

UNDERSTANDING THE CONCEPT OF CRIMINALISTICS/FORENSIC SCIENCE

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Abstract

Crime, a phenomenon that has been present throughout human history and closely tied to the development of our species, has evolved alongside the progress of society. This evolution has necessitated the establishment of rules and norms to maintain order within society, and those who violate these rules are subject to punishment. As the concept of investigating and uncovering crime took shape, institutions dedicated to trial and investigation were established, forming the foundations of a fair and impartial justice system. For a long time, eyewitness testimony was considered crucial in solving crimes, but its reliability came into question, prompting the development of forensic science as a means to resolve legal disputes. Forensic science, which combines scientific principles with legal practice, emerged as a valuable tool to tackle the challenges faced in criminal investigations. From the time of Archimedes' famous exclamation of "Eureka" in 287-212 BC, forensic science has played a pivotal role in legal proceedings. Throughout the years, it has become an essential component of investigations, encompassing a wide range of criminal prosecutions. By applying physical and natural sciences, forensic science provides accurate evaluations of legal and social issues, making significant contributions to regulatory and civil proceedings.

The concept of crime has been present since ancient times and has evolved alongside the development of human beings. As societies began to form and people started living together, there arose a need to establish rules and regulations in order to ensure equal rights and maintain the honor of the society. These rules were put in place to prevent individuals from breaching societal norms, and those who did were subjected to punishment and penalties as a means of keeping the society free from evil. Over time, this concept of maintaining order and administering justice led to the establishment of various institutions for the investigation and trial of crimes. These institutions aimed to impartially deliver justice to all parties involved. One of the primary methods used in these delivery systems was evaluating the truthfulness of testimonies and determining whether the victim was genuinely speaking the truth or making false allegations with malicious

intentions. In this regard, the testimony of eyewitnesses played a crucial role in determining the guilt or innocence of the accused. In summary, the concept of crime has evolved alongside human development, leading to the establishment of institutions for the investigation and trial of crimes. The reliance on eyewitness testimonies and harsh interrogation methods has been gradually replaced by more scientific and reliable approaches, such as forensic science, in order to ensure justice is served accurately and impartially. However, it was observed that the reliability of eyewitness testimonies was often compromised. In many cases, eyewitnesses were coerced or threatened into providing false statements or denying the truth. This undermined the credibility of their testimonies and made it difficult to fully rely on them when determining a person's guilt. As a result of these limitations, investigators resorted to using harsh interrogation techniques, commonly referred to as "third-degree methods," to extract the truth from criminals. However, these methods were deemed cruel and often resulted in innocent individuals facing unintended consequences and enduring irreparable losses. As time passed and society underwent significant technological advancements, the field of criminal investigation also adopted modern scientific techniques. These techniques, collectively known as forensic science, helped in resolving criminal cases in a more efficient and reliable manner. This shift towards scientific methods allowed investigators to rely less on eyewitness testimonies and more on concrete evidence and analysis, thereby reducing the chances of wrongful convictions.¹

Forensic Science, the science used in legal proceedings to resolve disputes, encompasses various branches of science. It originated from the discovery made by Archimedes in 287 – 212 BC, when he determined that the crown of the king was not made of gold as claimed, using the principles of buoyancy and density. The term "forensic" is derived from the Latin word "forensis," which means "connecting to court of law." In the legal context, forensic science refers to the application of scientific principles and practices to address and resolve contentious issues in court, ultimately striving for justice. It is a unique blend of scientific expertise and legal knowledge, making it particularly effective in the legal realm. Over time, forensic science has played a significant role in both regulatory and civil proceedings, becoming an integral part of investigations. It is involved in examining a wide range of physical evidence, from macroscopic objects like vehicles to microscopic elements such as pollen grains. Whether it is conducting autopsies on abused children or identifying trace amounts of gasoline, forensic science actively participates in criminal prosecutions, acting as a safeguard for victims and aiding in the collection of evidence to prosecute offenders. Simply put, forensic science can be understood as the application of scientific methods and principles to legal matters. Since its inception, this scientific discipline has been instrumental in investigating and resolving cases involving civil disputes like fraud and negligence, as well as criminal offenses such as robbery, rape, murder, assault, and kidnapping. The identification of various types of evidence, including bloodstains, drugs, body fluids, deceased bodies, arson accelerants, and unknown materials, often requires scientific testing to ensure accurate results. The examination process includes analyzing and evaluating minute details such as type, color,

¹D.C.Dirkmaat, L.L.Cabo, et al.,—New perspectives in forensic anthropology||137(S47)American Journal of Physical Anthropology: The Official Publication of the American Association of Physical Anthropologists33-52 (2008).

composition, species, and anatomical origins to scientifically identify a specific piece of evidence and establish its connection to a crime scene, location, or individual. While evidence such as fingerprints and DNA can unequivocally link a perpetrator to a crime, other forms of evidence rely on finding reliability through careful examination of the source or person involved.²

