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Role of Forensic and Scientific Methods in Criminal Investigation

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ABSTRACT

Purpose: The human race since its inception has been plagued by the crime and related activities. The advancement of time has resulted in the development of new techniques adopted by criminals to commit crimes. The criminals are quick to exploit and adapt to technology for their personal gains. On the other hand law enforcement agencies are lacking the sophisticated methods to detect and interrogate the crime. This gives way to the existence of forensic science. It is the most powerful tool in investigation of crime as it is believed to be accurate and precise. Through this paper, the aim is to understand the importance of modern and scientific techniques and explore its applicability on criminal investigation. The paper targets its work on role of forensic science in keeping law and order in society, and analyzes legislative and judicial development on the subject.

Design/Methodology/Approach: To help build a deep understanding of the different dimensions of forensic and scientific investigation techniques and its related developments we have conducted systematic and extensive literature review to analyze forensic tools, address attainments and challenges encountered by criminal investigation agencies.

Findings: The judicial and legislative developments are finding their way towards usage of scientific methods at all stages of crime investigation. The forensic evidence provides accurate information to interrogating and adjudicating authorities which makes it possible to solve the criminal and civil disputes. However, the parameters and guiding principles within legal system are required to create the robust system and amplify its reliability.

Originality/Value: The puzzle ofcriminal investigation is incomplete without the application of forensic science based evidences. This paper will benefit law enforcement agencies, detectives and other stakeholders to understand diverse pool of forensic tools applied to investigation, challenges involved and methods to overcome them.

Paper Type: View Point.

KEYWORDS Scientific Techniques | Forensic Evidence | Investigation | Criminal Profiling

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Introduction

The vigilant search of truth is the symbol of our criminal justice system. Our methods and rules of criminal law are designed in such a way that ten guilty persons can escape but one innocent should not suffer. To achieve this,the administration of justice has to be constantly evolved to look for its persistent improvement and the law should not be read in its isolation. In this scientific era, law should take assistance of scientific inventions so that it could keep pace with the changing needs of the society. The legal system today has to deal with many scientific evidences which have profound challenges for it. On one hand, scientific evidence holds the possibility of finding an extremely accurate fact whereas on the other hand, it often includes a risk of uncertainty which our legal system is not willing to tolerate. This paper deals with the role of forensic and scientific investigation techniques as a tool of crime detection and investigation. It starts with the need of using these techniques, their types that can be or are being used, their accuracy and admissibility and the legislative, constitutional and judicial approach taken by our domestic law and law enforcement agencies and then divulges into the suggestions made by various Committee reports and the need to implement them urgently to keep a check on the inaccuracy inbuilt in the scientific methods.

To begin with, it is a known fact that the worst violation of human rights takes place during the course of investigation when the police uses the third degree interrogation i.e. inflicting of pain, physical or mental, to extract confessions or statements (Basu, 1997).This creates multiple opportunities for wrongful conviction of the innocent or over-confession by the guilty. It also contributes to erroneous convictions by coercing or intimidating witnesses into making false accusations against defendants and even to police perjury wherein the police regularly perjures themselves in court by denying the use of third-degree methods, typically claiming that the suspect's injuries were caused by resisting arrest, trying to escape, accidentally falling down stairs, banging his head on the cell door, or taking a beating from cellmates and the like. These factors led to the admonition of the third degree methods by the new generation of Criminal Investigating Agencies, judges and public at large. Even then, these methods have not completely vanished and to control this issue, Human Rights Commissions have been established in India and all over the world which advocate the need of using modern scientific methods for investigation of crimes to make the criminal justice system effective (Shankar, 2012).One such method is the use of forensic science in the investigation of a crime.

