CHAPTER 6

ROLE OF FORENSIC SCIENCE IN DETECTION OF DOWRY CRIMES

PART 1

INTRODUCTION

Forensic science in criminal investigation and trials is mainly concerned with materials and indirectly through materials with men places and time. Among men, the investigation officer is the most important person. In fact, it is he whose work determines the success or failure of the application of forensic science in the processing of a criminal case. If he fails to collect the relevant evidence, allows the exhibits to be contaminated or does not provide correct samples for comparison, the findings of a forensic scientist will be useless.

Materials are identified and compared with the process of forensic science. They establish the presence or absence of a link between the crime, the criminal, the victim, the place and the time of occurrence. In addition, the place of occurrence being the most important source of materials, to be considered for investigation.

6.1 NATURE

Forensic science embraces all branches of science and applies them to the purpose of law. Originally, all the techniques were borrowed from various scientific disciplines like chemistry, medicine, surgery, biology,
photography, physics and mathematics. But in the past few years it has developed its own branches which are more or less exclusive domains of forensic science. The science of fingerprints, anthropometry, track marks, documents (especially the examination of handwriting) and forensic ballistics essentially belong to forensic science alone. More recently significant advances have been made in serology, voice analysis, odour analysis and in studies relating to nose prints and ear patterns.

6.2 NEED

There is urgent and widespread need for the application of forensic science in criminal investigation. The present day picture of crime investigation and prosecution of criminals, is a sad story. A large percentage of the murder trials, ultimately, end in acquittal. It is estimated that the prosecution agency spends on an average over Rs.10,000.00 per trial. Thus, not only a dangerous criminal goes scotfree but huge amount of public money is also wasted. These frequent acquittals also embolden the criminals.

Once attended a court as witness, where one of the accused was facing his eleventh trial for murder (of his own father this time) he was acquitted in the previous ten cases.

The need for the application of science in criminal investigation has arisen from the following factors:

6.3 SOCIAL CHANGES

The society is undergoing drastic social changes at a very rapid pace. India has changed from a colonial subject race to democratic republic.
Sizeable industrial complex has sprung up. The transport facilities have been revolutionized. There is a growing shift from a rural society to an urban one. These changes have made the old techniques of criminal investigation obsolete. In the British days the police was so much feared that once it had laid its hand upon an individual, he would ‘confess’ to any crime, he may not have even known. The fear is vanishing now. The use of ‘third degree’ techniques used in those days does not find favour with the new generation of police officers and judges.

6.4 Hiding Facilities

The quick means of transport and the high density of population in cities have facilitated the commission of crimes. The criminal can hide himself in a corner of a city or move away to thousands of miles in a few hours. He, thus, often escapes apprehension and prosecution.

6.5 Technical Knowledge

The technical knowledge of an average man has increased tremendously in recent years. The crime techniques are getting refined. The investigating officer, therefore, needs interpreting the modern methods to combat the modern criminal.

6.6 Wide Field

The field of activities of the criminal is widening at a terrific rate. Formerly, the criminals were usually local, now we find that national or international criminal is a common phenomenon. Smuggling, drug trafficking, financial frauds and forgeries offer fertile and ever expanding fields.
The physical evidence evaluated by an expert is objective. If a fingerprint is found at the scene of crime, it can belong to only one person. If this person happens to be the suspect, he must account for its presence at the scene. Likewise, if a bullet is recovered from a dead body, it can be attributed to only one firearm. If this firearm happens to be that of the accused, he must account for its involvement in the crime. Such evidence is always verifiable.

6.8 FUNCTIONS

Forensic science provides answer to the following three questions:

1. Has a crime been committed?
   Consider the case of recovery of a dead body. Death could be natural, accidental or homicidal. Forensic science by ascertaining the nature of death, establishes the existence or absence of corpus delict.

2. How and when was the crime committed?
   The examination of the ‘corpus delict’ reveals the way of the crime was committed and possibly the time when it was committed.

3. Who committed the crime?
   Forensic science establishes the identity of the culprit through personal clues like fingerprints, footprints, blood drops or hair. It links the criminal with the crime through objects left by him at the scene and with the victim or carried from the scene and the victim.
On the other hand, if the clues recovered do not link the accused with the victim or the scene of occurrence, the innocence of the accused is established. Forensic science, thus, helps the innocent.

