

EVIDENTARY VALUE OF DNA PROFILING
WITH SPECIAL REFERENCE IN
INDIAN CONTEXT

DISSERTATION

Submitted in the Partial Fulfilment for the Degree of

MASTER OF LAW'S (LL.M.)
(CRIMINAL AND SECURITY LAW)
SCHOOL OF LEGAL STUDIES

SESSION: 2019-20



BBD UNIVERSITY

UNDER SUPERVISION OF:

Mrs. Sarita Singh (Asst.prof.)

DESIGNATION

SoLS, BBDU

SUBMITTED BY:

Apoorva singh

ROLLNO. 1190997012

SoLS,BBDU

DECLARATION

Title of Project Report **EVIDENTARY VALUE OF DNA PROFILING**

I understand what plagiarism is and am aware of the University's policy in this regard.

APOORVA SINGH

I declare that

- (a) The work submitted by me in partial fulfilment of the requirement for the award of degree **LLM** Assessment in this **DISSERTATION** is my own, it has not previously been presented for another assessment.
- (b) I declare that this **DISSERTATION** is my original work. Wherever work from other source has been used, all debts (for words, data, arguments and ideas) have been appropriately acknowledged.
- (c) I have not used this work previously produced by another student or any other person to submit it as my own.
- (d) I have not permitted, and will not permit, anybody to copy my work with the purpose of passing it off as his or her own work.
- (e) The work conforms to the guidelines for layout, content and style as set out in the Regulations and Guidelines.

Date :

APOORVA SINGH

ROLLNO.1190997012

LL.M.(2019-2020)

CERTIFICATE

This is to certify that **Apoorva singh** , student of LL.M. Second semester, **Babu Babu Banarasi Das University, Lucknow** has completed his dissertation work titled “**evidentary value of DNA profiling with special refrence to indian context**” under my supervision. To the best of my knowledge the dissertation embodies the original work of the candidate herself and findings and research put forth in dissertation are her own, formulated after perusal of primary and secondary resources cited in this dissertation.

Date

Under the supervision of

Mrs. Sarita singh

Assistant Professor

School of Legal studies

Babu Banarasi Das

University

ACKNOWLEDGEMENT

I express my immense gratitude to my mentor, **Asst. Prof. Mrs. Sarita Singh**, who has been constant source of energy and inspiration under whom I have prepared this dissertation work. His valuable guidance and control helped me throughout my work.

I also express my gratitude to the Dean and Head **Prof. Dr. T.N Prasad** for his constant support in making this tedious task smooth enough to overcome any difficulty and I thank him for proving a helping hand right from the permission to submission of this work.

Last but not least I also express my regards to all my friends and teachers for their guidance and valuable suggestions and without their support this project work could not been easily completed.

THANK YOU

Apoorva singh

LL.M.(criminal and security law)

ROLL NO. 1190997012

ABBREVIATIONS

AIR	All Indian Reporter
Art.	Article
Bkm	Banded krait minor
CODIS	Combined DNA Index System
COMB	Centre for Cellular and Molecular Biology
CrPC	Code of Criminal Procedure
DAB	DNA Advisory Board
DNA	Deoxyribosenucleic acid
ed.	Editor, Edition, Edited
etc.	Etcetra
Ibid.	Ibidem (in the same place)
Id.	Ibid (in the same)
Infra	Cited below
IPC	Indian Penal Code
J.	Justice
LDIS	Local DNA Index System
PCR	Polymerase Chain Reaction
RFLP	Restriction Fragment Length Polymorphism
SC	Supreme Court
SDIS	State DNA Index System
Sec.	Section
STR	Short Tandem Repeats
Supra	Cited above
TWGDAM	Technical Working Group in DNA Analysis Methods
v.	Versus
Viz.	Namely
VNTRs	Variable Number of Tandem Repeats

LIST OF CASES

Amarjit Kaur v. Harbhajan Singh, (2003) 10 SCC 228
Ammuni v. State of Kerala, AIR 1998 SC 260
Bakhula Behra v. State, AIR 1957 Ori. 172
Balakrishna Das Agarwal v. Radha Devi, AIR All. 133 (1989)
Balkrishan v. State of Maharashtra, AIR 1981 SC 37
Benarasi Dass v. Teeku Dutta and Another, (2005) 4 SCC 449
BRB v. JB, [1968] 2 All ER 1023
Daubert v. Merrell Dow Pharmaceuticals Inc., 113 S Ct 2786 (1993)
Frye v. United States, 293 F 1013 (DC Cir 1923)
Gangadharappa v. Basavaraj, AIR 1990 Kant 155
Gautam Kundu v. The State of West Bengal, AIR 1993 SC 2295
H.P. Administration v. Omprakash, AIR 1975 SC 905
Kamti Devi v. Poshi Ram, (2001) 5 SCC 311
Kuljeet Singh @ Ranga v. Union of India and Anr., (1981) 3 SCC 324
Kunhiraman v. Manoj, (1992) 1 CCR 286
Mohanlal v. Ajith Singh, AIR 1978 SC 1183
Mohit Bansal v. State of N.C.T. of Delhi, 2002 (2) JCC 915
Morris v. Gantous, (1941) 47 Bde Jur 150
Nandini v. Doni, AIR 1978 SC 1025 para 30
People v. Guerra,
People v. Kelly, 144 Misc 2d 956 NVS 2d 985 (Sup Ct 1989)
Phool Kumar v. Dehi Administration, AIR 1975 SC 905
Pratap Mishra & others, Appellants v. State of Orissa, Respondent, 1977
Cri.L.J. 817 SC
Ram Lai's case, AIR 1979 SC 1791
Ramsarup v. State, AIR 1958 All. 126
Rohit Shekhar v. Narayan Dutt Tiwari and Another, 2010 INDLAW SC 574
Sajeera v. P.K. Salim, 2000 CrLJ 1208
Sharda v. Dharpal,
State of Kerala v. Anthony, 1978 Cri.L.J. (NOC) 41
State of Madhya Pradesh v. Sitaram, AIR 1998 SC 260
State of Maharashtra v. Sukh Deo Singh and another, 1992 Cri.L.J. 3454

State of Mysore v. Sampangirs Miah, 1953 Cri.L.J. 1071

Subayya Gounder v. Bhoopala Subramaaniam, 1959 Cr LJ 1087 (Mad)

Swati Lodha v. State of Rajasthan, 1991 Cr LJ 939

Syed Mohd Ghouse v. Noorunnisa Begum, 2001 Cr LJ 2028

Tulsiram Konu v. State, AIR 1954 SC 1

United States v. Harvard, 115 Harv. L.R. 2349 (2002)

Venkateswarlu v. Subbayya, AIR 1951 Mad 910

X v. Z and Another, AIR 2002 Delhi 217

CONTENTS

Abbreviations

List of Cases

Chapter I	INTRODUCTION	11
Chapter II	CONCEPT OF DNA PROFILING	17
2.1	HISTORICAL BACKGROUND	17
2.2	WHAT IS DNA? 17	
2.3	STRUCTURE OF DNA.....	20
2.4	WHAT IS DNA PROFILING	22
2.5	HOW DNA PROFILING IS DONE?	23
2.6	WHAT IS DNA FINGERPRINTING?.....	24
2.7	DNA IDENTIFICATION TEST	26
2.8	BIOLOGICAL SAMPLES OF DNA IDENTIFICATION TEST	32
2.9	THE ADVANTAGES OF DNA PROFILING.....	35
2.10	THE SCIENTIFIC INTERPRETATION OF DNA EVIDENCE.....	37
Chapter III	DEVELOPMENT OF DNA PROFILING: A STUDY IN INTERNATIONAL PERSPECTIVE	38
3.1	LAW AND APPLICATION OF DNA EVIDENCE IN USA	38
3.2	LAW AND APPLICATION OF DNA EVIDENCE IN UNITED KINGDOM.....	45
3.3	LAW AND APPLICATION OF DNA EVIDENCE IN FRANCE.....	47
3.4	LAW AND APPLICATION OF DNA EVIDENCE IN GERMANY	50
3.5	LAW AND APPLICATON OF DNA EVIDENCE IN ITALY	50
3.6	LAW AND APPLICATION OF DNA EVIDENCE IN NEW ZEALAND.....	51

3.7	LAW AND APPLICATION OF DNA EVIDENCE IN AUSTRALIA.....	51
-----	-------------------------------------------------------	----

Chapter IV DNA PROFILING AND LAWS IN INDIA 53

4.1	APPLICATION OF DNA TECHNOLOGY IN THE INDIAN CRIMINAL JUSTICE SYSTEM55	
4.2	DNA PROFILING BILL 2007	63
4.3	PROPOSED PRIVACY BILL 2011.....	71
4.4	CONFLICTING JUDICIAL APPROACH REGARDING ADMISSIBILITY OF DNA EVIDENCE IN INDIA.....	73
4.5	APPLICATION OR DNA TECHNOLOGY IN INDIAN CASES OF PATERNITY DISPUTE 74	
4.6	ANALYSIS OF JUDICIAL DECISIONS REGARDING ADMISSIBILITY OF DNA EVIDENCE IN PATERNITY DISPUTE CASES	92
4.7	SECTION 112 OF THE INDIAN EVIDENCE ACT 1872 VIS-A-VIS DNA TESTING.....	93
4.8	LACK OF INTERACTION BETWEEN SCIENCE AND LAW ONE OF THE MAJOR PROBLEMS OF OUR JUDICIAL SYSTEM IN APPLICATION OF DNA TECHNOLOGY 98	
4.9	DILEMMA OF THE INDIAN COURTS IN EVALUATING DNA EVIDENCE.....	99
4.10	APPLICATION OF DNA TECHNOLOGY IN CRIMINAL CASES	101

Chapter V DNA PROFILING IN INDIAN CRIMINAL JUSTICE SYSTEM 108

5.1	FINGERPRINTS EXPERT AND HIS REPORT.....	110
5.2	ADMISSIBILITY OF THE DNA REPORT WITHOUT PHYSICAL PRESENCE	113
5.3	REPORT QUALITIES FOR ITS VALIDITY	115
5.4	IMPORTANCE OF FINGERPRINTS	136
5.5	A GOOD ALTERNATIVE TO TORTURE – SYSTEM.....	117
5.6	SKILLFUL OR SCIENTIFIC BASED INVESTIGATION	120
5.7	ROLE OF DNA FINGERPRINTING SCIENCE	120
5.8	FINGERPRINTS IN COMPARISON TO D.N.A. AND OTHER MEDICAL TESTS	142

5.9	HOW DNA FINGERPRINTING IS DONE?.....	121
5.10	RELIABILITY OF D.N.A. SEMEN TEST, QUESTIONED	125
5.11	IN COMPARISON WITH HAIRS AND TEXTILE FIBERS	127
5.12	IN COMPARISON WITH HANDWRITING TEST	127
5.13	THE VALUE OF SCIENCE OF DNA PROFILING.....	130
Chapter VI	DNA PROFILING AND HUMAN RIGHT	133
Chapter VII	CONCLUSION AND SUGGESTIONS	138
BIBLIOGRAPHY i-iii	146

Chapter I

INTRODUCTION

It is beyond doubt that modern scientific and technological revolution can be utilized as an effective instrument in detection of crime to increase control on crime for making a society better and safe. But at the same time we cannot deny the fact that the new technologies cannot be practiced or implemented in any legal system without infringing some basic human rights of an accused for example, right against self-incrimination, right to privacy etc.

The effect of modern scientific and technological revolution on various aspects of our social and cultural activities are enormous. Today, the most significant question is how far the present value system of justice needs to be altered, or changed or amended for the purpose of capitalizing the benefits of modern scientific discoveries and technological developments. Ensuing pages shall try to find out the answer to the above query from the point of view of the prospect and problem of the application of DNA technology in administration of justice.

The new modern technologies used to detect the crimes are widely applied in various developed countries such as, USA, UK, France etc. This work tried to find out the reactions and the response of criminal administration agencies of these various developed countries and how India should deal with the problems which creating hurdles in

Forensic science, as a scientific discipline, functioning within the parameters of the legal system not only provides guidance in criminal and civil investigation but also supplies the courts accurate information about all the attending features of identification of criminals. Actually, the recent advancement in modern biological research has revolutionized forensic science resulting in a radical impact on the administration of justice. DNA technology, as a latest tool of forensic science, is the by-product of modern genetic science. The said science established the belief that the pattern of chemical signals i.e. the genetic structure which may be discovered with the DNA molecule in the cells of each individual, is unique and different in every individual. As such, the chemical structure of the DNA in the cells of each individual is the sole determining factor to identify one separately from another except the genetically

identical twins. The discovery of modern genetic science can be used in identification of criminals in criminal cases by analysing various objects recovered on the crime spot like any body fluid, hair root, saliva, fibres etc. which are associated with the crime and accurately linked to the perpetrator of the crime. Actually, this technology is utilised as a new form of circumstantial evidence, which is placed on a higher footing than the direct and ocular evidence because of its objectivity, scientific accuracy, infallibility and impartial character.

According to Black's Law Dictionary DNA identification is a method of comparing a person's DNA, a patterned chemical structure of genetic information, with the DNA in a biological specimen (such as blood, tissue, or hair) to determine whether the person is the source of specimen. It is also known as DNA fingerprinting or Genetic fingerprinting.

DNA technology (DNA profiling) tell us as to how new and improved forensic investigation techniques will make the crime investigation much easy than earlier and this became possible by the analysis of biological material which is found at place of occurrence. DNA technology, in comparison to blood grouping tests, has made it easy, reliable and accurate to give decisions in paternity disputes too. Development of this technique is the most significant discovery of 20th century and now it is proved a great boon for Criminal Justice System. The forensic science is the need of the present day and with the modern techniques the identification of accused and solving of a crime became very easy and conclusive. DNA testing technique has given very effective methods of solving complex crimes, such as murder, rape, sexual assaults, burglary and disputes relating to paternity and maternity.

A number of human rights issues arise in the use of DNA testing. These involve the collection and testing processes, elements of a fair trial, and include issues surrounding privacy and the right to silence.

The collection and use of biometrics for identification of criminals legally began in India during the 1920's with the approval of the Identification of Prisoners Bill 1920.¹ The object of the Bill is to "provide legal authority for the taking of measurements of finger

¹ The Prisoners Identification Bill was most recently amended in 1981.

impression, foot-prints, and photographs of persons convicted or arrested..”² The Bill is still enforced in India, and in October 2010 was amended by the State Government of Tamil Nadu to include “blood samples” as a type of forensic evidence.³ Other Indian legislation pertaining to forensic evidence is the CrPC and the Indian Evidence Act. In 2005 section 53A of the CrPC was amended to authorize investigating officers to collect DNA samples with the help of a registered medical practitioner, but the Indian Evidence Act fails to manage science and technology issues effectively.⁴ The current states of statutes for DNA collection in India are not sufficient as the neglect to lay out precise procedures for collection, processing, storage, and dissemination of DNA samples. One question to consider though is if the Prisoners Identification Bill, CrPC, and Indian Evidence Act could be amended to incorporate DNA, and the needed safeguards, as a type of forensic evidence for all of India.

In the year 1986, Dr Alec Jeffreys of the University of Leicester, England, for the first time, used this technology to assist the investigating agency identifying a suspect in a case of rape and homicide. This incident paved the way for the development and application of DNA technology in the United States. But initially before the pronouncement of Daubert case (1993)⁵ the US Supreme Court strictly adhered to a very conservative view formulated in Frye case (1929)⁶ regarding acceptability of scientific evidence. As this technology, in its initial stage, was used only in few laboratories, US courts did not accept it as admissible evidence under the said Frye rule. It directed the courts to determine whether the scientific evidence in question has gained general acceptance in the particular field in which it belongs. Thus, the Frye standard was considered to be a roadblock in admissibility of DNA evidence in USA simply because the techniques were recently developed.

After the pronouncement of Daubert case, DNA technology was extensively used in US legal system not only for the purpose of proving the innocence of undertrial prisoners in pending cases but also for exonerating those prisoners who were earlier convicted by the conventional system of justice. The US National Institute of Justice under the guidance of former Attorney General Jonet Reno, issued a report in 1996, namely, *Convicted by Juries*,

² <http://lawcommissionofindia.nic.in/51-100/report87.pdf> visited on 24.03.2014.

³ <http://www.tn.gov.in/stationaryprinting/extraordinary/2010/305-Ex-IV-2.pdf>

⁴ Jyotirmoy Adhikary, *DNA Technology in Administration of Justice*. Lexis Nexis 2007 p. 259.

⁵ *Daubert v. Merrell Dow Pharmaceuticals Inc.*, 113 S Ct 2786 (1993)

⁶ *Frye v. United States*, 293 F 1013 (DC Cir 1923)

Exonerated by Science: Case Studies in the Use of DNA Evidence to Establish Innocence After Trial. The said report revealed DNA exculpatory cases and thereby the increase in the importance of the use of DNA testing in exonerating innocents even after their conviction.

Issues regarding privacy from Art. 12 of The Universal Declaration of Human Rights, Art. 17 of the International Covenant on Civil and Political Rights (ICCPR, 1966) and Article 8 of the European Convention on Human Rights (1950) come into conflict with DNA Forensics. Constitution of India does not provide explicitly for 'right to privacy; as a fundamental right or there expresses provision in any other statute but has been inferred from Art. 21 as well as Art. 19 of the Indian Constitution.

The issue of admissibility of DNA evidence is crucial. While presenting the DNA evidence there should be balance between basic rights of the suspect as against the interest of the State. This is the main reason to support the conformity required by law leading to accurate collection of DNA samples. The power is in the hands of judiciary to consider or not to consider DNA evidence after weighing the prejudices against probative values.

Every Court of law has discretionary power to refute DNA evidence obtained in situations which may cause to be used against the accused in unjustly manner. The exercises of the discretionary power of the Court for the sake of justice, the courts balance public interest in prosecution of wrongdoers or perpetrators, as against the public interest in the protection of the individual from illegal and unjust treatment. While DNA evidence is acquired in breach of stipulated scientific process, the court can admit the questionable evidence simply when the necessity of admitting the evidence prevails over the undesirability of admitting it. The problem of admissibility of DNA evidence is nevertheless, an issue which has to be regulated under domestic law.

The Supreme Court has approved the application of DNA technology in civil or matrimonial disputes but its applicability in criminal cases is barred by Article 20(3) of the Constitution of India or not this question remains unanswered and therefore the present work is an attempt to find the answer on this issue. In most of our Supreme Court judgments, specially in criminal cases where acceptability of DNA evidence has come in question, the Hon'ble Judges in deciding cases relied upon unscientific traditional evidence rather than

scientific DNA evidence, although they never raised any question regarding the scientific accuracy of this evidence. Therefore it can be safely said that our legal system is not still ready to accept and utilise these new scientific advantages as a fresh means of ascertaining the truth.

Objectives of the Study

The objective of this dissertation to provide glaring insight on the use of this newly emerging technology in the justice delivery system of India. This study also raises issues of human rights and privacy violation issues due to use of DNA information. Also the adequacy and effectiveness of the current mechanisms, balancing individual privacy rights and public interests in the forensic use of DNA information.

Research Methodology

This is purely doctrinal method of research with reference to the existing legislations and judicial precedents, national as well as international magazines. Legal and scientific literature has been collected from text books, journals, internet sites etc.

The issue of admissibility of DNA evidence in Indian perspective has been detailed out here in this study. For the purpose of evaluation the researcher has collected and reviewed various text books, survey reports, law journals, case laws and some landmark judgments and citations by the eminent judges, as well as exhaustive internet materials from various legal websites.

Hypothesis

The **evidentiary and probative value of DNA profiling** is reliant on the fact that the probability of a random match of the sample found on the victim, to those of the accused is extremely low. The probabilities are calculated using the results of population studies.

Research problem

- **Whether there is need to assimilate the scientific advancement**

of genetic profiling in justice administration system ?

- **In matter of disputed paternity, can DNA Technology be considered as conclusively establish truth?**
- **DNA test is a strong boon in criminal administration of justice
And how far this test can be declared as against of human dignity
especially child and women in civil cases ?**

Chapter 2

CONCEPT OF DNA PROFILING

2.1 HISTORICAL BACKGROUND

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. Crick and Watson identified the double-helix structure of DNA, which resembles a twisted ladder, and established the role of DNA as the material that makes up the genetic code of living organisms. The pattern of the compounds that constitute the DNA of an individual life-form determines the development of that life-form. DNA is the same in every cell throughout an individual's body, whether it is a skin cell, sperm cell, or blood cell. With the exception of identical twins, no two individuals have the same DNA blueprint.

DNA analysis was first proposed in 1985 by the English scientist Alec J. Jeffrey's. By the late 1980s, it was being performed by law enforcement agencies, including the Federal Bureau of Investigation (FBI), and by commercial laboratories.

The first example illustrates the way in which DNA evidence is used in the criminal justice system in early 1990s *United States v. Jakobetz*.⁷ After a Vermont woman was KIDNAPPED and raped in a semi-trailer truck; police identified Randolph Jakobetz, a truck driver, as a suspect in the crime. After arresting Jakobetz, law enforcement officials sent a sample of his hair and blood to the FBI laboratory in Washington, D.C., for DNA analysis and for comparison with DNA taken from semen found in the victim shortly after the crime. Based on this and other strong evidence, Jakobetz was convicted and sentenced to almost 30 years in prison.

In 1990, a series of brutal attacks on elderly victims occurred in Goldsboro, North Carolina, by an unknown individual dubbed the "Night Stalker." During one such attack in March, an elderly woman was brutally raped and almost murdered. Her daughter's early arrival home was the only thing that saved the woman's life. The suspect fled, leaving behind materials intended to burn the residence and the victim in an attempt to conceal the crime.

⁷955 F.2d 786 [2d Cir. 1992]).

In July 1990, another elderly woman was brutally raped and murdered in her home. Three months later, a third elderly woman was raped and stabbed to death. Her husband was also murdered. Their house was burned in an attempt to cover up the crime, but fire/rescue personnel pulled the bodies from the house before it was engulfed in flames. When DNA analysis was conducted on biological evidence collected from vaginal swabs from each victim, authorities concluded that the same perpetrator had committed all three crimes. However, there was no suspect. For 10 years, both the Goldsboro Police Department and the crime laboratory refused to forget about these cases⁸.

Though DNA is not the only forensic tool available for the investigation of unsolved cases, advancements in DNA testing and the success of DNA database systems have inspired law enforcement agencies throughout the country to reevaluate cases previously thought unsolvable.

2.2 WHAT IS DNA?

DNA, or deoxyribonucleic acid, is the genetic blueprint for all living things.⁹ Almost every cell in the human body contains DNA, which encompasses the biological instructions that render each species unique.¹⁰ DNA is made up of four bases: A, T, C & G which are put into a combination to form a gene.¹¹ Genes are protected by a chromosome which wraps the gene up in a protective layer of protein.¹² Each human contains on average 3 million bases, 20,000 genes and 46 chromosomes.¹³ Each person inherits half of their chromosomes from their mother, and the other half from their father.¹⁴ The human Y chromosome is the sex determining chromosome (an XX chromosome indicates a female and an XY chromosome

⁸ Sarah V. Hart, "Using DNA to Solve Cold Cases", *National Institute of Justice*, Available at <http://www.ojp.usdoj.gov/nij>

⁹ Martin Egli et al., *Nucleic Acids in Chemistry and Biology* (Royal Society of Chemistry; 3rd Revised edition, 31 Aug 2005) 210.

¹⁰ Russell P J, et al., *Biology Volume 1: The Dynamic Science* (Brooks/Cole; 2nd edition (1 Oct 2010) 3.

¹¹ Gennaro F. Vito, et al., *Criminology: Theory, Research and Policy* (Jones and Bartlett; 3rd Revised Edition (6 May 2011) 91.

¹² Mollie F Hayes, et al., *DNA and Biotechnology* (Academic Press; 3rd Edition (6 Nov 2009) 197.

¹³ Dorling Kindersley, *The Concise Human Body Book: An Illustrated Guide to its Structure, Function and Disorders* (Dorling Kindersley (1 Jun 2009) 34.

¹⁴ Helen Kreuzer, et al., *Molecular Biology and Biotechnology: A Guide for Teachers* (American Society for Microbiology; 3rd Edition (11 April 2008) 410.

indicates a male).¹⁵ There are two types of DNA; DNA which can be found in the nucleus (Nuclear DNA) and DNA which can be found in the mitochondria (Mitochondrial DNA).¹⁶ Testing of the latter can establish immigration patterns because it is a clear record of maternal inheritance; however it is the former that is most commonly used for forensic testing.¹⁷

¹⁵ Karthikeyan *et al.*, 'A database for Human Y chromosome protein data' *Bioinformatics* 4(5): 184-186 (2009) 184.

¹⁶ Lucian Gorgan 'DNA – Source of Forensic Evidence', *International Journal of Criminal Investigation*, Volume 1, Issue 2 at 103.

¹⁷ John M. Butler, *Fundamentals of Forensic DNA Typing* (Academic Press; 1 edition, 13 Oct 2009) 383.

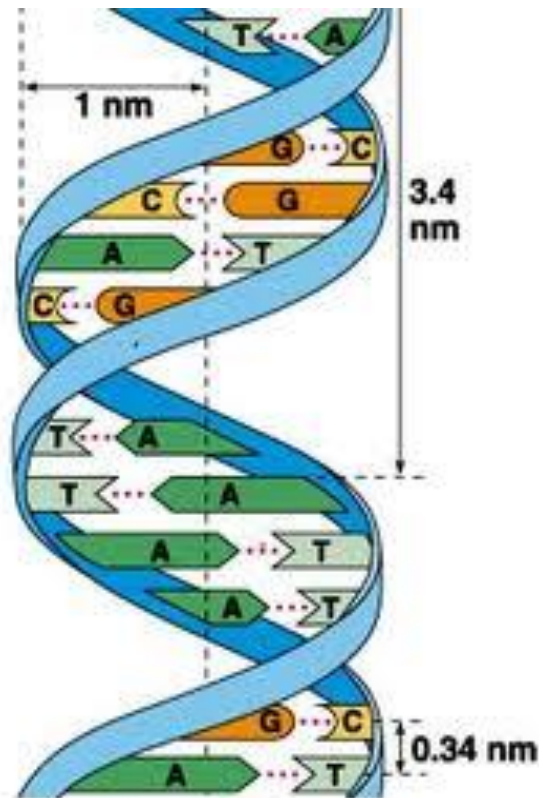
2.3 STRUCTURE OF DNA

It is inferred from the above that DNA is a chemical structure that forms chromosomes. A piece of a chromosome that dictates a particular trait is called a gene. For this reason, DNA is also sometimes referred as the genetic blueprint because it stores information necessary for passing down the genetic attributes to future generation and this information for the said blueprint is encoded in four chemical building blocks of DNA— Adenine (A), Thymine (T), Guanine (G) and Cytosine (C). These units, called bases, are strung together like beads on a string and a pair of bases is called as base pair.

DNA consists of nucleotide unit (sequence of bases) and each nucleotide unit is composed of: (a) Deoxyribose sugar (b) phosphate group and (c) nucleobase (A, T, G, C). Sugar and phosphate form the backbone of the DNA and the bases are attached to the sugar groups of the backbone. These bases impart variation in each nucleotide unit. The various combinations of these four bases yield the diverse biological differences among all living beings, including human beings. Human being has been estimated to have approximately 3 billion nucleotide positions in the total genomic DNA.

However, on the basis of X-ray diffraction studies, Watson and Crick remarked that the two single strands of the double helix are identical in general structure but differ in base sequence in a remarkable way. The structure of DNA is elegant where individual nucleotides pair up with their complementary base through hydrogen bonds. The base pairing rules are such that Adenine hybridizes only to Thymine and Cytosine hybridizes only to Guanine. The hydrogen bonds holding the two strands of DNA together through base pairing are broken either by elevated temperature or by chemical treatment known as denaturation. These two strands are joined together through a process called hybridization, which is the fundamental property of DNA. These two strands of DNA are 'anti-parallel', that is, one strand in the 5' to 3' orientation and the other strand lies the other way round.¹⁸

¹⁸ *Ibid.*



Now let us see how one strand of DNA looks like—

A-A-T-G-A-T-A-G-G-T-C-T-A-G

The DNA strand bound to it will look like this—

T-T-G-A-C-T-A-T-C-C-A-G-A-T-C

Together, the section of DNA would be represented like this—

T-T-G-A-C-T-A-T-C-C-A-G-A-T-C A-A-C-T-G-A-T-A-G-G-T-C-T-A-G

DNA strands are read in a particular direction, from the top (called the 5" or 'five prime' end) to bottom (called the 3' or 'three prime' end).

In a double helix, the strands go opposite ways—

5'T-T-G-A-C-T-A-T-C-C-A-G-A-T-C3'

3'A-A-C-T-G-A-T-A-G-G-T-C-T-A-C5'

The genomic DNA is composed of 'coding' and 'non-coding' regions. The coding regions are known as genes, which are programmed to provide information for a cell to make protein. Genes comprises axons (Proteins-coding region) and intones (the intervening sequence). Genes make up about five percent of total human genomic DNA and rest 95 percent is referred to as 'junk DNA' because this region is not directly involved in making proteins and moreover, its complete functions are yet to be studied. Interestingly, it is this 'junk DNA' that shows variation among individuals and markers for human identity testing are found in the non-coding regions.¹⁹

2.4 WHAT IS DNA PROFILING

The process of testing to identify DNA patterns or types. In the forensic setting, this testing is used to indicate parentage or to exclude or include individuals as possible sources of body fluid stains (blood, saliva, or semen) and other biological evidence (bones, teeth, or hair)²⁰.

DNA profiling in forensic casework is based on comparison of the results of biological evidence with direct reference samples of the individual concerned or with indirect references of his close blood relatives. The selection of reference samples for analysis is crucial to the success of a case; it not only depends on the authenticity of the reference samples, but also on the authenticity of the biological relation of the donors with the person in question. There are situations when the social or legal relationship is not the biological one and there is a need to educate investigating officers, forensic analysts, and the judiciary about the associated problems²¹.

¹⁹ *Ibid.*

²⁰ Kathryn M. Turman, "Understanding DNA Evidence: A Guide for Victim Service Providers", OVC Bulletin April 2001, p. 9.

²¹ A.K. Sharma. DNA profiling: Social, legal, or biological parentage. *Indian J Hum Genet* 2007;13:88-92

According to *dictionary.com* (an online dictionary) “The analysis of a small amount of genetic material from a blood or cellular sample, which is unique per individual as a fingerprint is, as an aid to identification; also called genetic fingerprinting”²².

According to *Wikipedia*²³, “DNA profiling (also called DNA testing, DNA typing, or genetic fingerprinting) is a technique employed by forensic scientists to assist in the identification of individuals by their respective DNA profiles. DNA profiles are encrypted sets of numbers that reflect a person's DNA makeup, which can also be used as the person's identifier. DNA profiling should not be confused with full genome sequencing. It is used in, for example, parental testing and criminal investigation”.