Forensics: Definition and Scope

Forensics, by its simplest definition refers to the application of scientific techniques and principles to the law. The term forensic is derived from the Latin word *forensis*, which means public or pertaining to a forum. While forensics has only recently become a high profile field, the practice of forensic principles actually dates back to ancient times. For instance, it is believed that the first recorded autopsy was performed sometime around 44 BC, following the death of Julius Ceasar (Discover Criminal Justice). Today, forensics encompasses a wide range of disciplines within the criminal justice system. Even in India, the application of science and technology to the detection and investigation of crime and administration of justice is not new. Although our ancestors did not know forensic science in its present form, scientific methods in one way or the other seem to have been followed in the investigation of crime. Its detailed reference is found in Kautilya's 'Arthashastra' which was written about 2300 years ago. Among other instances, the handprints, known as the 'Tarija', were known for long to Indians to be unique. This science gradually developed into a concrete form that we see today. Presently, the main kinds of evidence this form of forensic investigation yields are biological or DNA evidence, such as blood spatter or hair; impression evidence, like fingerprints and tire tracks; and weapon identification, the microscopic examination of firearms and tools for the purpose of matching weapons to wounds. Forensic investigation is increasingly playing an important role in the pursuit of justice. When used appropriately, it can be an incredible tool for practitioners and society, but if used inappropriately, it can generate error and injustice in the system (Shankar, 2012).

Forensic Science: Legal Provisions and Judicial Decisions

The courts have been accustomed to act on the opinion of experts from early time, the reason being that there are many matters which require professional or specialised knowledge which the court may not possess and it may therefore, rely on those who possess it (Singh Avtar, 2022). These include the matters of forensic and scientific investigation techniques of which there is an acknowledgement in our domestic law underSection 45 of The Indian Evidence Act, 1872 which makes the opinion of persons especially skilled in some science, art, foreign law, identity of handwriting and finger-impressions relevant. It must be read with Section 51 of the Act which makes the grounds on which such opinion is based also relevant. Even though it may completely change the course of arguments in a case, the law is completely silent on the definition of the terms 'opinion' and 'science'. There are no criteria to know if any and every new scientific technique comes within the purview of this Section. It has been left to the mercy of the courts. The jurisprudence on the subject points that the term 'science' has not been taken in any technical sense, but as including anything that

requires specialised knowledge, skill, study or experience or is otherwise beyond the comprehension of a layman. From this point of view the word 'science' does not merely mean subjects of science study. It includes all technical subjects on which the course of special study or experience is necessary to the formation of opinion (Singh, 2022).

Also, the issue of determination of whether a person is especially skilled in that particular science has been left to the discretion of court. The Section does not refer to any particular attainment, standard of study or experience, which would qualify a person to give evidence as an expert. Generally, a witness is considered as an expert if he has made a special study of the subject or acquired a special experience therein. In such case the question is: Is he skilled? Has he adequate knowledge? (Singh, 2022). These questions of fitness of a witness as an expert are to be decided by the judge.

What is to be noted is that an expert's opinion will be required only where certain inferences have to be made on the basis of some special skills and scientific knowledge and not where merely on the basis of observation and common sense, the opinion can be given. If that is the case, then shouldn't such an opinion be given a status more than a mere advisory as mostly in such cases, the hapless victim does not have any other strong piece of evidence? That is probably not done because of the role that forensics has played in wrongful convictions. The judges and lawyers alike, lack the scientific expertise and background to determine the reliability of forensic evidence and to effectively cross- examine forensic experts respectively. This has the potential of the abuse of law by the experts deliberately or erroneously which ultimately is a blow to the human rights of the accused.

The matter of the problems faced by the investigating agencies in collection and production of the forensic and scientific evidence before the court also needs attention. One of the major issues faced by the agencies is contamination of the crime scene. In some cases, preventing contamination may be especially difficult, for example,if multiple first responders are tending to the victim, their first responsibility is towards the victim; they are not necessarily thinking about scene preservation. Also, most of the contamination comes accidentally from the people investigating the scene. There might also be cases where the evidence collected is not enough to base a scientific opinion upon it, for example, cases where blood or other samples taken from the body are found to be putrefied. The problem has also increased with the advent of technology with rising number of cases of fraud etc. using IT which poses a greater difficulty in collection of e-evidences.

