction that the sentence imposed for the offence punishable under Section 201/34 of Indian Penal Code, 1860 shall run concurrently with the sentence imposed for other offences by the High Court. Adequate compensation is required to be granted. The High Court had considered all the aspects and enhanced the fine, determined the compensation and prescribed the default clause.

The appeals are disposed of with the singular modification in the sentence i.e. the sentence under Section 201/34 Indian Penal Code shall run concurrently. Needless to say, all other sentences and directions will remain intact.

In the case of **Somasundaram v. State**⁴⁹⁸, the Trial Court convicted accused Nos. 1 to 11 and 13 to 17 including Appellants. High Court upheld order

⁴⁹⁸ Criminal Appeal Nos. 403 of 2010, 827 and 828 of 2013, decided on 28.09.2016, in the Supreme Court of India.

of conviction against all accused, except accused No.10 who was acquitted of all charges. High Court relied on testimony of Prosecution Witness-1, son of deceased and testimony of PW-13, who saw deceased walking. Both Trial Court and High Court treated PW-10 and PW-11 as accomplices. Hence, present appeals to ascertain, whether High Court was justified in upholding conviction imposed on appellants by Trial Court and whether benefit could be obtained by acquittal under Section 120-B of Indian Penal Code, 1860.

Brief facts of the case were as follows:

The son of the deceased lodged a missing person complaint as the deceased went for morning walk, but did not return home. The Investigating Officer came to know of the involvement of accused No. 5 in the case through an informant. On the basis of his statement, the FIR was altered and the offences under Sections 120-B read with Sections 364, 365, 302 and 201 of Indian Penal Code, 1860 were added to the same. Subsequently, the rest of the Accused persons were arrested on the basis of the statements of the witnesses. On the basis of the evidence of Appellant Accused No. 3, vehicle under mahazar was recovered on the same day. Appellant/Accused No. 4 was also arrested and on the basis of the disclosure made in the statement, another vehicle was recovered. Appellant/Accused No. 15 was arrested and on the basis of the disclosure, a motor cycle and a black coloured shoe kept inside the side box of that motor cycle were recovered. The final report was filed against Accused Nos. 1 to 17 and one unknown person. Pursuant to further investigation and apprehension of accused No. 18, final report was filed under Section 120B read with Sections 364, 365, 419, 437, 387, 302, 402 and 201 of Indian Penal Code, 1860.

The Trial Court convicted and sentenced Accused Nos. 1 to 11 and 13 to 17. Accused Nos. 12 and 18 were acquitted of all charges. The Accused persons preferred appeals against their conviction and the State preferred an appeal against the acquittal of acquitted Accused before the High Court. The High Court upheld the order of conviction against all the Accused, except Accused No. 10 who was acquitted of all the charges. The next crucial link, according to the High Court was provided from the evidence of PW-10 and PW-11, who saw some of the

Accused bringing the deceased into the vermicelli manufacturing factory premises. Both the Trial Court and the High Court treated PW-10 and PW-11 as accomplices, keeping in view their role in the entire incident. The High Court accordingly, came to the conclusion that the evidence of PW-10 and PW-11 was reliable and could be considered while examining the guilt of the Appellants. The High Court held that the conviction and sentence imposed by the Trial Court in respect of all the Accused persons was liable to be confirmed as the same did not suffer from any infirmity in law. Hence, the present appeals.

Gopala Gowda, J., while allowing the appeals held that:

- (i) The prosecution as far as accused Nos. 3 and A-4 were concerned rested heavily on the evidence of PW-10 and PW-11, whose evidence was supported by the evidence of PW-33 and PW-34. From a perusal of the evidence of PW-10 and PW-11, it became clear that they were accomplice witnesses. PW-10 and PW-11 were not granted pardon by any Court and had been arrayed as prosecution witnesses. The present Court held that the mere fact that pardon has not been tendered by a court of law does not make an accomplice cease being an accomplice. PW-10 and PW-11 being accomplice witnesses, their evidence must be treated as such.
- (ii) While the evidence of an accomplice can be used to convict an accused, as a Rule of prudence, the Court must first ensure that the testimony of the accomplice is corroborated in material particulars by adducing independent evidence.
- (iii) Even at the vermicelli factory premises, Accused No. 3 stayed downstairs, while it was PW-11 who went upstairs and actually saw the deceased tied to chains and the room where he was kept. PW-11 only saw Accused No. 15 at the site, carrying a tiffin parcel. Accused No. 4 was not mentioned anywhere at the vermicelli factory at all. As far as Accused No. 15 was concerned, the crucial evidence on which reliance was placed upon by both the courts below to convict him was the recovery of shoes on his direction. He took a shoe from the factory. Both the courts below, however, failed to notice that the evidence of PW-31 could not be used against Accused No.

15, which erroneously done by the courts below. Further, PW-1 and PW-2 both stated in their testimony that the particular shoe did not belong to the deceased. Thus, there was nothing on record which connected Accused No. 15 either to the crime or to the deceased.

- (iv) Since, the evidence of PW-10 and PW-11 was not reliable for recording the finding of guilt on the charges against the Accused Appellants. Even, if it was placed reliance upon, Accused Nos. 3, 4 and 15 could not be convicted of the offences of kidnapping and murder, more so in light of the fact that they had been acquitted of the charge of criminal conspiracy under Section 120B of Indian Penal Code by the courts below.
- (v) For Section 109 of Indian Penal Code, it is not enough to show a conspiracy. What needs to be proved is an act committed in furtherance of that conspiracy. In the instant case, both the courts below did not find sufficient evidence to convict the Accused Appellants of the charge under Section 120B of Indian Penal Code.
- (vi) The Trial Court erred in convicting the Accused Appellants, more so, after having acquitted them of the offence of criminal conspiracy punishable under Section 120B of Indian Penal Code. Even, the High Court adopted the same erroneous approach while re-appreciating the evidence against the Accused Appellants and attempting to look for a complete link, as if the Accused persons had been convicted for the charge of criminal conspiracy as well. This shows a gross non-application of mind on the part of the courts below, which certainly cannot be allowed to sustain by the present Court, as the same was wholly erroneous in law. Therefore, these criminal appeals must be allowed in exercise of the power of the present Court under Article 136 of the Constitution of India and the Accused Appellants were entitled for acquittal from the charges. The impugned judgment and order was set aside passed by the High Court in upholding the judgment and order passed by the Trial Court convicting the Appellants. The prosecution had not proved its case beyond reasonable doubt against the Accused Appellants.

While dismissing the appeals, Arun Mishra, J. held that-

- (i) The abduction of the deceased was proved and deceased had been murdered soon after his abduction in two days and thereafter his body had been cremated under the name of a fictitious person.
- (ii) It was apparent that the deceased was killed in factory and the fact that the Appellants were not persons who brought down body from upstairs is not enough to exonerate Appellants considering the established facts and circumstances in case they have been rightly held guilty of murder also.
- (iii) The Trial Court rightly found that the Appellants had acted upon the conspiracy of Accused Nos. 1 and 2 and had been found guilty of offences under Sections 365, 387, 302, 347, 364, 109 and 201 of Indian Penal Code.
- (iv) There was nothing to doubt the statement of PW-10 regarding purchase of chain. The Trial court with respect to commission of offence under Section 387 of Indian Penal Code rightly gave the finding that the prosecution established its case to the effect that the Accused Nos. 1 to 11 and 14 to 17 had committed the offence punishable under Section 387 of Indian Penal Code beyond all reasonable doubt.
- (v) When charge under Section 109 had been found established, mere their acquittal under Section 120-B was of no avail to them. Charges which were framed were specific ingredients of Section 109 had been rightly found to proceed by both the courts below. Their acquittal under Section 120-B of Indian Penal Code, 1860 cannot help them as offences of both Sections were separate. Section 120B found established against Accused Nos. 1 and 2 and other charges against Accused/Appellants.
- (vi) Commission of offence under Section 109 had been established along with other sections. The conviction and the sentence imposed by the Trial Court and the High Court was absolutely proper and no benefit could be obtained by acquittal under Section 120B of Indian Penal Code.
- (vii) As per the case of prosecution the body of the deceased was fully burnt as such the recovery of certain remains which was made after several months

from the cremation ground was of no utility. Remains would not have been at cremation ground after 2¹/₂ months when everyday bodies are cremated. Their seizure and the forensic science report regarding that were of no value. The conviction and sentence imposed by the Trial Court as affirmed by the High Court called for no interference in the appeals.

In the case of **Dipanwita Roy v. Ronobroto Roy**⁴⁹⁹, the present appeal has been filed against impugned order passed by High Court directing holding of DNA test of Respondent-husband and male child born to Appellant-wife. Whether impugned order of approving holding of DNA test of Appellant-wife in respect of infidelity was justified. Held, Respondent-husband had made clear and categorical assertions in petition filed by him under Section 13 of Hindu Marriage Act, alleging infidelity and gone to extent of naming person, who was father of male child born to Appellant-wife. It was in process of substantiating his allegation of infidelity, that Respondent-husband had made application for conducting DNA test, which would establish whether or not, he had fathered male child born to Appellant-wife. It would be impossible for Respondent-husband to establish and confirm assertions made in pleadings in respect of Appellant-wife's infidelity. DNA testing was most legitimate and scientifically perfect means, which husband could use, to establish his assertion of infidelity. Therefore, direction issued by High Court in respect of DNA was fully justified. However, it was just and appropriate to record caveat, giving Appellant-wife liberty to comply with or disregard order passed by High Court, requiring holding of DNA test. Appeal was disposed of.

The facts of the case, in brief, were as follows:

The Petitioner-wife Dipanwita Roy and the Respondent-husband Ronobroto Roy, were married at Calcutta. Their marriage was registered on 9.2.2003. The present controversy emerges from a petition filed under Section 13 of the Hindu Marriage Act, 1955 by the Respondent, inter alia, seeking

⁴⁹⁹ Civil Appeal No. 9744 of 2014 (Arising out of SLP (C) No. 5694 of 2013), decided on 15.10.2014.

dissolution of the marriage solemnised between the Petitioner-wife and the Respondent-husband, on 25.01.2003.

One of the grounds for seeking divorce was, based on the alleged adulterous life style of the Petitioner-wife. For his above assertion, the Respondent-husband made the following allegations.

That since 22.09.2007 the Petitioner never lived with the Respondent and did not share bed at all.

That by her extravagant life style the Respondent has incurred heavy debts. Since, she has not disclosed her present address to bank and has only given the address of the Petitioner, the men and collection agents of different banks were frequently visiting the Petitioner's house and harassing the Petitioner. The Respondent purchased one car in 2007 with the Petitioner's uncle, Shri Subrata Roy Chowdhary as the guarantor. The Respondent has failed to pay the installments regularly.

That the Petitioner states that the Respondent has gone astray. She is leading a fast life and has lived in extra marital relationship with the said Mr. Deven Shah, a well to do person who too is a carrier gentlemen and has given birth to a child as a result of her cohabitation with Shri Deven Shah. It is reported that the Respondent has given birth to a baby very recently. The Respondent is presently living at the address as mentioned in the cause title of the plaint.

The above factual position was contested by the Petitioner-wife in her reply wherein she, inter alia, submitted as under:

That the statements made in the plaint are admitted by the Respondent to the extent that the daughter namely "Bivas" is residing in the custody of the Respondents mother with the arrangement of the Petitioner and as a result of which the Petitioner used to come at his mother in law's place and spending days therein and the Respondent used to spend time with him and carrying on their matrimonial obligation which includes co-habitation.

That the statements made in the plaint is absolutely false, concocted, untrue, frivolous, vexatious and made with the purpose of harassing the Respondent and the Petitioner is call upon to prove the allegation in toto. It is categorically denied by the Respondent that she was a selfish person, very much concern about her own self and own affairs and without an concern for the Petitioner as alleged. The Respondent further denied that she was self willed, arrogant and short tempered and she used to fly into rage ever now and then over small matter and used to quarrel with the Petitioner and his mother as alleged. The Respondent further denies and disputes that she does not care little for the feelings of either the Petitioner or his mother as alleged. The Respondent further denies and disputes that she got extremely irritated and used to quarrel with the Petitioner whenever the Petitioner tried to speak to her as alleged.

That the statements made in the plaint are absolutely imaginative, concocted and false and the same are being made for the purpose of this case. The Respondent denies and disputes from the statement they lead an extravagant life style and thereby she incurred debts as alleged therein and the Respondent provided her matrimonial house address to the bank as because the same is her permanent address after her marriage. The Respondent is to further state and submit on repeated insistence of the Petitioner, the Respondent purchased a car on credit for accommodating herself smooth journey at her office work as well as for other places and in such event the Petitioner promised that he would pay 50 per cent of the EMI in respect of purchase of the car which is actually failed to contribute.

The Respondent strongly denies and disputes the statement that she is leading a fast life in extra marital relationship with one Mr. Deven Shah and she had given a birth of a child as a result of cohabitation with Shri Deven Shah as alleged.

The Respondent is to state and submit that she had no extra marital relationship with one Mr. Deven Shah. It is pertinent to mention that the Respondent is having a continuous matrimonial relationship with the Petitioner and the Petitioner too performed the matrimonial relation as well as the

cohabitation with the Respondent in great spirit and as a result of which a male child was born.

A perusal of the written statement filed on behalf of the Petitioner-wife reveals that the Petitioner- wife expressly asserted the factum of cohabitation during the subsistence of their marriage, and also denied the accusations levelled by the Respondent-husband of her extra marital relationship, are absolutely false, concocted, untrue, frivolous and vexatious.

In order to substantiate his claim, in respect of the infidelity of the Petitioner-wife, and to establish that the son born to her was not his, the Respondent-husband moved an application on 24.7.2011 seeking a DNA test of himself (the Respondent-husband) and the male child born to the Petitioner-wife. The purpose seems to be, that if the DNA examination reflected, that the male child born to the Petitioner-wife, was not the child of the Respondent-husband, the allegations made by the Respondent-husband in paragraphs 2 to 25 of the petition, would stand substantiated. The Petitioner-wife accordingly sought the dismissal of the application filed by the Respondent-husband, for a DNA test of himself and the male child born to the Petitioner-wife. The Respondent-husband filed a reply affidavit reiterating the factual position contained in the application, and thereby also repudiating the assertions made by the Petitioner-wife in her written objections.

The Family Court by an order dated 27.08.2012 dismissed the prayer made by the Respondent- husband, for conducting the afore-mentioned DNA test. Dissatisfied with the order passed by the Family Court on 27.8.2012, the Respondent-husband approached the High Court at Calcutta. The High Court allowed the petition filed by the Respondent - husband vide an order dated 6.12.2012.

Aggrieved with the order passed by the High Court on 6.12.2012, the Petitioner-wife has approached this Court by filing the instant special leave petition. Notice was issued by this Court on 15.2.2013. The Respondent-husband has entered appearance.

Learned counsel for the appellant wife, in the first instance, invited our attention to Section 112 of the Indian Evidence Act.

A similar issue came to the adjudicated upon by this Court in **Bhabani Prasad Jena v. Convenor Secretary, Orissa State Commission for Women and Anr.**⁵⁰⁰, wherein this Court held as under:

In a matter where paternity of a child is in issue before the court, the use of DNA test is an extremely delicate and sensitive aspect. One view is that when modern science gives the means of ascertaining the paternity of a child, there should not be any hesitation to use those means whenever the occasion requires. The other view is that the court must be reluctant in the use of such scientific advances and tools which result in invasion of right to privacy of an individual and may not only be prejudicial to the rights of the parties but may have devastating effect on the child. Sometimes the result of such scientific test may bastardise an innocent child even though his mother and her spouse were living together during the time of conception.

The Apex Court, however, while upholding the order passed by the High Court, consider it just and appropriate to record a caveat, giving the Appellant-wife liberty to comply with or disregard the order passed by the High Court, requiring the holding of the DNA test. In case, she accepts the direction issued by the High Court, the DNA test will determine conclusively the veracity of accusation levelled by the Respondent-husband, against her. In case, she declines to comply with the direction issued by the High Court, the allegation would be determined by the concerned Court, by drawing a presumption of the nature contemplated in Section 114 of the Indian Evidence Act, especially, in terms of illustration (h) thereof. Section 114 as also illustration (h), referred to above, are being extracted hereunder:

Court may presume existence of certain facts - The Court may presume the existence of any fact which it thinks likely to have happened, regard being had to

⁵⁰⁰ (2010) 8 SCC 633.

the common course of natural events, human conduct and public and private business, in their relation to the facts of the particular case.

Illustration (h) - That if a man refuses to answer a question which he is not compelled to answer by law, the answer, if given, would be unfavourable to him.

This course has been adopted to preserve the right of individual privacy to the extent possible, of course, without sacrificing the cause of justice. By adopting the above course, the issue of infidelity alone would be determined, without expressly disturbing the presumption contemplated under Section 112 of the Indian Evidence Act. Even though, as already stated above, undoubtedly the issue of legitimacy would also be incidentally involved.

The instant appeal was disposed of in the above terms.