2.5 HOW IS DNA PROFILING DONE?

Only one-tenth of a single percent of DNA (about 3 million bases) differs from one person to the next. Scientists can use these variable regions to generate a DNA profile of an individual, using samples from blood, bone, hair, and other body tissues and products.

In criminal cases, this generally involves obtaining samples from crime-scene evidence and a suspect, extracting the DNA, and analyzing it for the presence of a set of specific DNA regions (markers).

Scientists find the markers in a DNA sample by designing small pieces of DNA (probes) that will each seek out and bind to a complementary DNA sequence in the sample. A series of probes bound to a DNA sample creates a distinctive pattern for an individual. Forensic scientists compare these DNA profiles to determine whether the suspect's sample matches the evidence sample. A marker by itself usually is not unique to an individual; if, however, two DNA samples are alike at four or five regions, odds are great that the samples are from the same person.

If the sample profiles don't match, the person did not contribute the DNA at the crime scene.

²² <http://dictionary.reference.com/browse/genetic+fingerprinting>

²³ http://en.wikipedia.org/wiki/dna_profiling

If the patterns match, the suspect may have contributed the evidence sample. While there is a chance that someone else has the same DNA profile for a particular probe set, the odds are exceedingly slim. The question is, How small do the odds have to be when conviction of the guilty or acquittal of the innocent lies in the balance? Many judges consider this a matter for a jury to take into consideration along with other evidence in the case. Experts point out that using DNA forensic technology is far superior to eyewitness accounts, where the odds for correct identification are about 50:50.

The more probes used in DNA analysis, the greater the odds for a unique pattern and against a coincidental match, but each additional probe adds greatly to the time and expense of testing. Four to six probes are recommended. Testing with several more probes will become routine, observed John Hicks (Alabama State Department of Forensic Services). He predicted that DNA chip technology (in which thousands of short DNA sequences are embedded in a tiny chip) will enable much more rapid, inexpensive analyses using many more probes and raising the odds against coincidental matches.

2.6 WHAT IS DNA FINGERPRINTING?

DNA analysis or ‘DNA fingerprinting’ was first described in 1985 by Dr. Alec Jeffreys, an English geneticist.²⁴ Jeffreys discovered that DNA contained a number of sequences that were repeated again and again.²⁵ He then established that the number of repeated sections varied in each individual, rendering their genetic make-up completely unique, with the exception of identical twins.²⁶ Jeffreys developed a technique which could examine the variation of length in each of these DNA sequences which created the ability to discern one person from another.²⁷ The concept of testing DNA for the purpose of human identification was then established.

DNA can be extracted from a variety of places such as blood, semen, bones and teeth.²⁸ DNA analysis does not mean testing every single base of the DNA as this would

²⁴ Ibid at 4.

²⁵ John M. Butler, *Forensic DNA Typing: Biology, Technology and Genetics of STR Markers* (Academic Press: 2nd Edition, 8 Feb 2005) 2.

²⁶ Ibid.

²⁷ Salem Press, *The Twentieth Century: Great Scientific Achievements* (Salem Press Inc. (31 Dec 1994) 1062.

²⁸ Brenda W. Lerner, *World of Forensic Science: A-L* (Thomson/Gale, 2006) 220.

be an impossible feat.²⁹ Instead scientists test a location in the DNA known as a locus.³⁰ The number of loci which will be tested varies from jurisdiction to jurisdiction.³¹

Since its first use in 1985, DNA analysis has developed scientifically following the introduction of a number of sensitive and accurate scientific tools and techniques.³² One such technique is Low Copy Number (LCN) DNA which has led to attempts to analyse more difficult and challenging samples such as those containing DNA from only a few cells.³³ Today, the sensitivity and discriminating power of forensic DNA analysis has resulted in the science behind this important investigative technique becoming even more sensitive (scientifically)³⁴ and the public perception of it even more powerful.³⁵

²⁹ Susan Petricevic (ESR) 'DNA Profiling in forensic science' <<http://nzic.org.nz/ChemProcesses/biotech/12D.pdf>> Accessed 31 October 2013.

³⁰ Kelly Pyrek, *Forensic Science under Siege: The Challenges of Forensic Laboratories and the Medico-Legal Investigation System* (Academic Press; 1 edition, 12 April 2007) 306.

³¹ Keith Inman, et al., *Principles and Practice of Criminalistics: The Profession of Forensic Science (Protocols in Forensic Science)* (CRC Press; 1 Edition (29 Aug 2000) 280.

³² Ajay Kumar, et al., *Ethics and Policy of Biometrics: Third International Conference on Ethics and Policy of Biometrics and International Data Sharing* (Springer; 1st Edition. edition (23 April 2010) 27.

³³ Coast, G. & Genetics, I., 2009. Extracting evidence from forensic DNA analyses : future molecular biology directions. 'Review Literature and Arts of the Americas', 46(iii), p.339-40, 342-50.

³⁴ William J Tilstone, *Forensic Science: An Encyclopedia of History, Methods and Techniques* (ABC_CLIO Ltd (15 May 2006) 256.

³⁵ John M. Butler., *Forensic DNA Typing: Biology, Technology and Genetics of STR Markers* (Academic Press; 2nd edition, 8 Feb 2005) at x.

2.7 DNA IDENTIFICATION TEST

DNA identification test is a technique involving chemically dividing the DNA into fragments which form a unique pattern and then matching that identify profile with the pattern obtained from similarly testing a suspect's blood specimen. If the two patterns match, the possibility of error, i.e., the chance that they do not belong to the same individual, may be less than one in 30 billion.³⁶

In 1985, Dr Alec Jeffreys developed a technique to examine the Variable Number of Tandem Repeats (VNTRs) called as Restriction Fragment Length Polymorphism (RFLP) and the technique of DNA fingerprinting came into existence since then. This determines the variation in the length of a defined DNA fragment and gives an impression of bar codes. This procedure was termed as RFLP because it involves the use of restriction enzymes, which cut the regions of DNA surrounding the VNTRs. Restriction enzymes are usually purified from bacteria, which cleave double stranded DNA at specific sequences of bases known as restriction sites.³⁷

Another effective process of DNA identification test is Polymerase Chain Reaction (PCR), which allows target short segments of DNA sequences to be selectively copied a million fold or more, hence it is termed as 'gene amplification'. It was first described in 1985. This method brings preference to the analysis of biological evidence as the same can be applied even in the circumstances when a very small amount of DNA is found in a single hair sheath cell or on faint stains of body fluid on clothing or on other crime exhibits is encountered. PCR has rapidly gained acceptance as a tool in molecular biology, population genetics, gene mapping and medical diagnostics.³⁸

After evaluation of the aforesaid methods of DNA test in 1985 in England, the National Research Council of USA approved DNA testing in 1992 as a reliable method of identification of individuals. The technology rapidly entered into the mainstream of the American Justice System. Since then increasing attention has been paid around the world to the use of DNA profiling for individualisation purposes in criminal and allied cases.

³⁶ KSN Reddy, *The Essentials of Forensic Science and Technology*, Twenty-first ed., p. 391.

³⁷ *Supra* note 3

³⁸ *Supra* note 2

METHODS OF DNA FINGERPRINTING

Restriction Fragment Length Polymorphism (RFLP) Method

A schematic outline of the DNA Finger printing procedure is described. The first stage in DNA finger printing involves chemical extraction and purification of genomic DNA from the various biological cells, such as from blood, semen, hair roots, saliva, and other tissues, by using standard proteins digestion and organic solvent extraction procedure. The extracted DNA is checked to ensure that sufficient good quality DNA has been recovered for the actual finger printing. The DNA is then broken by a specific restriction enzyme, the restriction end nucleases (REs) that cleave double stranded DNA at specific sequences. The DNA is then separated into fragments of varying length. Many of these pieces will contain a portion of repeated sequences, as these regions occur throughout the chromosome. In other words, it represents the variable mini-satellites. The DNA fragments are then separated according to their molecular sizes into bands, by their passage through a slab of gel in an electric field by gel electrophoresis. The distance migrated by a DNA fragment is the inverse function of the logarithm of its molecular weight. The DNA band pattern in the gel is transferred to nitrocellulose or a nylon membrane by a technique known as Capillary (Southern) Blotting. The membrane is treated to separate the two strands of the double helix within each DNA fragment, without disrupting the pattern on the membrane. The membrane is then reacted with radioactive sequences, known as 'probes', a segment of stuttered DNA that seeks out and forms a double helix with any mini-satellite fragments on the membrane which contain the shared motif. The DNA thus bound to a filter can be identified by hybridization with a labelled probe of homologous sequences. The nylon membrane is placed in contact with an X-ray film, the radioactivity will cause any image of bands to be produced by the technique called auto radiography. The X-ray film is developed to make visible pattern of bands, which is known as DNA finger printing. The variable mini-satellites thus become radioactive and are visualised on X-ray film. The final picture of this process is a pattern of bands or stripes on X-ray film, each band containing one of the mini-satellite regions.³⁹

It is known that the chromosomes are derived from both the parents, hence the distribution of restriction sites and the resultant fragment separation are in fact a heritage from both the biological parents. Some rearrangement of the DNA may also occur. Thus, when

³⁹ J Sambrook, EF Fritsch and T Maniatis, *Molecular Cloning: A Laboratory Manual*, Second edn., Cold Spring Harbor Laboratory Press, New York, 1989

a DNA is analysed by means of repeat sequence probe, fragments can be detected which are of maternal and paternal origin, while others are specific to the child. DNA fingerprinting produces a band pattern as unique in its way as normal finger print, towards individualization in addition, it provides the information relating to parental origin, when compared with parental DNA fingerprints.

In DNA pattern, when analysed by means of a probe, the core sequence if occurs at only one DNA locus, the probe is called a single locus probe. The core sequence if occurs at many different loci, the probe is called a mutinous probe. The forensic science laboratories currently make use of three different methods of DNA typing: single locus RFLP, mutinous RFLP and the polymerize chain reaction. The forensic DNA profiling have been pioneered by two private laboratories namely Life Codes Corporation (New York), and Cell Mark Diagnostics (Maryland, Germany), which undertake DNA testing on the request of private parties also.

The Centre for Cellular and Molecular Biology (CCMB), at Hyderabad in India also undertakes DNA testing. A team led by Dr Lalji Singh at CCMB has contributed in improving the accuracy of the DNA finger printing technique by substituting the Jeffreys probe with their own probe called Bkm Probel. The Banded krait minor (Bkm) probe detects qualitatively more polymorphic regions in the human genome than the probe used by Jeffreys.⁴⁰

The technology of Restriction Fragment Length Polymorphism (RFLP) analysis of VNTR markers for individualisation of the biological material has undergone rapid changes in the last few years. Now, the use Of multiple single-locus mini-satellite probes produce one or two band pattern (depending on ones homo-or hetrozygosity), which is less confusing, and easier to evaluate when making comparisons. Chemiluminescent detection of RFLP patterns with alkaline phosphates conjugated oligonucleorite probes and a chemiluminescent substrate provides an alternative to isotopic detection.⁴¹

The main limiting factor in the DNA profiling is that sometimes sufficient amount of DNA is nor available for the purpose from the crime exhibits, for example when a single hair or clothing with faint stains, having a few sperm or the blood cells are to be tested, This

⁴⁰ L Singh, 'DNA profiling and its Applications', *Current Science Journal*, vol 60, 1991, pp. 9-10

⁴¹ ED Johnson and Thomas MKolowski, 'Chemiluminiscent Detection of RFLP Patterns in Forensic DNA Analysis', *Journal of Forensic Sciences*, vol. 41, July 1996, pp. 569-578

limitation is overcome by a typing system based on Polymerase Chain Reaction (PCR), which copy and amplify DNA in the test tube.⁴²

Polymerase Chain Reaction (PCR) Method

The polymerase chain reaction is a method by which specific segments of DNA which are of interest, can be replicated a million fold or more, so as to obtain sufficient DNA for analysis. Mullis and his colleagues originally developed the PCR process.⁴³ Subsequently, developments have led the PCR to be automated and an accepted tool in molecular biology. The PCR process is analogous to cellular mechanisms for DNA replication. The double stranded DNA extracted from the biological material is dissociated into single strands by incubation at high temperature. Each strand serves as a template for the replication of their complementary sequences.

The detection of genetic variation in PCR-generated material has two general approaches; those based on detecting differences in sequences and those based on detecting differences in the size of the PCR products. Sequence specific probing is the most general and specific in defining sequence variation at a site.⁴⁴

In PCR or the VNTR, typing short sequence segments are amplified more efficiently than long ones. The limited PCR cycle numbers prevent over amplification. As always, the conditions for reliable genetic typing must be defined empirically.

Study at the DNA level is beginning to unravel the differences between the sex chromosomes. A number of X and Y-chromosomes specific sequences have been identified, and these serve as potential markers for sex determination. Based on amplification of X and Y sequences in the sex determination assays have been successfully applied to forensic samples.⁴⁵

⁴² *Supra* note 2

⁴³ RD Saiki, S Scharf, F Faloona, KB Mullis, GT Horn, HA Erlich and N Arnheim, "Enzymatic Amplification of Beta-globin Genomic Sequences and Restriction Site Analysis for Diagnosis of Sickle Cell Anemia", *Science*, no. 230, 1985, pp. 1350-1354

⁴⁴ George G. Sensabaugh, "The Polymerase Chain Reaction", *Journal of Forensic Science*, 1991, vol. 31, no. 2

⁴⁵ RE Gaensslen, KM Berka, DA Grosso, G Ruano, EM Pagliaro, D Messina and HC Lee, 'A Polymerase Chain Reaction (PCR) Method for Sex and Species Determination with Novel Controls for Deoxyribonucleic Acid', *Journal of Forensic Science*, vol 37, 1992, pp. 6-20.

Short Tandem Repeats Methods (STR)

Micro satellite DNA or commonly known as Short Tandem Repeats (STR) or Simple Sequence Repeats (SSR), are scattered throughout the human genome and occur on an average every 10,000 nucleotides. Also, they have become popular as they are easily amplified using PCR technique. STR markers are named as di-nucleotide, tri-nucleotide, tetra-nucleotide, penta-nucleotide and hexa-nucleotide depending upon the length of the repeat unit it has. Forensic DNA community has moved primarily towards tetra-nucleotide repeats, which may be amplified using the PCR with greater fidelity than di-nucleotide repeats and the most important is that low stutter bands are obtained when a STR marker with longer repeat units is used.

STRs have an advantage that these can be carried out in multiplex PCR, which means that target DNA can be amplified simultaneously at more than one loci by simply adding more than one primer set to the reaction mixture. In multiplex PCR, the primer pairs need to be compatible. In other words, the annealing and extension temperature of the primers should be similar and excessive regions of complementarities should be avoided to prevent from the formation of primer-dimer. It is an ideal technique for DNA typing because the probability of identical alleles in two individuals decreases with an increase in the number of polymorphism loci. And if each locus is inherited independently of other loci, then DNA profile frequency is calculated by multiplying each individual genotype frequency together, known as the product rule. Due to hyper variability relative ease of scoring via PCR, co-dominant nature and high reproducibility micro satellite markers are considered to be the most powerful genetic markers.⁴⁶

Advantages of STR Markers

PCR-based STR has several advantages over conventional southern blotting techniques of the larger Variable Number Tandem Repeats (VNTRs). Genetic typing of STR has become a robust and efficient tool in forensic genetics. STR markers are interpreted by comparing the allele produced by an individual with the allelic marker, which is an artificial mixture of the common alleles present in the human population for a particular STR marker.

⁴⁶ *Supra* note 3

Before a DNA test is performed on any biological sample, it is mandatory that the sample should be collected, preserved and transported in a proper format for further analysis.⁴⁷

Mitochondrial DNA Analysis

Mitochondrial DNA analysis (mt DNA) can be used to examine the DNA from samples that cannot be analyzed by RFLP or STR. Nuclear DNA must be extracted from samples for use in RFLP, PCR, and STR; however, mt DNA analysis uses DNA extracted from another cellular organelle called a mitochondrion. While older biological samples that lack nucleated cellular material, such as hair, bones, and teeth, cannot be analyzed with STR and RFLP, they can be analyzed with mt DNA. In the investigation of cases that have gone unsolved for many years, mt DNA is extremely valuable. While the mitochondria of each new embryo come from the mother's egg cell, hence all mothers have the same mitochondrial DNA as their offspring. The father's sperm contributes only nuclear DNA. Comparing the mt DNA profile of unidentified remains with the profile of a potential maternal relative can be an important technique in missing-person investigations.

Y-Chromosome Analysis

The Y chromosome is passed directly from father to son, so analysis of genetic markers on the Y chromosome is especially useful for tracing relationships among males or for analyzing biological evidence involving multiple male contributors.

⁴⁷ *Ibid.*

2.8 BIOLOGICAL SAMPLES OF DNA IDENTIFICATION TEST

There are several pre-conditions of successful DNA identification test, which every investigating officer, as well as forensic scientists have to strictly comply with. The investigating officers have to take extreme care and caution when they are collecting the samples for DNA analysis and they have to follow various complex procedures for the collection, preservation and documentation of DNA evidence. However, to provide a comprehensive idea about the entire process of DNA fingerprinting at the outset, we will discuss in the following paragraphs from where the biological samples of DNA fingerprinting can be collected; about the collection, preservation of the said samples collected from the scene of crimes and also various formalities of preparation of DNA evidence for the trial.

Sampling

DNA is found in every living cell of our bodies and can, therefore, be extracted from a whole variety of different materials, a list of the same is given below:

The most common forms of forensic evidence available for testing and comments upon their suitability as well as the ideal conditions for storage are given as under.⁴⁸

1. Blood;
2. Semen;
3. Hair roots;
4. Fingernail pairings;
5. Saliva
6. Body tissues;
7. Bone marrow;
8. Urine;
9. Fecal matter;
10. Tooth canal root pulp;
11. Foetal material,
12. Postmortem samples;
13. Blood samples in blood,

⁴⁸ Dr BR Sharma, Forensic Science in the Criminal Investigation and Trial

14. Relationship cases.

The most common forms of forensic evidence available for testing and comments upon their suitability as well as the ideal conditions for storage are given as under:

(1) Blood

Blood is clearly the most common sample tested, either as a liquid sample or as a dried stain. DNA is in fact extracted from the white blood cells (leukocytes)—it is not present in either red blood cells (erythrocytes) or in plasma. Liquid blood samples are usually taken from suspects, either as a one-off exercise or as part of a mass—screening programme. They should be taken with a non-hyperons syringe and needle and be put into blood collection tubes that contain EDTA as an anticoagulant. Such tubes are commercially available. Ideally, a minimum of five ml of blood should be taken, with a duplicate sample as well, if that is possible. The blood should be well mixed with the EDTA preservative and then stored at 4°C unless it is unlikely to be used for several weeks. In the latter cases, it should be frozen at 20°C. Bloodstained materials may also be used for DNA profiling. Laboratory tests have shown that DNA can be extracted from even the smallest stain but clearly the larger the sample) the better is the chance of success. The important factor for successful DNA analysis is not necessarily the size of the stain, or even its age, but the conditions under which it has been stored. Stained material should be air-dried at room temperature and then stored in moisture-resistant containers (such as polythene bags) in a freezer.⁴⁹

(2) Semen

Semen is the other most common form of material tested and is almost certainly the prime form of forensic evidence in most sexual crimes. It is in fact the sperm heads that contain DNA rather than the seminal fluid and therefore) before DNA analysis can be performed, it is clearly advisable to first ascertain whether the material is actually semen and does contain sperms. Testing the semen sample from a man who has had a vasectomy would clearly be of little value since quite obviously there would be no sperm present. Semen-stained clothing should similarly be examined to confirm the presence of sperm as part of the

⁴⁹ *Ibid.*

general forensic investigation of the evidence available. Ideally, a small portion of the stain should be cut out for this confirmatory work since casework experience has shown that the standard conventional forensic tests employed to confirm the presence of sperm may actually damage the DNA present and reduce the amount available for DNA analysis. Once sperm is confirmed in this test sample, then the remainder can be used for DNA extraction and profiling. In cases of sexual assaults semen may also be recovered on vaginal swabs, anal swabs or mouth swabs. Together with any stained material, these should be air-dried and stored under dry conditions.

Liquid samples should be ideally stored at low temperature (4°C) or be frozen. Repeated freezing and thawing should be avoided since this can also reduce the amount of DNA which can be recovered. Semen samples rape cases may well be contaminated with blood or vaginal secretions from the victim, which will also contain DNA. Chemical procedures can isolate and remove this contaminant material such that a DNA profile of just the assailant can be clearly produced. As a precautionary measure, a blood sample from the victim should always be taken where possible, in order to aid the interpretation and analysis.⁵⁰

(3) Hair

Hair cut from someone's head is, in fact, dead material. It is not useful for this technique. It is the live cells within the hair root that contain DNA and therefore, only hairs which have been freshly plucked or pulled out intact, are suitable for DNA profiling. Hairs often found at the scene of a crime may well in reality be hairs that have simply been shed rather than actually pulled out and may not therefore contain sufficient DNA for analysis. Different types of hair contain different amount of DNA. In the same person head hair may well be different from moustache, beard, chest or pubic hair. Some samples may yield plenty of DNA for analysis, and others may yield none. Hair root samples are not particularly easy to analyze and therefore, should ideally be stored dry prior to analysis. Although it may be possible to analyse one single hair root using single locus probes, ideally around 10 hair roots is probably the minimum number required to successfully produce a DNA profile with multi—locus probes.⁵¹

⁵⁰ *Ibid.*

⁵¹ *Ibid.*

(4) Saliva/Mouth Swabs

It is generally accepted that saliva per se does not contain DNA and is, therefore, unsuitable for DNA profiling. However, the taking of a mouth swab may well remove sufficient epithelial skin cells from the inside of the mouth for DNA profiling purposes. The technique has been shown to work in this way, during research studies but in practical terms may be unreliable and is not one that could be recommended at present. Research studies are continuing into its possible future use.

(5) Postmortem Samples

The success of DNA analysis in postmortem samples depends upon the state of decomposition of the body. This, in turn, depends upon the time since death, the temperature at which the body has been stored, and whether or not the person was suffering from any disease. Postmortem blood samples can be used, but are suitable only when the body is relatively fresh. Spleen or bone marrow are good sources of DNA, and another useful source is muscle, particularly from the thigh or upper arm.⁵²

(6) Foetal Material

Foetal material can be used as a source of DNA and should be frozen without any added liquids or preservatives. Satisfactory DNA profiles can be produced from such material in order to prove or disprove paternity.⁵³

2.9 THE ADVANTAGES OF DNA PROFILING

Forensic DNA analysis has many advantages. Firstly, DNA evidence can be said to be a more reliable form of evidence which is now widely accepted by the scientific community.⁵⁴ Prior to the use of DNA evidence in courts, eye witness testimony was more heavily relied upon and this brought along with it inherent

⁵² Dr. B.R. Sharma, *Forensic Science in the Criminal Investigation and Trial*

⁵³ *Ibid.*

⁵⁴ Shelton, Donald. *Forensic science in court challenges in the twenty-first century*, (Lanham, Md: Rowman & Littlefield Publishers, 2011) 28.

dangers.⁵⁵ This is a huge percentage which highlights the difficulties with relying on eyewitness identification as a reliable source of evidence. DNA analysis sought to relieve some of the problems which existed in the criminal justice system time and again.⁵⁶

Secondly, DNA analysis can also be seen to be valid as it provides a scientific basis which allows for a physical link to be made between a criminal and a crime scene in order to secure a conviction.⁵⁷ At the same time it also works to exclude suspects who without it may be charged for a crime they did not commit.⁵⁸

⁵⁵ Michael Bromby *et al.* '[An Examination of Criminal Jury Directions in Relation to Eyewitness Identification in Commonwealth Jurisdictions](http://gcal.academia.edu/MichaelBromby/Papers/9952/An_Examination_of_Criminal_Jury_Directions_in_Relation_to_Eyewitness_Identification_in_Commonwealth_Jurisdictions)' *Common Law World Review* Vol. 36 (4), 303-336, 2007, <http://gcal.academia.edu/MichaelBromby/Papers/9952/An_Examination_of_Criminal_Jury_Directions_in_Relation_to_Eyewitness_Identification_in_Commonwealth_Jurisdictions > Accessed 02 November 2013.

⁵⁶ *Ibid.*

⁵⁷ U.S. Congress, *Congressional Record*, V. 149, PT.1, Jan 07 2003 – Jan 17 2003 (United States Congress (2006) 503.

⁵⁸ Robert Bertino, *Forensic Science: Fundamentals and Investigation* (SWEP; 1 edition (7 Feb 2008) 160.

2.10 THE SCIENTIFIC INTERPRETATION OF DNA EVIDENCE

Scientific evidence can be problematic for courts: the subject matter is often complex, the experts can be biased and the judge and juries may be unsure of how to interpret the evidence once it has been presented in court.⁵⁹ At an even more fundamental level, miscarriage of justice will arise if the science underlying the expert evidence presented in Court is not sound. Interpretation of forensic evidence often has to be performed within a framework appropriate for both scientific analysis and presentation in court.⁶⁰ Forensic DNA analysts often testify to their findings using statistical probabilities rather than statements of certainty which can turn out to be arbitrary and unsupported.⁶¹ The field of DNA analysis still requires a great deal of analysis as the apparent certainty of this powerful investigative tool can be deceptive and this can lead to it being misused and misapplied.⁶²

⁵⁹ John Danaher, *'Blind expertise and the problem of scientific evidence'*, The International Journal of Evidence and Proof, E. & P. 2011, 15(3), at 207.

⁶⁰ Andrei Semikhodskii, *'Dealing with DNA Evidence: a Legal Guide'* (Routledge-Cavendish; 1 edition (25 Jan 2007) at 51.

⁶¹ Michael J. Saks & Jonathan J. Koehler, *The Coming Paradigm Shift in Forensic Identification Science*, 309 Science 892, 893 (2005).

⁶² *Ibid.*

Chapter III

DEVELOPMENT OF DNA PROFILING: A STUDY IN INTERNATIONAL PERSPECTIVE

The DNA fingerprinting and its methodologies has left profound impact on the administration of justice, we will now look into the pace of adoption of DNA evidence by various countries in the world today and their legal process. In order to adopt this new science in the legal system, many countries have changed or amended their existing laws and some countries have even introduced new special DNA legislations for maintaining proper balance between some basic human rights of the persons involved in criminal cases and the need of DNA evidence for the interest of justice and social security.

3.1 LAW AND APPLICATION OF DNA EVIDENCE IN USA

In the United States, there are two main tests for admissibility of scientific information from experts. One is the Frye test, enunciated in *Frye v. United States*.⁶³ The other is a 'helpfulness' standard found in the Federal Rules of Evidence and many of its state counterparts. In addition, several states have recently enacted laws that essentially mandate the admission of DNA typing evidence.⁶⁴

The Frye Test

In 1923, the decision in *United States v. Frye*,⁶⁵ the District of Columbia Circuit Court ruled against the admissibility of lie detector evidence in a murder case because the technology had not been accepted in the relevant scientific community. Since then, most state courts have followed this general standard on whether to allow novel scientific evidence. The so-called Frye hearing gives the prosecution and defences the opportunity to attack adverse scientific evidence and try to keep it out of the trial. The key paragraph in the

⁶³ 293 F 1013 (DC Cir 1923).

⁶⁴ DNA Technology in Forensic Science, Committee on DNA technology in Forensic Science, USA Board of Biology, Commission of Life Science, National Research Council of USA, 1992

⁶⁵ *Supra* note 1.

decision reads as follows:

Just when a scientific principle or discovery crosses the line between experimental and demonstrable stages is difficult to define. Somewhere in the twilight zone the evidential force of the principle must be recognised, and while courts will go a long way in admiring expert testimony deduced from well-recognised 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.⁶⁶

The *Frye* test stated that any new evidence should be approved by the people who use it,⁶⁷ however many questions remained unanswered after *Frye*: What types of evidence shall be accepted? If accepted, what shall the purpose of it be? Who shall accept it? How many experts constitute general acceptance?⁶⁸ Despite the ambiguities in the exact meaning of *Frye*, it was utilised by many courts in the 70 years after, in determining the admissibility of novel scientific evidence.⁶⁹

⁶⁶ *Ibid.*

⁶⁷ Stephen M. Patton, 'DNA Fingerprinting: The *Castro* Case' *The Harvard Journal of Law and Technology*, Volume 3, Spring Issue, 1990.

⁶⁸ *Ibid.*

⁶⁹ Kaushal B. Majmudar (J.D., Harvard Law School, Class of 1994), 'Daubert v. Merrell Dow: A Flexible approach to the admissibility of novel scientific evidence' *Harvard Journal of Law and Technology*, Volume 7, Number 1 Fall 1993 at 187.

Admissibility of DNA Technology in the light of Frye Standard

In view of the aforesaid Frye's⁷⁰ decision the 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. But, 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 generalised, rather than as a specialist.

When a process is new and complex, a court should recognise that the expertise of more than one discipline might be necessary to explain it. That is the 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) whether except for identical twins, each person's DNA is unique; (2) whether two DNA samples show the same patterns at particular loci; and (3) whether 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; and (4) whether the laboratory's procedures and analysis in the case in question were performed in accordance with accepted standards and provide reliable estimates of the probability of a match.

⁷⁰ *Ibid.*

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 analysing 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 RFLP 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. Once such a system of quality assurance is established it 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 and evidence DNA could occur by chance are appropriately conservative.

The validity of Assumption 4 — the analytical work done for a particular trial confronts with proper procedure—can be resolved only case by case and is always open to a 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. The court in deciding can exercise more control whether the general practices in the laboratory or the theories that a laboratory uses accord with acceptable scientific standards. Even if experts in the field accept the general scientific principles and techniques, the same experts could testify that the work done in a particular case was so flawed that the court should decide that, under Frye, the jury should not hear the evidence.⁷¹

The Frye⁷² 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 hearing 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.

In California, the additional standard evolved from the 1976 decision in *People v. Kelly*⁷³ which held that ‘the proponent of the evidence must demonstrate that correct scientific-procedures were done in the particular case. The court in the landmark decision in *New York v. Castro*⁷⁴ excluded DNA evidence. A distinction lost on some courts is that the Kelly Rule only requires that correct procedures be used, not that the court must determine that these procedures were performed correctly.