Another issue is regarding the accuracy of these opinions based on certain scientific techniques. Let us take a look at how the courts have settled this issue-

Age: A doctor's opinion as to age of a person based on his or her height, weight and teeth, does not amount to legal proof of age of that person. But such evidence is relevant. It has been held that in ascertaining date of birth, opinion of radiologist cannot be preferred over the entry in the register of births and deaths maintained under the provisions of the Act. It has also been held that ossification test to determine the age of a person is not a conclusive test (Qudrat, 1939).

Rigor Mortis: Time of death- In the determination of time of death, *rigor mortis* is only a rough guide. A doctor's evidence can never be absolutely certain on point of time so far as the duration of injuries is concerned (Swaroop, 2000).

Handwriting or finger impressions: As to the reliability of such evidence, the Supreme Court has laid down in quite a few cases that the evidence of an expert as to handwriting is only in the nature of an opinion and it can rarely, if ever, take the place of substantive evidence. It should be corroborated either by clear direct evidence or by circumstantial evidence. This is because the identification of handwriting is an imperfect science. An expert can certify only probability and not 100% certainty (Koya, 2003).

Regarding finger impressions, it has been agreed that no two fingerprints are ever exactly alike in every detail, even two impressions recorded immediately after each other from the same finger.It requires an expert examiner to determine whether a print taken from crime scene and one taken from a subject are likely to have originated from the same finger. Also, the fingerprint often isn't perfect at a crime scene. It might be dirty or smudged and hence susceptible to human error. A study by Southampton University has found that two thirds of experts, who were unknowingly given the same sets of prints twice, came to a different conclusion on the second occasion. Keeping all these exigencies in mind, our courts havefairly concluded that the evidence of fingerprint expert is not substantive evidence (Sarah, 2014). It can only be used to corroborate some other evidence of substantive nature which is already there on record (Khan, 2010).

Medical Opinion: Ordinarily, the value of medical evidence is only corroborative (Ukabhai, 1983). In the case of conflict between medical and ocular evidence, the proper course for court is to prefer testimony unless it belies fundamental facts. (Singh 2005). When oral evidence is credible and cogent, the medical evidence to the contrary would be inconsequential. Only when medical evidence totally improbabilises oral evidence, an adverse inference can be drawn (Kumar, 2004)

Further, a medical officer is not a ballistic expert. He is not expected to answer whether the injury in question could have been caused by bullet alone. (Mahmood, 2008).

Post mortem report: It is highly reliable and is in particular relevant and important in the cases where cause of death is not known (Singh, 1988). If however, there is a conflict between post mortem report and inquest report, the court will not rely upon either of them unless one of them is supported by circumstantial evidences. If neither is proved beyond doubt, then in that case the cause of death will not be treated as an important piece of circumstantial evidence.

Tape recordings/ video recordings: Per se, an audio recording is not treated as a true identification of the person unless the voice of the person is duly identified. It is also to be proved that there was no tampering done with the sample and that the recorded sample was carefully sealed and kept in safe custody (Malkani, 1973).The same rule applies for a video recording.

Narco analysis, BEAP, Polygraph Test: In narco test, the test subject under the influence of drug (sodium pentothal) injected into the body loses control over one's responses and therefore cannot decide consciously about the questions which one should not answer. Likewise, in polygraph test, physiological responses like blood pressure, respiratory flow, pulse rate, galvanic skin resistance, etc. are measured after putting certain questions to test subject and the person has no conscious control over these responses. Similarly, in the case of BEAP test (Brain electrical activation profile) wherein electrical waves emanating from test subject's brain are studied in response to probes involves testimonial compulsion (Selvi, 2010).

These tests when conducted under compulsion violate right against self-incrimination protected under Article 20(3) of the Constitution of India and right to mental privacy as an extension of right to privacy guaranteed under Article 21. It is also a violation of the right against cruel, inhuman and degrading treatment implicit under Article 21.Not only that, they also violate the right to remain silent under Section 161(2), Code of Criminal Procedure as the test subject has no conscious control over the responses. In CrPC, Explanation (a) to Section 53, Section 53A, Section 54 provide for the medical examination of the accused but in neither of these Sections, there is any hint at narco tests etc (Selvi, 2010). Even if we go by the logic that when these sections were drafted, such scientific advancement was not in the contemplation of the legislature, we are not able to bring them within these provisions by the rule of *ejusdem generis*. Moreover, legislative intent is clear from the fact that Parliament while amending the said Expln. (a) in 2005 did not include these tests despite the fact that these tests were in existence at that time (Selvi, 2010).