In the case of **Shri Banarsi Dass v. Mrs. Teeku Dutta and Anr.**⁵⁰¹, the core question involved in this appeal is whether a direction for Deoxyribonucleic Acid Test (DNA test) can be given in a proceeding for issuance of succession certificate under the Indian Succession Act, 1925.

Challenge in this Appeal is to the order of a learned Single Judge of the Delhi High Court setting aside the order of learned Administrative Civil Judge, Delhi dated 20.12.1999 whereby he had allowed an application under Section 151 of the Code of Civil Procedure, 1908 filed by the appellant filed by the appellant seeking DNA test of the respondent No. 1- Smt. Teedu Dutta or Shri Ram Saran Dass Sharma, (who is not a party in this appeal). Respondent No. 1 has filed case for grant of succession certificate under Section 372 of the Act.

Brief facts in a nutshell are as follows:

The respondent No. 1 filed a petition for grant of Succession Certificate in respect of the properties of one Iqbal Nath Sharma claiming that she was his daughter and the only surviving Class I legal heir under the Hindu Succession Act, 1956. It was indicated in the petition that the deceased had intestate leaving

⁵⁰¹ Civil Appeal No. 2918 of 2005 (Arising out of SLP(C) No. 17427 of 2004), decided on 27.04.2005, in the Supreme Court of India.

behind five brothers namely, Shri Banarsi Dass, Shri Amar Nath Sharma, Shri Ram Saran Dass Sharma, Shri P.L. Sharma and Shri K.C. Sharma. Originally Shri Banarsi Dass was not impleaded and rest four were impleaded. Out of them Shri P.L. Sharma and Shri K.C. Sharma had expired and only Amar Nath Sharma and Ram Saran Dass Sharma were alive and were impleaded as respondent to the petition. During the pendency of the petition Banarsi Dass, was also impleaded. He filed objection to the grant of Succession Certificate disuting Mrs. Teeku Dutta's claim. It was stated that she was not the daughter of the deceased. Evidence has been led and documentary evidence was also filed in support of the respective stands. At this stage the application under Section 151, Civil Procedure Code was moved by the objector - Banarsi Dass alleging that the respondent Mrs. Teeku Dutta was not the daughter of the deceased, but in fact is the daughter of Ram Saran Dass Sharma and since the deceased and his wife both were dead it would not be possible to subject them to a DNA test and compare with the DNA test of Mrs. Teeku Dutta. Since Ram Saran Dass Sharma is alive, DNA test of Shri Ram Saran Dass Sharma and Mrs. Teeku Dutta would conclusively establish the paternity of Mrs. Teeku Dutta. The application was opposed on the ground that it was malafide and was made with a view to delay the proceedings. It was further stated that the DNA test would not serve am purpose us sufficient documentary evidence has already been brought on record. The trial court allowed the application primarily on the ground that Mrs. Teeku Dutta had initially concealed the fact that the deceased had five brothers and had deliberately left out Banarsi Dass Sharma from the array of respondents, and this casts doubt on the bonafides of the applicants claim of being the daughter of the deceased. The Trial Court considered the petition for grant of succession certificate and the no objections filed by other respondent namely, Ram Saran Dass and Amar Nath Sharma to be somewhat collusive. Another reason which appears to have weighted heavily with learned trial judge was that the documentary evidence brought on record as not cogent enough to show that she was the daughter of the deceased. Further the trial court held that since the applicant for the DNA test was willing to bear the cost of the said DNA test, there would not be any difficulty in directing DNA test.

The High Court found that this is not a fit case where such a direction could be given. It was noticed that the scope of the enquiry was very limited and the trial court being a testamentary court should have left the parties to prove their respective cases by such evidence produced during trial, rather than creating evidence by directing DNA test. Accordingly, the Revision Petition filed under Section 115 of the Code of Civil Procedure by Mrs. Teeku Dutta was allowed.

In support of the appeal learned counsel for the appellant submitted that the trial court had kept in view the correct perspectives of the case and instead of leaving the matter to be decided by oral and documentary evidence, the High Court should have held that the conclusive DNA test would have provided necessary material for an effective adjudication.

The main object of a Succession Certificate is to facilitate collection of debts on succession and afford protection to parties paying debts to representatives of deceased persons. The grant of a certificate does not establish title of the grantee as the heir of the deceased. A Succession Certificate is intended to protect the debtors, which means that where a debtor of a deceased person either voluntarily pays his debt to a person holding a Certificate under the Act, or is compelled by the decree of a court, he is lawfully discharged. The trial court erroneously held that the documents produced by the respondents were not sufficient or relevant for the purpose of adjudication and DNA test was conclusive. This is not a correct view, it is for the parties to place evidence in support of their respective claims and establish their stands. DNA test is not to be directed as a matter of routine and only in deserving cases such a direction can be given, as was noted in **Goutam Kundu's case**.⁵⁰² Present case does not fall to that category. High Court's judgment does not suffer from any infirmity. We, therefore, uphold it. It is made clear that we have not expressed any opinion on the merits of the case relating to succession application.

Above being the position, the direction for DNA test as was given by the Trial Court is clearly unsustainable and the High Court has rightly set it aside.

⁵⁰² *Goutam Kundu v. State of West Bengal*, 1993 Cri LJ 3233: AIR 1993 SC 2295

Appeal is dismissed with no orders as to costs.

In the case of **Bhabani Prasad Jena v. Convenor Secretary, Orissa State Commission for Women and Anr.**⁵⁰³, two questions arise to be decided. i.e., whether the direction of DNA Test by High Court *suo moto* was justified in ascertaining the paternity of child in a matrimonial dispute already pending in Competent District Forum whether the High Court was justified in issuing direction or Deoxyribonucleic Acid Test (DNA) of the child and the Appellant, specially when the matrimonial dispute is pending before the competent District forum. Held, that matter where paternity of a child is in issue before the Court, the use of DNA is an extremely delicate and sensitive aspect. Any order for DNA can be given by the Court only if a strong prima facie case is made out. Whenever such a request is made, court must be reluctant in use of such scientific advances and tools which result in invasion of right to privacy of an individual and may not only be prejudicial to the rights of the parties but may have devastating effect on the child. When there is apparent conflict between the right to privacy of a person not to submit himself forcibly to medical examination and duty of the Court to reach the truth, the Court must exercise its discretion only after balancing the interests of the parties and on due consideration. In the present case the State Commission has no authority, competence or power to order DNA. Where the matrimonial dispute between the parties are already pending in the Court of competent jurisdiction and all aspects concerning matrimonial dispute raised by the parties in that case shall be adjudicated and determined by that Court. High Court also exceeded its jurisdiction in passing the impugned order. If an issue arise before the matrimonial Court concerning the paternity of the child, obviously that Court will be competent to pass an appropriate order at the relevant time in accordance with law and hence, the Appeals are allowed.

As regards the Jurisdiction and Extent of power of the State Commission for Women (Section 3 of the Orissa (State) Commission for Women Act. 1993) the court held as per Section 10 of the 1993 Act the State Commission is broadly assigned to take up studies on issues of economic, educational and healthcare that

⁵⁰³ (2010) 8 SCC 633.

may help in overall development of the women of the State, gather statistics concerning offences against women, probe into the complaints and upon ascertainment of facts take up the matter with the concerned authorities for remedial measures and to guide the women in enforcement of their legal rights. However, no power or authority has been given to the State Commission to adjudicate or determine the rights of the parties. Act of 1993 has not entrusted the State Commission with the power to take up the role of a Court or an adjudicatory tribunal and determine the rights of the parties. State Commission is not a tribunal discharging the functions of a judicial character or a Court. In the present case the State Commission has no authority, competence or power to order DNA testing to Appellant. Appeal allowed.

It was certified also that order shall not preclude the respondent No. 2 from claiming maintenance or any other order of financial support against the appellant in appropriate proceedings from the court of competent jurisdiction or in the petition filed by the appellant before the District Judge, Khurda, Bhubaneswar. Obviously the appellant shall be at liberty to contest the claim of respondent No. 2 on all available grounds and the concerned Court shall consider and determine such claim in accordance with law on its own merits. The parties shall bear their own costs.

The ratio decidendi of the case is that *“DNA test is not to be directed as a matter of routine and only in deserving cases such a direction can be given only by the Court competent to pass an appropriate order at the relevant time”*.

“State Commission is not empowered to take up the role of a Court or an adjudicatory tribunal and determine the rights of the parties”.

The case of State of **Maharashtra v. Natwarlal Damodardas Soni**⁵⁰⁴ is an important case on this issue. Here, the premises of the accused were searched and gold was seized by the authorities. The defendant was consequently, arrested and charged with certain offences. His contention was that, since the search was illegal, the seizure was inadmissible as evidence. The Court held that even

⁵⁰⁴ AIR 1980 SC 593 :1980 Cri LJ 429.

assuming that the search was illegal, it did not affect the validity of the seizure and its admissibility in evidence. In **Bai Radha v. State of Gujarat**⁵⁰⁵, it was held that non-compliance with some of the provisions relating to the search would not affect the admissibility of the probability so collected, unless a prejudice was caused to the accused.

The question of admissibility of illegally obtained evidence has also occurred in the context of illegal searches by the tax authorities. There has been conflict of opinion amongst the High Court's as to whether evidence collected through an illegal search can be used by the department. In the case of **Harikisandas Gulabdas & Sons v. State of Mysore**⁵⁰⁶, the High Court of Mysore held that such evidence could not be used in Court proceedings, while the High Courts of Allahabad⁵⁰⁷, Madras⁵⁰⁸ and Delhi⁵⁰⁹ have taken a contrary view. Finally in the matter of **Pooran Mal v. Director of Inspection**⁵¹⁰, the Supreme Court held that there was no constitutional bar or statutory bar in using such illegally obtained evidence. In **R.M. Malkani v. State of Maharashtra**⁵¹¹, the police used an eavesdropping device to record a conversation between the accused and a third person about the demand of bribe by the former. The Court denied this plea stating that a warrant had been issued but even if evidence is illegally obtained it is admissible. However the Court did not that "the Police Officer is more likely to behave properly if improperly obtained is liable to be viewed with care and caution by the Judge."⁵¹²

Finally in the matter of **Ukha Koihe v. State of Maharashtra**⁵¹³, blood from the accused was obtained to determine whether he had committed an offence

⁵⁰⁵ AIR 1970 SC 1396 :1970 Cri LJ 1279.

⁵⁰⁶ 1971Tax LR 1336.

⁵⁰⁷ *Agarwal Engineering Stores v. State of LIP.*, 1971 Tax LR 487, referred in 2003 Cri LJ, Journal Section at 268.

⁵⁰⁸ *S. Natarajan v. Joint Commercial Tax Officer*, 1971 Tax LR 1654, referred in 2003 Cri LJ, Journal Section at 268.

⁵⁰⁹ *Balbant Singh v. R.D. Shah*, AIR 1969 Del 91, referred in 2003 Cri LJ, Journal Section at 268.

⁵¹⁰ AIR 1974 SC 348 1974 (1) SCC 345 : 1974 (2) SCR 784 1974 Tax LR 340. This was followed by the Kerala High Court in *Verghese v. Commissioner of Agricultural Income-Tax*, 1977 Tax LR 564, referred in 2003 Cri LJ, Journal Section at 268.

⁵¹¹ AIR1973 5C 157 : 1973Cri LJ 228.

⁵¹² 1973 SC 157 at 163 : 1973 Cri LJ 228 at 233-234, referred in 2003 Cri LJ, Journal Section at 268.

⁵¹³ AIR 1963 SC 1531 1963 (2) Cri LJ 418.

under the Bombay Prohibition Act. The procedure prescribed in Section 129-A of the Statute, was however not followed in the matter. There was however a provision in the statute which stated that nothing in Section 129-A “shall preclude the fact that the person accused of an offence has consumed an intoxicant from being proved otherwise than in accordance with the provisions of this section.” In accordance with this provision, the majority, four to one, held that the probability in question was admissible.

The overwhelming judicial view is, thus, that illegally obtained evidence is admissible except where prejudice is caused to the accused. Moreover, such probability is to be viewed with care and caution.

Judgments in Contravention :

The Apex Court in **State of Punjab v. Balbir Singh**⁵¹⁴, laid down that a search or arrest in violation of the provisions of the NDPS Act vitiates the trial. This was followed in the case of **Saiyed Mohd. Saiyad Umar Saiyad v. State of Gujarat**⁵¹⁵, these decisions run counter to the settled law and have the potential to impede the enforcement of the Act with serious social consequences.

In the case of Saiyad Mohd. a violation of Section 50 of the Act (which deals with ‘special provisions relating to the search of a person’) was pleaded but in the absence of any probability a presumption was raised under Section 114 Illustration (e) of the Evidence Act to find due compliance. The Supreme Court found that this presumption could not supply the proof of compliance of provisions of Section 50 and set aside the conviction only on the finding of non-compliance of the provisions of Section 50. It also quoted from the Balbir decision and endorsed the finding that the provisions of Section 50 are mandatory and that its language obliges the officer cornered to inform the person to be searched of his right to demand that the search be conducted in the presence of a Gazetted Officer or a Magistrate.

⁵¹⁴ AIR 1994 SC 1872 1994 Cri LJ 3702.

⁵¹⁵ AIR 1995 SCW 1852.

7:1 Safeguards-Reasons and Effect of Non-compliance :

Search is an integral part of investigation and is meant to procure probability of an offence. To ensure that the searches and seizures are credible, safeguards are provided in Criminal Procedure Code and in special laws including the Narcotic Drugs and Psychotropic Substances Act, 1985. If the safeguards are not followed, the logical consequence would be that the search would not have the same credibility it which a search would have if the safeguards are duly followed. Non-compliance cannot have the effect of totally effacing the search or seizure. And the Courts have been following this principle for a fairly long time.

Normally, a person accused of an offence is tried and his guilt is determined on the basis of the probability produced. However when there is a procedural lapse, which vitally affects the trial to the prejudice of the accused and is irreversible, the accused would be entitled to be acquitted. In such a case, the Court has to be satisfied of the prejudice caused. The Courts have consistently followed this principle.⁵¹⁶ Giving the accused benefit of every small irregularity is no longer permissible. The interest of the society is also to be considered, with equal concern for the liberty of an individual.⁵¹⁷ It has been held by the Courts in this country consistently that probability obtained by illegal search cannot be shut out on that ground alone. A Constitutional Bench of the Supreme Court considered this question in **Pooran Mal v. Director of Inspection**⁵¹⁸, where it was urged that the material obtained by an illegal search not be permitted to be used in evidence. The High Court rejected this contention even after assuming the search to be illegal. The Supreme Court upheld this decision and said :

“So far as India is concerned its law of evidence is modelled on the rules of evidence which prevailed in English Law, and Courts in India and England have consistently refused to exclude relevant evidence merely on the ground that it is obtained by illegal search and seizure.”

⁵¹⁶ *H.N. Rishbud v. State of Delhi*, AIR 1955 SC 196 : 1955 Cri LJ 526 and *Joydeb Mittra v. State of WB.*, AIR 1973 SC 912 : 1973 Cri LJ 901, referred in 2003 Cri LJ, Journal Section at 269.

⁵¹⁷ *Nandini Satpathy v. P.L. Dani*, AIR 1978 SC 1025 : 1978 Cri LJ 968. See also Supreme Court's decision in *Joginder Kumar v. State of U.P.*, AIR 1994 SC 1349 1994 Cri LJ 1981, referred in 2003 Cri LJ, Journal Section at 269.

⁵¹⁸ AIR 1974 SC 348 : 1974 (1) SCC 345 : 1974 (2) 5CR 784 : 1974 Tax LR 340

The Supreme Court relied on the decisions in **Emperor v. Abdulla Khan**⁵¹⁹; **Kuruma v. R.**⁵²⁰; **King v. The Queen**⁵²¹, and **Barindra Kumar Ghose v. Emperor**⁵²², this principle was reiterated by another Constitution Bench of the Supreme Court in **State of Kerala v. Allasserry Mohammed**⁵²³, when it categorically rejected the exclusionary rule. The view that the exclusionary rule is bad law and that the criminal should not go free because the constable had blundered was approved in the case of **Joginder Kumar v. State of U.P.**⁵²⁴, these principles were not considered by the Supreme Court in Balbir Singh's case. Nor did it examine its own precedents which run to a large number and some of which were rendered by larger benches.⁵²⁵ These decisions have clearly held that illegal searches do not affect the trial and that the exclusionary rule be rejected expressly. Thus, the only consequence of illegality in search is a reduced credibility so that the Courts have to examine the evidence more carefully, and right of the person searched to resist it. Non-consideration of these aforementioned decisions, which have an important bearing on the effect of illegal searches, renders the value of Balbir Singh as a precedent, doubtful.

The only just approach would be to let the Courts assess the reason(s) for non-compliance when there is one and then consider its effect on trial, as has been the settled law. It is heartening to note that post Balbir Singh decisions have gone back to the original position. In **State of Punjab v. Jasbir Singh**⁵²⁶, Balbir Singh was not followed:

“.....the evidence collected in breach of mandatory requirement does not become inadmissible, it is settled law that evidence collected during investigation in violation of the statutory provisions does not become inadmissible and the trial on the basis thereof does not get vitiated. Each case is to be considered on its own backdrop.”