In *People v. Castro*, a New York trial court concluded that the theory underlying DNA typing is generally accepted by scientists in genetics and related fields. 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.⁷⁵

⁷¹ 293 F 1013 (DC Cir 1923)

⁷² *Ibid.*

⁷³ 144 Misc 2d 956 NVS 2d 985 (Sup Ct 1989)

⁷⁴ 447 NW 422 (Minn 1989)

⁷⁵ DNA Technology in Forensic Science, Committee on DNA Technology in Forensic Science, USA Board of Biology, Commission on Life Science, National Research Council of USA, 1992

In November 1989, the Supreme Court of Minnesota, deciding *State v. Schwartz*,⁷⁶ became the first appellate court to reject the use of DNA evidence analysed by a forensic laboratory. 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. Because the laboratory in this case did not conform with these guidelines, the test results lack foundational adequacy and, without more, are thus inadmissible. 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. 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 dehumanise our system of justice.⁷⁷

The first case to question Frye and the idea that general acceptance in itself was sufficient for scientific evidence to be admissible, arose in *Daubert v. Merrell Dow*.⁷⁸ In this case, the US Supreme Court ruled that the trial judge was the "gatekeeper" to prevent "junk science" from entering the courtroom.⁷⁹ This gate keeping function of the court could be interpreted to suggest that the court will be wary of sciences in order to prevent evidence with no scientific basis from even entering the court. The US Supreme court in *Daubert* recognised "general acceptance" as an important, rather than exclusive, factor in determining the reliability of scientific evidence.⁸⁰ The implication of this would be a higher standard of test for determining what types of evidence are scientific which may be another step in the right direction to prevent so-called "junk science" from entering the court room. The court suggested that there are four factors to consider, now known as the "Daubert factors", they

⁷⁶ *Ibid.*

⁷⁷ DNA Technology in Forensic Science, Committee on DNA Technology in Forensic Science, USA Board of Biology, Commission on Life Science, National Research Council of USA, 1992

⁷⁸ *Daubert v. Merrell Dow Pharmaceuticals Inc* (1993) 509 US 579.

⁷⁹ *Daubert v. Merrell Dow Pharmaceuticals Inc* (1993) 509 US 579.

⁸⁰ David S. Caudill, 'Expert Scientific Testimony in Courts: The Ideal and Illusion of Value-Free Science', The Panteneto Forum, Issue 39, July 2010.

are; testing and validation, peer review, error rates, and lastly, the traditional factor set out in Frye of general acceptance in the relevant scientific community.⁸¹ In order to be deemed admissible, scientific evidence would need to satisfy all of the above criteria. Daubert also placed increased emphasis on the overall reliability of scientific evidence.⁸²

Impact of Frye Rule in Subsequent Cases

Legal evidence rules generally hold that how well work is performed should not be the subject of an admissibility hearing because the quality of testing in a particular case goes to the weight of the evidence, and not its admissibility. It is up to the tier of fact, the judge or the jury, to determine how much weight or consideration to give that evidence. In practice, the legal distinction between the admissibility of scientific testing and the weight that should be given that testing has become increasingly blurred in DNA evidentiary hearing.

It should be noted that, at least in California, the Frye rule does not require absolute 'unanimity of views within the scientific community' which, according to the California Court of Appeals, would 'demand the impossible.' In *People v. Guerra*⁸³ (restated in the Reilly case), the court ruled that, 'the test is met if the use of the technique is supported by a clear majority of the members of that community. Nevertheless, some courts have interpreted 'general acceptance' to mean the absence of controversy, an unrealistic standard in almost any scientific or technical area.

Those seeking to exclude novel scientific evidence have criticised the Frye Rule for its overtly conservative approach and its vulnerability to manipulation. After the Federal Rules of Evidence were enacted, a number of jurisdictions abandoned Frye.

3.2 LAW AND APPLICATION OF DNA EVIDENCE IN UNITED KINGDOM

⁸¹ *Daubert v. Merrell Dow Pharmaceuticals Inc* (1993) 509 US. 579.

⁸² Jessica M. Sombat, *Latent Justice: Daubert's Impact on the Evaluation of Fingerprint Identification Testimony*, 70 *Fordham L. Rev.* 2819 (2002), <<http://ir.lawnet.fordham.edu/flr/vol70/iss6/30>> Accessed 10 December 2011.

⁸³ *Ibid.*

The history of DNA profiling in the UK demonstrates how the work of the Forensic Science Service (FSS) over a decade established the feasibility and provided the firm foundation for the development of their National DNA database. The processes used by the UK Government as an organization to address the complexity of interactions needed to fulfil the need in the very short timescales that were required, the outcome being the successful translation of a user requirement from government and the police into an ordered sort of product offerings. The initiative of the DNA technologies in the justice system demanded following concerns:

- (i) Existing technologies were compared and evaluated against the then newly emerging technologies.
- (ii) The emphasis on blood as a control sample had to be revised to accommodate a change to samples that could be collected by non-invasive methods of sample collection.
- (iii) In law, blood was to be classed as an 'intimate sample' which could only be collected with the permission of the donor, whereas buccal scrapes and hair roots were considered to be non-intimate and could be collected by force if necessary. For the English customers there was also a considerable cost advantage in taking buccal scrapes rather than blood.
- (iv) The UK Government also agreed that the information provided from the National DNA Database would be for intelligence purposes only and not necessarily to an evidential standard, providing them with some flexibility in the approach.
- (v) Against the given technological and political scene, the choice of the STR technique, the criteria they used for the particular STRS and the decision to use a semi-automatic fluorescent based methodology, were to be considered. The requirement was that results needed to be stored and compared over many years; it was estimated that up to 5 million would eventually be analysed— analysis for intelligence purposes still required the data to be reliable and error free.

- (vi) Comparisons between results from individual's samples and undetected crime stains over many years via computer based databanks requires definitive information. This is in sharp contrast to, for example, paternity testing where routinely side by side comparison of results is the expected procedure.
- (vii) In order to run an effective system the emergent need is to design and build a unit, train staff, address the flow of materials and informant that were required to support an undertaking equivalent to between a third and a quarter of the existing staff of the FSS as it was then. The FSS ran a pilot, which was valuable but limited, they used consultants, both successfully and unsuccessfully and they developed a whole new set of terminology around capacity equations, work flows etc.

The UK Government ran in parallel a development programme. At the start there was constant revision to technology and process. The English Government has a vision for the future of DNA services that includes widening the scope of the services they provide, enhancing the inceptive nature of the information produced, linking that information with other disciplines to provide an integrated service to customers.

In 1907, the FSS introduced multilocus profiling (MLP) to forensic science in the UK. The celebrated case of Pitchfork,⁸⁴ a multiple rapist from rural Leicestershire, in the middle of England, provided an early indication of the potential of DNA analysis. It showed:

- (i) Innocent men who confess to a murder/rape could be rapidly eliminated for enquiries;
- (ii) Two rape/murders of teenage girls, Linda Mann (1993) and Dawn Ashworth (1986) committed three years apart, were committed by the same man;
- (iii) The effectiveness of DNA analysis as an investigative tool. A survey of 5000 local men was carried out using conventional blood grouping and DNA analysis.

⁸⁴ Decided in January 1998

- (iv) The court and the public could be faced from enormous expense. Faced with the DNA evidence, the perpetrator—Pitchfork pleaded guilty.

3.3 LAW AND APPLICATION OF DNA EVIDENCE IN FRANCE

The introduction of DNA fingerprinting technology in France aroused at once a mixture of ethical concerns, suspicion and interest among the scientific and legal communities. The major fear consisted in the possible uncontrolled and uncontrollable abuse of the technique for personal, commercial police or political purposes leading to a diversion of the natural objectives of scientific research that consist first of all in pain relieving, hereditary diseases detection, etc. As a result, this controversial subject gave rise to a long and passionate debate between scientists and lawyers- involving the publication of two official reports at the request of the French Prime Minister, two Parliamentary committee evaluations, a recommendation of both Bar and Medical Councils, a statement of the National Consultative Committee on Bioethics and finally the adoption by the Parliament in July 1994 of a law related to the respect of the human body with reference to DNA fingerprinting.

The decision was motivated by the absolute necessity for the French legislator to preserve civil liberties and individual freedom in accordance with Art. 8 of the European Convention on Human Rights which requires that every individual has the right to respect Lot private and family life.

The respect for civil liberties means- that DNA fingerprinting due to its efficiency in paternity testing could not interfere in family life by facilitating action for disputed paternity which is strictly regulated by the French Civil Law. In this respect, preservation of the family cohesion is essential to protect and secure the child's rights. Parental link should be in fact more based on love and social considerations than reduced to only data of the biology.

DNA fingerprinting raises the question of taking samples with or without the consent of the suspect, the victim or a third party who is not involved in the offence. In France, consent is always required whatever the nature of the sample (blood, hair, saliva In the same context the issue arises as to how long the DNA findings and the samples on which they are based can be stored? The general rule should be that the data are deleted when they are no longer

necessary for the purposes of which they were collected and used. However, some exceptions can be identified:

- The first one refers to the necessity for the laboratories to set up databases consisting in anonymous population files as a research tool for statistical background of DNA fingerprints.
- The second exception concerns the need for police agencies to set up databases for the purpose of identifying and investigating individuals as potential criminal suspects. In this delicate matter involving different protected interests, the Committee of Ministers of the Council of Europe has recognised the utility of such databases under certain strict conditions related to specific offences against the life, integrity and security of persons.
- The last exception relates to samples which were found at the scene of an offence and which may not be attributed to an individual.

Finally, people fear that samples collected for DNA fingerprinting might be used for purposes other than those for which they were collected. In this respect, everybody knows that companies as insurers are increasingly reluctant to employ those whose lifestyle or genetics may predispose them to a future illness. In the context of the growing economic competition, screening techniques that will identify those predisposed to genetic disease can become a cost-effective way to control absenteeism, reduce compensation claims, and avoid future medical costs for workers and their families.

Taking into consideration the objections and fears expressed by the different consultative instances, the new legislation (voted on 27 July 1994) is now regulating the use of DNA analysis in France. As a general rule, the law provides the right to respect for the human body which is stated to be inviolable. Any kind of offences to the bodily integrity of an individual is only permitted with his consent.

3.4 LAW AND APPLICATION OF DNA EVIDENCE IN GERMANY

DNA analysis may be carried out in both cases of civil and criminal law. Generally DNA typing adopted forensic stain sample, carried out in laboratories of the police and of university institute of legal medicine. At present, there is no general accreditation system for forensic DNA laboratories, for all the relevant, RFLP and PCR system used by majority of participating laboratories. The results have been published regularly since 1992, and the participants obtain a certificate documenting their successful participation.

Within the German justice system, the code of criminal procedures (Strafprozessordnung StPO) regulates the investigation and proceeding of criminal cases. Many experts including lawyers and politicians as well as the Supreme Court are convinced that the related paragraphs (§§81a and 81c, StPO) are sufficient also for DNA analysis. Nevertheless, on 6 December 1996, the German parliament has agreed on a law extending the existing §81a for the purpose of regulating the application of DNA analysis in criminal investigations. The major changes of §81a as well as the new §§81e and 81f address the issue of samples, permitted analysis, responsibilities, anonymisation and control.

According to German data protection law, personal data can only be stored and used when explicitly permitted by the law. At present, there is no law regulating the storage of individual DNA profiles from convicted criminals or casework samples.

3.5 LAW AND APPLICATION OF DNA EVIDENCE IN ITALY

DNA profiling techniques, mainly based on PCR markets, are widely employed in the Italian courts, either in criminal identification trials or in disputed paternity in civil ones. However, on behalf of the Italians working group (GEFI) of the international society for forensic Haemogenetics (SFH), a biannual collaborative exercise has been developed to optimize and validate short tandem repeats (STRs) analysis for forensic purpose. The

scientific community approaches any use of these new capabilities from a viewpoint that preserve individual autonomy and privacy, if we are to remain a society that respects human dignity.

3.6 LAW AND APPLICATION OF DNA EVIDENCE IN NEW ZEALAND

DNA profiling used as means of determining paternity is increasingly employed for the purpose of forensic analysis in criminal investigations. To address this new technology it need classification of the criminal law, is illustrated in two recent New Zealand decisions raised two issue need urgent legislative attention :(1) the requirement for informed consent to DNA testing of a suspect; and (2) the regulation of procedures for DNA profiling in criminal cases.

In *Pengelly v R* CA85/90, 23 Aug 1991the court of appeal upheld the high court ruling to admit evidence derived from a blood sample taken from the accused for DNA analysis. The court held that 'informed consent' to a taking of blood does not require that the person be informed about the method or technique which might be used to obtain information from the samples given by him; it is sufficient that the consent was obtained 'without artifice or deception'.

In *R v montella* high court, Dunedin, T 5/91, 13 may 1991, Williamson j refused to admit evidence obtained through DNA analysis linking blood samples taken from the accused with semen stains found on the clothing of the complainant, on the grounds that while the accused had consented to a blood test for a limited purpose (AIDS testing), he had not consented to the use of the blood sample for forensic analysis by DNA profiling.

3.7 LAW AND APPLICATION OF DNA EVIDENCE IN AUSTRALIA

Section 23XM of crimes act 1914 contains a table that lists the persons who are authorized to carry out each forensic procedure. These groups have been chosen to ensure that proper medical or dental skill is employed. In addition, an intimate forensic procedure, other than the taking of blood or saliva sample, a buccal, sawab or a dental impression, is to

be carried out by a person who, where practicable, is of the same sex as the suspect. The same requirement applies if the suspect is required remove clothing, other than specific articles of clothing listed, in the conduct of non intimate forensic procedures.⁸⁵

Division 6 also regulates conduct after the forensic procedure has been performed. Firstly, in relation to samples, s 23xu applies where a sample is taken from a suspect that provides enough materials to be analysed in regard to the investigation of the offences, and on behalf of the suspect. This provision is limited in this way because in many cases insufficient materials may be available. Under s 23XU, where a sufficient sample has been obtained, the investigating constable must ensure that part of the materials sufficient for analysis is given to the suspect as soon as practicable after the procedure has been carried out, and that reasonable assistance is given to ensure that the sample provided by the suspect is protected and preserved until it can be analyzed.⁸⁶

Importantly, division 8A of part ID established a DNA database system in which DNA profile may be held. Information obtained from analysis of forensic materials may be used for compiling this database for statistical purpose. The evidentiary value of DNA data obtained from forensic sampling depends upon the ability to compare this data to a background sample group.

DNA evidence is admissible in criminal proceeding if it is relevant to a fact in issue, and it is not barred under an exclusionary rule or by judicial discretion.⁸⁷ The DNA evidence is inadmissible, if it has been unlawfully obtained and under crimes Act 1914 in breach of, or due to a failure to comply with, the provision of part ID with regard to forensic procedure or the recording or use of information on the DNA database system.⁸⁸

⁸⁵ Crime Act 1914, s 23XN(I)

⁸⁶ Crime Act 1914, s 23 XQ

⁸⁷ Australian law reform commission, 2002, proposal 37.3

⁸⁸ Crime Act 191, s23XX

Chapter IV

DNA PROFILING AND LAWS IN INDIA

Unlike the practice in developed countries and other emerging developing countries, DNA technology has very little application in the Indian legal system. Our accusatorial system places the entire burden of proof on the investigating agency, almost coercing it to pad and plant evidence, or resort to all kinds of illegalities to build a foolproof case. This pressure also compels the investigators to resort to third-degree method in order to get evidence. Our social set up is heterogeneous and a majority of the population is illiterate, poor and caste-ridden. Genuine witnesses are generally reluctant to tender evidence and even if they do, their evidence is diluted during the intense battle of intense cross-examinations and re-examination. Witnesses often lose their interest and even turn hostile. Sometimes illiterate, poor, and unemployed people are often exploited to give professional evidence.

Despite the above-mentioned short comings, our legal system is strictly adhered to a conventional legal set up, even in this modern age of science and technology, the fate of the accused depend upon the subjective knowledge of the eyewitnesses which in most of cases, is inaccurate, partial and fallible. In many cases, taking advantage of such loopholes, real culprits are escaped and innocents are falsely implicated.

However, the law has to keep pace with the changing society. But only half-hearted measures have been attempted from time to time to improve the situation. In certain crimes the onus of proof of crime has been shifted from the prosecution to the requirement of proving innocence by the accused, with a view to make prosecution easier. But all these changes have neither hastened the trial procedure not increased the rate of conviction. Actually, the Code of Criminal Procedure 1973 or the Indian Evidence Act 1872 do not provide for appropriate legal framework for application of forensic science and its latest tools, like DNA technology in the criminal justice process. When the (previous) Code of Criminal

Procedure and the Indian Evidence Act 1872 came into being, forensic evidence had not been evolved and evaluated substantially. Later on also, these aspects were overlooked though certain modifications were effected in the law. Despite its widely acknowledged merits, there is no provision in our legal system to ensure that forensic science, specially DNA technology, is adequately used in the investigation of crime as well as in the administration of justice⁸⁹.

4.1 APPLICATION OF DNA TECHNOLOGY IN THE INDIAN CRIMINAL JUSTICE SYSTEM

The advancements in science and technology, socio-economic upheaval, population growth, easy access to scientific knowledge, fast communication and transport facilities and consequent increase of conventional as well as organised crimes pose new challenges to our criminal justice system. Also, the importance of forensic science is rapidly increasing in crime detection and criminal investigation, and its application in the criminal investigation process is indispensable in view of the rising crime rate in the new millennium. Generally, it is the tendency of criminals to destroy all sorts of proof or evidence which will be used against them in a criminal trial. Emergence of DNA technology creates a serious impact in criminal justice administration. This new technology is not only successful in investigation of paternity or maternity dispute cases, baby exchanging cases or rape and murder cases, but also in identification of habitual hardened criminals by keeping the DNA profile records of listed offenders. Moreover, as DNA test is conclusive proof for identification of an individual, it can be effectively used as a best evidence in adjudicating guilt or innocence at the time of trial. However, in spite of all its advantages, DNA technology is not being used widely because of the following reasons:

Absence of Any Specific DNA Legislation

The admissibility of the DNA evidence before the court always depends upon its accurate and proper collection, preservation and documentation by which the prosecution can able to satisfy the court the unbroken chain of custody of the physical sample from the time of seizure to the of its analysis. For the said purpose, a specific legislation is required which cannot only provide an objective guideline to the investigating agency for handling DNA

⁸⁹ *Crime in India*, 2002

samples but also helps the judges for the accessing admissibility of DNA evidence at the time of trial. Moreover, a special DNA legislation aims to create a susceptible balance between the constitutional rights of the suspects or the accused and the larger public rest.

In so far as Indian legal system is concerned, when Indian Evidence Act 1872, or Code of Criminal Procedure 1973, were enacted, legislature cannot anticipate the tremendous development of modern science and technology and its deep impact on forensic science as well as administration of justice. Thus there is no specific provision in the Indian Evidence Act 1872 or the Code of Criminal Procedure 1973 (CrPC) to manage science and technology issues effectively since the rules of our judicial system are modeled on the traditional law. Actually, in our country though the society is changing faster under the influence of modern scientific and technological revolution, law is lagging behind it. For instance, in criminal investigation, for the purpose of crime investigation, an investigating officer has to face much trouble in absence of a specific DNA legislation. For collecting blood sample, semen sample or taking of sample of hair-roots, there is no specific statutory provisions except s 53 of the CrPC. An investigating officer faces much trouble regarding collection of these materials from the person of the suspected accused in absence of a proper legislative guideline. There is also no lower limit or upper limit for collection of these materials. There is no specific DNA legislation in India which authorises an investigating officer to collect a specified amount of blood or semen, etc, for the purpose of investigation. As for example, there is no specific legislation for collecting 2 cc of blood or 1 cc of semen, for which an investigating officer is legally entitled to collect from the person of the accused or defendant for investigation purposes. Thus absence of a specific DNA legislation creates trouble in the crime investigation process.

Inadequacy of Forensic Set-up

Inadequacy of infrastructure and lack of financial assistance on the part of the government is the another problem in application of DNA technology in our country. In the USA there are 280 forensic science laboratories set up under the police departments, 80 forensic science laboratories under other governmental agencies, 40 forensic science laboratories in the private sectors. Therefore there are approximately 320 forensic science laboratories for 30 crore American people. On the contrary, in our country, there are only 23 Central Forensic Science Laboratories and approximately 17 regional laboratories for 100

crore people. More interestingly arrangement for DNA testing is available only in four cities, i.e., Chandigarh, Hyderabad, Kolkata and New Delhi. Ideally, a country like India needs nearly 1000 forensic laboratories for aiding in criminal investigations.⁹⁰

Lack of Forensic Awareness among the Police, Prosecutors, Judges and Advocates in the Indian Legal System

Lack of forensic consciousness among investigating officers, judges and prosecutors as well as the victims of crime is the another major problem in implementation of DNA Technology in the Indian legal system. It is needless to say that forensic science has a paramount role in the detection of crime. Whenever a crime is committed, the suspect inadvertently leaves on the crime scene, some clues, which aid in his arrest and in bringing criminal charges against him. If these clues are wasted or damaged, the suspect may escape. So, immediately after the commission of a crime, paramount care should be taken so as to ensure that these clues are not be destroyed or damaged. In many situations, the suspect destroys such evidence to protect himself. So, all proofs, clues and materials, which are directly or indirectly connected with the accused, should be preserved cautiously, so that they are not destroyed or damaged in any way.

This basic knowledge of preservation of clue materials and information to the police station may be regarded as forensic awareness which is unfortunately absent in our judicial and administrative process. Therefore, several measures have to be taken for the purpose of proper application of DNA technology in the Indian legal system. This measures are: as for e.g., in a rape case, immediately after the occurrence of rape, the victim must be examined by a registered medical practitioner, so that the spermatozoa obtained in the vaginal wall of the victim may be collected immediately, for forensic analysis. Before going to the medical officer, the victim immediately after rape, should report the concerned police station and the concerned police officer should make all necessary arrangement for clinical examination. Precautions should also be taken in respect of other types of crime like murder, dacoity, mischief, etc. and the crime scene should not be disturbed or interfered in any manner or any fashion, because in the crime scene, the suspect may have left some clues, which would aid

⁹⁰ Dr. GV Rao, Group Leader, DNA Fingerprinting Division, Centre for DNA Fingerprinting and Diagnostics, CCMB Campus, Uppal Road, Hyderabad, Interaction Between Science and Law: A Better Judicial System, (1999) Cr LJ 191

in the investigation. Whenever a corpse is found in suspicious circumstances, the matter should immediately be informed to the concerned police station. Several photographs should be taken of the crime scene surrounding such corpse from different angles. That place is to be protected carefully, so that all clues remain intact in the crime scene and no material should be tampered with or couched.

For an enlightened and powerful criminal justice system, there should be extensive use of the application of forensic science in the crime-investigation process. For achieving this end, there should be increased awareness of forensic science amongst all the agencies of the criminal justice system.⁹¹

Code of Criminal Procedure 1973, Section 53: Examination of the Accused by Medical Practitioner at the Request of the Police

This section deals with examination of the accused by a medical practitioner at the request of the police officer, if there are reasonable grounds for believing that an examination of his person will afford evidence as to the commission of offence. So it shall be lawful for a registered medical practitioner at the request of the police officer, not below the rank of sub-inspector and for any person acting in good faith in his aid and under his direction, to make such an examination of the person arrested as is reasonably necessary in order to ascertain the facts which may afford such evidence and to use such force as is reasonably necessary for that purpose.

Section 53, CrPC, gives some scope to the investigating officer for the purpose of investigation of crime. But this section relates to investigation of criminal cases instituted by police only. This section does not enable a complainant to collect blood, semen, etc. for bringing criminal charges against the accused. This section does not apply to complaint cases. This section does not specifically say whether it would be applicable for DNA tests. It relates to examination of the accused by a medical practitioner. This section does not state that the police officer shall be entitled to personally collect semen, blood, saliva, hair-root, urine, vaginal swab, etc for the purpose of investigation himself.

⁹¹ *Ibid.*

Recent Amendments of Code of Criminal Procedure 1973

Section 53 of the CrPC was subsequently amended in the year 2005 by the Code of Criminal Procedure (Amendment) Act 2005. By the same amendment two new sections, namely s 53A and s 164A were introduced, which authorised the investigating officer to collect DNA sample from the body of the suspect as well as the victim with the help of a registered medical practitioner. The new s 53A states as follows:

53A. Examination of person accused of rape by medical practitioner. — (1)

‘When a person is arrested on a charge of committing an offence of rape or an attempt to commit rape and there are reasonable grounds for believing that an examination of his person will afford evidence as to the commission of such offence, it shall be lawful for a registered medical practitioner employed in a hospital run by the Government or by a local authority and in the absence of such a practitioner within the radius of sixteen kilometers from the place where the offence has been committed by any other registered medical practitioner, acting at the request of a police officer not below the rank of a sub-inspector, and for any person acting in good faith in his aid and under his direction, to make such an examination of the arrested person and to use such force as is reasonably necessary for that purpose.

(2) The registered medical practitioner conducting such examination shall, without delay, examine such person and prepare a report of his examination giving the following particulars, namely:—

- (i) the name and address of the accused and of the person by whom he was brought;
- (ii) the age of the accused;
- (iii) marks of injury, if any, on the person of the accused;
- (iv) the description of material taken from the person of the accused for DNA profiling; and
- (v) other material particulars in reasonable detail.

(3) The report shall state precisely the reasons for each conclusion arrived at.

(4) The exact time of commencement and completion of the

examination shall also be noted in the report.

(5) The registered medical practitioner shall, without delay, forward the report of the investigating officer, who shall forward it to the Magistrate referred to in section 173 as part of the documents referred to in clause (a) of sub-section (5) of that section.

Now, s 164A is reproduced as follows:

164A. Medical examination of the victim of rape.—(1) Where, during the stage when an offence of committing rape or attempt to commit rape is under investigation, it is proposed to get the person of the woman with whom rape is alleged or attempted to have been committed or attempted, examined by a medical expert, such examination shall be conducted by a registered medical practitioner employed in a hospital run by the Government or a local authority and in the absence of such a practitioner, by any other registered medical practitioner, with the consent of such woman or of a person competent to give such consent on her behalf and such woman shall be sent to such registered medical practitioner within twenty-four hours from the time of receiving the information relating to the commission of such offence.

(2) The registered medical practitioner, to whom such woman is sent, shall, without delay, examine her and prepare a report of his examination giving the following particulars, namely:—

- (i) the name and address of the woman and of the person by whom she was brought;
 - (ii) the age of the woman;
 - (iii) the description of material taken from the person of the woman for DNA profiling;
 - (iv) marks of injury, if any, on the person of the woman;
 - (v) general mental condition of the woman; and
 - (vi) other material particulars in reasonable detail.
- (3) The report shall state precisely the reasons for each conclusion arrived at.
- (4) The report shall specifically record that the consent of the woman or

of the person competent to give such consent on her behalf to such examination had been obtained.

- (5) The exact time of commencement and completion of the examination shall also be noted in the report.
- (6) The registered medical practitioner shall, without delay, forward the report to the investigation officer who shall forward it to the Magistrate referred to in section 173 as part of the documents referred to in clause (a) of sub-section (5) of that section.
- (7) Nothing in this section shall be construed as rendering lawful any examination without the consent of the woman or of any person competent to give such consent on her behalf.

Explanation.—For the purposes of this section, “examination” and “registered medical practitioner” shall have the same meanings as in section 53.

Again, s 293 of CrPC states the reports of certain Government Scientific experts can be used as evidence in any enquiry, trial or other proceedings under the CrPC and he need not be examined as a witness. This section applies to the following government scientific experts:

- (a) any Chemical Examiner or Assistant Chemical Examiner to Government;
- (b) The Chief Inspector of Explosives;
- (c) The Director of the Finger Print Bureau;
- (d) the Director, Haffkeine Institute, Bombay;
- (e) the Director Deputy Director or Assistant Director of a Central Forensic Science Laboratory or a State Forensic Science Laboratory;
- (f) The Serologist to the Government. Of course, it is open to the court to summon and examine any such expert as to the subject matter of the report.

The centres for DNA finger printing and diagnostics are not specified in 293(4) of the

CrPC. Therefore, the expert has to give evidence in each case where a report has been given. In view of the fact that DNA typing or printing is a pure science, there is a necessity to amend the provisions of the CrPC, to include the scientists of this Institute in s 293(4) of the CrPC and to treat their reports as evidence. Otherwise it is difficult for these experts to go round the country for giving evidence at every trial in cases where they have given expert opinion.

Analysis of the Above Contentions

In the light of the experience of several countries where DNA technology has already been implemented, it can be safely deduced that the aforesaid legal provisions are not at all sufficient to combat various complex legal and social problems which would arise in introducing this technology in the Indian legal regime. Neither s 53, the amended s 53A, nor s 164A of the CrPC are adequate to protect the interest of the suspects as well as the accused.

Moreover, the latest amended s 53A and 164A of the CrPC are only restricted to rape cases and thus so far as offences are concerned, these two provisions are not applicable. Again, both the section authorise any medical practitioner within the meaning of s 2(h) Indian Medical Council Act 1956 to collect DNA samples which is an absolutely misconceived idea, because any registered medical practitioner is not supposed to know the sophisticated complex procedure for collecting DNA samples. For this purpose a medical technician, having sufficient knowledge about the forensic genetics which has of course been recognised by any forensic genetics institute is required. Therefore, amended ss 53A and 164A, instead of providing clarity create more confusion for the investigating agency and court about the handling of DNA evidence in criminal prosecutions and trials.

Today, science and technology have been developed to a larger extent and for keeping pace with the development of science and technology, new techniques of scientific investigations must be employed in the crime investigation process and also for solving civil and criminal disputes. It is not probable or expected that an investigating officer shall know the Supreme Court decisions. For this purpose, a uniform statute is required which will be helpful for investigation. The decisions some times create uncertainty and confusion as there are number of decisions and counter- decisions on the same point. In such a situation, for removing all types of uncertainty, suspicion, doubt and ambiguity, a separate, uniform DNA legislation for whole of India is urgently necessary. Like USA, UK, Denmark, Germany, Russia

and Sweden, blood testing should be allowed in the civil and criminal courts in India, and for this purpose, a separate DNA legislation is of paramount importance in India. By this new DNA legislation, not only blood test but also semen, saliva, nasal fluid, urine and all other types of body fluids should be ordered to be taken by order of the court for the purpose of investigation and establishment of criminal charges and solving civil disputes also.

4.2 DNA PROFILING BILL 2007

Does India already have sufficient legislation?

The collection and use of biometrics for identification of criminals legally began in India during the 1920's with the approval of the Identification of Prisoners Bill 1920⁹². The object of the Bill is to "provide legal authority for the taking of measurements of finger impression, foot-prints, and photographs of persons convicted or arrested..."⁹³ The Bill is still enforced in India, and in October 2010 was amended by the State Government of Tamil Nadu to include "blood samples" as a type of forensic evidence.⁹⁴ Other Indian legislation pertaining to forensic evidence is the CrPC and the Indian Evidence Act. In 2005 section 53A of the CrPC was amended to authorize investigating officers to collect DNA samples with the help of a registered medical practitioner, but the Indian Evidence Act fails to manage science and technology issues effectively.⁹⁵ The current state of statutes for DNA collection in India are not sufficient as they neglect to lay out precise procedures for collection, processing, storage, and dissemination of DNA samples. One question to consider though is if the Prisoners Identification Bill, CrPC, and Indian Evidence Act could be amended to incorporate DNA, and the needed safeguards, as a type of forensic evidence for all of India.