6.9 DEVELOPMENT

The application of forensic science in the investigation of crime can be effective only if the investigating officer knows:

1. The nature of physical evidence to be collected.
2. Where it is found.
3. How it is collected and packed.
4. What standard samples for comparison purposes are necessary.
5. How much sample is required.
6. How the sampling is done.
7. How the evidence will link the crime with the criminal and to what extent his labours will be rewarded by the laboratory results.

This is possible if the investigating officer is given a thorough grounding in the above aspects. He needs both theoretical and practical training.

All police training institutions have courses in scientific aids, but the syllabi and the teaching standards are far from satisfactory. Periodical attachment of investigating officers to the departmental forensic science laboratories can go a long way in inculcating the scientific spirit.
Ignorance about the value of evidence sometimes causes a lot of disappointment to an investigating officer. For example, hair are recovered in quite a few cases. Evaluation of hair does not lead to positive identification of the source of hair. It is not possible at the present stage of development of the science. They would not be disappointed, if they know the limitations.

6.10 DISSEMINATION

There is a very strong case for proper dissemination of forensic science knowledge among the judges and the lawyers in addition to the police officers.

The evaluation of physical evidences is to be understood and utilized by the lawyers, the jury and the judges. They must understand its general basis and its weak and strong points. They do not accept the experts' ipse dixit.

Proper dissemination of knowledge on various aspects of forensic science can be achieved only if a common forum is established where police officers, forensic scientists, lawyers and judges can get together and discuss topics of common interest. The forum can be the journals, conferences, seminars and formation of societies.

6.11 PRINCIPLES

The laws and principles of all the natural sciences are the bases of forensic science. In addition, it has developed its own principles.
6.11.1 Law of Individuality

Every object, natural or man-made, has an individuality which is not duplicated in any other object.

This principle, at first sight appears to be contrary to common beliefs and observations. The grains of sand or common salt, seeds of plants or twins look exactly alike. Likewise, man-made objects: coins of the same denomination made in the same mint, currency notes printed with the same printing blocks one after the other (excluding serial number) and typewriters of the same make, model and batch appear to be indistinguishable. Yet the individuality is always there. It is due to small flaws in the materials, in the arrangement of the crystals, imperfect stamping or due to inclusions of some extraneous matter.

The individuality has been verified in certain fields. The most extensive work has been carried out in fingerprint. Millions of prints have been checked but no two fingerprints, even from two fingers of the same person have ever been found to be identical.

In a series of experiments carried out, the superimposition techniques for fingerprints, footprints, tool marks, die marks and marks obtained from various parts of firearms, it was observed that with the best of efforts exactly alike superimpositions even imprints from the same finger could not be produced. The fingerprints were taken one after the other, on the same paper, with the same ink and by the same person; yet they failed to give perfect superimpositions. Imperfect inking, unequal pressure, slight differences in the texture of the surface of the paper or interferences from extraneous
matter always introduce some differences. The same finger failed to give exactly alike prints. It is difficult to imagine exact duplication of any other object.

The law of individuality is of fundamental importance in forensic science. Anything and everything involved in a crime, has an individuality. If the same is established, it connects the crime and the criminal.

6.11.2 Principle of Exchange

'Contact exchanges traces' is the principle of exchange. It was first enunciated by the French scientist, Edmond Locard.

According to the principle, when a criminal or his instruments of crime come in contact with the victim or the objects surrounding him, they leave traces. Likewise, the criminal or his instruments pick up traces from the same contact. Thus, a mutual exchange of traces takes place between the criminal, the victim and the objects involved in the crime. If these traces are identified to the original source, viz., the criminal or his instrument (or vice versa), they establish the contact and pin the crime on to the criminal.

The principle of exchange is amply demonstrated in hit and run cases and in offences against person. Tracks and trials, (scent, foot and footwear marks and tyre marks), chance fingerprints, tool marks, dust, paint, soils and professional dust are other manifestations of the same principle. It is difficult to imagine a crime where the criminal, the victim or the objects involved, would not exchange traces.
The basic requirement of the principle is the correct answer to the question 'What are the places or objects with which the criminal or his tools actually came in contact?' If the investigating officer is able to establish the points of contact, he is likely to reap a rich harvest of physical clues:

1. If a criminal enters the premises through a ventilator, he leaves his footprints in dust on the sill.

2. If he breaks a window or a door, the jimmy leaves its marks on the wooden frame.

3. The burglar, who opens a safe by an explosive, leaves the area around and the clothes (including shoes) covered with insulating material as well as some exploded and unexploded explosive materials.