⁵¹⁹ (1913) ILR 35 All 358.

⁵²⁰ 1955 AC 197 : (1955)1 All ER 236.

⁵²¹ (1969) 1 AC 304 : (1968) 2 All ER 610.

⁵²² (1910) ILR 37 Cal 467.

⁵²³ AIR 1978 SC 933 1978 Cri LJ 925.

⁵²⁴ AIR 1994 SC 1349 : 1994 Cri LJ 1981.

⁵²⁵ *Pratap Singh (Dr.) v. Director of Enforcement*, AIR 1985 SC 989, referred in 2003 Cri LJ, Journal Section at 269.

⁵²⁶ (1996) 1 SCC 288 1996 SCC (Cri) 1.

Again in **State of H.P. v. Pirthi Chand**⁵²⁷, appeal was filed against discharge of a person on the ground that the provisions of Section 50 of the Act had not been complied with. The Supreme Court noted the decisions in Balbir Singh and Saiyad Mohd. But relied on the decisions in Pooran Mal etc. cases and held that the probability collected on search in violation of law did not become inadmissible under the Evidence Act and that even if it was found to be in violation of law what weight should be given to the evidence was yet another question which the Court had to consider. Thus the Supreme Court has again reverted to the earlier position on this question.

7:2 Global Acceptance of DNA Evidence :

Most of the nations have enacted laws dealing with DNA profiling within the framework of their constitutional and other legal principles, particularly for dealing with the criminal cases. A mechanism has also been developed to identify the disaster victims through DNA profiling.

(A) Argentina :

The National Criminal Procedure Code was amended in 2009 to provide for uniform approach to DNA testing in cases of illegal adoption and falsification of identity under Article 218, empowering Judges to order compulsory DNA testing in certain circumstances. They have established a National Bank of Genetic Data and DNA. The Argentine DNA Law does not leave any option respecting the right wherein any one refuses to DNA testing and prevents the individual from exercising the right to privacy at all. Thus, in the existing legal regime, it is well within the legislative competence of Argentina to legislate in a way that favoured one right-truth-over another right-privacy.⁵²⁸

(B) The United States :

There is a global trend to accept DNA evidence. For example in the U.S.A., the initial rationale adopted for placing reliance upon the exclusionary

⁵²⁷ AIR 1996 SC 977 1996 Cri LJ 1354.

⁵²⁸ Prof Elizabeth B. Ludwin King (A Conflict of Interests: Privacy, Truth and Compulsory DNA Testing for Argentina's Children of the Disappeared 2011.

principle, since its inception in **Weeks v. U.S.**⁵²⁹, was a forging of the 4th and 5th Amendments⁵³⁰, as a guarantee of privacy⁵³¹, as necessary to assure the accused a fair trial⁵³² and a sort of criminal equity or “clean hands” ethics, stating that the Government shall not benefit from its failing (this is often called the ‘imperative of judicial integrity’).⁵³³ From amongst these, the two reasons that have survived are that of ‘deterrent effect’⁵³⁴ and the protection of the constitutional right to privacy.

The importance of the exclusionary principle as tool of deterrence was first discussed in **Elkins v. U.S.**⁵³⁵, where the Court reasoned that the principle was “to deter to compel respect for the constitutional guarantee in the only effective available way i.e. by removing the incentive to disregard it”. Much later, in the case of **U.S. v. Calandra**⁵³⁶, Justice Powell stated deterrence to be the exclusionary principle’s “primary purpose”. The Court reasoned that since the purpose of the principle was deterrence, the need was to deter through a direct action against the illegal act. Thus, it was held that a witness summoned to appear and testify before a grand jury may not refuse to answer questions on the ground that they are based on evidence obtained through unlawful search and seizure. Further in **U.S. v. Janis**.⁵³⁷ Justice Blackman’s reasoning suggest that deterrence might be the “sole” purpose of the exclusionary principle. The Court in that case held that the aforementioned principle did not apply to an Internal Revenue Service proceeding (a civil action) where the local police had conducted the illegal search. Since the application of the principle would not ordinarily damage the case of the Revenue Service, there would naturally be a negligible deterrence

⁵²⁹ (1914) 232 US 383

⁵³⁰ Justice Black dissenting in *Mapp v. Ohio*, (1961)367 US 643 at 662 and Justice Clark in *Ker v. California*, (1963)374 US 23 at 30, referred in 2003 Cri LJ, Journal Section at 270.

⁵³¹ Justice Brandeis in *Olmstead v. U.S.*, (1928)277 US 438 at 478, Justice Clark in *Mapp* at 650, referred in 2003 Cri LJ, Journal Section at 270.

⁵³² *Frankfurter in Irvine v. California*, (1954) 347 US 12S at 148, referred in 2003 Cri LJ, Journal Section at 270.

⁵³³ *Elkins v. U.S.*, (1960) 364 US 206 at 217, referred in 2003 Cri LJ, Journal Section at 270.

⁵³⁴ J.B. Dawson, *The Exclusion of Unlawfully Obtained Evidence A Comparative Study*, 31 ICLQ 512 (July 1982) at 517, referred in 2003 Cri LJ, Journal Section at 270

⁵³⁵ (1960) 364 USC 206 at 217.

⁵³⁶ (1974) 414 US 338.

⁵³⁷ (1975) 482 US 433 at 466

value to the local police on such an exclusion of probability. The Court further stated that:

“Clearly, the enforcement of admittedly valid laws would be hampered by so extending the exclusionary rule and as is nearly always the case with the rule, concededly relevant and reliable evidence would be rendered unavailable”.⁵³⁸

Until 1961, the United States did not have any bar to the admissibility of illegally obtained evidence in the “due process” clause of the American Constitution.⁵³⁹ The result of this was that in case of a State prosecution for a State crime, the Court permitted illegally obtained evidence to be admitted, since search and seizure does not apply to the State. In 1961 however, the Court in the matter of **Mapp v. Ohio**⁵⁴⁰, overruled its earlier decision in **Wolf v. State of Colorado**⁵⁴¹, and by a five to four decision, held that, under the “due process” clause, evidence obtained by a search and seizure in violation of the Fourth Amendment is inadmissible in a state prosecution for a state crime.

In 1949, only about 17 States followed the exclusionary rule but by 1961 and the Mapp judgment, nearly half of the American States had adopted the rule. The plight of this development is that although State and federal trials and appeals exclude such improperly obtained evidence from direct use, they may still be used to attack the defendant’s credibility upon his testifying⁵⁴², as the basis of questions posed by the grand jury⁵⁴³ against someone other than the victim of the illegal search⁵⁴⁴, in sentencing⁵⁴⁵, in civil proceedings⁵⁴⁶ and even at a parole revocation hearing.⁵⁴⁷

Thus, while proclaiming deterrence to be the primary if not the sole reason for trust in the exclusionary system, the Court has nullified any possibility of it

⁵³⁸ *U.S. v. Janis*, (1975) 482 US 433 at 447, referred in 2003 Cri LJ, Journal Section at 270.

⁵³⁹ *Wolf v. State of Colorado*, (1949)338 US 25, referred in 2003 Cri LJ, Journal Section at 270.

⁵⁴⁰ (1961) 367 US 643.

⁵⁴¹ (1949) 338 US 25.

⁵⁴² *Harris v. New York*, 401 US 222 (1971), referred in 2003 Cri LJ, Journal Section at 270.

⁵⁴³ *United States v. Calandra*, (1974) 414 US 338, referred in 2003 Cri LJ, Journal Section at 270.

⁵⁴⁴ *U.S. v. Alderman*, (1969) 394 US 165.

⁵⁴⁵ *U.S. v. Schiponi*, 435 F 2d 51(2nd Circ. 1970).

⁵⁴⁶ See 22.3 Journal of Indian Law Institute 325 (1980).

⁵⁴⁷ *U.S. v. Winsett*, 518 F 2d (9th Circ. 1975).

making an adverse impact leading to a deterrent effect, by allowing such evidence to be readily used collaterally or in alternative forums.⁵⁴⁸

The irony in depending on the deterrent value of the exclusionary principle is that it has never yielded any definite results. On the contrary, based on empirical data as well as widespread studies and commentaries it may be inferred that such exclusion has no real disciplining effect on the authorities, which it seeks to keep in check.⁵⁴⁹ While the evidence showing any beneficial effects of the principle are slackening, there is enough reason to argue against the use of this rule. The Exclusionary principle is only applicable in situations where the erring authorities possess the motive to convict the individual who is in question it shall have no bearing or deterrence on the use of the probability to harass or threaten another person to obtain collateral information.⁵⁵⁰ The exclusion assumes that the intention of the law enforcement authorities is to convict where it may be to merely charge, arrest or deter from criminal activity. It must be noted that the exclusionary principle at best provides an indirect sanction to an erring officer but more often than not serves as a mere hindrance in battling crime.⁵⁵¹

The Federal Bureau of Investigation in early 1990's designed the Combined DNA Index System (CODIS) with the purpose of amalgamating forensic sciences and computer technology into an effectual apparatus for solving serious crimes. This has been corroborated by the recent judgment of the US

⁵⁴⁸ See 2003 Cri LJ, Journal Section at 271.

⁵⁴⁹ See G.L. Davies, Exclusion of Evidence Illegally or Improperly Obtained, 76 The Australian Law Journal 170 at 180 (March, 2002); see also Oaks, Studying the Exclusionary Rule in Search and Seizure, 37 U Chi L Rev. 665 (1970); Spiotto, Search and Seizure, 2d Legal Studies 243 (1973); Canon, in the Exclusionary Principle in Failing Health? 62 Kentucky U 681 (1974); Herschel, Fourth Amendment Rights 86 (1979); Canon, Ideology and Reality in the debate over t-. Exclusionary Rule, 23 South Texas U 559 (1982), Barlow, Effects of Mapp V. Ohio on Police Search and Seizure Practices in Narcotics Cases, 4 Columbia U and Soc Probs 87 (1968).

⁵⁵⁰ The Exclusionary principle does not allow the evidence to be directly used in Court against a person charged and about to be convicted by the Court, however it allows the same to be used for all collateral questioning, interrogation and arguments. Moreover, the probability thus apparently excluded may well be used to coerce the testimony of others and so on. Thus the entire purpose of disallowing the use of this probability in its entirety, which is the purpose of the exclusionary rule, is dislodged.

⁵⁵¹ The difficulty is in satisfying two entirely different issues To punish errant law enforcement officers and to deter officers from committing from resorting to improper means in the future are not the same thing; in the former sense it is an unsatisfactory and an unfair means of discipline (if it punishes at all), because a Criminal Court is not equipped for or intended as a full enquiry into such conduct. While most of time it is hardly able to adequately affect the latter cause.

Supreme Court in **Maryland v. King**⁵⁵² wherein it was held that when officers making an arrest for a serious offence are authorized to take and analyse a cheek swab of the arrestee's DNA and the same is legitimate under the Fourth Constitutional Amendment. The Court observed:

In addition the processing of respondent's DNA sample's 13 CODIS loci did not intrude on respondent's privacy in a way that would make his DNA identification unconstitutional. First, as already noted, the CODIS loci come from non-coding parts of the DNA that do not reveal the genetic traits of the arrestee. While science can always progress further, and those progressions may have Fourth Amendment consequences, alleles at the CODIS loci are not at present revealing information beyond identification.

In the United States, the type of crimes included in the database varies depending on the State. In some States many types of crimes are included and in others the database is restrictive and contains information pertaining to serious crime only.⁵⁵³

In **Andrews v. State of Florida**⁵⁵⁴, the DNA evidence was accompanied by Andrew's regular fingerprints left on a windowsill, and his identification by the most recent victim in a photo-lineup. In this case, the strong DNA evidence was admitted. In **People of the State of New York v. Joseph CASTRO**⁵⁵⁵, a three-pronged test was developed to determine whether DNA evidence should be admitted:

- I. Is there a generally accepted theory in the scientific community which supports the conclusion that DNA forensic testing can produce reliable results?
- II. Are there techniques or experiments that currently exist that are capable of producing reliable results in DNA identification, and which are generally accepted in the scientific community?

⁵⁵² 133 S. Ct. 1958 (2013)

⁵⁵³ Data obtained from National Institute of Justice of the United States of America (www/ojp.usdoj.gov/nij).

⁵⁵⁴ 533 So.2d 841 (1988).

⁵⁵⁵ 143 Misc.2d 276 (1989).

III. Did the testing laboratory perform the accepted scientific techniques in analysing the forensic samples in this particular case?

In **U.S. v. Matthew Sylvester TWO BULLS**⁵⁵⁶, two additional standards added by the Court of Appeals to make a new five-pronged test:

- I. Whether DNA evidence is generally accepted by the scientific community?
- II. Whether the testing procedures used in this case are generally accepted as reliable if performed properly?
- III. Whether the test was performed properly in this case?
- IV. Whether the evidence is more prejudicial than probative in this case?
- V. Whether the statistics used to determine the probability of someone else having the same genetic characteristics is more probative than prejudicial under Rule 403.

In the case of **PEOPLE of the State of Illinois v. Reggie E. MILES**⁵⁵⁷, the evidence included regular fingerprints and semen stains, whose DNA was found to match Miles by scientists at Cellmark Diagnostics, a DNA identification company in Maryland. This case ended with a general strong support for DNA evidence and faith that the techniques can produce reliable results. In **Daubert v. Merrell Dow Pharmaceuticals**⁵⁵⁸, after analysing the details of the standards of evidence previously set and the Federal Rules of Evidence, the Court put forth 5 criteria to characterize the weight of evidence:

- I. Whether the theory or technique has been tested?
- II. Whether the theory or technique has been subjected to peer review and publication?
- III. Whether the theory or technique has a known or potential rate of error. IV. Whether the theory or technique has standards for controlling the technique's operation.

⁵⁵⁶ 918 F2d 56.

⁵⁵⁷ 577 N.E.2d 477 (1991).

⁵⁵⁸ 509 U.S. 579 (1993).

V. The degree to which the theory or technique has been accepted in the relevant scientific community.

(C) **Canada** : Canada passed DNA Identification Act on June 30th, 2000 which allowed the establishment of DNA data bank and amended their criminal code. The salient features of the Act are:

1. It empowered the judges with the mechanism to order convicts to provide blood, hair samples which will be added in the bank.
2. The National Data Bank works in accordance with the guidelines of the Act and ensures that the privacy is respected.
3. The samples can be collected only for legal purposes.
4. Collecting genetic sample is legally valid when the sample is collected by health care professional.
5. A National Forensic Science Commission established to make recommendations to the Attorney General to ensure :
 - Appropriate use and dissemination of DNA information.
 - Accuracy, security and confidentiality of DNA information.
 - The timely removal and destruction of obsolete and inaccurate DNA information.
 - Measures are taken to protect privacy.

In **R. v. Stillman**⁵⁵⁹, the majority view of the Canadian Supreme Court had been that though unauthorised use of a person's body or bodily substances is a "compelled testimony", but if balance of probabilities demonstrate that the evidence would have been discovered by alternative non-destructive means, its admission will not render the trial unfair. In *R. v. S.A.B.*⁵⁶⁰, the Supreme Court of Canada Upheld the Constitutional validity of DNA warrant legislation and dealt with the issue of weight to be attached to the evidence of DNA experts.

⁵⁵⁹ (1997) 1 SCR 6075

⁵⁶⁰ (2003) 2 SCR 678; see also *Harjinder Kaur*, supra note 1.

(D) China :

China, in 1999 passed a law allowing the Ministry of Justice and the Ministry of Interior to establish DNA Banks. The essential things incorporated in this legislation are:

1. The offenders - convicts as well as suspects who are sex offenders have to provide for such samples voluntarily.
2. In case of refusal the prosecutor has the power to compel the person to do so.
3. The written and photographic samples of DNA can be retained for 10 years.
4. People who are suspected of committing a crime for which punishment is more than 5 years are required to give non intimate samples.

(E) United Kingdom:

DNA profiling was first used in a criminal case in England in 1986. DNA samples collected from the men living and working within the neighbourhood of two rape and murder scenes resulted in two positive outcomes. The one man initially convicted was proved to be innocent and the guilty criminal was caught, one year later.

UK has an extensive legal foundation regarding DNA technology. In the UK the question of consent and privacy has been debated and ultimately it was held that the court will not order a blood test to be carried out against the will of a parent. The essence of every law in UK is to protect one's personal liberty. Although there are statutory provisions, where under blood samples can be taken without parent's consent, for example, testing for diseases like HIV.

In 1994, the British Parliament passed the Criminal Justice and Public Order Act, which provided the legal foundation for the National DNA Database (NDNAD). The Act allows the police to take DNA samples 33 without consent from anyone charged with any offence that is classified as 'recordable', and also to search the database speculatively for matching profiles. Because of

Parliamentary Act, the police is permitted to take DNA's of the arrested person before the investigating process begins so as to make the process faster. The Home office by this step has a complete record of active criminal population, making it easy to first eliminate the innocents.