The peculiarity of these tests is that they cannot be accorded same treatment as is given to collection of specimen signatures and handwriting samples for the reason that specimen signatures and handwriting samples are not used as testimony against test subject but are used for identification or corroboration of facts already known to investigators. Moreover, the reliability of these tests is not 100 percent guaranteed. Also, the experts who conduct these tests may not be credible. It has hence been concluded that these tests conducted under compulsion are unconstitutional. It was also held that a voluntary conducting of these tests is constitutionally permissible and the only evidentiary use in such a case can be in the form of a discovery statement.The leave granted for a voluntary conduction of the test raises a doubt in relation to the possible abuse of law in the cases where accused might be forced to give his consent, but at the same time it can be seen as a beneficial piece of legislation for the accused who might want to voluntarily subject himself to the tests to prove his innocence. Further, there is no guideline with respect to the category of cases in which these tests are required.

The problem of the fact also remains with respect to the balance of probabilities; whether the ill-fated victim having no other substantial piece of evidence should not be allowed to take recourse to the scientific advancement or whether on the other hand, these tests become so essential in solving a case as to jeopardise the legal rights of the accused. In this regard, the Supreme Court has referred to some guidelines in relation to the lie detector test (NHRC, 2000)

which strive to strike a balance between the administration of justice while holding the rights of the accused intact. Perhaps more guidelines should be issued in relation to all the types of techniques and the circumstances under which the various tests can be conducted.

Digital Forensics: The reality of the information age is having a significant impact on the legal establishment. Digital evidence, by its very nature is invisible to the eye. Therefore, the evidence must be developed using tools other than the human eye. Digital forensics is a branch of forensic science related to the use of digital information produced, stored and transmitted on computers as source of evidence in investigations and forensics. The authenticity, reliability, completeness and non-tampering of the digital evidences thus need to be confirmed before admitting it in a case. Matters may involve computer security breaches, computers used in committing illegal deeds, criminal activity that had a computer as its target, or computer-based devices that inadvertently collects information pertinent to a crime or dispute. The Information Technology Act, 2000 deals with this branch of law.

Miscellaneous: For sciences of footprint (Singh, 1955) and dog tracking (Razak, 1970), the apex court has settled that even if such evidence is admissible, it does not ordinarily carry much weight and is not enough to base a conviction solely upon it.

It is to be noted that any scientific and forensic investigation technique abovementioned can rarely be cent percent accurate and hence a conviction cannot be based solely upon that without any other supporting circumstantial evidence, but at the same time, they help in eliminating multiple probabilities and to reinforce other evidences. A problem that emerges when dealing with such evidences is about their credibility. The unheeded question remains whether appropriate safeguards were taken in collecting them, keeping them and working on them. Unfortunately, there is no legislation in the country that specifically deals with the safety of such evidences, which is all the more required in the next mentioned category.

DNA Typing: The complete analysis of DNA is known as 'DNA Typing' or 'DNA Profiling'. It is the most reliable method which is available to the scientists in the present times to determine an individual provided there has been no human error in collecting and testing DNA samples. It can be used to determine whether the biological substances found at the scene of crime are of the accused or not. Since DNA is found in all body cells, therefore all biological materials containing body cells like blood, saliva, urine, flesh, skin, hairs, nails, bones, bone marrow, semen and vaginal fluids can be used as source material for DNA Typing. The exceptional characteristic of this test is that an individual can be identified not only by his own biological material but also by comparing the biological material of his blood relatives.

Though there is no particular criminal law in India to deal with DNA test, however Section 53 and Section 54 of the Criminal Procedure Code, 1973 talks about DNA test impliedly after the amendment in 2005 which added an explanation to Section 53 dealing within its ambit examination of blood, blood stains, semen, sputum, swabs, hair samples and finger nails as well as an examination of an organ inside the body by the use of modern techniques in the cases of sexual offences. This Section has proved beneficial in deciding many criminal cases in the country.

