INTRODUCTION

An impression that actual culprits escape punishment, is gaining currency. The society is peeved at this development. This situation is the result of the failure of the prosecution to produce sufficient and clinching evidence. It is possible that the courts may be convinced that the accused has committed the offence; but they are not in a position to convict him for dearth of legal and admissible evidence. Judiciary is very often depending upon 'expert evidence' for arriving at a decision on matters adjudicated by it. Their role in the administration of justice is increasing day by day. Complex and scientific evidence is becoming increasingly significant as a component of litigation, especially in criminal cases.

Since 1950s the contribution of forensic science to the legal system has changed by many orders and magnitude. No doubt, it is a result of the development in all scientific disciplines and the technology. Several new techniques have occupied the discipline of forensic science within a short span of time. This benefited all stages of the administration of justice, from the investigation of the crime to the trial stage. The proliferation of cases involving scientific evidence brings to the courts new problems connected with the evaluation of such evidence. The problem mainly relates to the fixing of standards for the admissibility of scientific evidence. The standard for admissibility of scientific evidence is the central part of modern litigation for two reasons viz. scientific evidence is more and more prevalent and important part of both civil and criminal litigation and it is also an area where admissibility may have more impact as the outcome of litigation than any other type of evidence. Therefore, it is vital for all jurisdictions to adopt a standard of admissibility, which
ensures, as much as possible that reliable and only reliable evidence is entering into the court premises. Rules governing the reliability and admissibility of scientific evidence have engendered much debate and different views were considered on who and what factors should govern such evidence. Ideally, scientific evidence introduces facts, which are beyond the common knowledge and experience of laypersons, and thereby helps the judges in arriving at a correct determination of issues. But, judges usually lack any reliable or consistent basis for evaluating the credibility of scientific expert testimony. They cannot escape from the judicial process by saying that they are not experts to evaluate the opinions adduced by persons from other disciplines. Therefore, the prominent question that stunned the legal luminaries for several decades has been "who is the apt person to evaluate the credibility of the evidence from other discipline; judge or any expert having knowledge on the subject?"

Judiciary should allow more and more scientific or other disciplines to enter into the legal fact-finding process; if it is helpful to the legal system in determining the facts in issue of a case. Judicial system must try to create a good inter-disciplinary relationship, especially, in the case of science. The discipline known as forensic science can be considered as a good example for the active law science relationship. Some minor inconsistencies are due to the difference in the approach of the discipline involved. The only question ought to be who can find out the truth? And it is immaterial whether it is by an expert or judge.

Since the advent of traditional fingerprinting, it was DNA technology, which became a helping hand to the criminal justice system. The development of this technology not only helped the law enforcement machinery to easily identify the
real culprits, but also helped accused in exonerating them from false cases. It also helps the prosecutors in establishing guilt of the accused beyond reasonable doubt and helps courts in the search for the truth. Its introduction to the criminal justice system has made revolution in identifying the violent offenders of rape and murder and in confirming their guilt with a very high degree of confidence. The great significance of the DNA typing from other biological stain evidence is that it is highly powerful in discriminating individuals than other methods. Thus, DNA testing has become the new great detective, representing the most significant advance in forensic science since the advent of fingerprinting. The impact made by the DNA evidence in the legal system is evident.

The scientific community all over the world has accepted the basic theory and the application of DNA fingerprinting. Almost all scientific literatures have covered within a short time, the theoretical and practical aspects of the technology. Courts in United States and England have accepted the evidence derived through the technique in civil and criminal cases from the end of 1980's itself. However, there are certain issues in connection with the technique and its application. Moreover, there are certain technical limitations when the technique is used in forensic setting. The issues and limitations will range from the collection of DNA samples to the interpretation of the results. One of the important problems, which has been faced by the scientific and legal community, is that how far it is possible to incorporate scientific proofs in the legal setting. It includes the elements like source of information, communication and its appreciation. An important problem faced by the judges in scientific DNA fact determination is that the judges should receive the proof given by the DNA scientist with the same degree of certainty, which has been attained by the
scientist. If there is any mistakes in the interpretation of the data's given by the DNA expert, it may result in miscarriage of justice. Therefore, cases in which DNA evidence has become the tool of identification, it is the duty of the court to check the reliability of the evidence in its full strength.