The Court of Appeal, in **R (on the application of S) v. Chief Constable of South Yorkshire**⁵⁶¹, upheld a legislation compelling preservation of finger prints, bodily samples, DNA profiles and DNA samples. It was contended that the amended provision was incompatible with Articles 8 and 14 of the Human Rights Act, which dealt with protection of privacy and hence it was prayed that the fingerprints and DNA samples of the concerned parties should be destroyed. In the said case, a distinction was drawn between the 'taking', 'retention' and 'use' of fingerprints and DNA samples. The statutory basis for the retention of physical samples taken from suspects was addition of new Section 64(1A) of the Police and Criminal Evidence Act, 1984 which provides that these samples could only be used for the purposes relating to the 'prevention or detection of crime, the investigation of an offence or the conduct of a prosecution'. The Court observed: So far as the prevention and detection of crime is concerned, it is obvious that the larger the data bank of fingerprints and DNA samples available to the police, the greater the value of the data bank will be in preventing crime and detecting those responsible for crime. There can be no doubt that if every member of the public was required to provide fingerprints and a DNA sample this would make a dramatic contribution to the prevention and detection of crime. To take but one example, the great majority of rapists who are not known already to their victim would be able to be identified. However, the 1984 Act does not contain blanket provisions either as to the taking, the retention, or the use of fingerprints or samples; Parliament has decided upon a balanced approach.

In **Saunders v. United Kingdom**⁵⁶², the court explained the difference between identification and self-incrimination when it comes to collection of DNA samples etc., observing: "...The right not to incriminate oneself is primarily concerned, however, with respecting the will of an accused person to remain

⁵⁶¹ (2003) 1 All ER 148,

⁵⁶² (1997) 23 EHRR 313

silent. As commonly understood in the legal systems of the Contracting Parties to the Convention and elsewhere, it does not extend to the use in criminal proceedings of material which may be obtained from the accused through the use of compulsory powers but which has an existence independent of the will of the suspect such as, inter alia, documents acquired pursuant to a warrant, breath, blood and urine samples and bodily tissue for the purpose of DNA testing.”

In the case of **S and Marper v. United Kingdom**⁵⁶³, the court upheld the right to privacy and said that retention of DNA samples is a substantial threat to privacy.

(F) Scotland :

Evidential, jurisdictional and procedural matters required amendment in the Criminal Procedure (Scotland) Act 1995 to:

- allow challenges to certain evidence relating to fingerprints and similar data where this is contained in certificate form;
- allow DNA samples to be taken by swabbing by a constable without authorisation from a senior officer;
- allow the police to retain DNA and fingerprints given voluntarily and with the consent of the person giving the sample;

Section 55 of the Criminal Procedure (Scotland) Act 1995 is amended to remove the requirement to obtain authorisation from an inspector before a police constable can exercise compulsory powers to take a DNA sample by mouth swab, without force. This is achieved by amending sections 18, 19, 19A and 19B of the 1995 Act which contain the statutory powers to obtain samples of DNA for analysis purposes. Section 18 applies where a person has been arrested and is in custody, or has been detained under section 14 of the 1995 Act. Sections 19 and 19A apply where a person has been convicted of an offence, although 19A covers only those offenders convicted of a sexual or violent offence as defined in sub-

⁵⁶³ [2008] ECHR 1581.

section (6). Section 19B details circumstances where a constable may use reasonable force while obtaining samples.

The statutory provision allows the police to use such samples and prints, taken with consent, in the investigation of an offence or offences. This puts on a statutory footing the current practice where the police takes samples or prints with consent and check them against evidence from a scene of crime, for example mass DNA screenings in a geographical area. It also provides the police with authority, in certain circumstances, to retain the samples and prints for use in subsequent investigations whereas presently they would be destroyed at the conclusion of the investigation in connection with which they were obtained.

(G) Trinidad and Tobago :

Trinidad and Tobago passed The Deoxyribonucleic Acid (DNA) Identification Act, 2000 to provide for DNA forensic analysis, to include a DNA report as evidence, to provide for the use of DNA testing to determine parentage, and other related matters. It provided for obtaining DNA samples by consent but also lays down a procedure for obtaining a tissue sample by a Court order. Under this there is also a provision where a child or an incapable person is detained, arrested or charged for an offence, a tissue sample shall not be taken from that child or that incapable person except by an order of a court, because they may not be fit to provide genuine consent.

(H) Other Countries :

In countries such as Holland, Germany, France or Austria only individuals who have committed certain serious crimes are included in the DNA profiling.⁵⁶⁴

The relevant portion of the Executive Summary of “National DNA Databases 2011⁵⁶⁵” published by Andrew D Thibedeau, J.D., Senior Fellow under the aegis of Council for Responsible Genetics, covering several countries with

⁵⁶⁴ Schneider PM. DNA databases for offender identification in Europe - the need for technical, legal and political harmonization. Proceedings of the 2nd European Symposium on Human Identification. Madison, WI, USA: Promega Corporation, 1998.

⁵⁶⁵ Available at www.antoniocasella.eu/dnlaw/DNA-data2011.pdf Last accessed on 13 July 2017

regard to DNA profiling, including removal criteria and sample retention. The Scottish legal system presumes that illegally or improperly obtained probability deserves to be excluded from trial proceedings; however the police or other law enforcement authorities are primarily given the opportunity to rebut the irregularity by showing circumstances under which the ‘improper acquisition of evidence’ was necessary and consequently, justified. This principle developed out of the decision of the Court in the case of **McGovern v. H.M. Advocate**⁵⁶⁶, where the Court held that “an irregularity in the manner of obtaining evidence is not necessarily fatal to its admissibility (but) irregularities of this kind always require to be ‘excused’ or condoned.....whether by the existence of urgency the relative triviality of the irregularity, or other circumstances.”

The Scottish law in this regard is thus widely built on human (Judges) discretion but the same must be carefully utilized bearing in mind the need for a balance between the interest of the citizens with regard to their personal security and a protection of their liberties and the interests of the State with regard to its duty to obtain evidence and ensure the carriage of justice through the Courts of law.⁵⁶⁷

While the former interest cannot be neglected or disregarded in an overzealous pursuit of evidence, the latter interest must not be thwarted by the suppression of evidence owing to a technical irregularity, which may be justified. It is this stage that the intention of the erroneous enforcement persons takes on a heightened importance because a general irregularity may be more readily excused than a situation where the misconduct was based on specific knowledge and deliberate intention. This is borne true by the case of **Fairley v. Fishmonger’s of London**⁵⁶⁸, where the police officers although acting in good faith and out of a well-founded sense of public interest, did so under a mistaken belief of certain powers and authority, thus staining their investigation procedure. The Court in that case however, held that since their actions were in good faith

⁵⁶⁶ (1950) SLT 133 at 135.

⁵⁶⁷ *Lawrie v. Muir*, (1950) SLT 39 at 39-40.

⁵⁶⁸ (1951) SLT 54 at 58.

and to secure public interest, the same should be condoned and the evidence in question should be admitted for trial.

The exclusion or condonation of improperly obtained evidence will also depend on collateral factors. For instance, the evidence in question will be less likely to be accepted if there were no circumstances to constitute an emergency⁵⁶⁹ for which the improper action was imperative⁵⁷⁰, where a specific procedure to be followed has been dictated by a statute⁵⁷¹, the evidence in question has been obtained by private individuals rather than public official (who are accountable to their superiors)⁵⁷²; where the enforcement authorities had the opportunity to act in compliance with legal requirements⁵⁷³; or where the improper conduct involves a serious violation like assault.⁵⁷⁴ The contrary is also true, for instance, the evidence is less likely to be excluded if the accused is charged with a serious offence, which is very hard to detect.⁵⁷⁵

The Scottish system, while allowing a wide discretion to the Judges, provides the most crucial opportunity to the erroneous officers to defend their actions before the Court. With respect to the discretion, a large amount of uniformity is sought to be maintained by providing a large number of criteria, which determine the status of evidence, as mentioned earlier. The greatest advantage of the system however, is that it successfully fulfils one of the major shortcomings of most other systems in this regard i.e. it ensures and necessitates the Continuing judicial scrutiny of police activities and transfers the burden of justifying the illegal actions into the erring parties.⁵⁷⁶

Threatening Constitutional Mandates :

It is relevant to point out that in the situation like threatening constitutional mandates, DNA evidence can play an important role in this regard. In the United

⁵⁶⁹ 2003 Cri LJ, Journal Section at 273.

⁵⁷⁰ *Hay v. H.M. Advocate*, (1968) SLT 334.

⁵⁷¹ 2003 Cri LJ, Journal Section at 273.

⁵⁷² 2003 Cri LJ, Journal Section at 273.

⁵⁷³ *Mc Groven v. H.M. Advocate*, (1950) SLT 133 at 135.

⁵⁷⁴ *H.M. Advocate v. Turnbull*, (1951) SLT 409 at 411.

⁵⁷⁵ *Hopes v. H.M. Advocate*, (1960) JC 104.

⁵⁷⁶ 2003 Cri LJ, Journal Section at page 274.

States, the authorities are mainly concerned with the constitution⁵⁷⁷ based aspect of the problem. The approach of the U.S. Supreme Court has been that so far as federal crimes are concerned, the search and seizure clause of the Fourth Amendment⁵⁷⁸ bars the admissibility of evidence obtained through illegal means.⁵⁷⁹ This although, as discussed earlier, is nullified by collateral use of the same evidence. The search and seizure provisions of the Fourth Amendment are all about privacy. It is the freedom to decide which details of one's life will be revealed to the public and which will be revealed only to those one cares to share them with. To honour this freedom, the Fourth Amendment protects against "unreasonable" searches and seizures by State or federal law enforcement authorities. The flip side is that the Fourth Amendment does permit searches and seizures that are considered reasonable. In practice, this means that the police may override an individual's privacy concerns and conduct a search, if;

- (i) the police have probable cause to believe they can find evidence that one has committed a crime, and a Judge issues a search warrant, or
- (ii) the particular circumstances justify the search without warrant first being issued.

Reasonable Searches:

As mentioned above, the Fourth Amendment permits "reasonable" searches. However, before getting to the question of whether or not a particular search is reasonable, and therefore valid under the Fourth Amendment, it must be determined whether the Fourth Amendment applies to the searches in the first place.

⁵⁷⁷ Similar approaches can be detected in those commonwealth jurisdictions to have adopted a more constitutional basis for the protection of human rights. See e.g. in Canada, *R. v. Collins*, (1987) 1 SCR 265 and in New Zealand, *R. v. H.*, (1994) 2 NZLR 143. The position in Australia has moved in the same direction without the benefit of formal constitutional support.

⁵⁷⁸ See Fourth Amendment : American Constitution "The right of the people to be secure in their person, houses, papers, and effects, against unreasonable searches and seizure, shall not be violated and no warrants shall issue; but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized

⁵⁷⁹ *Weeks v. US*, (1914) 232 US 383, referred in 2003 Cri LJ, Journal Section at 272.

The Fourth Amendment applies to a search only if a person has a “legitimate expectation of privacy” in the place or thing searched. If not, the Fourth Amendment offers no protection because there are, by definition, no privacy issues. The Courts use a two-part test (fashioned by the U.S. Supreme Court) to determine whether, at the time of the search, a defendant had a legitimate expectation of privacy in the place or things searched. Only if both questions are answered in the affirmative, will a Court go on to ask the next, ultimate question: Was the search reasonable or unreasonable? For example, a person who uses a public restroom expects not to be spied upon (the person has a subjective expectation of privacy), therefore, the installation of a hidden video camera by the police in a public restroom will be considered a “search” and would be subject to the Fourth Amendment’s requirement of reasonableness.⁵⁸⁰

The “Good Faith” Exception :

The Fifth Circuit, of the U.S. Court of Appeals in the case of **U.S. v. Williams**⁵⁸¹, allowed for the ‘good faith’ exception to the exclusionary rule under which, a “good faith mistake”⁵⁸² of the police officer or a “technical violation” (“in adhering to the statute which is later ruled unconstitutional, a warrant which is later invalidated, or a Court precedent which is later overruled”)⁵⁸³ will not be used to suppress evidence which may otherwise be crucial to the trial. The Court clarified its stance on the good faith exception with the clear reasoning that :

“Evidence is not to be suppressed under the exclusionary rule where it is discovered by officers in the course of actions taken in good faith and in the reasonable, though mistake, belief that they are authorized”.

⁵⁸⁰ Understanding Search and Seizure, <http://www.nolo.com>. See also *Bond v. US* No. 98-9349 (April 17, 2000).

⁵⁸¹ (1980) 623 F 2d 830.

⁵⁸² *Id.* at 840; see also *Michigan v. Tucker*, (1974)417 US 433 at 447 where the majority stated “the deterrent purpose of the exclusionary rule necessarily assumes that the police have engaged in unlawful, or at the very least negligent, conduct which has deprived the defendant of some right. Where the official action was pursued in good faith, however, the deterrence rationale loses much of its force”. *Stone v. Powell*, 428 US 465 at 488 (1975) (Justice White dissenting); *U.S. v. Pettier*, (1975) 422 US 531 at 542 Justice Rehnquist “If the purpose of the exclusionary rule is to deter unlawful police conduct then evidence obtained from a search should be suppressed only if it can be said that the law enforcement officer had knowledge, or may properly be charged with knowledge, that the search was unconstitutional under the Fourth Amendment”.

⁵⁸³ See 692 F 2d 830 (1980).

7:3 Government signs DNA Law inspired by Johnia Berry Murder on 30th May, 2007:

Nashville (Wate)– Governor Bredesen signed a bill into law Wednesday that requires anyone arrested for a violent crime to give a DNA sample. The law is named after unsolved murder victim Johnja Berry 21, who was stabbed to death in Knoxville in 2004 by someone who entered her apartment. Investigators have a DNA sample that doesn't match anyone in current databases. The new law requires DNA samples to be taken from persons booked for violent felonies after January 1. The charges that will require samples include:

- (i) First or second degree murder
- (ii) Especially aggravated kidnapping or aggravated kidnapping
- (iii) Aggravated assault
- (iv) Aggravated child abuse
- (v) Especially aggravated robbery, aggravated robbery or robbery
- (vi) Carjacking
- (vii) Sexual battery by an authority figure, aggravated sexual battery, statutory rape by an authority figure or aggravated statutory rape
- (viii) Aggravated rape, rape or rape of a child
- (ix) Aggravated arson
- (x) Especially aggravated burglary or aggravated burglary
- (xi) Criminal responsibility or facilitating commission of or being an accessory after the fact in any of the above offences.

The measure was unanimously approved in April in the Senate, where it was sponsored by Speaker Ron Ramsey in response to Berry's murder.

Previously, state law only required DNA samples from convicted violent offenders.

To be caught, Berry's killer will have to be arrested for another violent crime after the bill becomes law.

The Berry family attended the signing ceremony in Nashville. They strongly believe whoever stabbed Johnia to death has committed other crimes or will in the future. So the DNA database could help solve this murder and give them some closure.

7:4 Home Office Defends Sharing DNA Database :

Nail down your security priorities. Ask the experts and your peers at The Register Security Debate, April 17, 2008 Nail down your security priorities. Ask the experts and your peers at The Register Security Debate, April 17, 2008.

The Home Office is under fire for allowing foreign agencies access to the National DNA Database (NDNAD).

Following the news two weeks ago that the ID card database will be shared, Liberal Democrat Home Affairs spokeswoman Lynne Featherstone asked in parliament whether foreign law enforcement can already access DNA data. Home Office Minister Joan Ryan confirmed that since 2004 they had received 519 requests for UK DNA data from abroad. No records are available from before that time, she added.

Featherstone said yesterday “What confidence can we have in the Government’s reassurance of the DNA database having proper safeguards when, until last year, they didn’t even collate requests properly?”

National DNA Database contains profiles collected from crime scenes, and of suspects in criminal investigations. Samples are held indefinitely, regardless of whether an individual is convicted of a crime. Carrying the profiles of around 3.5m people, including more than half a million children under 16, it is the world’s largest law enforcement DNA database.

Featherstone called for an independent watchdog to monitor foreign access to the National DNA Database. She said : “There are no real safeguards in place to control this huge database which leaves it open for misuse and now we find out it’s not only being misused in our country but also internationally.”

In a statement, the Home Office said: “The increasing ease of travel and communication between EU member-states has also resulted in a higher risk of criminal activity crossing the borders of EU member-states.

“With the increase in the use of DNA technology to prevent and detect crime across the world, DNA profiles are exchanged more frequently between countries. This is essential to provide intelligence which will assist the investigation of increasingly trans-national crime”.

The Home Office did not comment on who exactly it has shared DNA with, or if it makes similar personal data requests to countries itself.

Featherstone said the fact the DNA database was already being shared without public knowledge or proper checks in pace does not bode well. She said: “This is a bad omen for the upcoming ID register, now the Government has made it clear that our personal data can be shared with foreign countries”.

7:5 How DNA Database Aid Investigations :

DNA databases have greatly enhanced law enforcement’s ability to solve old and new cases with DNA. These databases allow law enforcement officials to match crimes with suspects and develop critical investigative information.