Apart from criminal cases, DNA technology has been extensively used to resolve many civil disputes such as paternity issues under Section 112 of The Evidence Act, 1872, matters regarding inheritance and succession and even to determine the issue of adultery under Section 497 of The Indian Penal Code, 1860.However, before basing a conviction on a DNA report, there must be some basis to gauge if the sample collected is not tampered with, especially to avoid conviction in cases wherein the sample may have been implanted at the crime scene or may have been exchanged after collection. In a recent studyin the US, it is reported that there have been 330 post-conviction DNA exonerations there. It was also found that invalidated or improper forensic science played a role in 47 percent of wrongful convictions later overturned by DNA testing. This poses a serious question to the greater availability of science to our disadvantage rather than to our benefit and points towards the need of quality forensic science.

The extensive use of the technology has also led to efforts being made for a defined legislation in our country dealing with the same when as many as 60 countries have already built their DNA databases. The idea behind India's Human DNA Profiling bill was first developed in 2003 but even after a decade, the bill in its current form (DNA Profiling Bill, 2015) has many objectionable aspects which may curb it from being passed into legislation.

At the outset, The Centre for Internet & Society has recommended that the bill should incorporate an objects clause that makes clear that DNA profiles merely estimate the identity of persons, they do not conclusively establish unique identity and therefore, forensic DNA profiling should only have probative value and not be considered as conclusive proof (DNA Profiling Bill, 2015). Moreover, the bill provides for a recordingof the DNA of everyone ever arrested for a criminal offence. The estimated investment arrived at which is required for maintaining such a humongous database however doesn't seem to be enough. Further, the bill provides that a person will have to provide his name, gender, address and caste. There seems to be no logical connection in maintaining a caste profiling for conducting a criminal investigation. It only points to an assumption that certain communities are more prone to criminal behaviour. Worse still, there is no limit to how long a person's DNA will be kept on record. Does this lead to an assumption that once a criminal, always a criminal? While countries such as the US and the UK permit collection of DNA without consent and their laws are clear about when it can be done, our bill does not clarify under what circumstances someone's DNA will be collected for the database with or without consent (Rathi, 2015).

In most countries, the DNA database is used only for criminal investigation but India's bill allows for a lot more. For instance, it can be used to identify victims of accidents or disasters, to identify missing persons, and for civil disputes. The bill even allows the creation of population statistics, identification research, parental disputes, issues relating to reproductive technologies and migration. Setting up of such large databases is fraught with problems. For instance, the law that allowed the UK to setup a DNA database ended up maintaining a record of more than one million innocent people on a so called criminal database. This was because the law allowed DNA data to be recorded and stored at arrest, rather than waiting for the individual to be charged with the offence. With India's poor record on citizen privacy, the lax provisions in the draft bill are worrisome (Rathi 2015).

The bill is being introduced without comprehensive privacy safeguards in place on issues such as consent, collection, retention etc. Though the DNA board is given the responsibility of recommending best practices pertaining to privacy, this is not adequate given the fact that India does not have comprehensive privacy legislation. Further still, the bill does not explicitly restrict the use of a DNA sample to the purpose it was originally collected and created for, which could allow for the re-use of samples and profiles for unintended purposes. Also, the bill does not provide any restriction on the type of analysis that can be performed on a DNA sample or profile which could lead to an analysis for purposes beyond the basic identification of an individual. The Centre for Internet & Society has also recommended among other things, an elimination index containing the profiles of medical professionals, police, laboratory personnel etc. working on a case to prevent contamination of collected samples by accident (DNA Profiling Bill, 2015).With these and many other lacunae, the bill still hasn't reached a model form to be given the shape of an Act. The various loopholes cited by CIS and other succeeding reports bring a true picture to the forefront of where we stand today and where we intend to reach.