The criminal is likely to leave and carry minute traces only. It is seldom that he dares or neglects to leave or carry gross objects or traces. On a thorough search, the inconspicuous traces will always be found in all types of crimes. The minute traces connect the crime and the criminal as effectively as the gross objects or traces.

6.11.3 Law of Progressive Change

'Everything changes with the passage of time'. The rate of change varies tremendously with different objects. Its impact on forensic science is immense.
1. The criminal undergoes progressive changes. If he is not apprehended in time, he becomes unrecognizable except perhaps through his fingerprints, bone fractures or other characteristics of permanent (comparatively speaking) nature which are not always available.

2. The scene of occurrence undergoes rapid changes. The weather, the vegetable growth, and the living beings (especially human-beings) make extensive changes in comparatively short periods. Longer the delay in examining the scene, greater will be the changes. After some time, the scene may become unrecognizable.

3. The objects involved in crime change gradually, the firearm barrels loosen, metal objects rust, the shoes suffer additional wear and tear and the tools acquire new surface patterns. The degree of change depends upon the time, the upkeep and the use of the misuse of the particular object. In course of time the object may lose all practical identity vis-a-vis a particular crime.

The principle, therefore, demands prompt action in all aspects of criminal investigation.
6.11.4 Principle of Comparison

Only the likes can be compared is the principle of comparison. It emphasis the necessity of providing like samples and specimens of comparison with the questioned items:

1. In a murder case, a bullet is recovered from the deceased. The expert opines that the bullet has been fired from a firearm firing high velocity projectiles like a service rifle. It is futile to send shotguns, pistols or revolvs as the possible suspect firearm.

2. A bunch of hair is recovered from the hands of a deceased. The expert opines that the hair belong to a Negroid person. Hair from persons of white races for comparison will not be of any use.

3. The questioned writing is found to have been writing with a ball pen. To send fountain pen as a likely instrument of writing is futile.

Once handwriting available on a photograph allegedly written on s wall was compared with the specimen written on paper. It did not give worthwhile results.

A second set of specimens was obtained by writing on the same wall, at the same height and with the same instrument and then photographed. It allowed comparison.
A few years ago, an investigating officer sent moulds bearing footwear impressions lifted from the scene of occurrence along with specimen moulds prepared before a magistrate. The sole patterns were completely different. Further inquiry revealed that the investigating officer had used new pairs of shoes to get the specimens prepared.

The investigating officer thought that the culprit could be identified from the pressure patterns from the individual impressions on each mould.

6.11.5 Principle of Analysis

The analysis can be no better than the sample analysed. Improper sampling and contamination render the best analysis useless. The principle emphasizes the necessity of correct sampling and correct packing for effective use of experts are in the following manner.

1. A criminal while running away from the scene of occurrence, brushes against a painted surface. Some powdered particles of paint get deposited upon his clothes. The investigating officer scraps a few grams of paint from the same surface with a pen-knife and sends it as control sample. The result of the analysis shows that the two paints do not match. It is due to improper packing.

2. A small amount of dust is recovered from a small sticky patch of the shoe of a culprit. The investigating officer collects about two kilograms of soil from the scene, packs it in a tin and sends it as control sample. The results of comparison are inconclusive. It is due to improper packing.
3. In a rape case, the investigating officer collects the clothes of the victim. The clothes carry both blood and semen stains. The investigating officer dries the clothes and packs them together and sends them through a railway parcel. He wants to know if the clothes carry semen stains, and if so, to which blood group does the secretor belong?

It has been established the existence of semen but fails to give its blood grouping; because it found powdered blood sticking to semen stain.

6.11.6 Law of Probability

All identifications, definite or indefinite, are made, consciously or unconsciously, on the basis of probability.

'Probability' is mostly misunderstood. If we say that according to probability a particular fingerprint has come from the given source, the defence counsels will make most of the word and plead that it is not a definite opinion. Consequently, it is not customary to talk of 'probability' or 'probability figures' in courts.