A closer scrutiny of the decisions shows that the forensic science evidence has been adjudged as unreliable and misleading to the courts, partial to the prosecution and prejudicial to the defence. If this process continues as it is, it will result in serious miscarriage of justice. It has been identified that there are two prominent issues connected with the application of forensic science. One of the most pressing issues in this regard is the constitutional or the statutory right of the criminal defendant to have access to the forensic laboratories managed by the State, especially the right of the indigent accused to get State fund for the forensic expert assistance. The other is with regard to the constitutionality and the legality of the search and seizure of the criminal defendants to get forensic samples and the validity of its use for the prosecution purposes.

The first issue almost stems from the traditional role of the forensic scientist in connection with the prosecutorial services. This paves the way for the recent criticism against forensic science service and the doubts which has been created as to whether and to what extent the forensic evidence given by the forensic agency for prosecution are balanced with the needs of the criminal defendants on defending the case. Therefore, in order to solve the said issue, one has to go through the relevant Constitutional and legal provisions of a particular jurisdiction. The relevant constitutional and statutory provisions in U.S. and India, and various case laws in both jurisdictions, shows that the State has a Constitutional duty to permit criminal defendants to have an access to the
forensic laboratories managed by the State and a special duty to give financial aid to the indigent criminal defendants who are financially incapacitated for checking the results of the forensic tests conducted against them.

The second issue focuses mainly on the Constitutionality and legality of the police powers relating to the acquiring of samples from a person suspected of committing an offence. It is also clear that there are some constitutional problems in compelling the suspect for forensic sampling. Despite the constitutional and legal safeguards, there are many situations in which police may be able to secure forensic samples. The privacy rights provided against the law enforcement authorities are only limited and in almost all cases courts made a liberal approach in establishing these rights against search and seizure of the police authorities.

No doubt, an expert's opinion has been traditionally admitted by the court of law because of the special status given to the name “expert” within the legal community. Their testimony will be received even though it contains the hearsay statements of some other persons. Actually this is a privilege given to them as an expert, having special knowledge of the subject in which the Judges have no direct knowledge. But recent practice of the experts in courts creates some suspicion on their testimony. This trend has been evolved due to the partisanship of the experts and hence the unreliable character of the evidence often given by them. The result is that this class of testimony has lost most of its effectiveness in the legal system due to the evils developed in the experts' profession.

The research concisely gives a clear picture about the significance of the subject viz. “Interpreting Scientific Expert Evidence - with Special Emphasis on
the Admissibility and Probative Value of DNA Identification Evidence”. Though a deep analysis of the subject, scientific evidence and the admissibility of DNA typing evidence is of labyrinthine in nature, the present study is a pioneering one confined to recent developments warranting a re-look at the entire issue. It will help the reader to have a proper idea about the scientific expert evidence and its probative value in the process of administration of justice. It is an undisputed fact that the efficient functioning of an unblemished judiciary is the cornerstone of the very existence of a nation where rule of law prevails. But absence of proper standards for evaluating evidence creates problems for the judiciary. This is an area, which calls for an in-depth study. The study is centered on the following hypothesis.

**Primary Hypothesis**

"In the judicial system there is no uniform standard for evaluating the scientific expert evidence, especially new forms of scientific evidence”.

**Secondary Hypotheses**

1. “DNA typing is a reliable piece of scientific evidence provided it is taken after rigorous checks according to prescribed scientific procedures”.

2. “If DNA evidence is given, the checks needed for ensuring its authenticity and credibility have to be precisely laid down”

3. “Provisions in the Indian Evidence Act, 1872 and other legislations in India are not flexible enough to accommodate expert evidence from all fields”.

4. “The compulsory collection of bodily samples for forensic purposes is fraught with the risk of violating privacy rights of the individuals. The legal regime should be strengthened and restructured to ensure privacy rights
of the individuals are not infringe under the cover of forensic investigation”.

Objectives of the Research
The object of the study is to (1) make a critical analysis of the efficiency of the existing machinery in evaluating the scientific expert evidence with special emphasis on DNA identification evidence; (2) identify the defects in the system as well as to note the shortcomings in the legislation dealing with the admissibility of scientific evidence; (3) suggest suitable remedies for the effective working of the system in this field and to propose a model legislation for India dealing with the issue.