Lack of requirement for additional evidence

⁹² The Prisoners Identification Bill was most recently amended 1981

⁹³ <http://lawcommissionofindia.nic.in/51-100/report87.pdf>

⁹⁴ <http://www.tn.gov.in/stationeryprinting/extraordinary/2010/305-Ex-IV-2.pdf>

⁹⁵ Adhikary, Jyotirmoy. DNA Technology in Administration of Justice. Lexis Nexis. 2007 pg. 259

The preamble of the DNA Profiling Bill states that “The Deoxyribose Nucleic Acid (DNA) analysis of body substances is a powerful technology that makes it possible to determine whether the source of origin of one body substance is identical to that of another, and further to establish the biological relationship, if any, between two individuals, living or dead without any Doubt.” This statement is untrue as DNA test can be compromised under many circumstances including: techniques for declaring a match, the proficiency of examiners, laboratory control standards and statistical problems, and DNA samples can become degraded due to age or exposure to chemical or bacterial agents.⁹⁶ Because DNA is not foolproof individuals can be falsely implicated in a crime as a result of an incorrect DNA match. The Bill needs to put in place procedures for the court to recognize the fact that DNA is not 100% foolproof, present the statistics correctly, and require supporting evidence.

Scope for DNA Collection: The stated object of the DNA Bill is to: “enhance protection of people and administration of justice, analysis of DNA found at the crime scene, establish identity of victim and offender”. The list of offenses and situations in which the collection and testing of DNA is permitted, found in the Schedule of the Bill, provides for the collection DNA from individuals who are not related to a crime scene, are not victims, and are not criminals. Furthermore, section 13(xxii) allows this list to be expanded by the DNA board. We believe these sections should be omitted from the scope of the Bill, so that it is limited to only identifying individuals who are victims and offenders, and that a statutory body besides the DNA board be given the authority to expand the list of proposed offences.⁹⁷ Furthermore, within the Bill there are many places where vague language permits the DNA testing of individuals who are not yet convicted of a crime, which will constitute an invasion of privacy unless the DNA is provided voluntarily to release a person suspected or accused of a crime.⁹⁸ Additionally

⁹⁶ Adhikary, Jyotirmoy. DNA Technology in Administration of Justice. Lexis Nexis. 2007 p. 245

⁹⁷ Schedule of offenses 5) Miscarriage or therapeutic abortion, b. Unnatural offenses, 7) Other criminal offenses b. Prostitution 9) Mass disaster b) Civil (purpose of civil cases) c. Identification purpose 10) b) Civil:1) Paternity dispute 2) Marital dispute 3) Infidelity 4) Affiliation c) Personal Identification 1) Living 2) Dead 3) Tissue Remains

⁹⁸ 2 (xxvii) “offender” means a person who has been convicted of or is under trial charged with a specified offense.

2(1)(vii) “crime scene index” means an index of DNA profiles derived from forensic material found: (a) at any place (whether within or outside India) where a specified offense was, or is reasonably suspected

as mentioned above it is critical that the Bill recognizes and allows for different thresholds of privacy when collecting, analyzing and sharing DNA profiles.

Clear definition of when collection of DNA samples can be taken: The schedule of the Bill only lists the offenses and situations for which the collection of DNA is permitted. We believe a provision must be added that clarify when exactly DNA can be collected e.g. whether the DNA can be collected on arrest or on charge, whether the DNA has to be relevant to the offence, or whether the police decide this for themselves, and what are the oversight mechanisms for these decisions.⁹⁹

Privacy Principles: The Bill enables the DNA Profiling Board to recommend privacy protection statutes, regulations, and practices concerning: use and dissemination, accuracy, security, and confidentiality, and destruction of DNA information¹⁰⁰. Privacy principles should not be left to recommendations by the board or to regulations of the Bill, but instead should be incorporated into the Bill itself to ensure that such practices are in place if the Bill is passed. Furthermore, the appropriate collection, access, and retention of DNA information should be specified in this Bill.

Obligations for DNA laboratories: Section 19 of the Bill lays out the obligations of DNA laboratories¹⁰¹. We recommend that the implementation of a privacy policy should be mandatory under this section.

Storage of DNA profiles and samples: Currently the Bill allows for the complete storage of DNA of: volunteers, suspects, victims, offenders, children (with parental consent), and convicted persons. DNA samples taken from individuals contain unlimited genetic information (including health-related information) and are not needed for identification purposes once the profiles have been obtained from them, thus we recommend that the bill requires that DNA samples be stored temporarily for quality

of having been, committed; or (b) on or within the body of the victim, or a person reasonably suspected of being a victim, of an offense (DNA Profiling Bill)

⁹⁹ Adhikary, Jyotirmoy. DNA Technology in Administration of Justice. Lexis Nexis. 2007 Pg. 291

¹⁰⁰ Section (1) (xv) –(xvi) of DNA Profiling Bill

¹⁰¹ Section 19 of DNA Profiling Bill

assurance purposes (e.g. for up to six months) and then destroyed to prevent misuse. This is an important privacy protection, which also reduces the cost of storing samples. The only purpose of retaining DNA profiles on a criminal database is to help identify the individual if they reoffend. Thus we recommend that the criminal databases should be restricted to holding DNA profiles only from convicted persons and the types of offence and time period for retention should be limited. Although DNA profiles may have alternative uses other than solving crimes (e.g. identifying missing persons) we recommend that the missing persons database are kept separate from criminal databases. Furthermore, although collecting DNA from victims and volunteers may be useful during the investigation of a crime, DNA profiles obtained from victims and volunteers should be destroyed once an investigation is complete.

Conflicting Clauses: Section 14 of the Bill provides that DNA laboratories can only undertake DNA procedures with the approval, in writing, from the DNA profiling Board. Section 15(2) contradicts this statement by permitting already existing DNA laboratories to function and use DNA already collected even before they receive approval from the DNA profiling Board. We suggest that Section 14 is clearly written so that DNA laboratories that have already been set up are unable to continue functioning until they have met the approval of the DNA Profiling Board, and Section 15(2) should thus be deleted.

Access: According to section 41 of the Bill, the Data Bank Manager is given sole discretion as to who may have access to the DNA database, including persons given access for training purposes.¹⁰² Low standards such as these vest too much discretion in the Data Bank Manager. We recommend that access is strictly limited to trained personnel who have undergone proper security clearance. Furthermore, we recommend that the role of Data Bank Manager be analogous to a custodian for the databank. Thus, the manager would be accountable for the integrity and security of the data held in the DNA databank.

¹⁰² Section 41(i) (ii) of DNA Profiling Bill

Offenses: Though the Bill provides for penalties such as unauthorized access, disclosure, destruction, alterations, and tampering,¹⁰³ the Bill fails to provide punishment for the illegal collection of DNA samples. This should be made an offense under the Bill.

Redress: The Bill provides no redress mechanism to an individual whose DNA was illegally used or collected. Furthermore, section 49 (1) only permits the Central Government or DNA Profiling Board to bring complaints to the courts.¹⁰⁴ Thus, we recommend that individuals are enabled to bring charges against entities (such as DNA labs or police officials) for the misuse of their data.

Delegation of powers: The Bill allows the DNA Profiling Board to form committees of the members and delegate them the powers and functions of the board. This clause could allow outsourcing, and could allow a dilution of authority by which the DNA Profiling Board weighs approval or rejection of requests.¹⁰⁵ We recommend that the outsourcing of functions be limited to administration duties and jobs that do not directly relate to the core duties of the DNA Profiling Board.

Access by law enforcement agencies: The Bill currently allows for the DNA Profiling Board to grant law enforcement agencies access to DNA profiles¹⁰⁶. We recommend that DNA profiles are only accessed by the Data Bank Manager. Law enforcement agencies should send requests for matches to the Data Bank Manager, and the Manger would provide the needed intelligence.¹⁰⁷

Public interest: The Bill allows for DNA laboratories to continue to operate, even if the laboratory has violated the specified procedures, if the DNA Profiling Board finds

¹⁰³ Section 45, and section 46 of DNA Profiling Bill

¹⁰⁴ Section 49 (1) of DNA Profiling Bill

¹⁰⁵ Section 52 (2) The DNA Profiling Board may, by a general or special order in writing, also form committees of the members and delegate to them the powers and of the Board as may be specified by the regulations.

¹⁰⁶ Section 13(x), Section(2) The DNA Profiling Board may, by a general or special order in writing,also form committees of the members and delegate to them the powers and functions of the Board as may be specified by the regulations.

¹⁰⁷ Adhikary, Jyotirmoy. DNA Technology in Administration of Justice. Lexis Nexis. 2007 Pg. 300

it in the public interest¹⁰⁸. We believe that where there have been violations, a laboratory should be required to demonstrate remediation before being allowed to resume operations.

Contamination of DNA samples: Currently the Bill holds laboratories responsible for “minimizing the contamination of DNA.”¹⁰⁹ DNA Laboratories should be held fully and legally responsible for preserving the quality of DNA samples. If a DNA sample is contaminated, and the DNA lab does not follow due diligence to discard the contaminated sample and or collect a new sample, and subsequently the DNA used wrongly against an individual – an individual should have the ability to press charges against the institution.

Audits: The Bill provides for the auditing of DNA laboratories, but the DNA Profiling Board must also undergo annual audits¹¹⁰.

Indices Held by DNA Banks: Under section 33 (4),(5)The Bill provides for the DNA data bank to set up indices that hold DNA identification records and DNA analysis from: crime scenes, suspects, offenders, missing persons, unknown deceased persons, volunteers and such other indexes as specified by regulations. We believe the DNA data bank should not hold indexes on suspects, missing persons, or volunteers without consent and the ability for the individual to withdraw their consent. Furthermore, the Bill requires the taking of a victim’s DNA, but it is not listed as an index. We recommend that this section be deleted, as the creation of a DNA index is simply another copy of a DNA profile, and it does not serve a particular purpose.

Communicating of DNA Profile with Foreign States: Section 35 permits, with the approval of the Central Government, the sharing of DNA profiles with Foreign

¹⁰⁸ Section 17 (2) of DNA Profiling Bill

¹⁰⁹ Section 22 of DNA Profiling Bill

¹¹⁰ Section 28 of DNA Profiling Bill

States¹¹¹. We recommend that communication and use of a DNA profile with Foreign States should be limited to comparison only.

Access to Data Banks for administration purposes: Section 39 of the Bill permits access to the databank for “administrative purposes”. We recommend that the Bill clarify what exactly constitutes “administrative purposes”, and clarify that the process/procedures that permit access to data banks for administration purposes will not require access to data stored in Data Banks¹¹².

Enforcement for the removal of innocents: Section 36(3) of the Bill requires that the DNA profile of individuals who are found innocent be removed from the database. This provision should have legal mechanisms to ensure enforcement of the provision e.g. reporting by the Board.¹¹³

Ability to access one’s own DNA Profile: A provision should be added to the Bill that gives individuals the right to ask the police for any of their own details held on police databases, so an individual has the ability to know if their data is being held against the law¹¹⁴.

Clear Definition of identity: Section 33(6)(i) maintains that the DNA Data Bank will contain in relation to each of the DNA profiles... the “identity of the person”. The Bill needs to define what is “identity” and how “identifying” information can be used. Furthermore, it is important to ensure that no other information (like an identity number) that would allow for function creep, is included in the DNA data base.

Transparency of the DNA board: Section 13 of the Bill describes the powers and functions the DNA Board. In this section the DNA board should be required to publish and submit minutes and annual reports including detailed information on how it has exercised all its functions to the public and to Parliament. The report should

¹¹¹ Section 39 of DNA Profiling Bill

¹¹² <http://www.genewatch.org/sub-539478>

¹¹³ <http://www.genewatch.org/sub-539478>

¹¹⁴ [http://www.genewatch.org/article.shtml?als\[cid\]=492860&als\[itemid\]=567376](http://www.genewatch.org/article.shtml?als[cid]=492860&als[itemid]=567376)

include: numbers of profiles added to the database; numbers removed on acquittal, numbers of matches and solved crimes; costs; numbers of quality assurance inspections, and breakdowns of these figures by state¹¹⁵.

Restricted use of DNA database: Section 39 (1) of the Bill permits the DNA database to be used for identification purposes that are not related to solving a crime including the “ identification of victims of: accidents, disasters or missing persons or for such other purposes”. The DNA database should be restricted to the identification of a perpetrator of a specified criminal offence, and consent or a court order must be sought for any other use of the database for identification purposes.

Probability of error published: Because profiles found in the DNA data base are comprised of only parts of individuals DNA, the profiles are not unique to individuals. Thus, the number of false matches that are expected to occur by chance between crime scene DNA profiles and stored individual’s profiles depends on how the profiling system used, how complete the crime scene DNA is before it is added to the database (many crime scene DNA stains are degraded and not complete), and how many comparisons are done (i.e. how big the database it is and how often it is searched). With a population the size of India, the number of these false matches could be very high. The DNA board needs to take this probability for error into consideration and publish researched statistics on how many false matches they expect to occur purely by chance, based on the numbers of profiles they expect to store under the proposed criteria for entry and removal of profiles.

Cost analysis: The DNA board should publish a cost benefit analysis for the implementation the Bill. This should include the cost of storing samples, collecting sample, and testing samples.

4.3 PROPOSED PRIVACY BILL 2011

¹¹⁵ Standard setting and quality regulation in forensic science. GeneWatch UK submission to the Home Office Consultation

The most recent legislation, titled the Privacy Bill 2011, was leaked to the public in the spring of this year. If passed, the Bill will allow for the collection of DNA samples only with the consent of an individual, and will prohibit the public disclosure of such information to the extent that it will adversely affect an individual's right to privacy in a way that would amount to a civil wrong. Though the Bill creates an important standard by mandating consent, it fails to comprehensively protect and regulate the use of DNA data. In 2007, a Bill known as the Draft DNA Profiling Bill was piloted by the Centre for DNA Fingerprinting and Diagnostics, an autonomous organization funded by the Department of Biotechnology in India's Ministry of Science and Technology. The Bill is pending in Parliament, and aims to legalize the collection and analysis of DNA samples for forensic purposes in order to "enhance the protection of people and administration of justice through analysis of DNA found at the crime scene, and establish identity of victim and offenders." In its current state, the Bill would permit DNA to be collected and stored in a way that raises many concerns related to privacy and civil liberties.¹¹⁶

Most concerning, through a list that outlines the circumstances in which DNA can be collected, the Bill allows for the DNA of innocents who are not related to a crime scene, are not victims, and are not criminals to be added to DNA databases. This list can be expanded by the DNA Board as they deem appropriate. Furthermore, the Bill does not specify at what point exactly DNA can be collected. Permitting the collection and storage of innocent people's DNA is dangerous for many reasons and extends the core rationale of collecting DNA far beyond "for forensic purposes." As noted by the American Constitution Society for Law and Policy, by adding the DNA data of individuals with no discretion to these databanks, the governmental intent is presumptively changed from one of criminal investigation to population surveillance. The debate over holding an innocent person's DNA is key to understanding the core of what can and should be protected when formulating safeguards and regulations. Does the state ever have an interest in DNA aside from criminal identification? If so, should the government collect the DNA explicitly for that purpose?

Even in maintaining data for investigative purposes, there are questions as to which data should be kept. Is the answer the same for all countries? For all crimes? Is the answer

¹¹⁶ Law Reform Commission of Mauritius [LRC] – Discussion Paper 'Forensic Use of DNA' [April 2009]

derived from a fundamental understanding of state versus individual or is it a reflection of a specific national ethos? Who decides?

Another area of concern is that the Bill allows for the complete storage of DNA samples and DNA profiles from volunteers, suspects, victims, offenders, children (with parental consent) and convicted persons. Complete DNA samples taken from individuals contain unlimited genetic information (including health-related information) and are not needed once the profile is created. The primary purpose of retaining DNA profiles on a criminal database is to help identify the individual if they reoffend-not to exonerate innocent people or solve past crimes. Stored DNA profiles could in theory be used to track any individual on the database or to identify their relatives, so strict safeguards are needed to prevent misuse.

The comprehensive storage of DNA profiles is also alarming, because the Bill allows for the DNA Profiling Board to grant law enforcement agencies full and direct access to DNA profiles. For instance, new forensic laboratories with DNA testing facilities have recently been set up in Assam, Mumbai, and Hyderabad. The growth of forensic labs in India has also come at a time when the Indian Government is pushing for stronger surveillance regimes, revamping policing systems, and passing legislation that permits intelligence agencies easy access to individually identifying material. For instance in 2010, the Government established NATGRID, a program which aims to link information from different databases such as tax, travel, financial, and criminal information. The linking of these databases will allow intelligence agencies to create comprehensive profiles of residents in India. If law enforcement agencies are granted direct access to DNA profiles; it could be too easy for NATGRID to add DNA information to its collection of databases. Additionally, the Union Home Ministry has recently launched the Crime and Criminal Tracking System in Assam, Kerala and Uttar Pradesh. The system looks to facilitate collection, storage, retrieval, analysis, transfer and sharing of data and information between police stations, their state headquarters, central police organizations and other security agencies.¹¹⁷

¹¹⁷ <http://www.ebc-india.com/practicallawyer> Eastern Book Company Generated: , oct16, 2012

Another scheme that could be used by law enforcement to collect and compile information in India is the Unique Identification project. The project aims to provide all residents of India with an identification number based off of their biometrics. It is envisioned that the number will eventually become ubiquitous throughout society, and individuals will use the number to access benefits, identify themselves to the police, apply for a passport, and open a bank account.

Taken together, the Bill permits the creation of a database comprised of DNA samples and profiles that are unrelated to solving a crime (including the "identification of victims of: accidents, disasters or missing persons or for such other purposes"), which could be used for intelligence gathering and other forms of surveillance, not just for investigation of the specific crime for which the sample was taken.

4.4 CONFLICTING JUDICIAL APPROACH REGARDING ADMISSIBILITY OF DNA EVIDENCE IN INDIA

There are several conflicting judicial decisions of the Supreme Court and also several high courts, and it creates confusion and uncertainty as there are number of decisions and counter decisions on the same point. It is very remarkable to note that in almost all decisions of the Supreme Court and the high courts, judges do not deny the scientific accuracy and conclusiveness of DNA testing, but in some cases they express extreme reluctance in allowing DNA tests or in admitting DNA evidence on the ground of legal or Constitutional prohibition and sometimes for the sake of public policy. Like our legislatures, our higher judiciary also fails to provide any objective guidelines to the investigating officers to follow for the purpose of collection or preservation of DNA sample and cannot formulate any standard rule for the subordinate judiciary which they are to follow in appreciating DNA evidence. The application of DNA technology in our country largely depends upon the subjective discretion of the individual judges and as such, much confusion and uncertainty is created in this point.

4.5 APPLICATION OR DNA TECHNOLOGY IN INDIAN CASES OF PATERNITY DISPUTE

Parentage testing or relationship testing requires participation of two, sometimes three individuals in order to reveal useful information about biological relationship between those persons. The context in which outcome of parentage testing is revealed is often highly

emotionally charged. Where parentage has been misattributed, there may arise issues of 'betrayal, revenge, truth and the search for resolution' for many years. This raises the question whether law should emphasise biological parentage over social parentage in matters of parental responsibility, guardianship and maintenance, succession and so on.

Introduction of DNA technology puts serious challenges to the all well settled principles of law relating to paternity dispute cases irrespective of every legal system. Many developed countries, after advent of this technology, have been compelled to change their legislations, legal doctrines and in lieu of that, new special statutes have been introduced for the purpose of effective implementation of this technology in resolving complex problems of paternity. But, alongside, the extensive application of DNA technology in deciding paternity dispute cases often creates complex legal as well as social problems; such as, the questions that would often arise—whether the application of DNA testing in paternity dispute cases transgressed the right of privacy of the individual from whom DNA samples is collected. Secondly, if a person by virtue of DNA testing can prove that he is not the biological father of the child whose paternity is in question, then the obvious consequence would be that becomes illegitimate and his or her mother's life also becomes stigmatized which will also create another legal as well as social problem. Under such circumstances, it will be most difficult for the legislature as well as the judiciary to strike a proper balance between the interest of the innocent husband and the interest of the illegitimate child who is a victim Of circumstances. To overcome this problem, the legislature of many countries where this technology has already adopted, introduced separate legislation for purpose of protecting and recognising the rights of the illegitimate children against their parents. However, before dealing with the judicial approach of India in several reported cases in appreciating and applying this new technology, let us discuss how DNA technology is used in resolving complex paternity problems in foreign countries.

Law Relating to Paternity Disputes in Foreign Countries

In New York, in the year 1935, for the first time, the process of blood testing for disputed paternity cases was introduced. Denmark is very advanced in the matter of blood testing in the judicial process. Since 1937, Denmark has enacted statutes for blood testing in

affiliation cases.¹¹⁸ In Germany, blood testing in affiliation cases is permissible. In Soviet Russia, blood tests were allowed from 1927. Sweden made blood tests compulsory in affiliation cases. In Canada, in the case of *Morris v. Gantous*,¹¹⁹ the Quebec Court decided that the court had no power to order the drawing of a blood specimen for the purpose of carrying out a blood test. According to law in England: 'English Magistrates have no power to order blood tests. The Magistrates cannot take into account in any way applicant's refusal to undergo a test. The test can only be done by consent'.

The (UK) Family Reforms Act 1969 conferred powers on the court to direct taking blood test in civil proceedings in paternity cases. Courts were able to give directions for the use of the blood test and taking blood samples from the child, the mother and any person alleged to be the father. Since the passing of 1969 Act, the general practice has been to use blood tests when paternity is in issue. However, it is stated that court cannot order a person to submit to tests but can draw adverse inference from a refusal to do so. Now under the Family Reforms Act 1987 in keeping with modern thinking on the continuing and shared responsibility of parenthood, parentage' rather than paternity has to be determined before the court. Fathers as well as mothers can apply for maintenance. Therefore, contests can include mothers' denial of paternity. This Act finally removed the legal aid for corroboration of mother's statement of paternity. Two cases may be usefully referred to: *Re L Lord*, Denning MR, stated thus: 'but they can say positively that a given man cannot be the father, because the blood groups of his and the child are so different'.

In *BRB v. JB*,¹²⁰ this dictum was applied and it was held as under:

The Country Court Judge will refer it to a High Court Judge as a matter suitable for ancillary relief; and the High Court Judge can order the blood test. Likewise, of course, a Magistrate's Court has no power to order a blood test against the will of the parties. The Magistrate can only do it by consent of those concerned, namely, the grown-ups and the mother on behalf of the child; but, nevertheless, if any of them does not consent, the Magistrate can take that refusal into account. I adhere to the view which I expressed in *Re L Lord* that: If an adult unreasonably refuses to have a blood test, or to allow a child to have one, I think that it is open to the Court in any civil proceedings (no matter whether it be a paternity issue or an affiliation summons, or a custody proceedings) to take his refusal as evidence against him, and may

¹¹⁸ [1968] 2 All ER 20

¹¹⁹ (1941) 47 Bde Jur 150

¹²⁰ [1968] 2 All ER 1023

draw an inference therefrom adverse to him. This is simply common sense.¹²¹

Having heard full argument on the case, the court was satisfied beyond any reasonable doubt (to use the expression used in rebutting the presumption as to legitimacy) that Lord Denning, MR, was right in saying that such an order may be made in any case where the child is made a party to the proceedings and in the opinion of the judge of the high court it is in the child's best interests that it should be made.

In short, it may be said that a judge of the high court has the power to order a blood test whenever it is in the best interests of the child. The judges can be trusted to exercise this discretion wisely. Nobody can set any limit, condition or bounds to the way in which judges exercise their discretion. The object of the court always is to find out the truth. When scientific advances give us fresh means of ascertaining it, we should not hesitate to use those means whenever the occasion requires.

Conflicting Judicial Opinion Regarding Admissibility of DNA Evidence in Paternity Dispute Cases in India

Parentage testing requires participation of two, sometimes three individuals in order to reveal useful information about biological relationship between those persons. The context in which outcome of parentage testing is revealed is often highly emotionally charged. This raises the question whether law should emphasise biological parentage over social parentage in matters of parental responsibility, guardianship and maintenance, succession and so on.

To determine child's parentage, there are statutory presumptions, such as, under s 112 of the Indian Evidence Act 1872, that the fact that any person was born during the continuance of a valid marriage between his/her mother and any man, or within 280 days after its dissolution, the mother remaining unmarried, shall be conclusive proof that he is the legitimate child of that man, unless it can be shown that the parties had no access to each other at any time when that child could have been begotten. DNA parentage testing may be used to rebut a presumption arising under the Act, or to establish evidence in the circumstances where no presumption arises. A man might seek DNA parentage testing in order to obtain evidence of non-paternity for the purpose of civil proceedings against the

¹²¹ *Ibid.*

child's mother to prove 'paternity fraud' and claim damages for emotional stress and financial loss that he suffered due to such fraud. DNA parentage testing may provide evidence to how that a person has a biological connection with a deceased person and can be a proof in support of a succession claim.¹²²

For the purpose of adjudication of civil disputes regarding paternity of a child, taking of sample blood for the purpose of DNA analysis is of paramount importance. The supreme need for DNA analysis arises when the question of paternity arises in criminal cases, civil suits and in the maintenance proceeding in the criminal courts under s 125 of the CrPC. The recent decision of the Hon'ble Supreme Court in *Gautam Kundu v. The State of West Bengal*,¹²³ throws some light regarding blood grouping test for ascertainment of disputed paternity.

In the present case, *Gautam Kundu v. The State of West Bengal*,¹²⁴ a lady filed an application for maintenance under s 125 of the CrPC before the Chief Judicial Magistrate, Alipore, claiming maintenance for herself and her child. In that case, the husband petitioner challenged the paternity of the child and prayed for blood group of the child to prove that he was not the father of the child. The application being dismissed by the magistrate. a revision was preferred before the Hon'ble Calcutta High Court, Dismissing the revision application, the Hon'ble Calcutta High Court observed that according to s 112 of the Indian Evidence Act 1872 during the continuance of a valid marriage if a child is born, that is a conclusive proof of legitimacy. Criminal appeal against the dismissal order of criminal revision was preferred before the Hon'ble Supreme Court. Same problems arose in the recent judgment of the Hon'ble Kerala High Court in *Sajeera v. P.K. Salim*,¹²⁵ and in the decision of Hon'ble Andhra Pradesh High Court in *Syed Mohd Ghouse v. Noorunnisa Begum*.¹²⁶

Their Lordships, AM Ahmadi and S Mohan JJ of the Hon'ble Supreme Court have laid down the following guidelines.

- (1) Courts in India cannot order blood test as a matter of course.

¹²² Dr. BR Sharma, *Forensic Science in Criminal Investigation and Trials*, Supplementary pp. 49-50, AIR 1990 Kant 155

¹²³ AIR 1993 SC 2295

¹²⁴ *Ibid.*

¹²⁵ 2000 CrLJ 1208

¹²⁶ 2001 Cr LJ 2028

- (2) Wherever applications are made for such prayers in order to have proving 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 112 of the Indian Evidence Act 1872.
- (4) The court must carefully examine as to what would be the consequence of ordering the blood-test, whether it would have the effect of branding a child as illegitimate and the mother as an unchaste woman.
- (5) No one can be compelled to give sample blood for analysis.

A pertinent question then arises, whether the guidelines as discussed in (1), (2) and (5) are applicable to all types of cases—both civil and criminal. If the guidelines (1), (2) and (5) are applicable to all types of cases then the purpose of DNA application in crime investigation will be totally a failure. The investigation of the offences of rape, murder, paternity and maternity disputes, offences of baby exchanging shall be seriously jeopardised without the help of DNA technology. It is now an undisputed fact that DNA technology has a serious impact in the investigation of crimes as already mentioned, it has enormous contribution in solving paternity/maternity disputes cases or rape and murder cases.

In *Sajeera v. P.K. Salim*,¹²⁷ the paternity of the child was challenged by the respondent. At the stage of the trial, the petitioner of the maintenance case filed a petition to conduct DNA test of the minor petitioner (child). The respondent opposed the petitioner. He contended that he had absolutely no sexual intercourse with the mother of the petitioner and the petitioner was not his child. He also contended that there was absolutely no need to conduct the DNA test; but submitted that he has no objection in conducting the test at the expense of the petitioner. The lower court dismissed the petition for conducting DNA test. Against that order of dismissal, the petitioner challenged that order in the Kerala High Court. The Hon'ble Kerala High Court observed in para 15 of the judgment:

...blood test is an important piece of evidence to determine the paternity of the child. Though by a blood test it cannot be positively established the

¹²⁷ 2000 Cr LJ 1208

paternity of the child, it can certainly exclude individual as the father of the child. Therefore, while the negative finding in a blood test is definite, the positive finding only indicates a possibility. Now the DNA finger printing test has been much advanced and resorted to by the Courts of law to resolve the dispute regarding paternity of the child. It is true that without the consent of the person blood test cannot be conducted and there is no law in India enabling the Court to compel any person to undergo blood- test as available in England.

It transpires from the aforesaid judgment that there is no law in India by which a person can be compelled to undergo blood test, but such a law is prevailing in England. It is also dear that blood test can be done with the consent of the person whose blood is to be tested for comparison. Further, the court stated in para 17 of the judgment that:

Though the lower Court applied the above principles to the fact of this case to hold that DNA test is not permissible in this case. It is found that the facts and the circumstances of this case and the evidence on record when tested on the principles laid down by the Supreme Court in the above ruling, establish that this is an appropriate case wherein DNA test as prayed for should have been allowed.

But in this case the opposing party raised no objection to undergoing the DNA rest, if the petitioner incurred the expenses.

The question of paternity dispute has been reflected in the current judgment of the Hon'ble Andhra Pradesh High Court in *Syed Mohd Ghouse v. Noorunnisa Begum*.¹²⁸ In this case T Ch Surya Rao J, relying on the decision of the Hon'ble Supreme Court in *Goutam Kundu v. State of West Bengal*,¹²⁹ held that court cannot compel the father to submit himself to DNA Test. The fact of this case is similar to the previous cases. Here the petitioner also claimed for maintenance under s 125, of the CrPC. Here, the father denied paternity of the child. The learned family court ordered for a DNA test, however, the Honble Andhra Pradesh High Court following the decision of the Supreme Court in *Goutam Kundu* case ordered that the DNA test could not be sustained. The sole purpose of blood-test is for DNA analysis, which can conclusively determine paternity of the dispute. DNA test is the most useful test in the investigation of different types of crimes also. But it should not be left at the mercy of the

¹²⁸ 2001 CrLJ 2028

¹²⁹ 1993 Cr LJ 3233

other side for his no-objection or consent.¹³⁰

In *Venkateswarlu v. Subbaya*,¹³¹ it was decided that there is no procedure either in the Code of Civil Procedure 1908 or the Indian Evidence Act 1872 which provides for a blood test being carried out for a minor and his mother when the father is disputing the legitimacy.

In *Subayya Gounder v. Bhoopala Subramaaniam*,¹³² it has been held that if the parties are unwilling to submit to such a test the courts are not empowered to direct such a test to be made. But, in *Swati Lodha v. State of Rajasthan*,¹³³ the Rajasthan High Court observed that taking of blood test from veins of accused is not violative of art 20(3) of the Constitution of India. In this case, the Rajasthan High Court further observed that when the accused refused to give sample blood for determining paternity, refusal amounts to corroboration.

In *Ram Lai's case*,¹³⁴ the Hon'ble Supreme Court observed: Taking of sample blood cannot be termed as testimonial or compelling accused to be a witness against himself'.