Current Statistics and Suggestions by Committee Reports

There have been continuing discussions for many years about the delay in the disposal of cases in the country. According to the latest data released by National Crime Records Bureau (NCRB), there are 9,48,073 cases pending investigation from the previous year (2021) under the IPC which together with the cases reported during (2020) makes the total number of cases pending investigation to 37,93,771(NCRB, 2021) and those pending investigation under SLL to be 46,37,402 (NCRB, 2021).Though, in the public opinion, the judiciary is out rightly blamed for the delay, the ground reality is quite different. The Law Commission of India in its Report no. 239 (Law Commission of India, 2012) has listed some reasons for the said delay. These include among other things, the lack of periodical exercise of upgrading the skills of investigation. It stated that the police are quite often handicapped in undertaking effective investigation for want of modern gadgets such as cameras, video equipment etc. and that there is a dearth of forensic and cyber experts in police departments of various States. The result is that police heavily leans towards oral evidence, instead of concentrating on scientific and circumstantial evidence.

Even the Malimath Committee on Reforms of Criminal Justice System (2003) comprehensively examined the issue of scientific and efficient investigation with the help of forensic science. While emphasising the importance of application of forensic science to crime investigation, the Committee has observed that from the stage of the very first visit by the Investigating Officer to the crime scene, an appropriately trained scientific hand should be involved so that all relevant physical clues, including trace evidence, which would eventually afford forensic science examination, are appropriately identified and collected. In this context, the Committee also referred to the standard practice of investigation in most of the advanced countries. It has mentioned how in such countries scientific hands designated as 'Field Criminalists', 'Scene of Crime Officers' (SOCO), Police Scientists etc., are part of the permanent strength of each police station. It has further mentioned that in some cases these specialists are personnel drawn from definite scientific cadre while in some other cases they are policemen themselves, specially selected for their flair for scientific work and their academic background of science subjects. In the latter case the personnel are, after selection, provided in-depth training in crime scene management and in the identification of different types of scientific clues to be looked for in different types of crimes.

The Report also pointed out that the application of forensic science in crime investigation is somewhat low in the country urging for a need to bring about quantum improvement in the situation, more so when the conviction rate is consistently falling over the years and the forensic evidence, being clinching in nature, can reverse the trend to some extent. It also mentioned that the country has a scant number of Central Forensic Science Laboratories and Regional Laboratories and commented that forensic science facilities in India need heavy augmentation.

The Committee made a number of recommendations to achieve an effective scientific model of investigation. Some of these include the need for amendment of Police Manuals and Standing Orders of different States or UTs to make the use of forensic science mandatory, as far as practicable, in investigation of all grave and important crimes; creation of mobile forensic science units in districts in which each unit should have a forensic expert, fingerprint expert, a photographer and a videographer and the mobile units are to not only identify, collect and preserve the evidence but also tender necessary opinion, on the spot, to the IO, if scientifically feasible; provision of scientific investigation kits to each police station for identification and lifting of scientific clues from the crime scene and an arrangement to create proper facilities for packaging, storing and preserving scientific clue material collected from the crime scene or from suspects; prescription of a mandatory time limit for submission of reports to the police/ courts by FSLs and a need for training programmes of forensic scientists in the country who mostly learn on the job without any prior training.

Even after a decade of submission of the Report, the government has not implemented most of the recommendations. Sincere steps need to be taken to

incorporate these suggestions which have a potential of revamping the entire criminal justice system.

Conclusion

It is often said that 'wherever there is civilization there will be crime.' Ever since the beginning of civilization, the humanity has witnessed a range of crimes having been committed in the society from time to time. Up until recent past, traditional methods were utilized to investigate the crimes but during the last three decades, there has been a remarkable increase in the use of scientific methods. It goes without saying that these techniques have played a major role in solving numerous cases. When the use of the techniques has become quintessential, greater efforts must be made in drawing up specific legislation to deal with the same. The legislation while focussing on the variety of techniques that can be used, the procedure to be followed and providing for punishments for misuse of the evidence collected also needs to take into account the respective accuracy of each technique and how much reliability can be placed upon it in deciding a case. Guidelines must be issued on the precautions that the investigating agencies need to take in collection and presentation of such evidence as the court cannot know of the degree of contamination in each case and may decide assuming it to be a perfect piece of evidence which might lead to a victimisation of the innocent while letting the guilty go free despite the principle to the opposite effect. There must also be a mechanism for reviewing of the test results arrived at by a scientific expert to place higher reliability upon it. The scientists have done their job well, it is now time for the legislators to complement the dawn of scientific technology.