Probability is a mathematical concept. It determines the chances of occurrence of a particular event in a particular way of a number of ways in which the event can take place or fail to take place with equal facility. If P represents probability, \(N_s\) the number of ways in which the event can successfully occur (with equal facility) and \(N_f\) the number of ways in which it can fail (with equal facility), the probability of success is given by the formula:
\[ P = \frac{N_s}{N_s + N_f} \]

If the event consists of two occurrences which can take place independently, the probability of the second occurrence is also given by the same formula. If we denote probabilities of the first and second occurrences by attaching digits 1 and 2 to the relevant letters, the net probability \( P_i \) is given by the formula:

\[ P_i = P_1 \times P_2 = \frac{N_{s1}}{N_{s1} + N_n} \times \frac{N_{s2}}{N_{s2} + N_{f2}} \]

Likewise if the event consists of 'n' independent occurrences, the net probability of the event is given by:

\[ P_i = P_1 \times P_2 \times P_3 \times ...... \times P_n \]

Similarly, if the probability relates to separate events, the net probability is given by:

\[ P_i = P_1 \times P_2 \times P_3 \times ...... \times P_n \]

1. A coin is flung. It can rest either head-upward or tail-upward. Both positions have equal chances for all practical purposes. Therefore, the number of possible ways the head can come upward, \( (N_h) \) is 1, the number it can fail, \( (N_f) \) is also 1.
\[ P = \frac{I}{1 + \frac{1}{\sqrt{2}}} \]

2. An unknown woman is found murdered. The corpse has one gold plated tooth, a tattoo scar on its left hand and a healed fracture of collar bone. A woman with these characteristics is reported missing. What is the probability of the corpse being the missing woman? (given, the occurrence of gold-plated teeth in the area, 1 in 5,000, collar bone fracture 1 in 20,000 and of tattoo-scars 1 in 100).

Here

\[ P_1 = \frac{1}{5,000} = \frac{2}{(10)^4} \]

\[ P_2 = \frac{1}{20,000} = \frac{5}{(10)^5} \]

\[ P_3 = \frac{1}{100} = \frac{1}{(10)^2} \]

\[ P_4 = P_1 \times P_2 \times P_3 = \frac{2}{(10)^4} \times \frac{5}{(10)^5} \times \frac{1}{(10)^2} \]

\[ = \frac{1}{(10)^{10}} \]

Thus, the chances of the corpse being of another woman are 1 in 10,000,000,000.
This may be neglected other factors (sex, age and dress) and even without these additional factors, the identity of the deceased is established beyond a ‘reasonable doubt’.

6.12 FACTS DO NOT LIE

‘Facts do not lie, men can and do’, hence the importance of circumstantial evidence vis-a-vis oral evidence. The oral testimony depends upon the power of observation, assimilation and reproduction of the witness. It is modified by autosuggestion, external influence, suggestions, descriptions and opinions of others and rationality. Oral evidence, therefore, is coloured, whereas factual evidence is free from these infirmities.

But ‘facts’ can also be created:

1. A person is killed in an accidental firing. The relatives want to implicate their opponents. They procure an unlicensed firearm, fire a cartridge, place it at the scene and plant the firearm on the opponent.

The police recovers the shell and the firearm. The shell is married to the firearm. The police prosecutes the person.

2. A person is in the armed forces. He is seen carrying out duty upto 1 A.M. in the unit. He slips through the guarded premises, goes about a hundred miles, commits a murder, returns to his unit, enters into the guarded premises secretly and is present on his duty at 7-30 A.M.
By circumstantial evidence he proves his presence in the unit throughout the night.

3. A threatens B with death. The next day B is found murdered. B had no other enemies except A. Police suspects A as the murderer. He is not found anywhere. He is declared a proclaimed offender. Soon after 'A' appears before a magistrate and says he had gone on a pilgrimage, but checking at the allegedly visited places, his visits to the places are not established. He is arrested and prosecuted. In defence, he produces the jail record. He was behind the bars at the relevant time. He escapes sentence.