Prisons and jails throughout the country are a critical component of the nation’s DNA database system. Every state has a statute that requires the collection of DNA samples from some convicted offenders. Some states have expanded collection statutes that require DNA collections from arrestees or juveniles adjudicated delinquent for certain offenses. The vast majority of the DNA sample collections are managed by corrections departments jails and juvenile facilities.

States and the FBI store hundreds of thousands of potential suspect DNA profiles in what are called convicted offender databases. A computer software system known as Combined DNA Index System operates local, state and national databases of DNA profiles from convicted offenders unsolved crime scene evidence and missing persons.

Combined DNA Index System (CODIS) constantly compares crime scene DNA evidence with other crime scene DNA evidence, seeking to link what otherwise might appear to be unrelated crimes. At the same time, crime scene DNA profiles are constantly matched against existing and newly entered convicted offender profiles. Given the recidivistic nature of many crimes, especially sexual assault and burglary, these convicted offender profile databases are solving many serious and otherwise unsolvable crimes like the Goldsboro Night Stalker murders.

The Indian forensic scientists are also faced with the task of solving puzzling and intriguing evidence that are sent for their analysis by the baffled investigating agencies. What follows will give an idea of what the forensic scientists have to deal with when they try to help the investigating agencies in tracing the criminal.⁵⁸⁴

An Iskon Sadhu was accused of having raped a female follower. Subsequently he committed suicide as a result of these allegations. Meanwhile the vaginal swab was sent to the Central Forensic Science Laboratory (CFSL) (Kolkata). Forensic tests found that semen found in the vaginal swab did not belong to the Sadhu, who, it turned out, was the victim of some internal conflict among the Iskon members.⁵⁸⁵

From Haryana two charred skeletons were sent to the Central Forensic Science Laboratory (Kolkata) for identification of the victims, who were burnt live. The identities of the victims were established by DNA finger-printing. Similarly all the eleven rapists of a lady in Meghalaya were identified by DNA profile made with the help of the vaginal swab. These are some of the instances where forensic science played a crucial role in solving the crimes.⁵⁸⁶

In **Mukhtiar Singh v. State of Punjab**⁵⁸⁷, the Supreme Court accepted the forensic science expert's evidence, (produced by the prosecution) that the fired

⁵⁸⁴ 2003 Cri LJ, Journal Section, at 43.

⁵⁸⁵ Personal Information of the Author from CFSL (Kolkata).

⁵⁸⁶ Ibid.

⁵⁸⁷ AIR 1971 SC 1864 : 1971 Cri LJ 1298.

cartridges and missed cartridges found at the site of the occurrence were fired from the rifle recovered. In **Raghubir Singh v. State of Punjab**⁵⁸⁸, the Apex Court said that the science oriented detection of crime is made a massive programme of police, for in 'our technological age nothing more primitive can be conceived of than denying the discoveries of the science as aids to crime suppression and nothing cruder can retard forensic efficiency than swearing by traditional oral evidence only, thereby discouraging liberal use of scientific research to prove guilt'. In **Kashinath C. Jalmi v. Speaker**⁵⁸⁹, the Court held that the 'evidence provided by the forensic science laboratory was reliable'. In **State of Karnataka v. Bhoja Poojari**⁵⁹⁰, forensic scientist identified the decomposed body of the victim by skull superimposition. That evidence was held to be reliable by the Apex Court. In **Ammini v. State of Kerala**⁵⁹¹, the Court held that report signed by the Joint Director of the Forensic Science Laboratory is admissible in evidence. In **State of Rajasthan v. N.K.**⁵⁹², a girl of 16 years age was raped. One of the evidence on which the prosecution rested its case was the report of the Forensic Science Laboratory, which confirmed the presence of human semen on the *lehenga* of the prosecutrix. The Court accepted the forensic evidence and decided the case in favour of the prosecution. In **Pawan Kumar v. State of Haryana**⁵⁹³, forensic evidence was accepted as reliable for convicting the accused for bride burning.

Thus, the Court has shown favourable attitude towards accepting opinion of the expert in deciding cases⁵⁹⁴ as and when it got opportunity.

Hence, it is correct and proper to point out that now a days DNA evidence has become spinal cord and life line of criminal investigation and adjudication. It helps both i.e. investigating and adjudicating authorities at a time when no direct evidence or witness is available and working and serving as a crisis-management concept. It provides a ray of hope and helping hands to the above authorities in the

⁵⁸⁸ AIR 1976 SC 91: 1976 Cri LJ 172

⁵⁸⁹ AIR 1993 SC 1873.

⁵⁹⁰ AIR 1997 SC 3812 :1997 Cri LJ 4420.

⁵⁹¹ AIR 1998 SC 260 : 1998 Cri LJ 481

⁵⁹² AIR 2000 SC 1812 : 2000 Cri LJ 2205.

⁵⁹³ AIR 2001 SC 1324 2001 Cri LJ 1679.

⁵⁹⁴ 2003 Cri LJ, Journal Section, at 44.

situation of “no evidence” and convert itself into “all evidence and direct evidence”. The recent trend of Indian judiciary is towards DNA evidence and consider this evidence as their helping hands in the situation of vacuum of evidence in a particular case.

CHAPTER–VIII

CONCLUSION AND SUGGESTIONS

The increasing number of crimes relating to sex offences and paternity problems as well as the offences in scientific, systematic, sophisticated and secret manner are posing problem for both the authorities i.e. investigating and adjudicating that how to direct and decide such cases. In this regard, DNA evidence has developed as a real and true guide and helper to them. DNA evidence has become part of judicial system in India and growing further with fast speed to face and handle any eventuality.

Deoxyribonucleic acid (DNA) is a long molecule, found in the cellular nuclei of living organisms. Since 1954, scientists have recognised that the chemical structure of an individual's DNA encodes information about that individual's inherited characteristics. The present limits on genetic science mean that a direct analysis of a person's DNA will yield only limited information about individual characteristics, although some research suggests that investigators may in the future be able to discern specific physical traits such as hair, eye and skin colour from forensic samples⁵⁹⁵. Rather, the current utility of DNA analysis to the criminal justice system arises from the comparison of DNA from two sources, such as DNA from a crime scene and DNA from a suspect, to determine the relationship between those sources.

Traditionally, the identification of a person has required the observation of that person's entire body or of localised special characteristics such as fingerprints, blood group or hair type. By contrast, DNA analysis allows identification by reference to the information contained in any human nucleic cell, irrespective of which part of the body the cell comes from. The DNA in a human cell is unique, the product of sexual reproduction that combines half of the mother's DNA and half of the father's DNA. Every cell in an individual's body is the result of cellular division, which copies the DNA in the newly fertilised cell

⁵⁹⁵ National Institute of Justice 2000, pp. 18–19; van Oorschot et al. 2001.

into every other nucleic cell. As a result, DNA in a cellular nucleus is identical throughout a human body but variable between any two humans, making it a natural alternative to artificial human identifiers, such as names or tax-file numbers. The notable exception is identical twins, who develop from a single fertilised cell and hence have identical nuclear DNA.

As is its biological wont, DNA has an evolving role in the justice system. No longer a tool only for the prosecution, DNA testing has become a part of post-conviction review, a sometimes-appropriate model for what is considered science by the courts, and may eventually be of assistance to the investigator in the field. DNA's biologic centrality makes these actual and potential forensic applications at once powerful and concerning. The legal and scientific communities debate the utility of forensic DNA analysis from two very different professional mindsets. Attorneys de facto are biased because they have clients they are for or against some proposition brought before the court. They assist their clients through an adversarial process of rhetoric, questioning, and citing legal precedent. Attorneys have a goal: win. Scientists have a different professional perspective: they are neither for nor against either side—despite the fact that one of those sides called them to court and have no stake in the matter other than representing their science and their work objectively, fairly, and accurately. Scientists communicate through open debate and progress through the incremental accumulation of information about the world. In other words, their goal is to understand the world more completely. As a result, attorneys and scientists tend to view DNA and its forensic uses differently.

The science of DNA testing was developed in 1985 by British scientist Alec Jeffreys⁵⁹⁶. Genetic evidence was first tested using his method one year later to solve a double homicide in England and to link the suspect to other previously unsolved rapes and murders in the area. In 1987, a Florida rapist became the first criminal defendant in the United States to be convicted through DNA. Genetic material collected at crime scenes and preserved in evidence lockers also has

⁵⁹⁶ Jeffreys, A.; Wilson, V.; Thein, S., "Hypervariable 'minisatellite' regions in human DNA", (1985).

become an important factor in exonerating those who were wrongly convicted of violent crimes.

As DNA became the gold standard for identifying criminal suspects, the FBI and police departments throughout the U.S. started assembling databases (see The National DNA Database System). Additionally, sex offenders in all states are now required to submit DNA samples to their local police department. Unfortunately, many crime labs are overwhelmed with backlogs of genetic samples and may be unable to process them in a timely fashion.

DNA testing has become an established part of criminal justice process, and the admissibility of the test results in the courtroom has become routine. There is not, and has never been, controversy about its ability to eliminate suspicion in cases where the suspect's DNA does not match the evidentiary sample. Debate continues, however, concerning the extent to which the guilt can be inferred when an apparent match occurs. In most cases, the best it can ever do is to place a suspect at the scene of the crime.

However, the uncritical adoption of 'forensic biologic evidence' as the objective solution to the problem of determining criminal identity raises the possibility of 'scientific appropriation' of the criminal justice process and ignoring the fact that in most contested criminal cases, the crucial issue is not identity but of consent or mens rea, for which DNA evidence provides no assistance. This paper examines the current debate over the many roles that DNA can, and should, play in criminal justice system.

The discussion underlines the crucial role that forensic as a science has been playing and is playing to give strength to the efforts in fighting the criminals. It also shows the immense potential that the science has to speed up the process of criminal justice administration. But sadly all these words sound hollow for the simple reason that the reality of forensic science in our country does not present a very rosy picture.⁵⁹⁷ In the **Chapter First**, the researcher has explained the

⁵⁹⁷2003 Cri LJ, Journal Section, at 44.

concept and necessity of research on such a sensitive issue wherein he has explained the need and necessity of such evidence in the effective and fair implementation of the justice through the Indian judiciary.

DNA profiling was originally developed as a method of determining paternity, in which samples taken under clinical conditions were examined for genetic evidence that could link parent to child. It first made its way into the courts in 1986, when police in England asked molecular biologist Alec Jeffreys, who had begun investigating the use of DNA for forensics, to use DNA to verify the confession of a 17 year-old boy in two rape-murders in the English Midlands. The tests proved the teenager was, in fact, not the perpetrator and the actual attacker was eventually caught, also using DNA testing.

The advent of DNA (deoxyribonucleic acid) evidence is one of the best examples of how much technology has altered the criminal justice landscape, particularly its use exonerating the falsely convicted. DNA evidence technically doesn't pinpoint a single suspect, but rather narrows it down to just a few possibilities within the human population. However, it's extremely accurate and useful as long as it is handled and analyzed properly.

The utility and power of DNA as a tool to convict criminals or exonerate suspects has been greatly supported by the careful legal reviews and stringent quality assurance guidelines that have been developed over the course of nearly twenty years.

The ongoing legislative and judicial reviews at state and federal levels has contributed significantly to the evolution of DNA analyses and played an important role in its rapid adoption as a legal tool. This careful scrutiny has also made DNA analysis one of the most robust and powerful tools used today in the criminal justice system.

As the technology continues to advance, judicial and legislative reviews should continue to ensure that DNA analysis serves justice and protects the public.

In **Chapter Second**, the researcher has explained how the discovery of DNA was done and how this great scientific achievement has been used since its discovery. The chapter also deals with the historic development and the consequential development made in the field of DNA testing ever since. Alongwith that, he has explained the Indian scenario and assistability of DNA in courts from then to now.

The crimes report 1999 states that as many as 49,11,730 cognizable crimes were reported in the country during 1999. These comprised 17.6 lakh cases under the IPC and 31.5 lakh cases under the special laws. In addition, the other investigating agencies under the Central and State Governments also registered 8,02,411 cognizable crimes. Thus, crimes registered by the aforesaid agencies increased the cognizable crimes from 49,11,730 to 49,92,141. With the steadily increasing crime rate⁵⁹⁸, it becomes imperative that the crime investigating agencies are equipped with all available resources that can help them solve crimes at an accelerated pace and here it is pertinent to mention that forensic science forms an important part of this process. But with only 4 *Central Forensic Science Laboratory (CFSL)* and twenty or so FSL this seems a cumbersome task. While limited number of forensic labs is part of the problem the main problem lies with the fact that there is an enormous death of manpower. With high rate of crime, the pressure on forensic scientists will increase and if there is shortage of personnel then the quality of work also suffers.⁵⁹⁹

Lack of fund is also another factor that affects the quality of forensic work done in this country.⁶⁰⁰ The *Central Forensic Science Laboratories* are under the Ministry of Home Affairs, and as such for the approval of every project they require the permission of Delhi. This permission usually takes minimum 2 to 3 years to come. By that time the project would have become obsolete and the researcher would have lost interest.

⁵⁹⁸ Generally the 'Crime in India, 1999', National Crime Records Bureau, Ministry of Home Affairs. See 2003 Cri LJ, Journal Section, at 44.

⁵⁹⁹ 2003 Cri LJ, Journal Section, at 44.

⁶⁰⁰ 2003 Cri LJ, Journal Section, at 44.

Moreover, there is no incentive that can keep the bright people in this field. The pay scale is too low, the system of promotion is too cumbersome and on the whole forensic science is facing a lot of bureaucratic red tapism that is suffocating the scope of growth and innovation in this field.⁶⁰¹

The foundation of the Database system's success is the series of Parliamentary Acts establishing the right of law enforcement to collect and profile individuals arrested for or suspected of committing a crime. Empowering police to obtain DNA from arrestees and to use the database during the investigative process, rather than subsequent to any possible conviction, provides numerous advantages. It allows them to:

- (a) solve cases faster,
- (b) consolidate cases (and thus valuable resources) before trial,
- (c) detain dangerous individuals arrested on a minor charge but identified as having committed a much more serious offense, and
- (d) exonerate innocent suspects more quickly

Legislation also establishes the ability of law enforcement to obtain DNA profiles for individuals arrested for or suspected of "any recordable offense." With this legal authority, the Home Office has established the goal of DNA databasing the "entire active criminal population". Currently, the database population stands at approximately two million individual profiles. By nature of its size, the database matching potential increases. However, it is the ability to profile individuals arrested for relatively minor offenses which provides police the ability to solve more serious crimes.

The Chapter Third is crucial as because in this chapter the researcher has explained the value of DNA evidence and the potential of DNA testing. The chapter deals with the role of DNA and its impact of every aspect of society. Therefore, the researcher has detailed out the importance, the relevancy, admissibility and situation in different countries, regarding DNA testing.

⁶⁰¹ All the above problems became known to the author from personal communication with the forensic scientist working in Kolkata.

It is submitted with the help of judicial decisions that the rights provided against the law enforcement authorities are only limited and in almost all cases courts made a liberal approach in establishing these rights against collecting the bodily materials. In a rule of law prevailing society, it is the duty of the State to investigate crime and to produce the criminal to the hands of the legal machinery. Criminal investigation will be difficult unless the police have the power to take forensic samples from the suspects. No doubt, societal interest must prevail against individuals fight to privacy, even if it were so, it should not be an absolute shut up of all his liberties. Therefore, it is high time to think about the valuable civil liberties of the suspect, especially in situations in which police are using novel scientific methods like genetic identification. Nowadays, the new trend in the investigation of crime is that the police authorities usually collect the biological samples for forensic genetic identification. The genetic data not only provides information about the identity of a person, it also provides a large amount of information about genetic diseases and predispositions. Even more controversial than genetic diseases is the ability of the genes to establish the personality of a person. Recent scientific opinion is that genes can influence the behavior of a person. They can influence the homosexuality of a person, tendencies towards violent criminal behavior and nearly all behaviors of a person. In addition to criminal DNA identification, a large genetic typing process has been going on for determination paternity disputes. In the case of paternity dispute also a large amount of genetic data has been placed under DNA fingerprinting laboratories. Scientific and legal literature states that there is no room of fear about the DNA profiling techniques used in forensic case work because forensic scientists are using non-coded loci as the basis for genetic identification which does not contain genes. Despite, fears about genetic privacy arose in case of the storage of DNA samples in the testing laboratories. The forensic samples like blood, tissue and swabs usually contain large amount of DNA molecules and the scientists can extract necessary DNA from those samples and conduct research and this will seriously violate privacy of persons.

Considering the foregoing points, a number of suggestions were made to protect the common man from the evils of scientific process. It is firmly

established that the recent decision of the Supreme Court in the case of *Sharda*⁶⁰² cannot be considered as an authority in determining the issue whether the civil court had power to order for forensic analysis. As far as its rationale is concerned, it would appear that the Court intended to limit its application to the case on hand and not to any future cases. The ordering for a psychological or psychiatrist's examination is different from the ordering of a blood or DNA test, which requires surgical intrusion into the human copy. Therefore, court should consider the individuals right of privacy while ordering such type of scientific tests. Privacy is heart of the central dogma of human dignity and liberty.