Methodology of the Research
The study is purely doctrinal conducted with reference to existing legislations, judicial precedents and law reports as primary source and legal and scientific literature as secondary source.

The Abstract of the Study Report
The scheme of chapters of this study is as follows:

Chapter one is an introductory chapter. The basic concept of the lay opinion testimony and expert testimony as an exception to the exclusionary rule of the law of evidence is dealt with in detail. The philosophical and jurisprudential background of the exclusionary rule is analysed in detail. A comparative jurisdictional evaluation has been made regarding the definition, function and admissibility of both expert as well as lay witness opinion. Emergence, jurisprudential basis, development and present position of the exclusionary rules like ‘common knowledge rule’, ‘hearsay rule’ and ‘ultimate issue rule’ as a limitation of the expert testimony has considered and findings has been reached with the help of legislation and judicial precedents in different jurisdictions.
In chapter two, an attempt has been made to analyze with the help of comparative jurisdictional evaluation of "how scientific expert evidence can be best interpreted for determining its probative value and admissibility". An emphasis has been given regarding the standard of admissibility of scientific evidence in India. A detailed discussion has been made out regarding the following things:

1. The present position of the legal principles like relevance and admissibility;
2. The distinction between legal relevance and logical relevance;
3. The meaning and definition of "junk science" and its impact on the trial process;
4. The philosophical insight of the concept of "junk science";
5. The differentiation of the junk science from good science;
6. The scientific means and methods for the evaluation of the novel methods of scientific evidence;
7. The application of the doctrine of falsification in evaluating scientific evidence;
8. The comparative analysis of the methods adopted by different jurisdictions in evaluating scientific evidence;
9. The role played by judicial precedents in determining the standard for the admissibility of scientific evidence. In this part different tests like Frye, Daubert, reliability and helpfulness have been critically evaluated;
10. The effectiveness of the standard followed in India for evaluating scientific evidence and the proposal for a suitable method in India for evaluating scientific evidence.

The study in chapter three highlights the significant theoretical aspects of the use of DNA typing in forensic setting. The fixing of the scientific reliability of DNA typing has been clearly explained. Moreover, the merits and demerits of the recent DNA identification techniques like mitochondrial DNA analysis, allele specific probe analysis, HLA-DQ1 analysis, SNP analysis, STR analysis and 'Y' chromosome analysis have been highlighted.

In chapter four, the perspective and problems of the population genetics and statistical interpretation of the DNA typing have been critically evaluated with the help of scientific and legal literatures and judicial decisions.

In chapter five, the admissibility of DNA evidence has been discussed very broadly by evaluating different standards provided by the courts in different jurisdictions for determining the evidentiary value of scientific evidence. For easy understanding the history of the judicial acceptance of the theory and technique of forensic DNA typing is conveniently divided in to different stages. A detailed discussion has been made regarding the admissibility of DNA evidence in India in the light of judicial decisions and 185th report of the Law Commission of India on its amendment to the Indian Evidence Act.

In chapter six, some important constitutional and legal issues of the criminals' in connection with the State's forensic process are discussed seriously. One of the most pressing issue in this regard is the constitutional or statutory right of the criminal defendant to have access to the forensic laboratories managed by the State especially the right of the indigent accused to
get State fund for the forensic expert assistance. The other one is with regard to the constitutionality and legality of the search and seizure of the criminal defendants to get forensic samples and the validity of its use for prosecution purposes.

In chapter seven, it has been identified that the major problem on expert testimony depends on the professional ethics and quality of the experts in their field from which they are coming. Problems like hiding ones professional incompetence, approaching the issue with partiality and bias, making illegal monetary benefits and subjecting oneself to extraneous influence are some of the major factors which vitiate the testimony of forensic experts were considered in detail. Moreover, the quality of forensic service and the factors, which deteriorate the quality, is also discussed in detail.

Chapter eight deals with the conclusion of the entire research and certain recommendations.

The research was purely doctrinal in nature. Legislations, judicial precedents and reports were used as the primary materials and legal and scientific literatures as secondary source. Appraisal of the legislation on the concerned topic in India was also an important purpose of the research. Hence various amendments to the Indian Evidence Act and the Code of Criminal Procedure have been recommended and a model legislation specifically dealing with the forensic procedures has been drafted and provided. Some more recommendations for improving the quality of the forensic evidence in India have also been made.