6.13 TOOLS AND TECHNIQUES

The tools and techniques of forensic science are oriented to meet the following demands in an analysis:

1. Sensitivity
2. Specificity
3. Rapidity

The instruments and techniques should be highly sensitive because the quantities of materials involved are extremely small, often in micro, sub-micro or microscopic ranges. For example, a few milligrams of certain poisons are sufficient to kill a person. The quantity is distributed in the whole body. Only a few hundred grams of body matter is provided for analysis. The sample contains only micro quantities of the poison. It must be identified and estimated correctly.
Paints, soils, dusts, inks and body fluids are often me within micro quantities.

A clue material is to be identified positively, otherwise the evidentiary value of the clue is limited. The instruments and techniques must, therefore, be highly specific. In a poisoning case it is not sufficient to identify the poison as a barbiturate but it is necessary to find out which one it is, so that its source could be traced and linked to the criminal.

The number of cases requiring evaluation of clues is increasing every day. The techniques and instruments should, therefore, be rapid. In classical examination of viscera and organs each item is subjected to lengthy processes of extraction, purification, identification, and estimation. The results are checked and cross checked for mistakes. Modern techniques may eliminate most of these steps. The poison is extracted from a convenient body part (say blood, lungs or kidneys) and identified through chromatography (paper, column and thin layer). The quantity is estimated through ultra-violet spectrophotometry and specific poison is identified through infra red spectrophotometry. The classical methods need days and weeks for the complete analysis, whereas the above procedure identifies and estimates the clue material in a few hours. Similarly, blood alcohol in a sample (a drop or less is sufficient) may be identified and estimated through gas chromatography in a few minutes.

The tools and techniques currently used in modern forensic science laboratories belong to both classical and modern categories.
6.14 MEASUREMENTS

Examination of clue materials requires various types of measurements. Determinations of dimensions (length, breadth, depth, height, curvature, diameter), angles, melting points (including mixed melting points) boiling point (including boiling point curves and ranges), densities, refractive indices, birefringencies, polarisation and fluorescence are daily routine. They require elementary knowledge of science, yet they fix the identity of a material in a number of cases.

Refinement in the techniques has improved efficiency and accuracy of the determinations considerably in recent times. For example, density gradient tubes have permitted density determination of very small amounts with high accuracy. Likewise, using a hot stage in Beckeline method, small differences in refractive indices can be determined very accurately.

6.15 MICROSCOPY

A microscope is one of the most important tools of a forensic science laboratory. It is needed in all branches of forensic science.

A microscope in its simplest form is a magnifying lens. Continuous improvements and inventions have given a large variety of microscopes suitable for different purposes. Compound microscopes, stereomicroscopes, comparison microscopes, fluorescence microscopes, phase contract microscopes and metallurgical microscopes are common items in a forensic science laboratory.
The use of infra-red rays for microscopy (by using an image converter) and electron microscopy (where magnifications of the order \((10)^8\) or above can be achieved) SEM are comparatively additional recent innovations in the field. They have an important impact on forensic science.

6.16 PHOTOGRAPHY

The investigating officers and others concerned with the administration of criminal law are familiar with the photographs of the scene of occurrence and of the criminals. Photography is also being used to demonstrate invisible traces, unrecognizable clues, stains and the like. Photography with ultra-violet rays, infra-red rays, X-rays and coloured filters, macrophotography (magnified photographs), photomicrography (photographs of microscopic evidence taken in conjunction with a microscope), microphotography (miniature photography), cine photography and photogrammetry have great importance in criminal investigation work.

The variety of cameras used is very large.

6.17 INVISIBLE RAYS

The use of ultra-violet rays in criminal investigation is well known. The use of infra-red rays and X-rays are comparatively later additions.

Ultra-violet rays are absorbed by some materials. Some of their energy is consumed in the process. The rays of lower energy content are emitted. They have greater wave length and are in the visible range. The absorption powers of different materials vary greatly. Even small differences in the surface structure of an item are detected through differences in
fluorescence. It helps in the identification and differentiations of stains, sealing waxes, papers, inks, dyes, paints and varnishes.

Infra-red rays have greater wave length than the visible light. They also have greater penetration power and, therefore, pass through some materials. They are useful in the examination of documents, clothes, stains and the like.

6.18 CHROMATOGRAPHY

Chromatographic techniques have assumed great importance in forensic science. All its forms: column chromatography, paper chromatography, thin layer chromatography and gas chromatography are handy tools. They are used to separate, identify and estimate clue materials even in sub-microgram quantities. The impurities do not substantially interfere during the analysis.