In India, we don't seem to have realized how vast the potential of science technology is. DNA technology has made a drastic improvement in the methodology of providing different types of disputes of civil and criminal cases. Established in the middle of 19th century, today in India there are about 21 well-established forensic labs, 4 of them being administered by the Central Government. The scientific methods are being adopted in crime investigation in India in an organized way from 1849 onwards. Despite having DNA Technology in India, it is not seen used in the administration of Criminal Justice System.⁶⁰³

In **Chapter Four** is the basis and most important description as to the validity of DNA evidence. It is very important to know the legality of DNA evidence according to the Indian Constitution and the possibilities of barriers as to the legality of DNA testing and its acceptance in courts of law. The researcher has tried to explain and justify the questions regarding the constitutionality of DNA evidence.

There is no special enactment dealing with DNA profiling as is there in other countries. However, there are few legal provisions in Indian Constitution, The Indian Evidence Act, 1872, The Code of Criminal Procedure, 1973 and in The Identification of the Prisoner's Act, 1923 which deem to deal with DNA profiling. Many criminal as well as civil cases have been decided by the different

⁶⁰² *Sharda v. Dharampal*, AIR 2003 SC 3450.

⁶⁰³ Article on Development of Science in India, available at www.indianscience.org

courts taking into consideration the DNA evidence, but still it can be said that DNA technology is not widely used in India.

Quite early, the Kerala High Court in **Vasu v. Santa**⁶⁰⁴, had held that taking of a blood sample is a constraint on personal liberty and cannot be carried out without consent. The Madras High Court relying upon a very old case had laid down that it appears doubtful whether such a compulsion can be made even under legislation. It also questioned the power of a guardian aditem to give consent in such cases.

The **Chapter Fifth**, is the major chapter of the whole research work as it deals with the scope, extent and limitations of DNA testing and DNA evidence in legal context. The researcher has made tremendous efforts to describe the scope of DNA, methods, techniques, types and branches of DNA and testing of DNA. Alongwith that, effort has been made to compare the situation of DNA testing and DNA evidence in various countries. The social and ethical aspects have been discussed and the limitation of DNA evidence have also been detailed out in this chapter.

Realizing the value of such tests for determining paternity, maternity and fixing identities, a Bench of Allahabad High court in **Bharu Raj v. Sumesh Sachdeo**⁶⁰⁵, held that such a test puts a child on the anvil of legitimacy and illegitimacy and, therefore, it would be unjust and not fair either to direct a test for collateral reason to assist a litigant in his or her claim. The Hon'ble Allahabad High Court further held that the child could not be allowed to suffer because of his incapacity and that if in a case the Court has reasons to believe that the application for blood test is of fishing nature or was made for some ulterior motive, it would be justified in not acceding to such a prayer.

There is no law governing the presence of forensic scientist in the scene of crime. Even the guidelines of the National Human Rights Commission does not provide any specific instruction regarding the examination of the samples by the

⁶⁰⁴ 1975 Ker LT 53

⁶⁰⁵ AIR 1986 All 259.

forensic scientist though it has provided guidelines relating to post-mortem and autopsy. What we have is Section 45 of the Indian Evidence Act which provides for the opinion of expert admissible as evidence. So we have to take some radical steps to bring forensic science in the forefront of criminal justice administration.

One of the first steps is to give the Forensic Science Laboratories the status of an autonomous scientific establishment, that brings at par with other scientific organisations like the DRDO and CSIR. This would give the directorate more free hand in sanctioning the projects and the forensic scientists will be treated at par with other scientist. This will also free them from the red tapism associated with any governmental work.

The Criminal Procedure Code and the Evidence Act should be amended to make it mandatory for the forensic scientists to visit the scene of the crime to collect such clue materials as blood-stains on clothes etc. suspected poison containers, and so on.⁶⁰⁶

In **Chapter Sixth**, the researcher has discussed the DNA evidence in detail as the concept of it, experts opinion, the conflict of law and science regarding DNA, the ethical problem faced by court of law in accepting DNA as evidence despite it being accurate, etc.

Real justice, over and over again, depends on the truth finding process. It is an indisputable fact that forensic science service is playing a prominent role in this truth finding process. But the recent flaws made by the minority group of experts in the discipline deteriorate the trustworthiness of its service in the legal community. Once a famous criminalist Paul L. Kirk has rightly said, “Physical evidence cannot be wrong; it cannot be perjured; it cannot be wholly absent. Only in its interpretation can there be error. Only human failure to find, study and understand it can diminish its value.” Therefore, what should be seriously taken into consideration is regarding the improvement of forensic scientific discipline in its entirety. The foregoing analysis makes clear that the failure of concerned authorities to use “blind procedures” for interpreting test results contributes to the

⁶⁰⁶ 2003 Cri LJ, Journal Section, at 45.

production of inaccurate conclusions in lab reports and courtroom testimony. Similarly, “examiners bias” may come as the real terminators of the integrity of the output of the discipline. Since forensic labs have never allowed a detailed look at the caliber of their work, only fragmentary information is available. Those traqments, however, reveal a consistent pattern of unacceptable errors and inaccuracies. The proficiency testing conducted by some countries against forensic labs and personnel’s indicate the dangers posed to criminal justice. Incorrect analyses can lead to miscarriage of justice not only by condemning the innocent, but also by helping to free the guilty.

These and other flaws in the discipline will make serious warp of the image of the entire service. Therefore, it is high time to think about the renovation which is necessary in the system. As a first step, it is better to introduce a “National Quality Control Body” in order to fix the quality and standards of the forensic laboratories and personnels. The other important thing is that there must be uniformity among all forensic laboratories regarding the investigation and reporting of the results. This can be achieved by providing fixed protocols.

Forensic laboratories, however, frequently perform analyses without adhering to established procedures. The major drawback of the absence of a scientifically verified protocol is that the forensic laboratories may fix their own standards in testing the evidentiary samples. Subjectivity and bias in forensic analysis can be effectively checked by way of regular training and re-evaluation of forensic results. Compulsory blind proficiency testing programmes can achieve the efficiency and quality of the forensic laboratories. The criminal justice system also needs to know about the quality of individual laboratory performances, both to spur more accurate and reliable performance and to dispense justice.

DNA evidence revolutionized the criminal justice system over the past fifteen years. It also became a great helping hand to the law enforcement machinery in identifying criminals without any third degree methods. Within a short span of time, the legal system understood that the technique has the high prospective in supplying accurate results regarding the complicated identity of the suspects and victims in criminal trials. As a result of the criticism leveled against

the technique, courts have spent a lot of time, even months to determine the evidential value of the evidence provided through the technique. Now, one can say without any vacillation that the controversies around the technique have solved to a great extent. DNA identification evidence has been and will continue to be powerful evidence against criminal defendants. At the same time, due to the day-to-day advancement in the technical field, various new methods will come in the field of DNA typing. Therefore, courts must be in a position to take hold of such novel changes in the bio-scientific field. Lessons from the developed countries shows that the results of the DNA typing technique must be allowed to enter into the legal process only after completing a thorough reliability analysis. In India, the judicial system is, so far, in a budding stage to determine the evidentiary value of the DNA evidence. The foregoing analysis makes it clear that the Indian judiciary is less equipped with the tools to screen the scientific evidence like DNA typing. Judges, advocates and legal academicians interested in forensic evidence are not prepared to evaluate the pros and cons of the technique. Provisions in the Indian Evidence Act and the Code of Criminal Procedure are not enough to screen such high-tech evidence. Therefore, the suggestion is that before admitting such type of evidence, it is necessary to amend the relevant provisions in the concerned Acts and to enact a special law dealing with the evaluation of forensic evidence.

Chapter Seventh deals with the practical and tested approach in it. The researcher has explained the situation of DNA testing and DNA evidence with the help of various case laws including latest judgments and the landmark precedents.

The utility and power of DNA as a tool to convict criminals or exonerate suspects has been greatly supported by the careful legal reviews and stringent quality assurance guidelines that have been developed over the course of nearly twenty years.

The ongoing legislative and judicial reviews at the State and federal levels has contributed significantly to the evolution of DNA analysis and played an important role in its rapid adoption as a legal tool. This careful scrutiny has also

made DNA analysis one of the most robust and powerful tools used today in the criminal justice system.

As the technology continues to advance, judicial and legislative reviews should continue to ensure that DNA analysis serves justice and protects the public.

There is a unanimity that medical and forensic evidence plays a crucial role in helping the courts of law to arrive at logical conclusions. Therefore, the expert medical professionals should be encouraged to undertake medico legal work and simultaneously the atmosphere in courts should be congenial to the medical witness. This attains utmost importance looking at the outcome of the case, since if good experts avoid court attendance, less objective professional will fill the gap, ultimately affecting the justice. The need to involve more and more professionals in expert testimony has been felt by different organizations. The American College of physician's guidelines for the physician expert witness emphasizes on broad physician participation in providing this much-needed assistance to the legal system. The college believes that more doctors should serve as experts as a component of their professional activities in order to meet the need for medical testimony.

Despite being sensitive to the highest degree and having other drawbacks (already discussed in previous Chapter), PCR technique is indispensable because it has many advantages too, particularly where DNA amount is very small. In case following precautions are taken, the PCR testing may be made safer to some extent, as far as contamination is concerned:

- (i) Running Negative Controls and Background Controls is a must at the appropriate stages and throughout the entire process to detect contamination. It must be remembered that these two controls are the only way to detect low level contamination. However, there is no guarantee that despite using these controls, contamination has not occurred.
- (ii) In case contamination has been detected at any stage, all the equipment which could be disposed and the reagents shall be discarded. The

indisposable equipment, working surfaces and the environment shall be cleaned and made sterile through bleaches or gas flames.

- (iii) Performing chain reactions for amplification, the DNA mixture has to be heated and cooled many a times in the Thermal Cyclers. These Thermal Cyclers have to be cleaned thoroughly because they are not disposable and it is likely that some of DNA remain in the cycler from previous PCR. It is usual that tubes containing samples leak in the Thermal Cycler because every-time it is heated the glass of tubes become soft during temperature extremes. Sometimes, it is also found that sample tubes were not sealed properly due to which tubes have tiny pinholes. Therefore, it is a must that sample-tube of Thermal Cycler must be cleaned properly before starting the process.
- (iv) The storage of samples, before PCR starts, is one of the most needed precautions, particularly those samples which have lower amount of DNA must be kept separately, because they are prone to cross-contamination from other materials of evidence. The containers of samples is another area to be specifically looked upon. Even wax paper envelops are not sufficient to prevent contaminating materials to enter the container.

This, objective of greater expert participation can only be achieved by addressing to the apprehensions that ponder the mind of medical professionals. In the light of new developments in the forensic science, the home ministry, Govt. of India constituted a committee under the chairmanship of Dr. Justice V.S. Malimath to suggest reforms in the criminal justice system. This committee suggested comprehensive use of forensic science in crime investigation. According to the committee, DNA experts should be included in the list of experts given in Section 293(4) of Code of Criminal Procedure, 1973 and this will bring the desired results and fruits in the judicial administration.

SUGGESTIONS :

In the last, on the basis of study of judicial decisions, observations, research theories and survey the researcher would like to give some suggestions which may be considered by the legislature and judiciary.

1. It is necessary to make proper panel and advisory body for maintaining uniformity on DNA identification records, storage and DNA analyses, so that uncertainty should not remain.
2. State wise contributory funding for the Labs/Laboratories for DNA Databanks should be made with a view to make self-sufficient and independent.
3. There should be separate Central and State Acts to safeguard public interests which there is no such provision dealing with such a matter.
4. There should be establishment of DNA Data Bank and there should be legislations to regularize the same in proper manner and judicial.
5. The DNA Based Technology (Use and Regulation) Bill 2017 has tried to cover those situations which have been left by the existing Acts in India.
6. There should be separate “investigative” and “law and order” wings, for fair investigation and adjudication. For this purpose National Police Commission may be established which may bring desirable results.
7. Experiences and examples from other countries may also be taken on the DNA matter in the same manner as we ready ruling of foreign courts.
8. Special provision must be inserted in Code of Criminal Procedure, 1973 authorizing the court to supervise the entire procedure from the stage of collection to the disposal of bodily samples for the purpose of exact report of the incidents, place, human bodies and things used for commission of offence and this will be an additional help for the adjudicating authorities.
9. The police authorities while collecting forensic materials must safeguard and ensure maximum privacy of the accused and no person other than the person collecting materials and the investigating police officer shall be permitted to present while collecting materials. If the accused wishes so, an independent third party should be allowed to witness the sampling procedures to avoid dismantle of scene and site and things.
10. Stricter procedures should be enacted regarding the storing and destruction of forensic samples. As soon as practicable after the highest Appellate Court quashes the conviction, it must be ensured that any forensic material

obtained as a result of the carrying out of the procedure is destroyed in compliance of proper way and manner as the material requires otherwise it will be misused for ulterior purposes by the authorities.

11. Section 53 of the Criminal Procedure Code, 1973 provides some scope to the investigating officer to have the accused examined by a medical practitioner at the request of the police. This section does not specifically say whether it would be applicable for DNA test. It relates to examination of the accused by a medical practitioner. This section never contemplates that the police officer shall be entitled to collect semen, blood, saliva, hair root, urine, vaginal swab etc. for the purpose of investigation personally by himself. For the purpose of crime investigation, Section 53 of Code of Criminal Procedure, 1973 should be more specific, clear, more unambiguous, more meaningful, and more purposeful so that an investigating officer may not face any difficulty for the purpose of crime investigation and making his final report about the crime.
12. Under Section 293, Code of Criminal Procedure, 1973 the reports of certain government scientific experts can be used as evidence in any enquiry, trial or other proceedings under the Criminal Procedure Code, 1973 and he need not be examined as a witness. But the entry for DNA fingerprinting and diagnostics is not specifically mentioned under in Section 293(4) Code of Criminal Procedure. Therefore, the expert has to give evidence in each case where a report has been given by him. In view of the fact that DNA typing is an exact science, there is a necessity to amend the provisions of the Criminal Procedure Code, 1973 to include the scientists of this institute in Section 293 of Code of Criminal Procedure, 1973 and to treat their reports as evidence, otherwise it would difficult for these experts to go around the country for giving evidence at every trial, in cases where they are required to give expert opinion and this will be disadvantageous to for them.
13. Article 20(3) of the Constitution of India has to be reinterpreted to the effect that the accused should not get protection of this article. It will be in the interest of the society that the benefit of Article 20(3) Constitution of

India should not be given to an accused person involving with paternity, handwriting etc. matters because without medical examination, it is impossible for investigating and adjudicating authorities to deal with such a case. The Supreme Court of India in many cases has laid down that compelling to medical examination of the accused is not “becoming a witness against himself” and would amount to “giving evidence” only. Thus suggestion is in the light of recent developments in the society.

14. A specific unambiguous scientific DNA legislation is the paramount need of this age for effective application of this new gift of forensic science in our legal system. The purpose of the proposed legislation is threefold. Firstly, it would provide the investigating agency a specific guideline for collection and preservation of DNA samples from the crime spot. Secondly, it would provide specific objective guideline to the trial Judge to evaluate the DNA evidence properly. Thirdly, this scientific legislation gives a fixed standard of procedure for extracting and evaluating the DNA from the samples collected by the investigating agency.
15. With the view to keep pace with the changing times, it is necessary make a specific DNA legislation which would authorise to set up the Combined DNA Index System (CODIS), which consisted of three tiers of DNA data, namely, the Local DNA Index System (LDIS), which consisted of information installed by the laboratories of the local police and sheriff departments, then State DNA Index System (SDIS) which allowed the individual local laboratories to exchange information throughout the State and the National DNA Index System (NDIS) that allowed States to share information between each other on a national scale. This infrastructural set-up, laid down in the said legislation, will provide error-free result of DNA testing in our country. Thus may be done on the lines of U.S.A. DNA Identification Act, 1994. This will further give better results in this regard. A start has been made in India by the parliament by way of enacting The DNA Based Technology (Use and Regulation) Bill 2017.
16. For maintaining the privacy of DNA material and evidence, we should enact a separate Act for protecting privacy on the lines of Australian

Privacy Act, 1988 and its Amendment in 2001 and the DNA Based Technology (Use and Regulation) Bill 2017, which an starting step in this direction should be passed immediately. It is a bitter fact that in India concept of “morality” is very much rigid and traditional and hence the concept of morality of Western Countries cannot be applied in toto in Indian situations. Though, in *Sharda v. Dharmpal*⁶⁰⁷, the Supreme Court declared that the right of privacy guaranteed under Article 21 of the Constitution couldn’t operate as a bar when the question of public morality and public interest will arise, but a comprehensive legislation regarding privacy law is required in our country.