In *Kunhiraman v. Manoj*,¹³⁵ the Kerala High Court had an occasion to consider the contention that the DNA test conducted in the Centre of Cellular and Molecular Biology Hyderabad is not fool-proof because the process and techniques developed by the scientists ate from their own methodology and they do not having reliability that exists for the tests in western countries.

Case Analysis

One Kunhiraman was a wealthy middle aged eligible bachelor. Vilasini was his neighbour. She was a spinster working as an agent of an insurance company. Vilasini conceived and gave birth to a baby, Manoj. Pregnancy and delivery were cleverly concealed because she was unmarried. Delivery was in Paramba, where the child was abandoned. This matter came to the notice of the police. She was prosecuted but acquitted. In the birth register, Kunhiraman's name appeared as the father. He objected and got his name removed.

¹³⁰ *Gautam Kundu v. State of West Bengal*, (1993) 3 SCC 418, 1993 SCC (Cri) 928

¹³¹ AIR 1951 Mad 910

¹³² 1959 Cr LJ 1087 (Mad)

¹³³ 1991 Cr LJ 939

¹³⁴ AIR 1979 SC 1791

¹³⁵ (1992) 1 CCR 286

Vilasini, on behalf of Manoj filed an application under s 125, CrPC, for getting maintenance. Kunhiraman denied paternity.

During the trial, Kunhiraman wanted to make a show of his innocence before court alleging that Human Leukocyte Antigen Test (HLA Test) is fool-proof in the matter of deciding paternity. Kunhiraman applied for the same, stating his willingness. Vilasini readily agreed. But he then backed out saying that it is highly expensive and courts may not be inclined to accept the result. But unfortunately for him, Vilasini applied for deoxyribonucleic Acid Test (DNA conducted in CMB Hyderabad) to ascertain paternity Of the child on the ground that it is a sure test. Kunhiraman had no other way. He conceded that it is a sure test and agreed to abide by the result. Expenses were shared. Manoj, Vilasini and Kunhiraman came to Hyderabad and submitted to test by supplying blood.

When the report came, Kunhiraman went against his earlier assertions. He ignored his promise to abide by the result. In his objection, he said that even though DNA test conducted in western countries is fool-proof he had come to know from the available literature and other information that DNA test is not conclusive, because the process and technique developed by the scientist are his own methods and they do not have the reliability available for the test in western countries.

PW 4 of the said case, the senior scientist attached to the Centre for Cellular and Molecular Biology, Hyderabad (CCMB) who, according to CWI, is an authority on the subject. He had experience in the University of Edinburgh also. In collaboration with him, in the CCMB, a DNA fingerprint technique was being developed by using a probe isolated by PW 4 from the DNA of a poisonous Indian snake (Branded Krait) and designated as BKm. Results are said to be very encouraging and fool-proof. PW 4 said that CCMB perfected the technique in 1988 and that it was 100 percent sure. CW 1 agreed with him, stating reasons also. Many authoritative articles on the subject were also proved by him.

PW 4 collected the required blood from Kunhiraman, Vilasini and Manoj. He said that all the tests mentioned above were conducted with perfect accuracy. When the DNA profile of Manoj was compared with those of Kunhirarnan and Vilasini, he found that every band in the DNA profile of Manoj is either derived form the DNA profile of Kunhiraman or Vilasini. For this reason, he found that they are the biological parents of Manoj. That was the opinion given

by PW 4 in Ext P5 and in the box and his opinion was fully confirmed by PW 1, further supported by many authoritative articles. Mixed DNA profile of Kunhiraman also confirmed that all the mine bands shown by arrows in Ext P7 Photograph were those bands, which Manoj inherited from Kunhiraman. DNA patterns for BKm probe also developed from Mac IN. Alu 1 and BSTBN P of these three persons further proved that every band in the DNA profile of Manoj is either derived form Kunhiraman or Vilasini. From the various DNA profiles developed, it was seen that Manoj inhetited total 15 bands, which are not derived from the mother, but detived from Kunhiraman alone. His opinion was that it was proved beyond doubt, that Kunhiraman is the biological father of Manoj.

He said that the chance of Kunhiraman being unrelated to Manoj, who happens to share all fifteen bands is one in 300 billion, whereas the present world population is less than billion. He also said that prior to DNA tests, as a preliminary examination, samples for AEM, MN, Rh, BSD, EAP and HB polymorphic systems of the blood of all the three persons were also analysed and the results of all those tests also indicated Kunhiraman as the biological other of Manoj. These are facts spoken to by PW 4 and noted in Ext P5. PW 4 also said that nobody else in this world could be found with identical pattern, which the alleged father has contributed, to the child and the only possibility of error is in the case of monozygotic (developed from the same zygote) twins. No such contingency is alleged in this case, It was based on these reasons, supported by the relevant papers produced in the case, that PW 4 came to the definite conclusion that Kunhiraman alone could be the biological father of the child and that his conclusion was 100 percent fool-proof. In the light of the above facts of the said case, ultimately the court also observed that it is very expensive to get the DNA test conducted. There must be some provision by which the state should be made to bear the expenses in the case of poor litigants.

In *Gangadharappa v. Basavaraj*¹³⁶ the plaintiff instituted a title suit against his father claiming for partition and separate possession of his share in the coparcenaries properties. The defendant-father opposed the petition on the ground that the plaintiff was not born to him. The defendant filed an application under O XXVI, r 10-A of the Code of Civil Procedure 1908, along with s 151 of Code of Civil Procedure for appointment of a Commissioner for conducting blood test and genetic finger print test of the plaintiff for ascertaining whether he

¹³⁶ AIR 1990 Kant 155

is his son. The plaintiff opposed the petitioner on the ground of art 20(3) of the Constitution of India and the petition of the defendant for blood test for DNA fingerprinting was rejected.

The matter came up for hearing in the civil revision-application preferred by the defendant in the Karnataka High Court. The Karnataka High Court set aside the order of the learned munsiff as Art. 20(3) of the Constitution of India did not apply to this case and it does not apply to civil proceedings and applies to criminal cases. The trial court was ordered for appointment of a Commissioner for the purpose of genetic finger printing.

In another case, *X v. Z and Another*,¹³⁷ the Delhi High Court held:

The right of privacy though a fundamental right under Article 21 cannot be taken to be an absolute right. The right of privacy may arise from contact and also may arise from a particular specific relationship including matrimonial but when the right to privacy has become a part of a public document, in that event a person concerned, indeed cannot insist that such test (D.N.A. Test) would infringe his/her right of privacy.

In the instant case, the wife had filed a petition for dissolution of marriage on the ground of cruelty and adultery against husband under s 10 of the Indian Divorce Act 1869. The husband, on the contrary, asserted that wife had adulterous affairs with one, which resulted in the wife being in family way. The pregnancy of the wife, which was admitted a tubular pregnancy, was already terminated at the All India Institute of Medical Sciences. The husband having come to know that records and slides of tubular gestation of the petitioner have been preserved in All India Institute of Medical Sciences had filed an application for directing the Pathology Department of the All India Institute of Medical Science to prepare a slide containing his blood cells and calling for the slides and blocks of the case relating to his wife and order a DNA test with a view to ascertain if husband was the father of the foetus.

In view of the above facts, the Supreme Court held:

The foetus is no more a part of the body of the wife. The wife indeed has a right of privacy but it being not an absolute right, therefore, when a foetus has been preserved in All India Institute of Medical Sciences, the wife, who has already discharged the same cannot claim that it affects her right of privacy. Adultery has been alleged to be one of the grounds of divorce. At this

¹³⁷ AIR 2002 Delhi 217

stage, the Court did not express any opinion on merits of the matter, but the wife indeed can not resist the request of husband. However, if the wife was being compelled to subject herself to blood test or otherwise, she indeed could raise a defence that she can not be compelled to be a witness against herself in a criminal case or compelled to give evidence against herself even in a civil case but the position herein is different. The wife is nor being compelled to do any such act. Something that she herself has discharged, probably with her consent, is claimed to be subjected to DNA test. In that view of the matter, in the peculiar facts it cannot be termed that the wife has any right of privacy. Therefore, the application filed by the husband can be allowed.¹³⁸

The Supreme Court further observed it in the said case that:

...the carrying of the foetus would depend upon the mother but the bond between them came to an end when it was discharged. It cannot thereafter be treated as a part of the mother, but was a unique organism. When the foetus has already been discharged from the body of the wife there is no question of compelling her to submit to any test, It is an organism, which has been preserved, and therefore, once the organism is preserved, the wife cannot claim that it should not be put to any test. The question of compelling her to do any particular act does not arise.¹³⁹

Again, the Supreme Court held that though the Code of Civil Procedure 1908 or the Indian Evidence Act 1872 does not specifically deal with any such situation that court can direct or be instrumental in collecting the evidence for or on behalf of the either party.

When the parties litigate, it is for them to produce the necessary evidence relevant for disposal of the matter but just exceptions would always creep in. When certain evidence cannot be allowed or collected without the order of the court, in that event, either of the parties can seek the intervention of the court. Reverting to the controversy in the present case, it is obvious that when DNA test with respect to the slides pertaining to the foetus of the petitioner is to be conducted and as the said foetus was stated to be in All India Institute of Medical Sciences, necessarily, it would require an order of the court before slides would be prepared. In that view of the matter in peculiar facts, such an order, as permissible in law, would be necessary and it cannot be termed that evidence would be collected at the behest

¹³⁸ AIR 2002 Delhi 217, p. 220

¹³⁹ *Ibid.*

of the court¹⁴⁰.

The core question involved in the case of *Benarasi Dass v. Teeku Dutta and Another*,¹⁴¹ was whether a direction for deoxyribonucleic acid test (commonly known as DNA test) can be given in a proceeding for issuance of succession certificate under the Indian Succession Act 1925. The facts giving rise to the instant case were that one T (Respondent 1) filed a petition for grant of succession certificate in respect of the properties of deceased / 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 died intestate leaving behind five brothers. Originally, one of the brothers of B was not impleaded and rest four were impleaded. Later on, when B was impleaded, he filed objection disputing T's claim. An application under s 151 of the Code of Civil Procedure 1908 was moved by B alleging that T was nor the daughter of the deceased, but in fact was the daughter of his brother R. Since the deceased and his wife both were dead, B submitted that both B and T should be subjected to a DNA test to conclusively establish the paternity of T. The trial court allowed the application primarily on the ground that the claim of being the daughter of the deceased was doubtful as she had initially concealed the fact that the deceased had five brothers and had deliberately left out B. The trial court considered the petition for grant of succession certificate and the 'no-objections' filed by other brothers of the deceased to be somewhat collusive. It held that the documentary evidence brought on record was not cogent enough to show that T was the daughter of the deceased. Further, it also held that since the applicant for the DNA test was willing to bear the cost of the said test, there would not be any difficulty in directing DNA test. But, in revision, the high court held that this was not a fit case where such a direction could be given. Hence the present appeal by B.

Dismissing the appeal, the Supreme Court held:

- (1) DNA test is not to be directed as a matter of routine and only in deserving cases such a direction can be given. The present case does not fall in that category.
- (2) Under Section 112 of the Indian Evidence Act, 1872, there is rebuttable presumption of law that a child born during lawful

¹⁴⁰ *Singh v. State of Uttar Pradesh*, AIR 1963 SC 1295

¹⁴¹ (2005) 4 SCC 449

wedlock is legitimate, and that access occurred between the parents. This presumption can only be displaced by a strong preponderance of evidence, and not by a mere balance of probabilities.

- (3) It must be remembered 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 Evidence 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 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. 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 herein.¹⁴²

Of late, in recent judgment reported in *Kamti Devi v. Poshi Ram*,¹⁴³ again, the Supreme Court has expressed its most reluctant attitude regarding admissibility of DNA evidence in resolving paternity disputes. In this case, the Supreme Court, although admitted the scientific accuracy of DNA evidence, still did not accept it in deciding the instant case on the ground of public policy. Relying upon the previous judgment of *Gautam Kundu*, again in this case, the Supreme Court has taken a peculiar stance, which precludes the scientific evidence (DNA evidence) from being introduced in the Indian legal system, and needless to say, by this decision, the Supreme Court encouraged our lawmakers to strictly adhere to the conventional unscientific ineffective and biased system of justice. The said case is discussed below.

Facts of the Case

In this case, the respondent was the husband of the appellant. Fifteen years after marriage, the appellant gave birth to a child. When the said birth was sought to be recorded under the relevant Act, the respondent filed a suit for declaration that he was not the father

¹⁴² (2005) 4 SCC 449

¹⁴³ (2001) 5 SCC 311

of the child as he has access to the appellant during the period when the child would have been begotten. Relying on s 112 of the Indian Evidence Act 1872, the trial court dismissed the suit. However, on a re-evaluation of evidence, the first appellate court found that the respondent had succeeded in discharging the burden for rebutting the presumption by proving that he had no access to the mother of the child during a very long stretch of time covering the relevant period. Accordingly, it allowed the appeal and decreed the suit. The high court dismissed the second appeal on the ground that the question involved therein was merely a question of fact. Before the Supreme Court, the appellant contended inter alia, that the high court failed to formulate the substantial question of law involved in that case as to whether the burden of proof on the plaintiff husband to prove non-access to his wife was as heavy as the burden of prosecution in a criminal case to prove the guilt of the accused. Dismissing the appeal, in view of the above judgment the Supreme Court held that the word 'access' in s 112 of the Indian Evidence Act 1872 connotes only the existence of opportunity for marital intercourse. The Supreme Court observed in this case that when the legislature chose to employ the expression that a certain fact 'shall be conclusive proof' of another fact, normally the parties are disabled from disrupting such proof. This can be discerned from the definition of the expression, 'conclusive proof' in s of the Indian Evidence Act 1872. But s 112 itself provides that if it could be shown that the parties had no access to each other at the time when the child could have been begotten the presumption could be rebutted. Normally, the rule of evidence in other instances is that the burden is on the party who asserts the positive, but in this instance the burden is cast on the party who pleads the negative. The *raison d'être* is the legislative concern against legitimatising a child.

The Supreme Court further 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 (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 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. 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 herein.¹⁴⁴

¹⁴⁴ (2001) 5 SCC 311

The court again observed in view of the aforesaid case:

The standard of proof of prosecution to prove the guilt beyond any reasonable doubt belongs to criminal jurisprudence whereas the test of preponderance of probabilities belongs to civil cases. It would be too hard if the standard of criminal cases is imported in a civil case for a husband to prove non-access as the very concept of non-access is negative in nature. But at the same time the test of preponderance of probability is too light as that might expose many children to the peril of being illegitimatised. Therefore, the burden of the plaintiff husband should be higher than the standard of preponderance of probabilities. The standard of proof in such cases must at least be of a degree in between the two as to ensure that there was no possibility of the child being conceived through the plaintiff husband.¹⁴⁵

Again, in a recent case, *Sharda v. Dharmpal*,¹⁴⁶ Supreme Court took a very positive view regarding importance as well as admissibility of DNA evidence in matrimonial cases. Before this case, the Supreme Court in *Goutam Kundu case*, took a very negative view by holding that a person should not be compelled to undergo blood test even if it is necessary for the just decision of the case because if a person refuses to undergo blood test, he is protected by his right of privacy under Art. 21 of the Constitution and also his right against self-incrimination under Art. 20(3) of the Constitution. But this conservative view of the Supreme Court is now undergoing change, as was seen in *Sharda v. Dharmpal* where the court categorically said that:

- (1) The right to privacy has been developed by the Supreme Court over a period of time. With the expansive interpretation of the phrase 'personal liberty' this right has been read into Art. 21.
- (2) But the right to privacy in terms of Art. 21 of the Constitution is not an absolute right. If there were a conflict between fundamental rights of two parties, that right which advances public morality would prevail.
- (3) Certain laws have been enacted by the Indian Parliament where the accused may be subjected to certain medical or other tests. By way of example, one may refer to s 3 of the Identification of Prisoners Act 1920. Reference in this connection may also be made to ss 269 and 270 of the IPC. Constitutionality of these laws, if challenged, may

¹⁴⁵ *Ibid.*

¹⁴⁶

he upheld.

- (4) In all such matrimonial cases where divorce is sought, say on the ground of impotency, schizophrenia, etc, normally without medical examination, it would be difficult to arrive at a conclusion as to whether the allegation is correct or not. In order to substantiate such allegation, the petitioner would always insist on medical examination. If the respondent avoids such medical examination on the ground that it violates his/her right to privacy or for that matter, the right to personal liberty as enshrined under Art 21, then it may, in most of such cases, become impossible to arrive at a conclusion. It may render the very grounds on which divorce is permissible nugatory. Therefore, when there is no right to privacy specifically conferred by art 21 and with the extensive interpretation of the phrase 'personal liberty', this right has been read into art 21, it cannot be treated as an absolute right. What is emphasised is that some limitations on this right have to be imposed and particularly where two competing interests clash. In matters of the said nature where the legislature has conferred a right upon his spouse to seek divorce on such grounds, it would be the right of that spouse which comes in conflict with the so-called right to privacy of the respondent. Thus the court has to reconcile these competing interests by balancing the interests involved.
- (5) If for arriving at the satisfaction of the court and to protect the right of a party to the lis 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 would not arise. The court having regard to Article 21 must also see to it that the right of a person to defend himself must be adequately protected.
- (6) However, a court shall not order a roving inquiry. It must have sufficient materials before it to enable it to exercise its discretion. Exercise of such discretion would be subject to the supervisory jurisdiction of the high court in terms of s 115 of the Code of Civil Procedure and/or Art. 227. Abuse of the discretionary power at the hands of a court is not expected. The court must arrive a finding that the applicant has established a strong prima facie case before passing such an order.
- (7) 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 1872 also enables a court to draw an adverse inference if the party does not produce the relevant evidences in his power and possession.

- (8) So viewed, the implicit power of a court to direct medical examination of a party to a matrimonial litigation in a case of this nature cannot be held to be violative of one's tight of privacy.

It can be concluded that:

- (a) A matrimonial court has the power to order a person to undergo medical test.
- (b) Passing of such an order by the court would not be in violation of the right to personal liberty under Art. 21.
- (c) However, the court should exercise such a power if the applicant has a strong prima facie case and there is sufficient material before the court. If despite the order of the court, the respondent refuses to submit himself to medical examination, the court will be entitled to draw an adverse inference against him.¹⁴⁷

4.6 ANALYSIS OF JUDICIAL DECISIONS REGARDING ADMISSIBILITY OF DNA EVIDENCE IN PATERNITY DISPUTE CASES

From the above case analyses of several Indian cases it can be concluded that the main controversial issue which Indian courts have dealt with it time and again is whether biological parentage can be given priority over the social parentage when DNA test disproves the paternity of father against the child. In a series of cases both the Supreme Court as well as several high courts gave priority social parentage over the biological parentage. Though in Sharda's case (above), Supreme Court has settled many gray areas regarding the application of DNA technology in paternity dispute cases, however, the aforesaid issue remains unanswered in this case.

¹⁴⁷ (2003) 4 SCC 493

It is pertinent to mention here that, in *Kamti Devi's case*,¹⁴⁸ the Supreme Court has expressed its most reluctant attitude regarding admissibility of DNA evidence in resolving paternity disputes. In this case, the Supreme Court, although admitted the scientific accuracy of DNA evidence, still it did not accept it in deciding the instant case on the ground of public policy. Relying upon the previous judgment of *Goutam Kundu*,¹⁴⁹ again, in this case, the court has taken a peculiar stance, which precludes the scientific evidence (DNA evidence) from being introduced in the Indian legal system, and needless to say, by this decision our Supreme Court encouraged our lawmakers to strictly adhere to the conventional unscientific ineffective and biased system of justice. Moreover, in the *Kamti Devi case*,¹⁵⁰ the court failed to strike the balance between the conflicting interests of the child whose paternity was in question and the husband who proved himself innocent in the paternity dispute. With due respect, it is submitted in the instant case in the name of social justice and the future of the child, the decision was unjust to the husband whose innocence has been proved beyond reasonable doubt by the DNA testing. However, in order to analyse this issue comprehensively, we have to discuss it in the light of the interpretation of s 112 of the Indian Evidence Act 1872.

4.7 SECTION 112 OF THE INDIAN EVIDENCE ACT 1872 VIS-A-VIS DNA TESTING

Section 112 of the Evidence Act ('the fact that any person was born during the continuance of a valid marriage between his mother and any man, or within 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'), refers to birth during marriage and proof of legitimacy. One of the important issues is whether, apart from non-access, other exceptions based on blood! DNA tests be permitted or proof of sterility or impotency of the husband should be permitted. In the recent judgment of the Supreme Court in 2001 *Kamti Devi v. Poshi Ram*,¹⁵¹ the Supreme Court took a self-contradictory view by observing that the result of a genuine DNA test is said to be scientifically accurate. But even

¹⁴⁸ (2001) SCC 5311

¹⁴⁹ AIR 1993 SC 2295

¹⁵⁰ (2001) 5 SCC 311

¹⁵¹ *Ibid.*

that is not enough to escape from the conclusiveness of s 112 of the Indian Evidence Act 1872. When this Act was enacted, the legislature did not anticipate the revolutionary change of society by virtue of advancement of science and technology and as such, though society is changed, but here, law is lagging behind the society. Section 112 requires the party disputing the parentage to prove non-access in order to rebut the presumption of fact under the said section. This section is based on the maxim *is est quem nuptiae demonstrant* (he is the father whom the marriage indicates). The presumption of legitimacy that a child born of a married woman is deemed to be legitimate; it was on the person who is interested in making out the illegitimacy, the ole burden of proving it.

In *Dukhtar Jahan v. Mohd Farooq*,¹⁵² the Supreme Court interpreted 112 by the following observation:

Section 112 lays down that if a person was born during the continuance of a valid marriage between his mother and any man or within two hundred and eighty days after its dissolution and the mother remains unmarried, it shall be taken as 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. This rule of law based on the dictates of justice has always made the courts incline towards upholding the legitimacy of a child unless the facts are so compulsive and clinching as to necessarily warrant a finding that the child could not at all have been begotten to the father and as such a legitimation of the child would result in rank injustice to the father. Courts have always desisted from lightly or hastily rendering a verdict and that too, on the basis of slender materials, which will have the effect of branding a child as a bastard and its mother an unchaste woman.

The view has been reiterated by this Court in many later cases, for eg, *Amarjit Kaur v. Harbhajan Singh*,¹⁵³ *Benarasi Dass v. Tiku Dutta & Another*,¹⁵⁴ etc.

It may be recalled that s 112 of the Indian Evidence Act 1872 was enacted at a time when the modern scientific advancements with 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

¹⁵² (1987) 1 SCC 624, p. 629, para 12

¹⁵³ (2003) 10 SCC 228

¹⁵⁴ (2005)

be scientifically accurate. But even that is not enough to escape from the conclusiveness of s. 112, for instance, 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 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. 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 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.

In another case of Kerala High Court, *Yasu v. Sandia*,¹⁵⁵ it has been observed as follows:

A special protection is given by the law to the status of legitimacy in India. The law is very strict regarding the type of the evidence; which can be let in to rebut the presumption of legitimacy of a child. Even proof that the mother committed adultery with any number of men will not of itself suffice for proving the illegitimacy of the child. If she had access to her husband during the time the child could have been begotten the law will not countenance any attempt on the part of the husband to prove that the child is not actually his. The presumption of law of legitimacy of a child-will not be lightly repelled. It will not be allowed to be broken or shaken by a mere balance of probability. The evidence of non-access for the purpose of repelling it must be strong, distinct, satisfactory and conclusive; the standard of proof in this regard is similar to the standard of proof of guilt in a criminal case. These rigours are justified by considerations of public policy for there are a variety of reasons why a child's status is not to be trifled with. The stigma of illegitimacy is very severe and we have nor any of the protective legislations as in England to protect illegitimate children. No doubt, this may in some cases require a husband to maintain children who are not his biologically. But, the legislature alone can change the rigour of the law and not the court. The court cannot base a conclusion on evidence different from that required by the law or decide on a balance of probability which will be the result if blood test evidence is accepted.

Therefore, the Indian Evidence Act 1872 is required to be changed in the light of the

¹⁵⁵ (1975) Ker LT 533

changing social condition. It is pertinent to note that of late on the basis of the recommendations made by the Malimath Committee¹⁵⁶ the Law Commission of India proposed that s 112 of the said Act should be revised as follows:

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 child 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,
 - (iii) medical tests, that, at the relevant time, that man was impotent or sterile, and is not the father of the child; or
 - (iv) 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 man is not the father of the child; or
 - (v) 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 defense to any claim of

¹⁵⁶ Reforms of Criminal Justice System, Government of India, Ministry of Home Affairs, Report, vol. I, India, March 2003

paternity made against him.

Explanation I: For the purpose of the sub-clause (iii) of clause (b), the words 'DNA generic printing tests' shall mean the tests conducted by way of samples relating to the husband and child and the words 'DNA' mean 'Deoxyribo-Nucleic Acid',

Explanation II: For the purposes of this section, the words 'valid marriage' shall mean a marriage which is not void or voidable until it is declared nullity or a voidable marriage until 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 nevertheless be legitimate.

It transpires from the aforesaid proposal that the Law Commission has recommended two more exceptions but more stringent proof or 'conclusive proof' will be the standard. They have also dealt with cases of avoidance of marriage and nullify apart from dissolution of marriage. It is worthwhile to mention here that in the *Sharda v. Dharmpal* case, (above) the Supreme Court consciously avoided one controversial question: if an accused of a criminal case refuses to give his blood sample for DNA testing, does he get protection of Art. 20(3) of the Constitution? In the aforesaid case, the Supreme Court approved the application of DNA technology in civil or matrimonial disputes but whether its applicability in criminal cases is barred by Art. 20(3) of the Constitution of India, this question is still remained unanswered by the Supreme Court. Therefore, in most of our Supreme Court judgments, specially in criminal cases where acceptability of DNA evidence has come in question, the Supreme Court in deciding cases relied upon the unscientific traditional evidence rather than scientific DNA evidence, although they never raised any question regarding the scientific accuracy of this evidence. Thus out constitutional law, conservative judicial decisions, the Code of Criminal Procedure 1973 and the Indian Evidence Act 1872, the entire legal system is not yet-ready to accept and utilise these new scientific advantages as a fresh means of ascertaining the truth.

4.8 LACK OF INTERACTION BETWEEN SCIENCE AND LAW ONE OF THE MAJOR PROBLEMS OF OUR JUDICIAL SYSTEM IN APPLICATION OF DNA TECHNOLOGY

The ability of the courts to handle cases based on complex scientific evidence has often been called into question with widespread notion that the judicial system is largely

unable to adjudicate matters relating to science and technology. This is largely due to the fact that the judicial officers or judges cannot make appropriate decisions because of their varied backgrounds or simply, because of the lack of their technical training. Advocates also do not comprehend the complexity of the evidence produced, which they are supposed to analyse and cross-examine. At times, advocates complain that the expert witnesses on whom judicial system relies on have given biased testimonies producing erroneous or inconsistent determinations. If these kinds of procedures continue or if they are not dealt with strongly, confidence of the people in the judicial system will be undermined and people will start believing that the courts are incapable of correctly resolving some of the most pressing issues related to science and technology. Therefore, it is important to recognise the importance of obtaining as much information as possible about handling issues related to science and technology by our courts. The primary focus should be on the judiciary, because the most pressing problems raised by criminal cases whose evidence is based on scientific theories are readily apparent in the courts. It may be noted that handling of science and technology based issues may appear complex, but these difficulties can easily be managed within the present judicial process provided the judge, the advocate and the forensic scientist get together to comprehend diverse roles of science and technology. Recent developments in law and science have brought together complex scientific issues into the courtroom for resolution. This primarily focuses on the phenomenal growth of DNA fingerprinting which has put new pressure on the Indian legal system to adjudicate the issues on the cutting edge of DNA fingerprinting science and principles of substantial law. The pressure is intense because of the involvement of social, economic and public policy that this now technology raises.

4.9 DILEMMA OF THE INDIAN COURTS IN EVALUATING DNA EVIDENCE

An example of how the legal and scientific approaches may clash is that of the recent introduction of DNA evidence in the courtroom. The general theory of DNA is unassailable. Advocates do not question that, except for identical twins, every person's DNA is unique. For the advocate, however, the introduction of DNA evidence at trials raised case-specific questions that science had never addressed, ranging over such issues as techniques for declaring a DNA match, the proficiency of examiners, laboratory control standards, and statistical problems. For instance, although it did not initially occur to judges dealing with

DNA, to consider whether DNA samples can become degraded due to age or exposure to chemical or bacterial agents, advocates raised these questions when the forensic samples were old or contaminated with other substances such as soil. When advocates pursued these issues in the courtroom, they were able to demonstrate sufficient problems in some instances to merit exclusion of the evidence. Some of the objections raised by advocates have turned out to be groundless, while others have led to changes in the way DNA testing is done or have demonstrated the need for further scientific research.

The public, including some scientists, may not understand that these cases do not reject the underlying theory of the uniqueness of DNA. Rather, the facts of the particular cases required counsel to demonstrate that the conclusions drawn from the DNA evidence rested on assumptions that the scientific community had articulated or tested. Some scientists find disagreeable the courtroom ordeal in which their theories are deconstructed in public through the process of cross-examination. They may therefore refuse to participate in the judicial process. On the other hand, some advocates express scorn for scientists who venture a conclusion without analysing accurately all the assumptions on which their conclusion rests.

They fail to realise that scientists in the laboratory do not pay heed to the individual factual settings that become relevant in litigation.

It may further be noted that in many of the concerns expressed are greatly exaggerated. On the basis of reported decisions, it does not appear that the judicial courts are being inundated with science. Reported cases represent only a small fraction of the total cases, however, a vast majority of the cases seems to be terminating without function or without a trial and therefore very little data is available to show how problems in handling science and technology issues might have an impact on settlement or discontinued suits. It is strange to believe that the courts' ability to handle science and technology issues can be improved provided the tools to assist the judiciary are prepared. It will then, remain in the hands of the judges to assist and use them. Also, institutional support for the judiciary must be addressed when assessing ways in improve the courts' ability to resolve science and technology issues. At present the judiciary has no ready recourse to outside assistance in its attempts to understand the issues of science and technology. The judiciary has to depend on the experts to provide information about the technology. This situation to a certain extent can be made better by creating more formal institutional ties between science and technology

institutes and judicial communities. These institutions could also recommend and encourage increased dialogue between judges and forensic scientists to help scientists gain an understanding of the legal system and to assist judges in their understanding of objectives and process of science.

It has been found that there are several disparities in the way that judges handle science and technology based issues and where there is less divergence in the actual results of the cases. There is no one correct way of handling science and technology evidence, which has been mentioned in the Indian Evidence Act 1872. There is no rule present in the Code of Criminal Procedure 1973 or in the Indian Evidence Act 1872 to manage science and technology issues effectively since the rules of our judicial system are modeled on British law. There is an increased need to remodel these sections and laws. For a criminal case wherein the evidence is based on science and technology, it should become very pertinent that a pretrial stage should also be undertaken which will facilitate settlement leading to more focus speedy trial. The fault also lies with the experts who give testimony, which is not comprehensive to advocates. Therefore, judges and advocates should be given information or assistance in handling science and technology information for better understanding of science and technology issues. Cases undergoing trial in trial courts should get necessary guidance from appellate courts on the legal standards that govern science and technology issues.