Column chromatography is mainly used to isolate and purify a substance. The material is dissolved in a suitable solvent and pass through a suitable stationary phase, packed in a column. The substance is then eluted with one or more solvents. The required materials, due to difference in absorption power, is eluted out of the column in a pure form from before or after the impurities depending up on their nature.

Paper chromatography is similar in principle and action. Paper's cellulose fibre and water absorbed by the paper constitute the stationary phase. Two dimensional and reversed phase chromatography are additional innovations.
Paper chromatography is used for identification in addition to isolation and purification of clue materials. For this purpose the ration of the distance travelled by the material ad the solvent is found which is characteristic of the substance. It is called Rf value of the substance for the system. Circular paper chromatography is extremely handy for the purpose.

Thin layer chromatography is convenient variation of the above techniques. A thin layer of the solid stationary phase (e.g., silica or alumina) is deposited on a glass plate. The results are quick and accurate. The stationary phase and solvent can be varied at will.

Gas chromatography is one of the most important tools of forensic science. the three criteria mentioned for a technique are admirably met with by this technique. It requires minute quantities and gives qualitative and quantitative results within minutes.

The technique is applied in the analysis of gases, liquids, vapourizable solids and for substance which pyrolyze to give identifiable volatile products Petrol, kerosene oil, liquors, perfumes, lacquers, varnishes, paints, barbiturates, soaps and organic insecticides are being analysed by this technique. The field of application is extending every day.

The technique is simple in principle and practice. In general, a liquid or a solid stationary phase supported on small brick chips or other similar material contained in a column is maintained at a convenient temperature. The product to be analysed (for purification, identification and estimation) is passed through the column with the help of a carrier gas like nitrogen, helium,
argon or hydrogen. The sample in its passage through the column is fractionated. Different constituents come out of the column at different intervals and pass through the detector. They are detected by changes in the current of a circuit fitted therein. A recorder records these changes on a graph paper. Comparison of the graph with similar graphs of known products, permits identification and estimation of the constituents.

If the outcomeing gas or vaporous are collected in fractions at intervals indicated by the peaks and troughs of the graphs, the separation of constituents is obtained

6.19 ELECTROPHORESIS

The technique is particularly useful for colloidal or other materials like proteins, inks, paints and pigments having residual charge on the molecules. The technique is being extensively used in the study of blood and other proteinous matter.

The material to be analysed is taken on a paper strip (or gel) and an appropriate electric field is applied to the two sides of the strip. The charged molecules move in either direction depending up on the residual charge. The speeds of the molecules vary with the charge and the weight of the molecules and their absorption power in the medium. Thus, different molecules get separated into bands. The position of a band on the strip identifies the molecule.
Spectrography is the oldest modern technique used in the analysis of clue materials. Its use is limited to elemental analysis of some elements and their compounds.

A small amount of the materials is vaporized by a flame, an arc arc a spark. The light emitted is passed through a diffraction grating or a prism (both glass and quartz prisms have been used; the latter is preferable. They split the light into its various wave lengths. A photograph of split up light is taken and studied. The position and number of lines depend up on the nature of substance given the light. Comparison with standard spectrograms give the nature of the constituents of the sample analysed.

The quantitative estimates are made by studying the intensities of the various lines.

A recent innovation of the technique is laser spectrography. A small narrow beam of intense light (laser beam) is used to vaporize the material. The wave-lengths of the light so produced are studied in the usual way.
The technique has not been extensively used in forensic work so far. But it has a bright future as the sample required is still smaller. A small spot from the object is vaporized. There is no noticeable damage to the object, the analysis is 'non-destructive' for all practical purposes. Even documents, paintings etc. can thus be analysed.

6.22 MASS SPECTROMETRY

Mass spectrometry permits identification of all substances which can be vaporized into charged particles (most of the materials). The samples required for the analysis are virtually in the molecular weight (or atomic weight) range.

Both qualitative and quantitative estimations can be made. The technique has a great future in forensic work.

6.23 SPECTROPHOTOMETRY

One of the most important techniques in forensic work is spectrophotometry. It is sensitive, specific and rapid. It is simple in principle. The equipment is, however, sophisticated and costly.