17. The Family Courts Act, 1984 should be amended to provide a special chapter dealing with DNA parentage testing and adequate provisions should be made thereunder to ensure that parentage testing meets the highest technical and ethical standards, particularly in relation to consent to testing, protecting the integrity of genetic samples, and providing counselling. The parentage testing reports should be admissible in evidence only if made in accordance with the statutory requirements. This will solve the complicated parentage related problems like *N.D. Tiwari* case.
18. The same rule should be applicable in a case when child has reached 12 years age and there should be provision that it is absolute right of the child to give or hold consent of himself/herself when case relates to him/her. The paramount consideration should, however, in all events be the welfare of the child concerned.
19. It is need of the time that to deal with the increasing number of paternity and handwriting cases, there should be an Independent Commission, with judicial and technical members as it’s member. This will reduce the burden of judiciary in India which is over burden by use of number of pending cases. It may be done on the line of Custom and Excise, Tribunal, Industrial Tribunal, etc.

⁶⁰⁷ (2001) 5 SCC 311.

20. Courts should take judicial notice of three scientific underpinnings of DNA typing too and thus can reach at a definite conclusion in the issue involving DNA. This will served as a speedier method to combat such cases.
21. The adequacy of the method used to acquire and analyze samples in a given case bears on the admissibility of the evidence and should, unless stipulated, be adjudicated case by case. In this adjudication, the accreditation and certification status of the laboratory performing the analysis should be taken into account.
22. It is also worthwhile to suggest that it is a hard reality that DNA evidence has pointed power and so the authorities must make funds available to pay reasonable expenses to the expert witnesses so that they do not hesitate to come and the appropriate parties must be informed of the use of DNA evidence as soon as possible with a view to check the avoidance by the experts to reach on the spot and take relevant material for examination due to less or no payment to them, though provisions under Code of Criminal Procedure, 1973 exists in this regard, but in reality, never used.
23. DNA samples (and evidence likely to contain DNA) should be preserved whenever that is possible but a reasonable limit or period should be fixed in this regard or the line of Code of Criminal Procedure, 1973.
24. Looking into the sensitivity of the matter and future prospects of the aggrieved/victim/accused persons the protective orders should be issued only to protect the privacy of the persons involved. It will be in the interest of society and State too.
25. Since DNA evidence is a recently developed evidence, hence, it should be dealt with utmost care and caution and must as far as possible, corroborated by direct evidence because there are chances of fabrication and tempering with the evidence, hence, the DNA evidence should not be relied upon with blind faith that it is of unquestionable nature.

26. The misuse of DNA evidence be avoided with the view to blackmail the either party and the person doing so, should be punished under Indian Penal Code, 1860 under relevant sections.
27. Lastly, DNA evidence can never outweigh, the trustworthy eye witness who is like an established 'gold coin' and so his/her testimony should be given preference in case of clash between the DNA evidence and oral evidence.

Thus, it can be said that the DNA evidence has filled the gaps the law of evidence and has served as well as serving as a trustworthy guide and helper to the judiciary in critical situations and has become a ray of hope to fill the vacuum in "no evidence" matter and turned out to be gold coin and weapon in armoury and artillery of judiciary.

SUMMARY

Every day in the newspapers of local, national and international level as well as the television of national and international channel, we read and hear the examples of complicated nature of offences of known and unknown nature. It happens in unknown places and manners and by known or unknown persons like several persons commit adultery with a woman or several persons commit gang rape with a woman or several persons join the commission of an offence or offences with an infant, insane, idiot, illusioned, intoxicated and the like. Sometimes such rape or adulterous relationship result into birth of a child. Therefore, a complicated question arises as to the paternity of the child because it is an age old maxim that **“maternity is certainty and paternity is uncertainty”**.⁶⁰⁸ In such matter, in earlier times, super human or super natural means and methods of power used to resolve such issue. But later on these started creating more complications than to resolve the issues. Hence, human being turned towards scientific manner and methods to solve such parentage, heritage, lineage, succession and crime’s issues. The advent of Forensic Science made a revolution in this regard and in the ambit of forensic science, DNA (Deoxyribo Nucleic Acid) test stands on the top. The use of DNA throughout the world annihilated the old scientific and other kind of investigations relating to offences and other issues. The so called most advanced country Great Britain in Kingship or Royal family, whenever there is marriage of a son with a women, the prospective bride of the King has to undergo DNA test for chastity and when it is established, then only her marriage would be finalized. So, in short, it can be said that DNA is dominating the investigation, enquiry, trial and adjudication. It has turned into an important, material and substantive piece of evidence. Regarding it’s evidentiary value, it is unquestionable. But at the same time it is like an **“unruly horse”** and sometimes ruin the **“established home”** and family and bring **“tears from cheers”**. Hence, it should be resorted in rarest of rare cases when there remains no alternative or recourse.

⁶⁰⁸ Thomas Pollet and Daniel Nettle, “Contact frequencies between grandparents and grandchildren in a modern society: Estimates of the impact of paternity”, *Journal of Cultural and Evolutionary Psychology*, 4(2006) 3-4.

In this regard, it can be said that the present world is the world of science and technology, and new researches are taking place in every field. The rate at which the world has progressed is commendable. Advanced scientific technology has given the world an effective and precise tool for criminal investigation, e.g., fingerprinting analysis by fingerprint experts, hand-writing analysis by hand-writing experts, brain fingerprinting, narco analysis, testing of blood samples and other biological materials by forensic science techniques. In fixing paternity, the DNA test technology is coming up as the latest method. DNA technology is helpful in tracing the criminals not only in recent times but in the past unsolved crimes also. A person can change his looks by manipulations and tampering but he cannot change his DNA in order to escape from the clutches of law.⁶⁰⁹

Many years ago, it was believed that there exist 48 chromosomes in a human being. But in 1956 J.H. Tjio and A. Leven from Sweden discovered 46 chromosomes and changed that belief. Their discovery was, later on, supported by C.E. Ford and J.L. Hammerton (in 1956), and by S. Makino and M.S. Sasaki (in 1961).⁶¹⁰ By a famous scientist Garrod (1901) the fact was brought to light that “simply the most evolved and most intelligent living organism is the ‘MAN’ and almost all basic principles related to biology, including those of ‘genetics’ are, therefore, applicable to human beings just as well as are applicable to other organisms”; and he successfully interpreted some human diseases, e.g., *alkaptonuria*, *phenylketonuria*, etc. as traits inherited in accordance with Mendel’s Laws of genetics and heredity. This was the birth of the so called ‘Human Genetics’.⁶¹¹

Discovering the natural facts and principles that govern the “biology” of organism requires elaborate laboratory experimentation as well as field study. The facts and principles related to human genetics have, however, been mostly gathered from field study or are based upon the genetics of other organisms

⁶⁰⁹ H.J. Walls, *Forensic Science an Introduction to Scientific Crime Detection*, Universal Law Publishing Co. Pvt. Ltd., New Delhi, First Indian Reprint 2002.

⁶¹⁰ Makino, S. and Sasaki, M. (1961). A study of somatic chromosomes in a Japanese population. *An. J. Human Genet* 13: 47-63.

⁶¹¹ James F. Crow and William F. Dove, “Perspectives on Genetics: Anecdotal, Historical, and Critical Commentaries 1987-1998”, The University of Wisconsin Press, England in 2000.

because human beings, due to social and some other biological phenomenon based factors, cannot be used as “experimental laboratory materials”.⁶¹² Therefore, from the above said facts, it can be said that ‘man’ is unsuitable and unfavorable, in experimental genetics. However, they still continue to be preferred for genetic studies because of different nature, traits and habits.

Human genetic is a wide branch of the human biology wherein not only “heredity” or “inheritance” is studied but also the methods to determine human genetic traits and their Inheritance, i.e., pedigree analysis and study of twins; Blood groups and their inheritance (which includes Blood Group Antigens and Antibodies; Blood groups and their determination; Blood transfusion; Blood banks and blood donation; Heredity of blood groups; Blood grouping and legal suits, Rh-factor); Sex determination, Chromosomal aberrations, Human syndromes, Sex-linked characters and their Inheritance, Sex-influenced traits, Sex-limited traits, Eugenics, “Nature” and “Nurture”, Euthenics, Inborn errors in metabolism; and genetic analysis, chromosome-mapping and its use in Medical science as well as in Medico-legal and Forensic sciences.⁶¹³

The DNA stands for deoxyribonucleic acid, the strands of identity that living beings receive from their ancestors. Outside of identical twins, no two people have the same DNA pattern. DNA fingerprinting also has certain distinctive features. In 1987, the DNA fingerprinting was utilised as a tool for criminal investigation, to establish blood relations and trace medical history. Investigators would find “anonymous DNA” at the crime scene and compare it with the DNA of suspects for possible matches. The investigator would generally use a swab to collect bodily substances from a suspect's mouth to match it with DNA collected from the crime scene. Prior to the use of DNA, identification was heavily based on finger prints, foot prints, blood, or other evidence that a suspect may have left behind after committing a crime. The process of matching a suspects DNA with DNA found at a crime scene has provided both law enforcement agencies and court officials with a higher probability of ascertaining

⁶¹² Ibid.

⁶¹³ Sturtevant AH , “The linear arrangement of sex-linked factors in *Drosophila*, as shown by their mode of association”, *Journal of Experimental Biology.*, (1913), 14: 43–59

the identity of offenders. The DNA fingerprinting has been very useful for law enforcement, as it has been used to exonerate the innocents. Unlike blood found at a crime scene, DNA material remains usable for an endless period of time. DNA technology can be used even on decomposed human remains to identify the victims.

The Clinical trial and medical research has long been an important area of medical sciences as it has been referred to in large number of mythological and historical texts and scriptures.⁶¹⁴

Charaka Samhita (textbook of medicine) and *Sushruta Samhita* (textbook of surgery) dating back to 200 B.C. and 200 A.D. respectively, focus on India's age old proficiency in medical science. Today, there are number of laws which govern clinical research in India, some of them being: The Drugs and Cosmetics Act, 1940; The Medical Council of India Act, 1956 (Amended in 2002); The Central Council for Medicine Act, 1970; The Guidelines for exchange of Biological Material (MOH Order, 1997); and Right to Information Act, 2005.

Since there are shortcomings in the existing legal provisions with regard to identification of individuals for specified purposes such as victims of disasters, missing persons, etc., the Department of Biotechnology came up with a draft Bill titled "The Use and Regulation of DNA-Based Technology in Civil and Criminal Proceedings, Identification of Missing Persons and Human Remains Bill, 2016." On 27 September 2016, the draft Bill was forwarded to the Law Commission of India for examination and its revision, if required.

DNA profiling technology, which is based on proven scientific principles⁶¹⁵, has been found to be very effective for social welfare, particularly, in enabling the Criminal Justice Delivery System to identify the offenders. Such tests relating to a party would definitely constitute corroborative evidence.⁶¹⁶

⁶¹⁴ 271 Report of the Law Commission of India, July 2017.

⁶¹⁵ The DNA test has 99.99 % chance of correct conclusions and is perceived as an objective scientific test which may be difficult for an individual to refute. See: *Veeran v. Veeravarmalle & Anr.*, AIR 2009 Mad. 64; and *Harjinder Kaur v. State of Punjab & Ors.*, 2013 (2) RCR (Criminal) 146.

⁶¹⁶ *Simpson v. Collinson*, (1964) 1 All ER 262.

Appreciating the use and regulation of DNA based technology in judicial proceedings, particularly, identification of persons accused of offences under the Indian Penal Code 1860 (IPC) and other laws, identification of missing persons and disaster victims apart from its use in medical sciences; a need has long been felt to have a special legislation to regulate human DNA profiling. DNA analysis offers substantial information which if misused or used improperly may cause serious harm to individuals and the society as a whole.

DNA tests are highly reliable as because every person's DNA is unique except in identical twins. The greatest asset of DNA is that it is so specific to every individual that it cannot be tampered. DNA tests can be used for various reasons, such as, to establish parentage of a child, detect crimes and identify mutilated dead corpses. They are of immense help in criminal justice administration and even in some civil disputes like succession, inheritance etc.⁶¹⁷

DNA testing has become an established part of criminal justice procedure, and the admissibility of the test results in court has become routine.⁶¹⁸ DNA testing has also endeavoured in opening up new sources of forensic evidence, It has full potential to identify and distinguish between perpetrators and innocent people.

The development of forensic DNA testing has expanded the types of useful biological evidence. In addition to semen and blood, such substances as saliva, teeth, bones and even fossils can be sources of DNA.⁶¹⁹ These sources are still expanding as researchers are exploring the potential of other biological substances, such as hair, skin cells, and fingerprints.

Although the use of DNA testing is expanding but the use of DNA evidence is currently limited because most of what could be tested remains unrecovered and unanalyzed. The number of crimes are increasing, but in all the criminal convictions for which DNA collection is legislatively mandated, their samples are being obtained from less than half of the individuals, and of the

⁶¹⁷ Ibid.

⁶¹⁸ Subbash Chandra Singh, DNA Profiling and the Forensic use of DNA Evidence in Criminal Proceedings, Journal of the Indian Law Institute, Vol. 53, April-June 2011.

⁶¹⁹ Report of the Royal Commission on Criminal Justice, HMSO, London 1993, Chapter 9.

cumulative number of DNA samples obtained, merely 20 per cent have been processed.

The reasons for the delay or non-recovery of evidence and processing are scarcity of law enforcement resources, lab backlogs caused by insufficient funding, time-consuming and costly. Deadlines imposed by the courts, make it impossible to analyze all the potential evidentiary specimens submitted within the specified time.

More rapid processing of DNA evidence could make it possible to overcome these obstacles in forthcoming years as a result of improvements in technology. Likewise, the turnaround time of Restriction Fragment Length Polymorphism (RFLP) analysis has recently been reduced. The anticipated replacement of Restriction Fragment Length Polymorphism by Polymerase Chain Reaction (PCR) based technology is more promising which takes only days to perform. Initial collection of evidence is improving as a result of the establishment in many jurisdictions of more structured crime-scene teams and more specialised evidence collection procedures. In the past few years alone, major technological advances have been made in fingerprinting, the development of computerized fingerprint databases are perhaps most familiar because of recent sensational criminal cases related to DNA testing.

However, it is also an established fact that everything has two sides- good as well as bad. In this way the use of DNA has created more complications their resolved. One may find many examples of it's side-effects everyday. Hence, the researcher though to make it as a subject-matter of his research project. However, the main objectives were as follows:

Objectives of the Research :

The objectives of the research were as follows:

- (xv) Whether the DNA evidence is generally accepted by the scientific community?
- (xvi) Whether the testing procedure is generally accepted as reliable, if performed properly?

- (xvii) Whether the test was performed properly in a case?
- (xviii) Whether the conclusion reached in a case is acceptable?
- (xix) Whether DNA technology is a science and is accepted in world community?
- (xx) Is there any technology to establish Rule 1 and explain it further?
- (xxi) Whether the technology has been properly applied in the case?
- (xxii) Whether proper testing procedure was used in the case and is generally acceptable as reliable?
- (xxiii) Whether all relevant the tests were performed properly in the case?
- (xxiv) Whether the conclusion reached in the case is acceptable as just and proper and whether it can prevail over the testimony of a competent eyewitness who is like an established “gold coin”.

Research Methodology :

The methodology adopted for the study is completely doctrinal method involving content analysis. Judicial pronouncement and decisions for original sources have been studied and analysed through relevant books, articles, empirical studies, reports etc. to get the true picture of the problem of DNA. The standard forms of quotations and references have been used in the research work in this regard.

The imperative study has suggested the present need and a better DNA for the purpose of detection and decision of a complicated case. The methodology has included collect data on the topic of study for analysis of public opinion and to reach at a particular result.

The methodology which has been adopted for the present research work is mainly based on doctrinaire as well as empirical analysis. The study is based on primary as well as secondary source of information. Efforts have been made to study the :

- (5) Law, rules and regulations.
- (6) Judicial pronouncements of the Supreme Court and High Courts.

- (7) Legal Commentaries and reports.
- (8) Empirical studies and surveys for the DNA.

And in order to make the study broad-based, researcher has used the empirical method such as :

- (5) Collect data and material from the library of Delhi University;
- (6) From library of Kota University, Kota;
- (7) From the library of the Institute of Development Studies, Jaipur.
- (8) From library of Indian Law Institute and ISIL, Delhi.

The Plan of the Thesis :

The research study comprises eight chapters. The chapterization is as follows:

The introductory Chapter introduces the subject of study, justifies necessity to research on it, explains the research methodology and briefly highlights the content of the subsequent chapters of this thesis.

The Second Chapter of the research work focuses on Juristic Dimensions and Historical Perspective of DNA. For reaching at a definite conclusion of a problem, we have to go into it's depth i.e. from where, by who, when it came into existence. In the same manner, in legal field for study and analysis of a judicial concept, we have to go to it's legal jurisprudence which is considered to be origin of all legal issues. The same rule is applicable in the matter relating to (Deoxyribo Nucleic Acid) DNA evidence and hence, an attempt has been made in this chapter to go through the juristic and historical dimensions of the newly born Giant of law.

The next Chapter of the research work focuses on Role of DNA in Personal and Public Life. The recently developed embryo of law is playing an important role and dominating the public and personal life of the citizens and affecting the public opinion too in favour or against, both. It may make or mar the career and prospect of a person if he or she falls it's prey. Hence, an effort has

been made in this chapter to study the role of DNA evidence in personal and day to day life.