An educational programme should also be evolved which will produce materials on complex scientific issues to which a Judge can turn to when handling a problem in an upcoming case. Thus the judges can gain access to educational materials, which will be as important as the quality of the materials. Scientific educational programmes like judicial educational programmes in judicial academies should be made more effective by providing forums for interactive, conversational dialogue and debate. This needs the collaboration of scientists and advocates who understand science and law as well as needs of the court. As judiciary faces acute financial crunch, therefore, the development of these educational programmes should be collaborative between non-government organisations and private scientific foundations. Continued funding of these programmes should also be looked into.

4.10 APPLICATION OF DNA TECHNOLOGY IN CRIMINAL CASES

Despite the preceding commentary, it is found that numerous innovative, highly motivated and skilled judges and advocates are working hard in some the Indian courts to improve Judicial decision-making with regard to scientific issues. Despite the aforesaid difficulties and novelty of questions above mentioned cases, and the discouraging attitude of some courts it can be said that the legal system is actively pursuing scientific solutions. In many cases, the trial courts of our country, either *suo moto*, or on the basis of the prayer of the litigants are taking help of forensic science for DNA testing. Indian forensic scientists are nowadays engaged with the task of solving puzzling and intriguing evidence that are sent for analysis by the investigating agencies. The Department of Forensic Medicine and Toxicology, AIIMS, solved the cases of paternity investigated by a district magistrate in December 1995 regarding an alleged illegitimate pregnancy followed by delivery, by using DNA technology. This technology has been applied in many popular cases like the *Premananda Swami* case, *Rajiv Gandhi* case, *Tandoor* case, etc.

In the *Rajiv Gandhi Assassination* case, where the former Prime Minister of India was killed by a suicide bomber, the prime culprit was herself killed and consequently, most material evidences were destroyed in this massive explosion. Moreover, dead bodies of victim as well as of the assassin were dismembered beyond recognition and four disparate theories were held out by a large number of eyewitnesses about the source and mode of explosion.

Under such circumstances, forensic science helped the investigating agencies.

- (1) Scientific examination of torn pieces of denim vest jacket with velcro lining found at the scene indicated the use of belt bomb, Traces and remnants of RDX and steel pellets found on the persons of victims and assassin matched with those recovered from torn pieces of belt bomb.
- (2) Full body of assassin was reconstructed and her identity established through comparison with life-sized enlargement of photographs of her face and head.
- (3) DNA tests helped in matching dismembered parts of the bodies of the victim and assassin. Now, the results of the above forensic examination in this case are:
 - (a) Irrefutable evidence linked the crime with criminal

- (b) Twenty-six of the accused were awarded capital punishment by trial court.
- (c) Even the Supreme Court upheld convictions of all and confirmed capital sentence for four of the accused, modifying the punishment to imprisonment for life and other terms for the rest.
- (d) Although tribute has to be given to the extremely thorough and extensively painstaking investigation effort of the police administration but it cannot be denied that the conviction of such a large number of accused with capital sentence could not have been possible without the assistance of forensic science.

Again, in the *Tandoor Murder* case,¹⁵⁷ forensic science played a pivotal role in unraveling the crime. In this case, initially nobody knew who the culprit was and no clue was available even relating to motive behind the crime. The initial post mortem report only attributed death to excessive bleeding. Under such circumstances, forensic science came into operation when small trickles of blood were found at the crime scene and mystery of this ghastly crime was solved by forensic examination of DNA testing.

In another case, the Central Forensic Science Laboratory's (Kolkata) report on the DNA fudge scam at Chhatisinghpura¹⁵⁸ that nailed the Jammu and Kashmir Government and proved that the state machinery had tampered with DNA samples earned Kolkata's scientists praise from 'fellow forensic experts in Australia.

In a report the Australian Association of Forensic Scientists observes, 'Indian authorities are quick to see the potential of forensic DNA testing to facilitate cover ups. However, in the J & K case they have been foiled by the ethical position taken by forensic scientists who value integrity above obedience—a stance their western counterparts would do well to emulate.

Speaking to The Times of India a day after the CSFL report nailed the Abdullah government for killing five innocents and branding them as terrorists, CSFL Director VK

¹⁵⁷ Proceedings of National Seminar on Forensic Science – Presentation on 'Inadequate Use of Forensic Science on Criminal Investigation: Problems and Remedial Measures'.

¹⁵⁸ www.iprimus.com.au/dna-info

Kashyap agreed with the Australian report and said his lab was free from any corruption because of the number of checks and audits done on every report'. He claimed rapid strides in DNA technology had made it extremely difficult for anyone to fool forensic scientists by fudging DNA samples. He further said that:

DNA samples collected from teeth, mutilated tissues and even ashes can now be compared with wimples from living relatives to trace the identity of men and women... Present-day technology, is based upon analysis of very small Regions called 'micro-satellite'. Lakhs of such micro-satellites are present in human genomes as are 23 pairs of DNA. Even cell also contains a 'locus', which varies from person to person. We select a couple of such locus for checking variation between individuals. With modern technology now available we can therefore analyse DNA samples easier than ever before.

Explaining the new Y-chromosome test (Y-STR method) Dr Kashyap said:

Today even if none of the victim's parents or children are traceable, one can rake samples from a male child, many generations down the salve lineage and say for sure whether the two were related. Similarly by analyzing the mitochondria in female cells, one could march DNA samples and trace maternal lineage.¹⁵⁹

The following discussion relates to the recent sensational phenomenon of Kashmir where investigating officers tried to tamper with the DNA samples deliberately in order to achieve some ulterior dishonest motive.

Facts

Five persons were killed and burnt in a remote south Kashmir hamlet in March 2000, and it was stated that these five innocent local civilians were actually the militants that were responsible for the massacre of 35 Sikhs at Chittisinghpora. Though the strife ridden state of Jammu & Kashmir has witnessed over 100 major massacres since 1989, the killings which started from Chittisinghpora (intervening night of 21 and 22 March 2000) were globally reported and debated because 35 Sikhs were killed at a time when then US President Bill Clinton was in Delhi. Holding militants responsible for the 511th carnage, the army and the state police's anti-militancy Special Operations Group claimed they killed all the five militants

¹⁵⁹ Hussain, 'DNA fudging confirmed, forces killed 5, Economic Times, 17 July 2002

responsible for the massacre at fat-off Gujjar village of Panchalthan. Most of the five bodies were roasted beyond recognition. Villagers in the belt termed the encounter fake and alleged that the five were among the 17 persons who disappeared after Chittisinghpura massacre. From the site of the carnage, they even got the evidences. Seeking justice and exhumation, most of the south Kashmir remained paralysed for a week. On 3 April 2000, when a procession of those villagers were on their way to meet the district authorities in Anantnag, they were stopped in the peripheral village of Brakpora and fired upon. Eight civilians were mowed down and 14 were injured. The dead included the son of missing Juma Khan, who had traced some belongings of his father from the site of the 'encounter'. The government was forced to act. Barring five, surprisingly, all the missing persons returned home. Everybody demanded investigations in the three incidents. The government, however, appointed Justice SR Pandian, a retired judge of Supreme Court, to probe the Brakpora firing, the last of the three incidents. On 31 October 31, 2000, Pandian submitted his 255-page report indicting three personnel from SOC and four from the CRPF. The commission's recommendation that the Sikh carnage be probed was accepted but, till date, no judge has been appointed. As part of the investigations of Panchalthan 'fake encounter', all the five corpses were exhumed on 6 April 2000, and handed over to the claimants after samples were collected for DNA fingerprinting. In March 2002, it was widely reported that samples had actually been fudged. The report said that officials tempered with the samples in order to mislead the investigations. An embarrassed government put a number of doctors and police officials under suspension and ordered a commission of enquiry, the report of which is awaited. At the same time teams from CSL and CDFD were flown in and fresh samples collected, analysis of which proved that all the five were civilians. The government tabled the final DNA sample test reports that 'clearly established' the identity of the five. The state government had summoned the teams from Central Forensic Sciences Laboratory, Kolkata, and Centre for DNA Fingerprinting and Diagnosis, Hyderabad, in March 2000 after the labs reported the samples submitted for DNA testing were fudged. Samples were taken again and the analysis gave the present verdict.

Announcing this in the floor of the state legislature, Chief Minister Farooq Abdullah said the case on the fudging aspect will be transferred to the CBI. He appealed to the Centre to appoint a high court judge to probe the 'encounter' in Panchalthan, following the Chittisinghpura massacre. 'The deceased were not foreign terrorists as claimed by the forces who led the operations but they were innocent civilians for which the people agitated'.

The Chief Minister said in his statement. 'In view of the gravity of Use offence made out as well as the attempt made by certain officials to destroy the evidence and to ensure fair investigations, I have recommended that the investigation of the case be taken up by the CBI who will be requested to expedite the investigation to bring the accused to the trial court'. He further said, 'Since the Panchalthan killings gave new twist to the Chittisinghpora massacre a judicial probe into the Chittisinghpora incident has become imperative'.

Dr Abdullah told the state legislature that the twin reports have clearly established the deceased as Juma Khan, son of Faqeer Khan of Bran Anagan, Juma Khan son of Sher Ali of Brari Angan, Zahoor Ahmad, Ahmad Dalai son of Abdul Gaffar of Mominabad, Mohammad Yousuf Malik son of Kabir of Hallan Kapran and Bashir Ahmad Bhat son of Aziz of Hasan Kapran. With this two of three mysteries are solved by the virtue of application of DNA technology. Now it is the turn of the worst ever – Sikh massacre that shook the world to be investigated.

MALIMATH

In this regard suggestions provided by the Malimath Committee report as:

1. Sec. 313 of the CrPC must also be amended to as to draw adverse inference against the accused if he fails to answer any relevant material against him therefore, making it easy for the law enforcers to use DNA test against him.
2. A specific law should be enacted giving guidelines to the police setting uniform standards for obtaining genetic information and creating adequate safeguards to prevent misuse of the same.
3. A national DNA database should be created which will be immensely helpful in the fight against terrorism.
4. More well-equipped laboratories should be established to handle DNA samples and evidence.
5. Efforts should be taken to create more awareness among general public, prosecutors, judges and police machinery.

Different aspects of the justice administration can be further improved by the following measures:

- a. Discouraging routine summoning of doctors.
- b. Calling expert witness at pre-scheduled time.
- c. Recording experts' testimony by alternative judicial officer in case of non-availability of the presiding officer the court that summoned him.
- d. Amending provision of criminal procedures to have admissibility of the medical records.
- e. Recording of experts' testimony through video-conferencing.

Chapter V

DNA PROFILING IN INDIAN CRIMINAL JUSTICE SYSTEM

Significantly, during the investigation and after the investigation i.e. at the time of evidence in the court, the value and importance of the fingerprints cannot be measured in simple words. The fingerprints found at the crime scene are the best evidence for identifying a suspect. The fingerprints found at a scene and later identified as belonging to a particular person results in an irrefutable and conclusive identification of that person. The term identification used here really means “individualization” that is reproduction of the strong proof against a particular person.

When the subject matter of inquiry is such that person cannot prove or not capable of forming correct judgment upon a matter or when it is concerned with a science or art, the opinion of a person having special knowledge of the subject matter concerned became relevant. In a situation where technical knowledge is relevant, it is very difficult for the court to form an opinion unless the court gets assistance from expert person¹⁶⁰.

Law of evidence recognizes that in certain circumstances which involves scientific or technical questions¹⁶¹ the court may require the assistance of person (experts) who, on accounts of special studies or experience, are conversant with matter of science or professional skill. Law treats these expert as witness¹⁶².

The origin of expert evidence can be traced even before jury trial system developed¹⁶³. There were two modes of using expert knowledge in England - (1) to select the jury men and (2) to call to the aid of the court skilled person whose opinion might be adopted. This was the time when juries were not only judges of fact but also witness. But there was change in the admission of opinion and hearsay evidence also originated. Thus the use of experts remained as a means of assisting the jury to interpret matters of fact bearing scientific

¹⁶⁰ M. Monir, *Criminal Investigation Practical Finger Printing Thumb Impressions and Hand Writing Opinion Evidence*, University Book Agency, Allahabad 356 (1995).

¹⁶¹ H.A. Hamellmann, “Expert Evidence”, 10 *MLR* 32 (1946)

¹⁶² *Ibid.*

¹⁶³ The early usage of word ‘opinion’ means notion or precaution of the mind without proof or without certain knowledge. So the early English decisions rejected this evidence of opinion on the basis it is evidence of belief.

implications. These changes affected the procedural aspects also. Experts were no longer summoned by the court but the parties. Moreover experts became witnesses and caused to occupy the position of special jurors.¹⁶⁴

Section 45 creates an exception to the general rule that evidence of opinion is not admissible. Section 45 makes it clear that when the court has to form an opinion on a matter of foreign law, science, art, and identity of handwriting or finger impressions, the court can seek the assistance of persons skilled in these fields. The words 'science' or 'art' can be interpreted widely to include any branches of specialized knowledge. In view of language of section 45, it is necessary that before a person can be categorized as expert is one skilled in that particular science. This section is therefore exhaustive of the matters on which expert testimony can be given, though the expression "science" or "art: include almost all branches of human knowledge requiring special study, experience or training.

It is important to note here that in law, the term 'expert' has a special significance and no witness is permitted to express his opinion unless he is an expert within the terms of Section 45. Generally the use of experts may be useful in cases where the issues involve some fields of expertise, which the judge has not got¹⁶⁵. The function of the expert witness is to provide the court of law with information about a point at issue or to help the court to interpret information about a point at issue, which is out with the knowledge, and experience of that court. The court takes the aid of expert witness to help the judge and jury to understand the case. An expert is one who is skilled in a particular art, trade or profession of having particular knowledge in a field. The expert must have made a special study of the subject or have acquired special experience in the field. With regard to the competency of expert witness Lord Russel asked:

"Is he Peritus is he skilled has he adequate knowledge?"¹⁶⁶

¹⁶⁴ Larnard Hand, "Historical and Practical Consideration regarding Expert Testimony", 15 *Harv.L.R.* 40 (1901).

¹⁶⁵ Note, 'Expert Evidence and the Needs of Justice', 120 *New L.J.* 953 (1970).

¹⁶⁶ Jack Matson, *Effective Expert Witnessing*, London, Boca Raton 18 (1999).

A forensic scientist is neither a witness for the prosecution nor the defence but essentially a witness of the court¹⁶⁷. The expert operates in a field beyond the range of common knowledge. In short an expert means a person who by reason of his training or experience is qualified to express an opinion¹⁶⁸.

5.1 FINGERPRINTS EXPERT AND HIS REPORT

If the expert is able to show the court the existence of such facts and establishes the validity or invalidity, by proving and demonstrating his findings, his testimony becomes substantive evidence rather than mere expert opinion and is a great value to the case¹⁶⁹. The opinion of a fingerprint expert is a value only when he can give satisfactory reasons for his conclusions. Reasons that can be understood and convincing should be the basis for any opinion that might be expressed. If the expert witness simply testifies that a fingerprint is that of a particular person and gives no reason for reaching into the conclusions his opinion is valueless. Theories or opinions that cannot be proven have no practical standing and inevitably a fingerprint expert should not only express an opinion as a conclusion of his examination, but should first state and show to the court the facts and then his conclusions from the facts.

A competent fingerprint expert must have both theoretical and a practical knowledge of the subject. He has to compare the disputed fingerprints and point out the similarities or dissimilarities between the two impressions. He has also to educate both the court as well as the counsels about the existence of identity. The competency of the fingerprint expert possessed by the expert. For that matter, fingerprint experts are now being trained in the various fingerprint bureau and other institutions like Institute of Criminology and Forensic science in the Ministry of Home Affairs, Government of India and any person who has received training in those institutions can be classed as experts.

Fingerprints being scientific evidence, also presents special problems to the courts. As neither the judge or the jury can have direct experience of all scientific matters to a particular case. Here they are unable to assess the evidence against their own experience.

¹⁶⁷ H.L. Bami, "Development and Application of Forensic Science in Criminal Justice in India", *Cri.L.J.* 9 (1984).:

¹⁶⁸ *Balakrishna Das Agarwal v. Radha Devi*, AIR All. 133 (1989).

¹⁶⁹ Hanna Sulner, *Disputed Documents*, New York, Oceana Publications, 196 (1966)

The court has to rely heavily on the opinions expressed by these experts. Therefore, the court has to ensure that the expert witness is reliable by an examination of his qualification and experience in the field. It is the duty of the opposing counsel to ensure that the court does not inadvertently over estimate the value of a particular aspect of the evidence. The expert is asked not only to report his perceptions of events which he has observed but also to employ the resources he has invested in his training in order to draw inferences and form conclusions. The expert possesses a kind of equity in the substance of his testimony that is created by his investment of resources¹⁷⁰.

In *Mohanlal v. Ajith Singh*¹⁷¹ the fingerprints of the accused was found to be similar with that of the fingerprints on the currency notes which belonged to the deceased. The expert made it clear that this prints were clear enough for comparison. The Supreme Court held it is for the fingerprint expert to say whether the disputed fingerprints are clear enough for the comparison. The expert should be experienced and skilled to say it is unable to use it as evidence.

In order to ascertain whether a finger impression is that of a person any finger impression admitted or proved to the satisfaction of the court to be the finger impression of that person, may be compared with former impression, although that impression has not been produced or proved for any other purpose. The court may also direct any person present in the court to compare the impression so made, with any impression alleged to be the finger impression of such person¹⁷².

According to Stephen Meager¹⁷³, an FBI fingerprint there is three levels of fingerprint details, which the fingerprint expert should examine. Level one includes the print's central area, i.e., arch, whorl and loop, level two emphasizes features of friction on ridge paths, bifurcations, dots etc, level involves the intricate details such as the size and location of pores on the given ridge. So a fingerprint expert should examine all these three levels and come to a conclusion.

¹⁷⁰ H.J. Walls, "The Evaluation of Scientific Evidence", *Cri.L.R.* 278 (1978).

¹⁷¹ AIR 1978 SC 1183.

¹⁷² Sec. 73 of the Indian Evidence Act, 1872.

¹⁷³ *United States v. Harvard*, 115 *Harv. L.R.* 2349 (2002).

In *Ammini v. State of Kerala*¹⁷⁴ fingerprint were found on the two glasses found in the deceased house. The fingerprint expert compared this fingerprint with the admitted fingerprint of the accused and it tallied. The trial court disbelieved this valuable piece of evidence on the ground that those impressions was not clear enough to enable the expert to come into a definite conclusion and it was doubtful whether the subsequent photographs were of the original finger prints. The High Court severely criticized the trial court for taking such a conservative view. The Supreme Court also relied upon this fingerprint evidence in establishing the guilt of the accused.

In *State of Madhya Pradesh v. Sitaram*¹⁷⁵ the fingerprint expert failed to take enlarged photographs of all the disputed prints. The Madhya Pradesh High Court reminded that the task of the court become much easier where the fingerprint expert has taken enlarged photo of the disputed and specimen fingerprints and marked the distinct points of similarities. The court also laid that the court cannot delegate its authority to the expert but it has to satisfy itself as to the value given to any other evidence. The reasons given by the expert in arriving at the conclusion are ultimately to be weighed by the court and satisfy itself about the correctness of the conclusion by comparison of the prints.

It is difficult for the layman to appreciate the full meaning of the expert's testimony on account of its technical nature. While presenting the fingerprint evidence, the expert should present it in clear and visible terms. This will enable the court to satisfy itself with the genuineness of the evidence. Therefore it is to be presented with some graphic representation of facts. The two prints viz., the questioned and the specimen or admitted. Should be photographed and the prints enlarged to the same size.¹⁷⁶ The sufficient number of characteristics should also be marked with lines and numbers to show in visible form that the two impressions have same ridge characteristics.

Slam vague report of slam finger print expert is of no use to the court. It must be definite and should include the condition of the prints, as to whether they are complete, partially blurred or whether they have been heavily or lightly impressed. The reasons

¹⁷⁴ AIR 1998 SC 260.

¹⁷⁵ 1978 *Cri.L.J.* 1220.

¹⁷⁶ H.R. Hardless, *Handwriting and Thumbprint Identification and Forensic Science*, Allahabad, Law Book Company, 257 (1979).

supporting the opinion must be expressed in clear and definite language. There should be not any ambiguity.¹⁷⁷

5.2 ADMISSIBILITY OF THE DNA REPORT WITHOUT PHYSICAL PRESENCE

The most fundamental rule of law of evidence is that all evidence must be logically relevant to an issue which falls to be decided by the court. To be legally relevant, slam fact or item of evidence must establish or help to establish the particular point charged against the accused.

Under Section 293 of the Code of Criminal Procedure. 1973, any document purporting to be a report under the hand of a government scientific expert to whom this Section applies upon any matter or thing duly submitted of him for examination or analysis and report in the course of any proceeding under this Code may be used as evidence in any enquiry, trial or proceeding under this Code. This section applies to the following government scientific experts, viz., 1. Any Chemical Examiner or Assistant Chemical Examiner to Government, 2. The Chief Inspector of Explosives, 3. The Director of the Fingerprint Bureau, 4. The Director Haffkeine Institute Bombay, 5. The Director of a Central Forensic Science laboratory or a State Forensic Science Laboratory and 6. The Serologist to the Government.

This Section enable the court to admit the reports of the above mentioned experts which include fingerprint expert also, as evidence even without the physical presence of the expert. The section an expert covered by this provision is not to summon for oral evidence.¹⁷⁸

In *State of Kerala v. Anthony*,¹⁷⁹ the Kerala high court held that when an expert is summoned he need not attend the court but can depute circumstances of the case the government scientific expert mentioned under Section 293 Criminal Procedure Code, 1973 expressly includes the Direction of Fingerprint Bureau had there fore his report is admissible in evidence without his physical presence.

¹⁷⁷ Russell, *A Grefory's Identification of Disputed Documents, Fingerprints and Ballistics*, Lucknow. Eastern Book Company 193 (1989).

¹⁷⁸ JK.N. Chandrasekharan Pillai, *R.V. Kelkar's Criminal Procedure*, Lucknow, Eastern Book Company, 550 (2001).

¹⁷⁹ 1978 Cri.L.J. (NOC) 41.

In *H.P. Administration v. Omprakash*¹⁸⁰ the fingerprints were found on the glass panes of the windows and also on a flask found on the scene of crime. The expert opined that the prints matched with that of accused. It was contented that the fingerprint report did not contain reasons for the opinion that fingerprint that belonged to the accused. The Supreme Court held that the report regarding the fingerprint is that of the Director of the fingerprint bureau which under 510 of Criminal Procedure Code (Section 293 of criminal procedure code after the amendment) can be used as evidence in any trial or enquiry without examining the person who gave the report, As long as the report shows that the opinion is based on observation which lead as the report shows that the opinion can be accepted , But if there s any doubt it can be decided by calling of the person making the report.

In *Phool Kumar v. Dehi Administration*,¹⁸¹ the report of the fingerprint expert was used as evidence by the prosecution without examining him in court. Neither the court thought it did not fit nor the prosecution or accused filed any application to summon the expert on the subject matter of his report. The report of the fingerprint expert was being used even without his examination in court and was made admissible both by the High Court and the Supreme Court.

The Supreme Court in *Tulsiram Konu v. State*,¹⁸² observed that the reason why the report of the Director of the Fingerprint Bureau is treated as evidence without examining the person giving the report is that the comparison and identification of fingerprints has now developed into a science and the result derived there from have reached a stage of exactitude. As long as the report shows that opinion was based on observation which lead to a conclusion, that opinion can be accepted. But there should not be any doubt and if there arises doubt it can be decided by calling of the person making the report.

5.3 REPORT QUALITIES FOR ITS VALIDITY

The method adopted in identifying fingerprint identification has been used for approximately 100 years and is subjected to peer review. The error rate of fingerprint identification is low also. It has been commonly accepted that no two fingerprints are identical

¹⁸⁰ AIR 1975 SC 905.

¹⁸¹ AIR 1975 SC 905.

¹⁸² AIR 1954 SC 1.

and that fingerprints cannot be changed and do not alter with age¹⁸³. If a fingerprint can be identified as belonging to a particular person it is almost conclusive evidence that the person handled the object involved. The fingerprint system itself was developed in order to establish the identity of individuals.

In order to ascertain the validity of the opinion of the expert certain qualities should be ascertained from the expert.

- a) Expertise: It may be absurd to say that an expert witness lacked expertise. The question of expertise could be assessed on the basis of an enquiry into his scholastic attainments, Professional training, experience and means at his command to perform tests and finally the application of those means in the examination of exhibits in the particular case.
- b) Clarity: The opinion which he gives should be clear and should not be vague. The court should be able to understand his conclusions. It should be given after a complete and scientific, examination of the prints received for examination.
- c) Relevancy: Evidence is admitted on the basis of relevancy and admissibility. A piece of evidence may be relevant when it is connected to facts of the case. In addition to this it should be admissible under the law.
- d) Reliability: An expert opinion should be reliable and it must be free from all bias-consciousness of unconsciousness.¹⁸⁴

The weight given to the opinion of the expert is different matter from its relevancy. The act only provides about the relevancy of expert opinion but gives no guidance as to its value. The value of expert opinion has to view in the light of many adverse factors. Firstly, there is the danger of error or deliberate false hood. Secondly it is after all an opinion given by a person and human judgment is fallible. But with regard to evidence of fingerprints it has been referred to be an exact science¹⁸⁵. So the evidence of the fingerprint expert is

¹⁸³ Howard Leverson, "The Fingerprinting of Children", *Cri.L.J.* 698 (1980).

¹⁸⁴ Donald Cambell, "Fingerprints : A Review", *Crim.L.R.* 195 (1985).

¹⁸⁵ V. Mitter and R.N. Saxena, *Law of Identification and Discovery*, Allahabad, The Law Book Company, 3 (1994).

considerable weight¹⁸⁶. A fingerprint is in reality an unforgeable signature. The evidence of a fingerprint expert can be acted upon without corroboration as the science has developed to such an extent that it does not admit any mistake¹⁸⁷. The introduction of the use thumb impressions in the field of criminal investigation has marked a deathblow to the nefarious activities and also to the profession of forgers and dishonest litigants. So these adverse factors have not much relevance in fingerprint evidence¹⁸⁸.

5.4 IMPORTANCE OF DNA PROFILING

Significantly, during the investigation and after the investigation i.e. at the time of evidence in the court, the value and importance of the fingerprints cannot be measured in simple words. The fingerprints found at the crime scene are the best evidence for identifying a suspect. The fingerprints found at a scene and later identified as belonging to a particular person results in an irrefutable and conclusive identification of that person. The term identification used here really means “individualization” that is reproduction of the strong proof against a particular person.

5.5 A GOOD ALTERNATIVE TO TORTURE - SYSTEM

In a country like India where literacy rate is so low and people at large are ignorant about their legal rights. It encourages the police and other interrogating personnel to adopt the so called third degree type torture methods. By these torture treatments the truthful results can not be achieved, because what ever has been interrogated to the accused, he has answered just under the fear. Therefore, the scientific methods of investigation are needed in big essence, not only to bring forward the perfect truth but also to set — aside the mall practices of third degree type of torturing methods. The use of third degree torture methods during the investigation is in human, barbarous, illegal and above all unconstitutional.

Article 1 of the Convention defines torture as: Any act by which severe pain or suffering, whether physical or mental, is intentionally inflicted on a person for such purposes as obtaining from him or a third person, information or a confession, punishing him for an act

¹⁸⁶ *Bakhula Behra v. State*, AIR 1957 Ori. 172.

¹⁸⁷ 1983 Cri.L.J. (NOC) 238 (Orissa).

¹⁸⁸ C.K. Johari, “The Science of Fingerprints”, *Cri.L.J.* 110 (1995), at p. 157.

he or a third person has committed or is suspected of having committed, or intimidating or coercing him or a third person, or for any reason based on discrimination of any kind, when such pain or suffering is inflicted by or at the instigation of or with the consent or acquiescence of a public official or other person acting in an official capacity. It does not include pain or suffering arising only from, inherent in or incidental to lawful sanctions.¹⁸⁹

Torture means an act by which severe pain of suffering, physical or mental which also includes abusive language, is intentionally inflicted by a public servant acting beyond his official capacity on a person for obtaining information or confessional statement from him while seeking to prosecute him for an act which he has committed or is suspected of having committed. Torture, attribute to the law enforcement agencies can broadly be divided into two categories (i) Torture of suspects in the Police custody and (ii) Torture of inmates in the prisons.

Definition of torture

Some of the reasons considered behind tortures are : Lack of Police Staff, lack of facilities, Stress of work due to demands for quick results Inadequate scientific support, Political pressures, these pressures may be in any form either to give the quick results or to defame a person under political tendencies etc.

Torture is a naked violation of human dignity, the basic tenet of human rights. It is an accepted fact that torture, both physical and psychological, aims at adversely influencing the mental condition of the victims. Statistics have shown that the worst violation of human rights to life and liberty take place during the course of investigation when the Police generally resort to third - degree methods. This has become a global phenomenon and naturally has attracted international attention¹⁹⁰.

Article 20 and 21 of Indian Constitution

¹⁸⁹ Convention Against Torture, 1984, Article 1.1

¹⁹⁰ Deepa Singh, *Human Rights and Police Predicament*, Delhi, Bright Law House 56-58 (2002).

Again, Article 20(3) of the Constitution states “No person accused of an offence shall be compelled to be a witness against himself”. When it is question of disputed paternity and the accused is the alleged father any attempt to subject him to a blood test against his wishes will again be in direct contravention of Article 20(3) since such an attempt will be that of compelling the accused to give evidence against himself.

The law in India with respect to the above-mentioned principles of liberty provides that Article 20(3) of the Constitution gives protection against ‘testimonial compulsion’. In *M.P. Sharma v. Satish Chandra*,¹⁹¹ the Supreme Court pointed out that the immunity given by the clause extends to immunity against being compelled to furnish any kind of evidence which is reasonably likely to support a prosecution against him. But in the later case of *State of Bombay v. Kathi Kalu*,¹⁹² the Apex Court has narrowed down the above proposition by laying down that the protection does not extend to any kind of evidence but only to self incriminating statements made by the accused (including oral or written testimony) relating to the charge brought against him. Consequently, it follows that medical examination of person of the accused or the taking of blood from his person for the purpose without his consent, would also be justifiable for the same person.

Some High Court judgements are also to the same effect. The Hon’ble Kerala High Court in the case of *Sajeera v. P.K. Salim*¹⁹³ observed “Now the DNA finger-printing test has been much advanced and resorted to by the Courts of law to resolve the dispute regarding paternity of the child, it is true that without the consent of the person blood test cannot be conducted and there is no law in India enabling the court to compel any person to undergo blood test as available in England.”