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Annexure 14.20

Submission Date	Submission Id	Word Count	Character Count
28-Oct-2022	D1557333859 (Ouriginal)	5730	36396

Analyzed Document	Submitter email	Submitted by	Similarity
3.1 VP1_Pooja_GJEIS Oct to Dec 2022.docx (D1557333859)	ptrehan91@gmail.com	Pooja Trehan	11%

Ouriginal

Sources included in the report

SA	**8-6-2016-forensic evidences.docx** Document 8-6-2016-forensic evidences.docx (D25853509)	1
SA	**LLM Dissertation Saloni Singh.docx** Document LLM Dissertation Saloni Singh.docx (D110449582)	1
W	URL: https://www.worldwidejournals.com/paripex/recent_issues_pdf/2015/June/June_2015_1435726141__177.pdf Fetched: 2020-03-15 20:05:25	3
SA	**4 Theses Zoya Fatima GD1832 Law AMU.docx** Document 4 Theses Zoya Fatima GD1832 Law AMU.docx (D142453658)	3
SA	**RESEARCH PAPER, Suraj (3).docx** Document RESEARCH PAPER, Suraj (3).docx (D112224818)	2
SA	**Thesis.docx** Document Thesis.docx (D19421157)	12
W	URL: https://nyaydristi.in/applicability-of-forensic-science-in-criminal-justice-system-in-india/ Fetched: 2020-12-22 23:15:31	1
SA	**Saloni Seth (Dissertation).pdf** Document Saloni Seth (Dissertation).pdf (D127616758)	1

Reviewers Memorandum

Reviewer's Comment 1: The study helps the readers to understand the diverse pool of forensic tools applied to investigation, the challenges involved, and methods to overcome them. It is self-explanatory in nature, and supported by good references and examples, which makes it very lucrative for the readers.

Reviewer's Comment 2: The paper is accomplished in a very planned way. A good number of recent literature and published reports are discussed strategically. This present study is based on secondary data. It further provides the basis to conduct a study by employing primary data.

Reviewer's Comment 3: The study examines the legislative and judicial developments in forensic science. The significance of the study can be seen from the fact that even though being an appropriate and emergent topic for research not a large number of studies have been conducted on the theme.

Citation

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Conflict of Interest: Author of the Paper had no conflict either financially or academically.

Editorial Excerpt

The article has 11% of plagiarism which is the accepted percentage as per the norms and standards of the journal for publication. As per the editorial board's observations and blind reviewers' remarks the paper had some minor revisions which were communicated on a timely basis to the author (Pooja), and accordingly, all the corrections had been incorporated as and when directed and required to do so. The comments related to this manuscript are noticeably related to the theme "**Role of Forensic and Scientific Methods in Criminal Investigation**" both subject-wise and research-wise. With the passage of time, new techniques for criminals to commit crimes have emerged. For personal gain, criminals are quick to exploit and adapt to new technologies. The paper examines legislative and judicial developments in the forensic science, as well as the role of forensic science in maintaining law and order in society. Overall, the paper promises to provide a strong base for further studies in the area. After comprehensive reviews and the editorial board's remarks, the manuscript has been categorized and decided to publish under "**View Point**" category.

Acknowledgement

The acknowledgment section is an essential part of all academic research papers. It provides appropriate recognition to all contributors for their hard work and effort taken while writing a paper. The data presented and analyzed in this paper by author (Pooja) were collected first handily and wherever it has been taken the proper acknowledgment and endorsement depicts. The authors are highly indebted to others who facilitated accomplishing the research. Last but not least, endorse all reviewers and editors of GJEIS in publishing in the present issue.

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