With the rise in criminal activities, the thorough investigation of these cases has become closely intertwined with forensic science, connecting crime, law, and justice. Unfortunately, the current state of criminal investigation is disheartening, as a significant percentage of murder trials end in acquittals. This results in a hefty cost for the prosecution agency, averaging over Rs.10000 per trial, which is a substantial amount of taxpayer money being wasted. During criminal incidents, trials primarily focus on materials and indirectly connect them to places, individuals, and time. The investigating officer plays a crucial role in gathering all relevant evidence promptly. However, the success or failure of forensic science in any criminal case hinges on the collection of pertinent evidence in a timely and proper manner. If the evidence is not collected on time, is contaminated, or if samples are not provided correctly for comparison, the findings may not be accurate or may even be useless. There are various factors where the forensic science needs to find some appropriate way to eliminate their limitations:

Social Changes – As technology continues to advance, it is crucial for forensic science to also keep up with the ever-evolving technological and investigative demands. The fast-paced society we live in necessitates a constant update in order to effectively address the changing needs. With a significant number of individuals moving from rural to urban areas in search of better opportunities and an improved quality of life, there is a growing desire for quick monetary gain, which unfortunately leads some to engage in criminal activities using new and sophisticated methods. In order to effectively combat this criminal mindset, it is essential to regularly upgrade and enhance evaluating and identification techniques, setting a strong example in society and deterring potential criminals from committing offenses.

Hiding Facilities – The advancements in globalization and industrialization have brought about a complete transformation in transportation facilities. As a result of the rapid development of cities and efficient transportation systems within and between countries, it has become increasingly convenient for criminals to flee to other cities and evade capture. Furthermore, it is often observed that criminals exploit the legal regulations of different countries, taking advantage of the opportunity to immigrate and avoid prosecution and arrest.

Technical Knowledge – The utilization of technology presents numerous benefits, however, its categorization as either a blessing or a curse ultimately relies on the individual and how they choose to employ it. In today's society, where an abundance of knowledge and information is easily accessible with a mere click, it is disheartening to acknowledge that there are individuals with malicious intentions who exploit this readily available information to inflict harm upon the

²E. Nissan, Computer applications for handling legal evidence, police investigation and case argumentation (Springer Science & Business Media, 2012).

unsuspecting general public. In instances where criminals employ highly sophisticated techniques to carry out their nefarious deeds, it becomes imperative for investigating officers and forensic investigators to possess an elevated level of expertise and acumen in order to meticulously scrutinize every minuscule detail of the crime scene. Only through such comprehensive analysis can these professionals successfully uncover the identity of the perpetrator and directly establish their connection to the offense committed.

Extensive Field – Due to the rise in crime rates, criminals and their illicit activities are no longer confined to their local areas or regions; instead, they have expanded their operations to a global scale. Various crimes, such as drug trafficking, financial fraud, smuggling, child trafficking, and forgery, now transcend national and international boundaries, presenting a challenging task for law enforcement agencies to monitor, trace, and apprehend the perpetrators.³

Lack of appropriate evidence – Corruption is a widespread issue in both society and the field of forensic investigation. Even within the realm of forensic science, there are instances where evidence is deliberately tampered with or manipulated, often due to undue influence from higher authorities or political pressures. This is done to aid criminals in evading justice. The focus of this thesis is on the application of forensic science, specifically in the areas of Forensic Entomology, Forensic DNA Analysis, Forensic Chemistry, Bloodstain Pattern Analysis, and Forensic Art. It is important to note that this research does not encompass Cyber Forensics or Computational Forensics.

Conclusion

However, the contemporary context presents numerous challenges for forensic science. The rapid advancements in technology require constant updates to forensic methods, ensuring they keep up with the evolving tactics of criminals. The globalization of crime, the utilization of hidden facilities, the demand for technical expertise, and the vast array of criminal activities pose formidable obstacles that necessitate innovative solutions. Moreover, the prevalence of corruption and deliberate manipulation of evidence highlights the importance of vigilance and maintaining ethical standards in forensic investigations. Overcoming these challenges is crucial to preserving the integrity of forensic science and ensuring its effectiveness in the pursuit of truth and justice. In navigating the intricate intersection of forensic science, crime, law, and justice, it becomes imperative to address these challenges. Forensic science, which involves the application of scientific principles to the legal field, holds immense importance in resolving legal disputes and providing a comprehensive understanding of complex societal issues. Its versatility can be seen in its involvement in a wide range of civil and criminal cases, including fraud, negligence, robbery, and murder, which underscores its broad impact on the legal landscape. To uphold justice, protect the innocent, and hold the guilty accountable, it is essential to continue the evolution and enhancement of forensic science. By committing to overcome limitations and adapt to societal

³B.Ghosh,—Trafficking in women and children in India: nature, dimensions and strategies for prevention||13(5) The International Journal of Human Rights 716-738 (2009).

changes, forensic science can remain a powerful force in the face of ever-changing tactics employed by perpetrators. The relentless pursuit of excellence in forensic science is necessary for the pursuit of a fair and just society, ensuring its sustained relevance and impact amidst dynamic challenges.