The Hon’ble Andhra Pradesh High Court in the case of *Syed Mohd. Ghouse v. Noorunnisa Begum*¹⁹⁴ held that Court could not compel the father to submit himself to DNA test.

Interestingly the Law Commission of India in its 180th Report on Article 20(3) of the Constitution of India and the Right to Silence of person accused, seems to have reopened the

¹⁹¹ AIR 1953 SC 300

¹⁹² AIR 1961 SC 1808.

¹⁹³ 2000 CrLJ 1208.

¹⁹⁴ 2001 CrLJ 2028.

issue of compulsory testing of blood sample, for DNA or other tests. It is expressly stated in the report that, "The right to silence has various facets. One is that the burden is on the State or rather the prosecution to prove that the accused is guilty. Another is that an accused is presumed to be innocent till he is proved to guilty. A third is the right of the accused against self-incrimination, namely the right to be silent and that he cannot be compelled to incriminate himself. There are also exceptions to the rule. An accused can be compelled to submit to investigation by allowing his photographs taken, voice recorded, his blood sample tested, his hair or other bodily material used for DNA testing etc.¹⁹⁵

5.6 SKILLFUL OR SCIENTIFIC BASED INVESTIGATION

The immunity under Article 20(3) does not extend to compulsory production of material objects of compulsion to given specimen writing, specimen signature, finger impressions, blood specimen or D.N.A. tests.¹⁹⁶

Therefore demand for the finger impressions of the accused by the investigation personnel or agencies can not be called illegal or unreasonable by any angle. The investigations on the basis of finger impressions may be performed in two ways.

- (i) Finger impressions taken from the place of occurrence or from the record.
- (ii) During the investigation he may be asked to give the finger impression.

Article 21 of the Constitution of India provides A person shall be deprived of his life and personal liberty except according to the procedure established by law."

It is submitted that any effort to compel any person to take DNA test against his consent will be in direct contravention of Article 21 which provides for the protection of personal liberty of the persons. Such an attempt will amount to deprivation of the personal liberty of the person concerned, the protection of which is expressly guaranteed under Article of the Constitution.

¹⁹⁵ Law Commission of India, 80th Report at 204-205.

¹⁹⁶ *Ramsarup v. State*, AIR 1958 All. 126; *Nandini v. Doni*, AIR 1978 SC 1025 para 30; *Balkrishan v. State of Maharashtra*, AIR 1981 SC 37.

5.7 ROLE OF DNA FINGERPRINTING SCIENCE

During the criminal investigation we take some of the things into consideration like - reaching up to the real offender, the accuracy of the investigations and maintaining the constitutionality all during the investigation. It must be stressed that till the investigation completes the officials concerned with investigation should enquire, examine, or detain all the suspected persons without infringing their Constitutional as also Human Rights. Therefore such officials or cops must adopt scientific methods to avoid all the forthcoming problems and also to gain the reasonable and accurate results¹⁹⁷.

5.8 FINGERPRINTS IN COMPARISON TO D.N.A.¹⁹⁸ AND OTHER MEDICAL TESTS

DNA technology in course of time is bound to play a prominent role in our legal system in both the criminal and civil areas giving a new look to the subject of expert testimony. In the matters of fixing the paternity and maternity of a child and also in cases of homicide and rape, DNA fingerprinting evidence will be a decisive and clinching factor. In India, barring a negligible number, cases have yet to come before the courts involving expert opinion in the science of DNA technology¹⁹⁹.

5.9 HOW DNA FINGERPRINTING IS DONE?

In DNA profiling process firstly, the DNA is isolated from cells or tissues of the body in which the amounts of DNA found at the root of one hair is sufficient. After chemically extracting the intact DNA from the sample restriction enzymes are used to cut DNA at specific places. The DNA pieces are then sorted out according to size by sieving technique called electrophoresis in an agarose gel. The DNA fragments are blotted from the gel into a nylon membrane. This process is known as Southern Blotting. On addition of radioactive or colored probe to the nylon sheet a pattern called the DNA fingerprint is built by using several probes (5- 15 or more) simultaneously.

¹⁹⁷ *Supra* note 29 at p. 111.

¹⁹⁸ D.N.A. stands for Deoxyribose Nucleic Acid.

¹⁹⁹ <http://www.dna.ebc.india.com>

Where the samples are the quality poor, this technique, has been found to be less satisfactory. Therefore, a new technology was developed to replicate the inadequate sample, by synthesizing new DNA from the existing one to obtain sufficient quantities for analysis. This technique is called Polymerase Chain Reaction (PCR) and the testing PCR is known as PCR-STR (Short Tandem Repeat). It can produce quick, valuable results with degraded specimens.

In India this technique is in its infancy. Centre for DNA fingerprinting 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 fingerprinting is done²⁰⁰.

In a case that came before the Court of Chief Judicial Magistrate, Tellicherry (Kerala), one Vilasini a village girl, filed a petition against one Kunhiraman for maintenance alleging that a child was born to her on account of the illicit connection between them. The defendant disowned her and denied the paternity of the child. The Chief Judicial Magistrate ordered both of them to undergo DNA fingerprinting test in order to ascertain the parentage of the child at CCMB, Hyderabad, which is carrying out experiments in this field. As Kunhiraman had no identical twin brother, the court safely arrived at the conclusion that he was the biological father of the child.

In the recently concluded case of *CBI v. Santosh Kumar Singh*²⁰¹ DNA evidence was sought to prove that the deceased had been raped. The defence submitted that it was a malicious attempt to connect the accused with the DNA profile. The so-called DNA profile was found suspicious and shrouded in mystery.

There could have been a possibility of tampering with the samples.²⁰² Those were sent for DNA testing. The burden was on the State as to show that the samples had not been tampered with. It was submitted that the underwear of the accused was tampered with and semen was planted upon the same. Unfortunately for CBI and fortunately for the accused the

²⁰⁰ Abhijeet Sharma, "DNA Fingerprinting – A Legal Perspective", *Cri.L.J.* 142 (2004).

²⁰¹ (2004) *Cri.L.J.* 964.

²⁰² V. Krishnamachari, "DNA Fingerprinting Evidence and its Legal Admissibility", *Cri.L.J.* 261 (1944).

DNA laboratory returned the said underwear without analysis considering the same to be irrelevant.

The Court, however, stated that the State in the matter of DNA identification evidence must satisfy that the physical evidence upon which the test was conducted has been obtained in accordance with law and reached the laboratory without being interfered with²⁰³. Due procedure and protocol was applied and that the accused got due opportunity of fair hearing in the matter of analysis, and during trial.

It was submitted, questioning the DNA report of CCMB, Hyderabad, that proper procedure for the examinations of the exhibits had not been adopted. The opinion of the expert in view of Section 45 of the Indian Evidence Act²⁰⁴ was held to be admissible provided the validity of the underlined protocol of the analysis was established. The validity of the technique applying those principles on a particular occasion had to be established. Further, in carrying out the analysis, the expert should have recorded the observation of analysis in such a manner as to give due opportunity of rebutting the opinion given by the experts. The DNA evidence adduced in the case was held inadmissible and was rejected.

The problem with DNA results is apparent—making them meaningful to a judge. The judge can also fall into the trap of confusing the probability of sample identification with a probability of guilt due to various factors. It is most unusual for a judge to be trained in anything other than the law, and as such to be grappling with issues that are often technical and obscure, shrouded in language that lawyers assert is designed to complicate and confuse, adds to the difficulty of the task.

²⁰³ For DNA testing the objects analysed were: (1) the blood of the accused, (2) the vaginal swab/smear of the deceased, (3) the clothes of the deceased. The semen of the accused on the underwear, which the accused was allegedly wearing at the time of the alleged offence, was not checked by the DNA laboratory. The underwear was returned without analysis considering the same to be irrelevant (a blatant mistake).

²⁰⁴ The State has to satisfy the following: (1) Obtaining known/unknown biological samples in accordance with law. (2) The State must establish a proper chain of custody for the substance subjected to the analysis. A proper foundation connecting the evidence to the accused or to place or object should be established. (3) Laboratory procedure, protocol and quality control. (4) Fair hearing is to be resorted to.

In *Rohit Shekhar v. Narayan Dutt Tiwari and Another*,²⁰⁵ while referring the case of *Goutam Kundu* case,²⁰⁶ Family & Personal - Code of Civil Procedure, 1908, s. 75 - Evidence Act, 1872, s. 112 - Interim Application - In original civil suit, plaintiff seeks declaration that Defendant no. 1 was his biological father - Plaintiff claims that his mother though not married to defendant no.1 was promised that if she gives birth to a child, defendant no. 1 will give his name to child - Present application seeks direction to first defendant to furnish blood samples for enabling DNA test - Whether defendant no. 1 can be given directions to give his blood samples for DNA test to enable fact of being biological father of plaintiff? - Held, defendant no. 1 did not deny fact that he knew mother of plaintiff - In photographs, plaintiff had been shown with defendant no. 1 in accordance with claim of plaintiff - Conclusive proof standard mandated by s. 112 r/w s. 4 of 1872 Act admits an extremely limited choice before Court, to allow evidence of 'non access' to a wife by husband, who alleges that child begotten by her was not his offspring; it was designed to protect best interests of child, and his legitimacy - A 'paternity' action by son or daughter of one, claiming defendant to be his or her biological father, filed in Court, particularly after plaintiff attains adulthood, or claims paternity, for other reasons, cannot be jettisoned by shutting out evidence, particularly based on DNA test reports, on a threshold application of s. 112 of 1872 Act - Court had to weigh all pros and cons on being satisfied about existence of 'eminent need' make appropriate orders - Development of statute law through enactment of Hindu Adoptions and Maintenance Act, 1956, Criminal Procedure Code, 1973 and Family Courts Act, 1984, read together with a child's right to knowledge about her or his natural parentage has added a new dimension where concept of paternity or a claim, cannot be ousted by s. 112 and concerns of legitimacy, underlying it - Hence, there was eminent need to direct first defendant to furnish his blood samples, for purpose of DNA testing - Application allowed.

An appeal was preferred by the defendant against the order of Delhi High Court. Recently the Supreme Court, while disposing of appeal ordered the appellant to subject himself to DNA test. The matter may be considered from another angle. In all such matrimonial cases where divorce is sought, say on the ground of impotency, schizophrenia DNA evidence, no doubt has the ability to increase the accuracy of verdicts in criminal trials. But this does not mean that we should be complacent about its use and presentation. With the human genome almost being mapped to completion, the discovery of

²⁰⁵ 2010 INDLAW SC 574

²⁰⁶ *Goutam Kundu v. State of West Bengal and Anr.*, (1993) 3 SCC 418 1993 Indlaw SC 1165

the constituents of the human DNA will create a comprehensive database eventually resulting in a human databank of DNA publicly accessible and tremendously utilised in criminal investigations.²⁰⁷

5.10 RELIABILITY OF D.N.A. SEMEN TEST, QUESTIONED

In a rape case for anticipatory bail, the learned council for the petitioner on the basis of photocopy of a forensic science laboratory report filed by them, argued that semen stains found on the cloth of the prosecutrix revealed AB group, which is not of petitioner. The prosecutrix is about 20 years. Prosecution case is likely to fail; therefore, the petitioner is entitled to be released on bail. Learned APP for state argued to the contrary and submitted that semen on his private part was missing and the medical examination of the prosecutrix show that her hymen was shown torn. This corroborates her statements and that earlier application of the petitioner having been dismissed; he is not entitled to be released on anticipatory bail.

The Hon'ble high court accepted the contentions of the prosecution, and held that since the corroboration test reports of the forensic science laboratory are not reliable strongly, therefore Bail application rejected.²⁰⁸

On the other hand declaring the reliability of the fingerprints, the Supreme Court held the result of the finger impressions are 100% reliable and acceptable in the court of law.

The D.N.A. and other forensic science tests are only utilized when the accused has been caught. And before his catch these tests cannot tell to whom the report of these tests belong, but the reports of the fingerprint experts indicates also that to which such prints belong to. That is to say that is to say that almost all the report begin their role after the arrest of the accused. But it is only the fingerprints report which begins its role prior the arrest of the accused and the prints if matched with the prints in question, it helps to catch the accused.

In *Pratap Mishra & others, Appellants v. State of Orissa, Respondent*,²⁰⁹ like the reports of fingerprints experts some other experts under the sections 45, 46 and 47 of

²⁰⁷ <http://www.casac.ca/dna.htm>

²⁰⁸ *Mohit Bansal v. State of N.C.T. of Delhi*, 2002 (2) JCC 915.

²⁰⁹ 1977 Cri.L.J. 817 SC.

Evidence Act are asked to submit their reports. These experts are the area of handwritings medical examination of the body which also includes the D.N.A. examination. Such medical examinations are highly required, in heinous crimes like Rape, Murder etc. But when we compare there examinations to fingerprint examination we find these are of less reliability where the fingerprints experts' reports are declared 100% reliable and doubtless. Regarding other exports the reliability is still questioned and doubtful.

In this rape case speaking on the medical expert's report submitted under Section 45 of Evidence Act regarding occurrence and time of occurrence the Hon'ble Supreme Court said- It is well settled that the medical jurisprudence is not an exact science and it is indeed difficult for nay was caused and in the present case as to the exact time when the appellants may have had sexual intercourse with the prosecutrix. The Doctor who has examined the victim is in a best position to depose about the medico- legal aspects of the offence committed on the victim. Thus, where there was a discrepancy of some hours between the opinion of the Doctor and version of the prosecution about the time of commission of rape, it was futile for the courts to make a detailed research on the point and the opinions of the Doctor should not have been disbelieved on that ground alone.

5.11 IN COMPARISON WITH HAIRS AND TEXTILE FIBERS

Hair and fiber investigations assist in placing the suspect at the scene of the crimes.

Interchange of hairs or fibers between the victim and the suspect's clothing may take place in violent crimes, such as rape, assault and murder. Hair or fibers from suspect may be found at the scene of crimes such as burglaries; armed robberies and car thefts. Hair or fibers on wrenches, knives or clubs for example, would help the investigations by identifying the weapon or the instrument of a crime, hair or fibers adhering to the suspect automobile would help in identifying hit and run vehicles.

The interchange of hairs from one's body to other's is often possible in rape, assault or murder type cases where a coercion or struggle to save oneself from the grip of other takes place. To an extent hair examination is good, and follows the relevancy in the same sense as the examination of finger prints, but not recognized scientifically and legally same as fingerprints are.

5.12 IN COMPARISON WITH HANDWRITING TEST

In suicide cases, where suicide notes have been written, or in cheating forgery cases handwriting tests are taken, but the results sometimes are not good. It is an accepted principle of law that the science of handwriting is not an accurate one and there is likelihood of errors creeping in when a handwriting expert gives his evidence and therefore such evidence should be received with caution. What is the evidentiary value of a handwriting expert and whether or not in conjunction with the other evidence available, the evidence of the expert supports the case of the plaintiff are matters for decision by the trial judge²¹⁰.

The errors in handwriting examination are in practical e.g. with the help of hand magnifier or a microscope an expert cannot declare the oldness of such handwriting. Such examination also requires not one or two 'letters' but it requires many letters, for the comparison with the found handwritings letters. But if we have only a few letters, then the comparison is difficult. The learned Author Albert S. Osborn has counted many other errors, and the Supreme Court also has approved them in *State of Mysore v. Sampangirs Miah*.²¹¹

In *State of Maharashtra v. Sukh Deo Singh and another*,²¹² The Court did not deny accepting competency of hand writing expert, but in comparison to finger prints it exclusively viewed that the opinion of hand writing expert is imperfect.

In this case the court held following things while measuring the reliability of hand writing expert's opinion:

- (i) A hand writing expert is a competent witness.
- (ii) The doubts may arise regarding quality of the opinion given by the handwriting expert. The, science of hand writing is imperfect in comparison to the science of finger prints.
- (iii) In the present case the hand writing expert's opinion is doubtful.

²¹⁰ R.A. Gregory, *Handwriting – Identification of Disputed Documents, Fingerprints and Ballistics*, Sweet and Maxwell, London, 27, 28 (2005).

²¹¹ 1953 Cri.L.J. 1071.

²¹² 1992 Cri.L.J. 3454.

The court said, "A hand writing expert is a competent witness whose opinion evidence is recognized as relevant under the provisions of the evidence. It would, there for, not be fair to approach the opinion evidence with suspicion but the correct approach would be to weigh the reasons on which it is based. The quality of his opinion would depend on the sound ness of the reasons on which it is founded. But the court can not afford to over look the fact that the science of identification of hand writing is an imperfect and frail one as compared to the science of identification of fingerprints, courts have, therefore, been wary in placing implicit reliance on such opinion evidence and have looked for corroboration but that is not to say that it is a rule of prudence of general application regard less of the circumstances of the case and the quality of expect evidence. No hard and fast rule can be laid down in this behalf but the court has to decide in each case on its own merits what weight it should attach to the opinion of the expert. In the instant case the opinion evidence of hand writing expert was not so high as to commend acceptance without corroboration.

The court further said that it is well settled that evidence regarding the identity of the author of any document can be tendered —

- i. by examining the person who is conversant and familiar with the hand writing of such person, or
- ii. through the testimony of an expert who is qualified and competent to make a comparison of disputed writing and the admitted writing on scientific basis, and
- iii. by the court comparing the disputed document with the admitted one.

In the present case the prosecution has resorted to the second mode by relying on the opinion evidence of the handwriting expert. But since the science of identification of hand writing by comparison is not an infallible one, prudence demands that before acting on such opinion the court should be fully satisfied about the authorship of the admitted writings which is made sole basis for comparison and the court should also, be fully satisfied about the competence and credibility of the hand writing expert. It is indeed to that by nature and habit, over a period of time, each individual develops certain traits which give a distinct character to his writings making it possible to identify the author but it must at the same time be realized

that since hand writing experts are generally engaged by one of the contesting parties they, consciously or unconsciously, tend to lean in favour of an opinion which is helpful to the party engaging him that is why we come across cases of conflicting opinions given by two hand writing experts engaged by opposite parties.

It is, therefore, necessary to exercise extra care and caution in evaluating their opinion before accepting the same. So courts have as a rule of prudence refuse to place implicit faith on the opinion evidence of a hand expert. Normally courts have considered it dangerous to base a conviction solely on the testimony of a handwriting expert because such evidence is not regarded as conclusive. Since such opinion evidence cannot take the place of substantive evidence, courts have, as a rule of prudence, looked for corroboration before acting on such evidence. True it is, no rule of law that the evidence of a hand writing expert can not be acted upon unless substantiated but courts have been slow in placing implicit reliance on such opinion evidence, without more, because of the imperfect nature of the science of identification of hand writing and its accepted fallibility. There is no absolute rule of law or even of prudence which has ripened into a rule of law that in no case can the court base its findings solely on the opinion of a hand writing expert but the imperfect and frail nature of the science of identification of the author by comparison of his admitted hand writing with the disputed ones has placed a heavy responsibility on the courts to exercise extra care and caution before acting on such opinion. Before a court can place reliance on the opinion of an expert, it must be shown that he has not betrayed any bias and the reasons on which he has based his opinion are convincing and satisfactory. It is for this reason that the courts are wary to act solely on the evidence of a hand writing expert: that, however, does not mean that even if there exist numerous striking peculiarities and mannerisms.

5.13 THE VALUE OF SCIENCE OF DNA PROFILING

In *Jaspal Singh, Jindra and another v. State of Punjab*,²¹³ The hon'ble Supreme Court expressly mentioned what the important value the science of finger prints has; the court delivered that science of identifying thumb-impression is an exact science and does not admit of any mistake or doubt.

²¹³ AIR 1979 SC 1708.

To keep the doubt beyond, it is necessary to mention here that the thumb- impression identification is a part of the science of finger prints in which we only tally the ridges and minutiae on thumb print instead of all ten fingers. As it has been mentioned earlier that a print of a respective finger consist the characteristics or ridges and minutiae which only can match the finger of which these are taken out of all the finger in the world.

In this case a particular witness Tejkaur's (Mother of Deceased) statement on a paper which was duly attested with her thumb impression submitted. In this statement it was mentioned that the statements of the other witness are false and wrong. But the thumb- impression given on this paper when examined by an expert declared not same to as or real Tejkaur's. The court expressed that such written statement demonstrates that that it was along with thumb-impression was not given by the real Tejkaur but by some other women who appeared to represent her falsely.

In *Ranga and Billa Case*,²¹⁴ In this famous case two innocent children of an Army officer namely Geeta Chopra & Sanjay Chopra Aged 16 and 18 years respectively, were abducted and brought to a solitary place where the girl was raped and there after the both were murdered brutally. From the scene of crime 8 (eight) chance prints were taken and developed. These prints were sent to the Central Finger Prints Record Bureau for the comparison. On comparison all the chance prints were found identical with two habitual offenders namely Ranga & Billa. Later both were declared convict in this case and sentenced with death penalty.

In *Nitish Katara Murder*²¹⁵ case was also due to the fingerprints. The chance prints taken from the place of occurrence, on comparison exactly matched with on Vikas Yadav son of D. P. Yadav, Member of Parliament, Vikas Yadav was the main suspect since beginning. In brief the facts of the case are that the deceased Nitish Katara fallen in love with accused Vikas Yadav's sister namely Bharti Yadav. The accused did not like this relationship, he threatened the deceased to break this relationship but the deceased ignored it and remained to continue with his lover. One day when the deceased went his college he was abducted, later on his

²¹⁴ *Kuljeet Singh @ Ranga v. Union of India and Anr.*, (1981) 3 SCC 324.

²¹⁵ Case pending before the Supreme Court.

dead body was recovered with the Vikas Yadav. His accusation held, he was charged with the commission of offence of abduction and murder. The case is still pending under the trial.

In this way the fingerprints not only linked a crime with the criminal but also helped a lot to investigation personnel in solving the cases by providing them valuable scientific evidence against the criminals.

Chapter VI

DNA PROFILING AND HUMAN RIGHT

As human right, it is said, are those rights which inhere in every human being by virtue of being a 'member of human family'. They are universal and cut across all national boundaries and political frontiers. UDHR, 1948 has been hailed that 'common standard of achievement for all peoples and nations. Thus every aspect or attribute of human dignity is human right.

The preamble to the UDHR, 1948 proclaims thatit is essential if man is not to have recourse, as a last resort to rebellion against tyranny and operation, that right should be protected by the rule of law.

Article 3 of the UDHR further provided that. '*Everyone has a right to life, liberty and security of person*'

The criminal justice system in India has deficiencies, both substantive and procedural. Some among the more serious manifestation of this deficiency are distorted proportion between number of convicted person and under trial prisoners in the breakup of the prisoners' population. The NHRC commission is deeply concerned over the phenomenon of unscientific police investigation need to include DNA finger printing as scientific tools in solving cases relate to criminal justice system.

The right to fair trail which includes the right to speedy trail is a part of our international obligation. So is our duty to organise our legal system and courts to comport with the mandate of article 9(3) and article 14(1) of ICCPR. Also section 309(1) of Cr.p.c criminal case requires greater urgency in their settlement. Indeed, this right to speedy trial is part of our fundamental law under art-21 of the constitution of India as said in A.R. Antuley v nayak case.²¹⁶

Whether one defines a 'miscarriage of justice' as convictions that are 'unsafe' in law as required by criminal appeal legislation or a 'wrongful conviction' in terms of the wrongful conviction of the factually innocent as understood in a lay or public discourse sense,²¹⁷ a range of rights issues can be conceived as coming into play. For instance, the violation of the fundamental *right to liberty* enshrined in Article 5 of the European Convention on Human Rights (ECHR) ratified by the introduction of the Human Rights Act 1998 (HRA) is self-evident

²¹⁶ A.R. Antuley v nayak 1992(1)SCC225

²¹⁷ see M. Naughton, *Rethinking Miscarriages of Justice* (Palgrave Macmillan: Basingstoke; New York, 2007) 14-36; published I international journal of evidence and proof, visited at <http://www.westlawindia.com>

where wrongful incarceration has resulted from a miscarriage of justice. Further, the *torture, inhuman and degrading treatment* suffered by many wrongful conviction victims brings Article 3 of the ECHR into view.²¹⁸ Indeed, even where the miscarriage of justice did not lead to incarceration, the traumatic ordeal of the wrongful arrest, prosecution and conviction, and the social stigma and damage to reputation that often accompany a criminal conviction, can leave permanent scars, not only in a literal physical sense but, also, in a social, psychological and financial sense. Moreover, the many thousands of people who overturn their miscarriages of justice through a successful appeal against their conviction each year in the United Kingdom stand testimony to the inherent and widespread unfairness of the way they are convicted, potentially calling the legitimacy of the entire criminal justice system into question.²¹⁹

However, these apparent breaches of human rights provisions are only discovered *retrospectively*, and are not officially recognised unless and until alleged victims of miscarriages of justice/wrongful conviction and/or imprisonment overturn their convictions through a successful appeal. Until such time as convictions are overturned in the appeal courts, the treatment of victims of miscarriages of justice/wrongful conviction is deemed to be legitimate punishment for crimes that they are legally guilty of.

This, then, raises a crucial question that this article will specifically address, namely, the issue of the rights that *might* apply to alleged innocent victims when they are seeking to overturn their wrongful convictions.

On this matter, Article 27(1) of the Universal Declaration of Human Rights (UDHR)²²⁰ states that:

Everyone has the right ... to share in scientific advancement and its benefits.

This is reinforced by Article 15(1)(b) of the International Covenant on Economic, Social and Cultural Rights (ICESCR)²²¹ which recognises the right of everyone: To enjoy the benefits of scientific progress and its applications.

²¹⁸ M. Naughton, 'Why the Failure of the Prison Service and the Parole Board to Acknowledge Wrongful Imprisonment is Untenable' (2005) 44(1) *Howard Journal of Criminal Justice* 1-11; M. Naughton, 'Does the NOMS (National Offender Management Service) Risk Assessment Bubble Have to Burst for Prisoners who May Be Innocent to Make Progress?' (2009) 48(4) *Howard Journal of Criminal Justice* 357-72; published in *International Journal of Evidence and Proof*, visited at <http://www.westlawindia.com>

²¹⁹ *Ibid*

²²⁰ Universal Declaration of Human Rights (1948), available at <http://www.un.org/en/documents/udhr/>; accessed 23 July 2010.

²²¹ International Covenant on Economic, Social and Cultural Rights (ICESCR) (1976), available at <http://www2.ohchr.org/english/law/cescr.htm>

These provisions contained in the International Bill of Rights²²² have been described by William Schabas²²³ as relatively neglected and under-developed human rights at the ‘tail end of Universal Declaration of Human Rights’. Yet, Schabas highlighted how the right to benefit from scientific progress combines with other rights such as the right to health, to food, to clothing, to housing and to education, and how it is also relevant to the civil and political right to receive and impart information.

In illustration, Schabas made reference to the centrality of advancements of medical science in Article 12 of the ICESCR, the ‘right of everyone to the enjoyment of the highest attainable standard of physical and mental health’, such as the reduction of the stillbirth rate and infant mortality, the healthy development of the child and the need for signatory states to create conditions which would assure to all medical service and medical attention in the event of sickness.

Likewise, Schabas²²⁴ observed how Article 11(2) of the ICESCR, the right ‘to be free from hunger’, is directly related to the right to share in the benefits of scientific advancements, as follows:

The States Parties to the present Covenant, recognizing the fundamental right of everyone to be free from hunger, shall take ... the measures, including specific programmes, which are needed ... [t]o improve methods of production, conservation and distribution of food by making full use of technical and scientific knowledge, by disseminating knowledge of the principles of nutrition and by developing or reforming agrarian systems in such a way as to achieve the most efficient development and utilization of natural resources

It is crucial to note, also, that the ICESCR specifies that signatory states are required to do all that they can to afford all citizens these rights without prejudice or discrimination: The States Parties to the present Covenant undertake to guarantee that the rights enunciated in the present Covenant will be exercised without discrimination of any kind as to race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status.

²²² The International Bill of Rights also includes the International Covenant on Civil and Political Rights (ICCPR) which is not referenced in this analysis, see International Covenant on Civil and Political Rights (ICCPR) (1976), available at <<http://www2.ohchr.org/english/law/ccpr.htm>>.,

²²³ W. Schabas, ‘Study of the Right to Enjoy the Benefits of Scientific and Technological Progress and Its Applications’ in Y. Donders and V. Volodin (eds.), *Human Rights in Education, Science and Culture: Legal Developments and Challenges* (UNESCO: Paris; Ashgate: Farnham, 2008) 273-9

²²⁴ *Ibid.*

Relation of DNA fingerprinting with Human Right

Although the right to science is not legally binding it renders a moral and political argument about the need for reliability in criminal convictions legally cognizable, thus improving the argument made here for access to official Deoxyribonucleic Acid (DNA) testing for the purpose of challenging the reliability of contested convictions in the United Kingdom (UK). Here we analyse, critically, the reviews undertaken by the CCRC, highlighting the extent to which it can be conceived to have denied the applicants in the cases cited the benefits from DNA science that could prove their innocence due to the way that it is statutorily remitted. It is concluded that the interests of justice require that all attempts must be made to ensure the reliability of criminal convictions, meaning in this context that convicted persons maintaining innocence must have access to the most appropriate and up-to-date DNA techniques that could help exonerate them if they are innocent and even lead to the conviction of the real perpetrators of the crimes

The use of DNA testing in post-conviction cases to exonerate factually innocent individuals has been a widespread phenomenon over the last two decades. The driver of this movement has been The Innocence Project, founded in 1992 by Barry Scheck and Peter Neufeld at the Benjamin N. Cardozo School of Law at Yeshiva University to assist prisoners who could be proven to be actually innocent through DNA testing. At the time of writing (January 2010), 249 people in the US have been exonerated by DNA testing, including 17 who served time on death row.²²⁵ These successful DNA exonerations have had significant impacts on * criminal justice reforms in the US. On a federal level, the Justice for All Act of 2004²²⁶ introduced the Innocence Protection Act,²²⁷ which allows all prisoners convicted of federal offences who are maintaining 'actual innocence' access to DNA testing if, amongst other criteria, the following are satisfied:

The specific evidence to be tested must not have been previously tested, except that testing using a newer and more reliable method of testing may be requested; the proposed DNA testing may produce new evidence raising a reasonable probability that the applicant did not commit the offence.

In the case of *District Attorney's Office v Osborne*,²²⁸ rejected a lower federal court ruling that William Osborne, a black man in Alaska convicted in 1994 of kidnap and sexual assault of a prostitute in Anchorage, had a constitutional, due process right to access DNA testing that could exonerate him. The main objective of the criminal justice system is to get to the truth of alleged wrongful convictions, even where both the biological evidence and the

²²⁵ The Innocence Project, 'About Us', 2010, available at <<http://www.innocenceproject.org/about/Mission-Statement.php>>

²²⁶ **Justice** for All Act of 2004 (H.R. 5107, Public Law 108-405).

²²⁷ Innocence Protection Act of 2004 (introduced under the **Justice** for All Act of 2004) Public Law 108-405

²²⁸ *District Attorney's Office v Osborne* No. 08-06 (US 18 June 2009).