A beam of electromagnetic rays of selected wave-length (from ultra-violet, visible or infra-red range) is passed through the material. Some of the energy of these rays (at a particular wavelength) is absorbed by the material. The residual rays fall up on a photo-electric cell and produce changes in the current of a circuit. The changes are recorded on a graph paper. Comparison
of the grabs with those of the known materials permits identification of the unknown material. Quantitative estimation is possible from the peak areas.

The technique is extensively used in the identification of sedatives, drugs, poisons, narcotics and intoxicants. It is also useful in the identification of liquids and gases.

6.24 NEUTRON ACTIVATION ANALYSIS

Most of the elements can be made radio-active. The radio activity is characteristic of the element and is studied by spectrometry. The substance is placed in an atomic reactor where it is subjected to high flux neutron bombardment. Neutron source other than atomic reactors have been developed but they have not been found so useful for forensic work.

The technique is the most sensitive and specific so far known. It has been utilized in the examination of hair, plant materials, paints, soils, dust, and other clue materials.

The neutron activation analysis has not become a routine technique. Nor it is likely to become so for sometime to come, as high flux neutrons required in the technique are available only in an atomic reactor, which is a complex and costly apparatus.

6.25 X-RAY DIFFRACTION ANALYSIS

It is a highly sensitive and specific technique for the identification of materials. The materials under study are not destroyed in the process.
A beam of X-rays in passed through the materials. The X-rays get diffracted depending up on the arrangement of the various particles int he crystals. The diffraction patterns are photographed and compared with diffraction patterns of known materials where by the identity of the substance is established.

The technique is useful in the study of barbiturates, glass gragemnts, minerals, inorganic substances, paints, pigments, corrosion, dust and the like.

6.26 DTA, NMR AND POLAROGRAPHY

Differential thermal analysis (DTA), nuclear magnetic resonance (NMR) and polarographic techniques are important analytical techniques used in chemical analysis. They are being adopted for forensic work. All these techniques are sensitive and specific.

6.27 SEM

Scanning electron microscopy has been recently tested and found useful in forensic work, particularly in tool marks and identification of fired ammunition in respect of the firearms.

6.28 FORENSIC SCIENCE IN DETECTION OF DOWRY CRIMES

Forensic Science is widely involved in detecting the dowry crimes like death due to strangulation, hanging murder, suicide, stove bursting, burnt to death administration of poisons and involvement of document in the form of suicide note expressing harassment and torture faced in husband’s house and in laws house are some of the cases.

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The different mode of dowry death, the type of clue materials & symptoms expected, examinations to be conducted and finally based on the inference conclusions arrival are as below.

6.28.1 Death Investigation

Death investigation is the most important assignment given to an investigating officer as murder is the most heinous crime. It needs skill, experience, intelligence and the ability to win confidence of persons to get information and cooperation from them.

All sudden deaths are not murders, accidents or suicides. In fact in U.K. they have calculated that about eighty per cent of sudden deaths are natural deaths (Act of God). Only about twenty per cent are unnatural deaths - suicide, accidents or murders.

Formerly, it was said that dead men tell no tales. It is no longer true. A corpse helps to establish corpus delicti. It gives the identity of the deceased, the time of death the cause of death, modus operandi and furnished clauses which link the criminal with the crime.

6.28.2 Methodology

Examination of the Scene

In case of death careful examination of the scene of occurrence is very important. The general examination of scene were conducted. Proper protection, proper photography, careful sketching, detailed search, proper collection and despatch of evidentiary clues are being stressed. In addition the following details were noted.
6.28.3 Indoor Scene

1. Suicide note. It may be real or fake.

2. Hiding places for incriminating objects including weapon of offence, discarded garments, material used for wiping stains etc. The objects may carry even fingerprints.

3. Conditions of the house; doors, windows, lighting, heating, fire places need check. Documents and garments may have been burnt. Residual fragments may still be available.

Kitchens, bathrooms, toilets may give useful indication of washed blood. Towels may carry bloodstrains. There may be even fingerprints on taps and wash-basins, etc.

Wall, ceiling, windows, ventilators may carry bullet damage or marks in cases of shooting. The marks should be carefully located, sketched and photographed. All bullets should be extracted and cartridge cases collected.