In this regard, it is relevant here to mention that the case which brought the Deoxyribo Nucleic Acid (DNA) controversy to the fore was the rape and murder of Priyadarshini Mattoo. In January 1966, Priyadarshini Mattoo, was allegedly raped and strangled in her house in New Delhi. A fellow student, Santosh Kumar Singh, incidentally the son of a Senior IPS Officer was the main accused and was ultimately acquitted. At trial, **CBI v. Santosh Singh**⁶²⁰, Court of the Additional Sessions Judge, New Delhi, the prosecution case relied on the DNA test of the vaginal swab, which was positive whereas the defence challenged the validity of the test stating that it was not conducted according to prescribed rules. The defence alleged that because the crime scene, etc., had not suggestive of sexual intercourse, the presence of semen was not possible and had to have been planted.⁶²¹ At the time of the post-mortem, the underwear of the deceased had earlier been returned with the assertion that there were no semen stains but subsequent analysis at the laboratory at Hyderabad revealed that there were in fact semen stains; the mix-up, however, led to the belief that the evidence had been tampered with. Thus, the case arose pros and cons of the use of this evidence. Hence, subsequent Chapter of the research work focuses on Constitutionality of the DNA as a Evidence. The Constitution is the foundation and source of all laws of land and it regulate it's applicability, availability, necessity too. So, if an legal provision or legal issue is against the norms laid down by the constitution, that will not be effective and if already in existence would cease to exist. Hence, constitutionality of the issue is most desired requirement of any legal issue/issues. Hence, an effort has been made in this chapter to evaluate the constitutionality of DNA evidence in the current dynamic scenario of the Indian society. Thus, modern DNA analysis has revolutionized the criminal justice system. It has been used to prove – without a doubt – that suspects were involved in crimes and to

⁶²⁰ (2010) 9 SCC 747.

⁶²¹ Bhadra Sinha, “Sensational murder case approaches judgment day”, Newspaper on Indian Express on 7th July, 2004.

free people who were wrongly convicted. The DNA sample is taken by swabbing the inside of a person's cheek.

The Chapter Fifth of the research work focuses on Forensic Analysis in Criminal Investigations, Scope, Extent and Limitations of DNA. Since DNA is the part of forensic science, it becomes relevant to study the different dimensions of the use of DNA evidence, for example, in the matter of criminal investigation and trial. In this regard, it can be said that the word "Forensic" is a derivative of Latin word "Foresis", which means belonging to market places or forum. In old Rome, forum or public meeting places were the sites where legal cases were tried. The Oxford Dictionary says 'Forensic' means 'pertaining to law courts' and according to another it means "crime-solving relating to the application of science to decide questions arising from crime or litigation".⁶²²

The next Chapter of the research work focuses on Human Genetic Material: Its Ethical and Legal Issues. Human Genetics is way too complicated as the humans are most complex living organisms, the genetic structure of human is very much complex. Beside, this natural reason study of human DNA is difficult due to certain other reasons. The DNA evidence has more complications than suggestions and solutions because it has various legal and ethical issues involved in it. So, it should be dealt with "Handle with Care" manner.

There is an established principle of criminal jurisprudence *Actus non facit reum, nisi mens sit rea* which defines criminal liability of an accused. The maxim literally means no one can be punished unless it is proved that the offence was committed by him and he did the same with intention. Therefore in order to constitute criminal liability, it is essential to have both an 'actus reus' (a wrongful act) and 'mens rea' (guilty mind).⁶²³

If we look into the deeper meaning of the maxim, it can be construed that it is essential that it must be proved that the act was committed by the accused and

⁶²² Encarta World English Dictionary.

⁶²³ Ram Lal Anand, A.S.N. Ayyar, Raghbirlal Bhagatram Sethi, All India Criminal Digest, 1951-60, Vol. 3, Law Book Company, 1963.

with a wrongful intention. Thereafter arises the need of evidence as it may always not be essential that the guilt can be proved from the circumstances as such.

Thus, evidence is elementary to any criminal proceeding not only for proving one's guilt but as a way of defence. With the progress of science and technology, crimes have become more complex in nature. It is of common fact that the role of law to curb offences and to meet the justice. Therefore, eventually it has led to the need of scientific evidence and testimony of experts in criminal trials and prosecutions.

The Chapter Seventh deals with the analysis of the Judicial Trends regarding DNA. The 'Evaluation' and 'adjudication' is the 'right', 'responsibility' as well as 'liability' of the judiciary. For every legal issue involved in controversy in civil or criminal matter, is to be dealt with accordingly. Since the DNA evidence is an sensitive and complicated issue recently developed, hence, it's appreciation, evaluation and application need special and higher care of caution and attention.

In this respect, it can be said that the general approach of the Indian Judiciary has been not to exclude the illegally obtained evidence on the ground that the method of collection adopted by the authorities does not affect its reliability and hence, it is admissible on account of its relevance at the trial, with a few exceptions.⁶²⁴

Last Chapter of the research work provides conclusion and suggestions. The increasing number of crimes relating to sex offences and paternity problems as well as the offences in scientific, systematic, sophisticated and secret manner are posing problem for both the authorities i.e. investigating and adjudicating that how to direct and decide such cases. In this regard, DNA evidence has developed as a real and true guide and helper to them. DNA evidence has become part of judicial system in India and growing further with fast speed to face and handle any eventuality.

⁶²⁴ 2003 Cri LJ, Journal Section at p. 267.

Deoxyribonucleic acid (DNA) is a long molecule, found in the cellular nuclei of living organisms. Since 1954, scientists have recognised that the chemical structure of an individual's DNA encodes information about that individual's inherited characteristics. The present limits on genetic science mean that a direct analysis of a person's DNA will yield only limited information about individual characteristics, although some research suggests that investigators may in the future be able to discern specific physical traits such as hair, eye and skin colour from forensic samples⁶²⁵. Rather, the current utility of DNA analysis to the criminal justice system arises from the comparison of DNA from two sources, such as DNA from a crime scene and DNA from a suspect, to determine the relationship between those sources.

Traditionally, the identification of a person has required the observation of that person's entire body or of localised special characteristics such as fingerprints, blood group or hair type. By contrast, DNA analysis allows identification by reference to the information contained in any human nucleic cell, irrespective of which part of the body the cell comes from. The DNA in a human cell is unique, the product of sexual reproduction that combines half of the mother's DNA and half of the father's DNA. Every cell in an individual's body is the result of cellular division, which copies the DNA in the newly fertilised cell into every other nucleic cell. As a result, DNA in a cellular nucleus is identical throughout a human body but variable between any two humans, making it a natural alternative to artificial human identifiers, such as names or tax-file numbers. The notable exception is identical twins, who develop from a single fertilised cell and hence have identical nuclear DNA.

As is its biological wont, DNA has an evolving role in the justice system. No longer a tool only for the prosecution, DNA testing has become a part of post-conviction review, a sometimes-appropriate model for what is considered science by the courts, and may eventually be of assistance to the investigator in the field. DNA's biologic centrality makes these actual and potential forensic applications at once powerful and concerning. The legal and scientific communities debate the

⁶²⁵ National Institute of Justice 2000, pp. 18–19; van Oorschot et al. 2001.

utility of forensic DNA analysis from two very different professional mindsets. Attorneys de facto are biased because they have clients they are for or against some proposition brought before the court. They assist their clients through an adversarial process of rhetoric, questioning, and citing legal precedent. Attorneys have a goal: win. Scientists have a different professional perspective: they are neither for nor against either side—despite the fact that one of those sides called them to court and have no stake in the matter other than representing their science and their work objectively, fairly, and accurately. Scientists communicate through open debate and progress through the incremental accumulation of information about the world. In other words, their goal is to understand the world more completely. As a result, attorneys and scientists tend to view DNA and its forensic uses differently.

DNA testing has become an established part of criminal justice process, and the admissibility of the test results in the courtroom has become routine. There is not, and has never been, controversy about its ability to eliminate suspicion in cases where the suspect's DNA does not match the evidentiary sample. Debate continues, however, concerning the extent to which the guilt can be inferred when an apparent match occurs. In most cases, the best it can ever do is to place a suspect at the scene of the crime.

However, the uncritical adoption of 'forensic biologic evidence' as the objective solution to the problem of determining criminal identity raises the possibility of 'scientific appropriation' of the criminal justice process and ignoring the fact that in most contested criminal cases, the crucial issue is not identity but of consent or mens rea, for which DNA evidence provides no assistance. This paper examined the current debate over the many roles that DNA can, and should, play in criminal justice system.

In the last, on the basis of study of judicial decisions, observations, research theories and survey the researcher would like to give some suggestions which may be considered by the legislature and judiciary while dealing such cases.

1. It is necessary to make proper panel and advisory body for maintaining uniformity on DNA identification records, storage and DNA analyses, so that uncertainty should not remain.
2. State wise contributory funding for the Labs/Laboratories for DNA Databanks should be made with a view to make self-sufficient and independent.
3. There should be separate Central and State Acts to safeguard public interests which there is no such provision dealing with such a matter.
4. There should be establishment of DNA Data Bank and there should be legislations to regularize the same in proper manner and judicial.
5. The DNA Based Technology (Use and Regulation) Bill 2017 has tried to cover those situations which have been left by the existing Acts in India.
6. There should be separate “investigative” and “law and order” wings, for fair investigation and adjudication. For this purpose National Police Commission may be established which may bring desirable results.
7. Experiences and examples from other countries may also be taken on the DNA matter in the same manner as we ready ruling of foreign courts.
8. Special provision must be inserted in Code of Criminal Procedure, 1973 authorizing the court to supervise the entire procedure from the stage of collection to the disposal of bodily samples for the purpose of exact report of the incidents, place, human bodies and things used for commission of offence and this will be an additional help for the adjudicating authorities.
9. The police authorities while collecting forensic materials must safeguard and ensure maximum privacy of the accused and no person other than the person collecting materials and the investigating police officer shall be permitted to present while collecting materials. If the accused wishes so, an independent third party should be allowed to witness the sampling procedures to avoid dismantling of scene and site and things.
10. Stricter procedures should be enacted regarding the storing and destruction of forensic samples. As soon as practicable after the highest Appellate Court quashes the conviction, it must be ensured that any forensic material

obtained as a result of the carrying out of the procedure is destroyed in compliance of proper way and manner as the material requires otherwise it will be misused for ulterior purposes by the authorities.

11. Section 53 of the Criminal Procedure Code, 1973 provides some scope to the investigating officer to have the accused examined by a medical practitioner at the request of the police. This section does not specifically say whether it would be applicable for DNA test. It relates to examination of the accused by a medical practitioner. This section never contemplates that the police officer shall be entitled to collect semen, blood, saliva, hair root, urine, vaginal swab etc. for the purpose of investigation personally by himself. For the purpose of crime investigation, Section 53 of Code of Criminal Procedure, 1973 should be more specific, clear, more unambiguous, more meaningful, and more purposeful so that an investigating officer may not face any difficulty for the purpose of crime investigation and making his final report about the crime.
12. Under Section 293, Code of Criminal Procedure, 1973 the reports of certain government scientific experts can be used as evidence in any enquiry, trial or other proceedings under the Criminal Procedure Code, 1973 and he need not be examined as a witness. But the entry for DNA fingerprinting and diagnostics is not specifically mentioned under in Section 293(4) Code of Criminal Procedure. Therefore, the expert has to give evidence in each case where a report has been given by him. In view of the fact that DNA typing is an exact science, there is a necessity to amend the provisions of the Criminal Procedure Code, 1973 to include the scientists of this institute in Section 293 of Code of Criminal Procedure, 1973 and to treat their reports as evidence, otherwise it would difficult for these experts to go around the country for giving evidence at every trial, in cases where they are required to give expert opinion and this will be disadvantageous to for them.
13. Article 20(3) of the Constitution of India has to be reinterpreted to the effect that the accused should not get protection of this article. It will be in the interest of the society that the benefit of Article 20(3) Constitution of

India should not be given to an accused person involving with paternity, handwriting etc. matters because without medical examination, it is impossible for investigating and adjudicating authorities to deal with such a case. The Supreme Court of India in many cases has laid down that compelling to medical examination of the accused is not “becoming a witness against himself” and would amount to “giving evidence” only. Thus suggestion is in the light of recent developments in the society.

14. A specific unambiguous scientific DNA legislation is the paramount need of this age for effective application of this new gift of forensic science in our legal system. The purpose of the proposed legislation is threefold. Firstly, it would provide the investigating agency a specific guideline for collection and preservation of DNA samples from the crime spot. Secondly, it would provide specific objective guideline to the trial Judge to evaluate the DNA evidence properly. Thirdly, this scientific legislation gives a fixed standard of procedure for extracting and evaluating the DNA from the samples collected by the investigating agency.
15. With the view to keep pace with the changing times, it is necessary make a specific DNA legislation which would authorise to set up the Combined DNA Index System (CODIS), which consisted of three tiers of DNA data, namely, the Local DNA Index System (LDIS), which consisted of information installed by the laboratories of the local police and sheriff departments, then State DNA Index System (SDIS) which allowed the individual local laboratories to exchange information throughout the State and the National DNA Index System (NDIS) that allowed States to share information between each other on a national scale. This infrastructural set-up, laid down in the said legislation, will provide error-free result of DNA testing in our country. Thus may be done on the lines of U.S.A. DNA Identification Act, 1994. This will further give better results in this regard. A start has been made in India by the parliament by way of enacting The DNA Based Technology (Use and Regulation) Bill 2017.
16. For maintaining the privacy of DNA material and evidence, we should enact a separate Act for protecting privacy on the lines of Australian

Privacy Act, 1988 and its Amendment in 2001 and the DNA Based Technology (Use and Regulation) Bill 2017, which an starting step in this direction should be passed immediately. It is a bitter fact that in India concept of “morality” is very much rigid and traditional and hence the concept of morality of Western Countries cannot be applied in toto in Indian situations. Though, in *Sharda v. Dharmpal*⁶²⁶, the Supreme Court declared that the right of privacy guaranteed under Article 21 of the Constitution couldn't operate as a bar when the question of public morality and public interest will arise, but a comprehensive legislation regarding privacy law is required in our country.

17. The Family Courts Act, 1984 should be amended to provide a special chapter dealing with DNA parentage testing and adequate provisions should be made thereunder to ensure that parentage testing meets the highest technical and ethical standards, particularly in relation to consent to testing, protecting the integrity of genetic samples, and providing counselling. The parentage testing reports should be admissible in evidence only if made in accordance with the statutory requirements. This will solve the complicated parentage related problems like *N.D. Tiwari* case.
18. The same rule should be applicable in a case when child has reached 12 years age and there should be provision that it is absolute right of the child to give or hold consent of himself/herself when case relates to him/her. The paramount consideration should, however, in all events be the welfare of the child concerned.
19. It is need of the time that to deal with the increasing number of paternity and handwriting cases, there should be an Independent Commission, with judicial and technical members as it's member. This will reduce the burden of judiciary in India which is over burden by use of number of pending cases. It may be done on the line of Custom and Excise, Tribunal, Industrial Tribunal, etc.

⁶²⁶ (2001) 5 SCC 311.

20. Courts should take judicial notice of three scientific underpinnings of DNA typing too and thus can reach at a definite conclusion in the issue involving DNA. This will served as a speedier method to combat such cases.
21. The adequacy of the method used to acquire and analyze samples in a given case bears on the admissibility of the evidence and should, unless stipulated, be adjudicated case by case. In this adjudication, the accreditation and certification status of the laboratory performing the analysis should be taken into account.
22. It is also worthwhile to suggest that it is a hard reality that DNA evidence has pointed power and so the authorities must make funds available to pay reasonable expenses to the expert witnesses so that they do not hesitate to come and the appropriate parties must be informed of the use of DNA evidence as soon as possible with a view to check the avoidance by the experts to reach on the spot and take relevant material for examination due to less or no payment to them, though provisions under Code of Criminal Procedure, 1973 exists in this regard, but in reality, never used.
23. DNA samples (and evidence likely to contain DNA) should be preserved whenever that is possible but a reasonable limit or period should be fixed in this regard or the line of Code of Criminal Procedure, 1973.
24. Looking into the sensitivity of the matter and future prospects of the aggrieved/victim/accused persons the protective orders should be issued only to protect the privacy of the persons involved. It will be in the interest of society and State too.
25. Since DNA evidence is a recently developed evidence, hence, it should be dealt with utmost care and caution and must as far as possible, corroborated by direct evidence because there are chances of fabrication and tempering with the evidence, hence, the DNA evidence should not be relied upon with blind faith that it is of unquestionable nature.

26. The misuse of DNA evidence be avoided with the view to blackmail the either party and the person doing so, should be punished under Indian Penal Code, 1860 under relevant sections.
27. Lastly, DNA evidence can never outweigh, the trustworthy eye witness who is like an established 'gold coin' and so his/her testimony should be given preference in case of clash between the DNA evidence and oral evidence.

Thus, it can be said that the DNA evidence has filled the gaps the law of evidence and has served as well as serving as a trustworthy guide and helper to the judiciary in critical situations and has become a ray of hope to fill the vacuum in "no evidence" matter and turned out to be gold coin and weapon in armoury and artillery of judiciary.

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