DNA technology exist to do so. Against this background, the following section draws from two case studies that derive from the investigations of the University of Bristol Innocence Project (UoBIP) that were allocated by the Innocence Network UK (INUK), an umbrella organisation that currently has 25 member innocence projects based in universities in England, Scotland and Wales.²²⁹ Both cases involve prisoners maintaining innocence who are currently serving life sentences for murder and who have exhausted the normal appeals process. They illustrate the existing difficulties for convicted persons maintaining innocence to prove their claims of innocence through DNA testing.

However, as the cases of Neil Hurley and Simon Hall demonstrate, the potential for exonerating alleged innocent victims of wrongful conviction offered by the range of available DNA testing technologies is of little, if any, relevance to the CCRC's restricted remit of reviewing the legal safety of the evidence that led to the convictions of its applicants.

Hence, and perhaps unsurprisingly, although numerous exhibits exist that may contain biological samples yet to be subjected to any forms of DNA testing, the CCRC failed to see the obvious possibility of DNA exoneration in Neil Hurley's case. Moreover, the CCRC can be conceptualised as displaying a *systemic* apathy towards the plight of possible innocent victims of wrongful conviction. This is illustrated by its apparent unwillingness to investigate all avenues provided by DNA testing technologies in the case of Simon Hall. There, routine DNA testing had been conducted which failed to yield any conclusive results, but the possibility remains that he could be exonerated through more advanced and appropriate DNA tests.

It is also crucial to note that a requisite component of the right to access DNA testing is the preservation of biological evidence retrieved from crime scenes. Indeed, returning to the example of the US, the Federal Government is mandated under s. 3600A of the Justice for All Act of 2004 (or Innocence Protection Act)²³⁰ to ensure the preservation of biological evidence in criminal cases. This includes the retention of sexual assault forensic examination kits, semen, blood, saliva, hair, skin tissues and other identified biological material.

In contrast, in the UK it is legitimate under existing provisions to destroy, even prior to conviction, many of the biological items that may exonerate alleged innocent defendants. Whilst the police in this jurisdiction are mandated under the Criminal Procedure and Investigations Act 1996 (CPIA) to retain all case materials at least until the person is released from custody, the CPIA does not cover third parties such as the FSS. Instead, the main provisions relating to the retention of case material are detailed in a 'Memorandum of Understanding' between the Association of Chief Police Officers (ACPO) and the FSS. These are simply 'best practices' rather than mandatory provisions, imposing on forensic scientists specific duties in relation to the preservation of material.²³¹ Moreover, although under this Memorandum, case materials in murder cases and other serious offences will be kept for 30

²²⁹ Innocence Network UK, 2010, available at <http://www.innocencenetwork.org.uk>;

²³⁰ R. Schehr, 'A View from the United States' in Naughton, above n. 46 at 208-9

²³¹ Crown Prosecution Service, 'Disclosure of Unused Forensic Material', 2010, available at http://cps.gov.uk/legal/d_to_g/disclosure_manual/disclosure_manual_chapter_23/

years as a matter of course, it does not tend to cover 'items of a perishable nature' such as blood samples, saliva samples and other biological swabs. In the case of Neil Hurley, a 'Notification of Intention to Destroy Items of a Perishable Nature' was issued on health and safety grounds by the FSS two weeks before his date of conviction. Crucially, the Notification called for the destruction of blood and saliva samples, various medical swabs, as well as hair and fingernail samples obtained from the deceased, amongst other items, meaning that the evidence that might prove his innocence may have been destroyed.²³²

What is apparent from this analysis, then, are the systemic obstacles, both in terms of the operations of the CCRC and of the (lack of) adequate provisions to ensure the preservation of evidence, that combine to limit the access of alleged innocent victims of wrongful conviction to DNA testing that could exonerate them.

The CCRC is restricted by statute to determine not if applicants are factually innocent victims of wrongful conviction but, rather, whether their convictions are 'safe in law'. In consequence, its reviews of alleged miscarriages of justice centre on whether the prevailing rules of criminal appeal are complied with and the pursuit of 'fresh evidence' and/or 'fresh argument' not available at the time of the original trial. This is at the expense of investigations that seek to validate whether a claim of innocence may be genuine, with the result that the capacity of DNA testing to exonerate those who are truly innocent has not been fully harnessed or capitalised upon.

The embracement of advancements in DNA science, however, has wider implications in terms of the benefits to the criminal justice system as a whole. In the US, the Innocence Protection Act has encouraged an investment in science by the criminal justice system that has potential benefits for all citizens, in terms of allowing a means of overturning wrongful convictions if and when they occur. Conversely, the failure of the CCRC to capitalise upon the advancements in DNA testing techniques in reviews of alleged wrongful convictions serves to deprive potentially innocent victims from having their innocence established. At the same time, it has also, arguably, blocked the criminal justice system as a whole from benefiting from advancements in DNA science which can get to the truth of claims of wrongful conviction and even bring to justice the real offenders who are at liberty, having the potential to commit further crimes.

The moral and political argument made here is that the system that deals with alleged miscarriages of justice must place the need to seek the truth of claims of innocence above the legality and procedural 'safety' of guilty verdicts. This is bolstered by the legally cognisable rights contained within the international human rights instruments. Although the right to benefit from advancements in science is not legally binding in the UK, this right was included in the International Bill of Rights because of the universal recognition of the importance of scientific advancements to the well-being, and even survival, of citizens. In the same way, for as long as alleged innocent victims of wrongful conviction have no legally enforceable right to DNA testing, they are deprived of possibly the only way to settle a contested criminal conviction and restore the liberty of those who are, indeed, innocent. Such a right is therefore

²³²

essential to ensuring that the criminal justice system truly operates in the interests of truth and justice.

Case analysis

*Res Publica*²³³ is the The main objective of genomics and international justice have adopted the concept of 'global public goods' to support both the view of genomics as a benefit and the sharing of genomics knowledge across nations. The concept of 'global public goods' appears to have been adopted as one strategy to support the sharing of genomics knowledge across nations. The HUGO Statement on Human Genomic Databases²³⁴ (December 2002) defines a genomic database as 'a collection of data arranged in a systematic way so as to be searchable. Genomic data can include *inter alia*, nucleic acid and protein sequence variants (including neutral polymorphisms, susceptibility alleles to various phenotypes, pathogenic mutations), and polymorphic haplotypes. This DNA database is currently used only for "fingerprinting" or identifying an individual, and tells you nothing further about the individual or their genomic make-up. The difference between different types of database will be found to be extremely pertinent to whether or not they count as global public goods.

The Attorney General²³⁵ referred a question concerning the interpretation of the Police and Criminal Evidence Act 1984 s.64(3B)(b), which prohibited the use of a DNA sample that should have been destroyed for the purposes of an investigation, following the acquittal of B on a charge of rape. A DNA sample that had previously been taken from B in connection with an unrelated burglary had not been destroyed as required by s.64 (1) and had been relied on in connection with the rape charge. The trial judge had found that s.64(3B)(b) was mandatory with the result that the DNA evidence was inadmissible. The Court of Appeal subsequently upheld that decision ([2000] 3 W.L.R. 1164). B argued that there had been a breach of the European Convention on Human Rights 1950 Art.8, which provided that the right to respect for an individual's private and family life was not to be interfered with where such interference was, *inter alia*, "in accordance with the law". B contended that since s.64 (1) required a DNA sample to be destroyed following an acquittal, the admission in evidence of the results of an investigation that was prohibited by virtue of s.64(3B)(b) could not satisfy that requirement.

[Criminal Procedure \(Scotland\) Act 1995 s.18](#), the Scottish Parliament could not have intended to authorise the taking of a relevant sample from a person who had been taken into detention and had been charged, without a warrant or informed consent to do so²³⁶.

²³³ Ruth Chadwick, Sarah Wilson Genomic databases as global public goods? *Res Publica* 2004

²³⁴ Ruth Chadwick, is Vice-Chair of the HUGO Ethics Committee which issued the *Statement on Human Genomic*

Databases. http://www.hugo-international.org/hugo/HEC_Dec02.html.

²³⁵ Attorney General's Reference (No.3 of 1999), Re Also known as: R. v B 14 December 2000

²³⁶ HM Advocate v Cowie (Yvonne Logan) High Court of Justiciary 02 November 2011

The Criminal Justice Act 1988 was passed by Parliament on July 29, 1988, incorporating the amendment as Schedule 14: "Body Samples The provisions of the Schedule are designed to produce bodily samples for the purposes of DNA fingerprinting, the revolutionary new procedure by which scientists are able to determine with absolute certainty whether a particular bodily sample originated with a particular individual."²³⁷

The Police and Criminal Evidence Act 1984 (hereinafter, "PACE"), The gist of section 64 of PACE is that where an identification procedure has been performed on an individual who was subsequently acquitted, the *res* that was produced by the procedure (*viz.* the item, be it a fingerprint or a hair sample, that might otherwise be used in future for identification purposes) ought to be destroyed to protect the privacy and dignity of the individual, who, after all, stands in no different position *vis-à-vis* the criminal justice system than any other unconvinced person. Of course, section 64 of PACE was enacted prior to the development of the DNA fingerprinting technique. Since the broad purpose of the Schedule is to obtain identification evidence in the form of DNA fingerprints, we might have expected that the incarnation of section 64 in the Schedule would have accounted for the essential difference between dactylographic fingerprints and DNA fingerprints: that is, the *rest* of a DNA fingerprint is the end product, the unique bar code formation, and not the bodily sample from which it is derived. In fact, once a DNA fingerprint has been produced from a suspect's sample, the sample itself is nothing more than biological refuse.²³⁸

The Law Commission's²³⁹ Consultation Paper and more recent report on *Expert Evidence in Criminal Proceedings in England and Wales* are very timely interventions. not necessarily portray English law and the problems with expert evidence, particularly forensic science and medicine, in such unflattering terms, it concedes that too much unreliable expert opinion evidence is currently being admitted in criminal proceedings and occasionally questions the value of elements of the adversarial trial. In consequence it recommends a range of reforms, with a renewed emphasis on *reliability* and increased use of a new statutory power to appoint an expert as the centrepieces.

1. The Law Commission Report and its recommendations²⁴⁰

²³⁷ K. F. Kelly et al. , "Method and Applications of DNA Fingerprinting: A Guide for the Non-Scientist" [1987] Crim.L.R. 105; R. M. White & J. J. D. Greenwood, "DNA Fingerprinting and the Law" (1988) 51 M.L.R. 145; "DNA Identification Tests and the Courts" (1988) 63 Wash.L.Rev. 903; and D. Burk "DNA Fingerprinting: Possibilities and Pitfalls of a New Technique" (1988) 28 Jurimetrics 455; and M. A. Gelowitz, "DNA Fingerprinting: What's Bred in the Blood" (1988), 65 C.R. (3d)

²³⁸ Mark A. Gelowitz Legislative Comment "Yet he opened not his mouth": a critique of Schedule 14 to the Criminal Justice Act Criminal Law Review 1989

²³⁹ Gary Edmond Is reliability sufficient? The Law Commission and expert evidence in international and interdisciplinary perspective: International Journal of Evidence & Proof 2012

²⁴⁰ Law Commission, The Admissibility of Expert Evidence in **Criminal** Proceedings in England and Wales: A New Approach to the Determination of Evidentiary Reliability, Law Com. Consultation Paper No. 190 (2009), available <http://www.justice.gov.uk/lawcommission/docs/cp190_Expert_Evidence_Consultation.pdf>, accessed 10 October 2011;

Our proposed reforms would introduce a *framework for effectively challenging the admissibility of expert opinion evidence* in any appropriate case and a basis for being able *properly to investigate and determine evidentiary reliability*.

The recommendations in the Report purport to codify the English common law and combine it with an explicit reliability standard in order to regulate the admission of all expert opinion evidence in criminal proceedings.⁵ The aim is to produce 'a new, critical approach to expert evidence (supported by appropriate training for legal practitioners and the judiciary)'. This new approach is intended to provide a framework that enables lawyers to 'effectively challenge' expert opinion evidence in order to 'properly' evaluate 'evidentiary reliability' before it is placed before a jury.

This follows from the current principle of *laissez-faire* approach to admissibility. i.e 'culture of acceptance' on the part of some trial judges, particularly in relation to evidence of a scientific nature.

According to the Report, expert opinion evidence has been 'admitted in criminal proceedings too readily and with insufficient scrutiny'.

Indian Constitution in tune with international endeavours, provides four basic principles to govern the criminal justice system.

1. *Presumption of innocence*

As the human rights, the emphasis is on basic human dignity the basic principle that an individual is presumed to be innocent till the contrary is proved against him, has been enshrined in art-21 of Indian constitution (vide judicial interpretation by the supreme court) and in article 14(2) of the international covenant of civil and political rights 1966.

2. *Prevention of ex-post facto operation of criminal law*

The second principle is that no person can be accused and convicted of an offence for an act which was not an offence under the law in force on the date when it was committed. This principle has been enshrined in art-20(1) of the constitution of India and article 11(2) of the UDHR-1948.

3. *Protection against 'double jeopardy'*

The third principle in ensuring human Rights is the protection against 'double jeopardy'- that is, no person can be punished for the same offences twice. This has been enshrined in the Indian constitution in article 20(2) and also in criminal procedure code.

4. *Due process concept*

The most important principle that no person shall be deprived of his life and liberty except according to the procedure established by law has been enshrined in art-21 of the

constitution, whose scope has extended by judicial interpretation by the Supreme Court. It gives protection not only against executive action but also legislation. This principle is also contained in article 9 of the international covenant on civil and political rights¹⁹⁶⁶.

In criminal justice administration, police through their restrictive and coercive authority, effect arrests, interrogate, search, seize, and detain people prior to trial. These entire actions affect individual's liberty and when done arbitrarily dignity²⁴¹. To prevent arbitrariness, following safeguards have been provided:

- a. Right to freedom from unwanted arrest; Art-21 and 22 (1)
- b. Right to reasonable investigation, interrogation, search, seizure, etc. Art-14(g) and 20(3)
- c. Right to legal defence; Art-22(1) and Cr.p.c 1973, sec-303
- d. Right to fair pre-trial detention; and
- e. Right to an open (public) and speedy trial. Art-14, 19(1)(a) and 21.

And under Cr.p.c-1973 following Human Rights are given to accused person even against DNA Fingerprinting.

- a. Protection against arbitrary or unlawful arrest. (Art-22 of the constitution and sec-41, 55 and 151 Cr.p.c).
- b. Protection against arbitrary or unlawful searches. (sec- 93, 94, 97, 100(4) to (81) and 165 Cr.p.c).
- c. Protection against "double jeopardy" Art-21(2) of the constitution and sec-300 of Cr.p.c.
- d. Protection against conviction or enhanced punishment under ex- post facto law. Art-21 of the constitution.
- e. Protection against arbitrary or illegal detention. Art-22 of the constitution and sec-56, 57 and 76 of Cr.p.c.
- f. Right to be informed of the grounds, immediately after the arrest. Art-22(1) of the constitution and sec-50, 55 and 75 of Cr.p.c.
- g. Right of arrested person not to be subjected to unnecessary restraint (sec-49 of Cr.p.c).

²⁴¹ (1969 Cr.L.J.1440)

- h. Right to consult a lawyer of his own choice. Art-22 of the constitution and sec-303
- i. Right to be produced before magistrate within 24 hours of his arrest Art-22(1) of the constitution and sec-57, 76 of Cr.p.c.
- j. Right to release on bail, if arrested.sec-436,437 and 439 cr.p.c
- k. Right not to be a witness against himself.Art-20(3) of the constitution.
- l. Right to get copies of the documents and statements of witnesses on which the prosecution relies. (Sec-173(7), 207,208 and 238 Cr.p.c)
- m. Right to have the benefit of the presumption of innocence till guilt is proved beyond reasonable doubt.sec-101-104 India Evidence Act-1872.
- n. Right to insist that evidence be recorded in his presence except in some special circumstances.(sec-273 and 317 of cr.p.c)
- o. Right to have due notice of the charges.sec-218,228(2), 240(2) of Cr.p.c etc.
- p. Right to test the evidence by cross- examination.sec-138 India Evidence Act-1872.
- q. Right to have an opportunity for explaining the circumstances appearing in evidence against him at the trail (sec-313 f Cr.p.c
- r. Right to have himself medically examined for evidence to disprove the commission of offences by him or for establishing commission of offences by him or for establishing commission of offence against his body by another person sec-54 of Cr.p.c
- s. Right to produce defence witness (sec-243 of Cr.p.c)
- t. Right to be tried by independent and impartial judges. Sec- 179,327,191,etc of Cr.p.c
- u. Right to submit written arguments at conclusion of the trail in addition to oral submission. (Sec-3014-cr.p.c).
- v. Right to be heard about the sentence upon conviction. (Sec-235(2) and 248(2) Cr.pc.
- w. Right to fair and speedy investigation and trail (sec-309 of Cr.p.c)
- x. Right to appeal in case of conviction. Sec-351,374,379,380 of Cr.pc and Art-132(1),134(1) and 136(1) of the constitution.

- y. Right not to be imprisoned upon conviction in certain circumstances (sec- 360 of cr.p.c and sec-6 of the probation and offender Act.
- z. right to restrain police from intrusion on his privacy (Art-31 of the constitution)
- aa. Right to release of a convicted person on bail pending Appeal (sec-389 of Cr.p.c)
- bb. Right to get copy of the judgment when sentenced to imprisonment. Sec-363 of cr.p.c

Human rights of the victims

Human Rights ensure that the victim is:-

- a. To be free from intimidation,
- b. To be informed about the availability of financial assistance,
- c. To get back stolen or other personal property which is no longer needed as evidence, and
- d. A speedy investigation and trial of the case

The council of Europe for improving victim protection has emphatically asserted that

- a. The victim should be treated in the police station in a sensitive manner so that he is not subjected to any additional emotional damages.
- b. The victim should be appraised of the possibilities of receiving financial, medical and psychological help.
- c. He should be advised about the restitutorial claims and compensation from the state.
- d. The victim should be protected from secondary victimization i.e., additional damage during the process of criminal justice.
- e. The family and friend of the victim should be protected from further victimization and threat.

.....

Chapter VII

CONCLUSION AND SUGGESTIONS

In the words of TS Eliot, “Where there is life, we have lost in living; where there is wisdom, we have lost in knowledge; where there is knowledge, we have lost in information”. Philosophers, poets and jurists have often remarked that there is a subtle demarcating line between ‘information’ and ‘knowledge’. It is said, information is the key to unlock the treasure of knowledge, which paves the way of ‘wisdom’. Thus information is the means, not an end in itself. Through present study it is strived to assimilate information in the preceding chapters which shows how and to what extent DNA technology as a latest tool of forensic science, discovered by Professor Alec Jeffreys, aids in the providing of a better administration of justice system than the conventional legal structure. In this chapter, an endeavour would be made to analyse the scope of DNA technology as it is being applied in India and other countries in the administration of justice.

With the development of science and technology, forensic science becomes a more accurate and effective instrument in solving various complex cases. Its examination and results are guided by pure science, The importance of forensic science in the administration of justice has tremendously increased after emergence of DNA technology. Before invention of this new technology DNA profiling was introduced to establish the identity of an individual in forensic cases. Forensic DNA experts use to identify people and determine the source of biological evidence such as blood or semen found at a crime scene. DNA testing is a powerful, sensitive and effective aid in pointing to the guilty and absolving the innocent.

An attempt has been made to provide a brief idea about the methods and procedural formalities of DNA profiling. It is thought to establish the identity of an individual in forensic cases. The technique is exclusively used for forensic purposes. Deoxyribonucleic Acid (DNA) is the vehicle of generational transference of heritable units. While searching markers for genetic diseases, Prof Alec Jeffrey’s discovered that certain regions of DNA showed variations in the number of tandem repeats known as variable number of tandem repeats (VNTR). Thus, DNA fingerprinting was named by observing the number of repeated sequences which differ

from individual to individual. The structural DNA is quite flexible, within the nucleus of each cell resides an identical copy of the individual genetic material, i.e., DNA. DNA fingerprinting can be applied to identify an individual in criminal and civil cases.

It has been said that in conventional legal system, conviction or acquittal of an accused largely depends upon the subjective knowledge of the eyewitnesses, which are always fallible, and there is always a chance of wrong conviction or acquittal. But DNA evidence is based on wholly objective experimental scientific reasoning which is much more accurate, conclusive, infallible, and above all, impartial in nature and therefore if we can utilise this technology in both investigation and trial stages properly, then the chances of wrong conviction or acquittal would be minimised. DNA analyses on saliva, skin tissue, blood, hair, semen or other body fluids can now be reliably used to link criminal to crime and this new technology can be effectively used in solving not only various criminal cases like rape, murder, etc, but also in paternity or maternity disputes, baby exchanging cases, in several civil litigations like succession, maintenance proceeding and matrimonial disputes, etc. It is worthwhile to note that emergence of this new technology changes the role of forensic science from passive spectator to main key-player.

Further the actual application of DNA technology from an international perspective. As it has already been noted that in the United States of America, initially, before the pronouncement of Daubert's case, the Supreme Court held very conservative views regarding admissibility of scientific evidence like DNA fingerprinting, but after the Daubert (1993) decision, this new technology has been extensively used not only in solving pending cases, but also in many cases where innocents people might be convicted by human evidence.

An overview of the application of DNA fingerprinting in the Indian legal system. The causes which prevents DNA technology from being used widely in our legal system are sought. These are: first, absence of any specific DNA legislation which will guide both the investigating agencies in conducting investigation and also the judges in detecting or evaluating DNA test. Secondly, conservative judicial approach regarding admissibility of DNA evidence. As it has been pointed out earlier, in the *Gautam Kundu's case*, that our Supreme Court expressed a most reluctant attitude regarding application of DNA technology in resolving paternity dispute cases. It transpires from the said judgment that there is no law in India by which a person can be compelled to undergo a blood test.

In English law, if an adult unreasonably refuses to have a blood test, it is open to the court to take his refusal as evidence against him and may draw an inference therefrom adverse to him. Unfortunately, in India, if a person refuses to undergo blood test, he is protected by the individual right against self-incrimination under Art. 20(3) of the Indian Constitution. Similar view has been taken in the recent judgment of the Supreme Court in *Kamti Devi v. Poshi Ram*.²⁴² It is very interesting to note that in all our Supreme Court judgments where acceptability of DNA evidence has come in question, the Hon'ble Judges of the court, in deciding cases, relied upon the unscientific traditional rule of evidence rather than scientific DNA evidence, although they have never raised any question regarding the scientific accuracy of this evidence. Thus, our Constitutional law, conservative judicial decisions, the Code of Criminal Procedure 1973 and the Indian Evidence Act 1872: the entire legal regime is not ready to accept and utilise this new scientific advantage as a fresh means of ascertaining the truth. Thirdly, lack of forensic awareness amongst judges, lawyers, investigating agencies and in the victims, prevent this new technology from implementation in our law system.

However, of late in *Sharda v. Dharmpal*,²⁴³ the Supreme Court took a very positive view by distinguishing its earlier decision in *Gautam Kundu* case it further held that right to privacy under Art. 21 of the Constitution is not an absolute right and in a case of conflict between the fundamental rights of the two parties, the court has to strike a balance between the competing rights. Fourthly, lack of interaction between science and law and inadequate infrastructure and resources are the practical reasons for the minimal application of forensic DNA testing in India.

Our criminal justice system seems to be near collapse and the situation has grown much worse day-by-day. Moreover, inordinate delay in disposal of criminal cases has led to huge pending all over the country. The criminal justice system does not seem to operate evenly, as which and the powerful hardly get implicated and even much less convicted in cases of serious crimes. The growing nexus between crime and politics has added a new dimension to the crime scenario. Victims feel ignored and are crying for attention and justice. Therefore, not only our criminal justice system is slow, ineffective, inefficient, but also costly and corrupt.

²⁴² (2001) 5 SCC 311

²⁴³ AIR 1993 SC 2295

People, by and large, are losing confidence in the criminal justice system and fear that the country is dangerously racing towards anarchy. In this juncture, the duty of our government is to regain the lost confidence by revamping the entire criminal justice system in such a way that no guilty person escapes punishment nor does any innocent person suffer and DNA technology may play a vital role in this regard.

It is said that by proper and extensive application of modern DNA technology at the investigation as well as the trial stage, this new tool of forensic science can only provide a much more speedier, accurate and effective criminal justice system by conclusively pointing out the guilt or innocence of an accused. But this requires a study of the entire system and effective fruitful interaction between science and law. It is argued that handling scientific evidence would be improved if more data is made available or if information about successful innovations is more widely disseminated to judges, advocates and investigating agencies had developed a cohesive system in which all the component works in coordinate to achieve the common goal. But in doing so, it should be kept in mind that at the present moment, the parallel paths of forensic scientists and advocates do not intersect even though both disciplines frequently ponder on the same object. Even when their paths cross, the result is often misunderstanding rather than constructive communication.

SUGGESTIONS

The Constitution of India, by Article 51-A(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. In the light of the said constitutional provision we need the following amendments in substantive as well as procedural laws of our country:

1. Section 53 of the Criminal Procedure Code 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 CrPC should be more specific, clearer, more unambiguous, more meaningful, and more purposeful so that an investigating officer may not face any difficulty for the purpose of crime investigation.

2. Under Section 293 CrPC the reports of certain government scientific experts can be used as evidence in any enquiry, trial or other proceedings under the Criminal Procedure Code and he need not be examined as a witness. But the entry for DNA fingerprinting and diagnostics is not specific in Section 293(4) CrPC. Therefore, the expert has to give evidence in each case where a report has been given. 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, to include the scientists of this institute in Section 293(4) CrPC and to treat their reports as evidence. Otherwise it is difficult for these experts to go around the country for giving evidence at every trial, in cases where they are to give expert opinion.
3. 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 when the investigating officer or the court direct him to give DNA sample for the purpose of investigation and if he does not give consent then an adverse inference should not be drawn against him.
4. 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.
5. DNA sampling involves intrusion into three forms of individual privacy; bodily privacy in cases where the sample is taken from a person body; genetic privacy where predictive health and other information about the person is obtained from the sample; and behavioural privacy where the information is used to determine where

a person has been and what he has done. Privacy and respect for human dignity need not be abandoned when balancing civil liberties with the larger interests of the community. Formulation of sound privacy principles can enhance the integrity and legitimacy of DNA profiling. The privacy principles with a statutory backing would bring about transparency and accountability and would reassure the community that what is sacrificed for greater safety and security is done so legitimately. Though in *Sharda v. Dharmpal* the Supreme Court declared that the right of privacy guaranteed under Article 21 of the Constitution could not 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.

6. Legislation should be enacted to ensure that only government-recognised laboratories in accordance with the regulatory requirements that may be statutorily laid down conduct DNA parentage testing in India. The Family Courts Act 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.
7. Again, the law should recognise a child right to give or withhold consent to the testing of his or her own genetic sample where the child has acquired sufficient maturity and understanding of the process and its implications to safeguard his or her own interest. Legislation should provide for enabling a child above 12 years of age and having sufficient maturity to make a free and informed decision whether to submit a genetic sample for parentage testing.

BIBLIOGRAPHY

ACTS

1. The Code of Criminal Procedure Act, 1973
2. The Indian Evidence Act, 1872
3. The Constitution of India, 1950
4. The Identification of Prisoners Act, 1920

ARTICLES

Bami, H.L., "Development and Application of Forensic Science in Criminal Justice in India", *Cri.L.J.* 9 (1984).

Chattopadhyay, P.K., "Comparative study of some methods of developing latent fingerprints," *CBI Bulletin* Vol. 7 Nov. 16-18 (1999).

Harrison, R Wilson. "The Detention of Fingerprints on Documents", *Crim.L.R.* 591 (1958).

Johari, C.K., "The Science of Fingerprints", *Cri.L.J.* 110 (1995).

John, T.G., "All About Fingerprints", 1990(1) *K.L.T.* (Jour.) 2-3 (1990).

Krishnamachari, V., "DNA Fingerprinting Evidence and its Legal Admissibility", *Cri.L.J.* 241(1994).

Lernard, Hand, "Historical and Practical Consideration regarding Expert Testimony", 15 *Harv. L.R.* 40 (1901).

Leverson, Howard, "The Fingerprinting of Children", *Cri.L.J.* 698 (1980).

Maheshwari, H.S., "Bromocresol green: APH indicator suitable for development of latent finger prints on paper", *Indian Journal of Criminology and Criminalistics*, 32-34 (Jun- Dec) (1994).

Note, "Expert Evidence and the Needs of Justice". 120 *New L.J.* 953 (1970).

Oden, S. and Holsten, Von. "Detention of Fingerprints by the Ninhydrin Reaction", *Nature*, 449 (1954).

Singh, Pradeep K., "DNA Fingerprinting and Criminal Justice", 37&38 *Ban.L.J.*, 2008-09, pp. 55-64.

Staas August John, "Fifth Amendment- Statutory Dilution of the Privilege Against Self Incrimination", *Criminal Law and Criminology* 619 (1980).

Sharma, Abhijheet, "DNA Fingerprinting- A Legal Perspective", *Cri.L.J.* 142 (2004).

Sharma, S.S, "Fingerprint Science and its Evidential Significance", *Cri.L.J.* 91-93 (1995).

Walls, H.J., "The Evaluation of Scientific Evidence", *Cri.L.R.* 278 (1978).

BOOKS

Arthur, O, Richard, *The Scientific Investigator* Springfield (1970).

Ahamed, Ejaj, *Medical Evidence & Gist on Non- Medical Evidence* Asoka Law House, New Delhi (1996).

Edward, Henry, *Classification and Uses of Fingerprints* London (1897).

Gross, Hans, *Criminal Investigation* Sweet & Maxwell London (1950).

Mehta, M.K., *Identification of thumb impression and the cross examination of fingerprint experts* Bombay (1963).

Monir, M, *Criminal Investigation Practical Finger Printing Thumb Impressions Hand Writing Opinion Evidence* University Book Agency Allahad (1995).

Moenssens, Andre, *Fingerprints and the Law* Chilton Book Company Philadelphia (1969).

Mitter, V, *Law of Identification and Discovery* The Law Book Co. Allahabad (1994).

Nickolls, L.C., *The Scientific Investigation of Crime* Butterworths London (1956).

Pillai, Chandrashekhra, K.N., *R.V. Kelkar 's Criminal Procedure* Eastern Book Company Lucknow (2001)

Rao Joga, S.V., Sir John Woodroof & Syed Amir Ali's *Law of Evidence* Butterworths
Group of Company New Delhi (2001)

Seervai, H.M, *Constitutional Law of India* N.M. Tripathi Pvt. Ltd. Bombay (1993).

Sarkar, Sudipto & Manohar V.N., *Sarkar on Evidence* Wadhwa & Company Nagpur
(1999).

Singh, Deepa, *Human Rights and Police Predicament* Bright Law House Delhi (2002).

WEBSITES

<http://www.D.N.A.ebc.India.com>

<http://www/casac.ca/dna/htm>

http://www.lawcommission_of_india.nic.in/report

<http://www.diagnosiscrime.wordpress.com>