Ash trays, waste paper baskets, waste heaps and dumps should be carefully checked for incriminating clues.

6.28.4 Outdoor Scene

Outdoor scenes need special care. The following important points were kept in view:
1. Outdoor scene needs immediate processing. Delay destroys evidence. Dust storm, rain, floods and traffic are potential dangers.

2. Not to let the scene be trampled.
   a. Rope off the concerned area.
   b. Formulated a plan for examination of the scene.
   c. Employed minimum persons to search the scene.
   d. Examined the scene during day, if possible. Flood lights were utilised.

3. Since Biological evidence (skin, flesh, blood, hair) are easily destroyed or displaced by insects, care has taken to preserve the due materials.

6.28.5 Signs of Struggle

Checked signs of struggle by followed the point.

1. Upturned furniture.

2. Spattered blood.

3. Pulled out hair.

4. Marks of weapon of offence at the scene: doors, walls, furniture, etc.

5. Foot or footwear marks on walls, furniture, bed, etc.

6. Foreign material like bullets, cartridges, cartridge cases, fragments of weapon of offence, etc.

7. Defence injuries on the person of the deceased.
6.28.6 Real or Fake Scene

The following factors indicated the faked nature of the scene.

1. The quantity of blood at the scene vis-a-vis the extent of the injuries may be less.

2. Nature, position, size, direction of strains of other body fluids especially semen, saliva, urine and faeces, etc. may not correspond with the given facts.

3. The condition of cloths: state of batons, tears, displacement, abrasion, crimping, creasing, staining, etc. may tend to tell a different story.

4. The evidence: blood, bullets, cartridge cases, semen and other items, underneath the body; may falsify the given version.

6.28.7 Side Information

Interpretation of side information helped to decide the case nature.

The following are taken into account.

1. Who was the victim?

2. Who saw him alive last?

3. Who was to meet the victim?

4. Who would gain by his death?

5. Who would lose by his death?
6. How much money did the victim carry on his person at the time of death?

7. What was the victim doing when he met his end?

8. What was the psychological portrait of the victim? Drunkard? Drug addict? Moody? Eccentric?


6.28.8 Corpse Examination

Corpse examination at the scene is very useful. However, it limited to external examination only. Detailed examination done by a pathologist in postmortem examination accounted for following reasons.

1. To confirm death

2. To photograph the body 'as is, where is'.

3. To sketch the position of the body.

4. To record the description of the body, the position of the body vis-a-vis other articles at the scene, describe the body fully: head, trunk, arms, legs. Special care should be taken in describing the head - position, mouth, eyes, etc.

5. To record the bloodstrains on and around the body without disturbing the body: their size, position, direction.
6. To record if there was blood froth (blood mixed with saliva and air). Usually it occurs when blood enter into air passage while the person was still alive. But in some cases putrefaction may give out froth.

7. To estimate the quantity of blood at the scene was it consistent with the injuries.

8. To note the number, size, nature and position of other stains.

9. To record the condition of the clothes of the victim.

10. To outline the position of the body with chalk before removal.

11. To place the dead body in a clean white, plastic sheet for its transfer to mortuary.

6.28.9 Postmortem Examination

Postmortem examination in cases of sudden and suspicious death has great value and therefore has carefully done for following:

1. The remain present at the time of postmortem examination.

2. To ensure collection of evidentiary clues by tactful suggestion to the doctor.
3. To get the body (clothed as well as naked) photographed, if necessary and possible, by colour photography to preserve the evidence on the person of the deceased.

4. To collect clothes invariably. They should be properly marked for identity.

5. To collect relevant samples of blood, hairs, fingerprints, and viscera if required.

6.28.10 Possibilities

Suicide, murder or accident?

To decide between suicide murder or accident, the examination of the scene, examination of the body and checking of the signs of struggle have done carefully. In addition there were indicators which helped to decide the nature of death.

6.28.10.1 Suicide

The following factors are indicated suicide:


2. Previous attempts at suicide indicate suicidal tendencies.

3. Extreme depression due to physical pain (illness), fear, quarrel, financial loss may lead to suicide.
4. Certain sites are predominantly used by suicide for self-inflicted injuries. For example with firearm, temple, forehead, mouth and chest are the favoured site. With knife throat and wrist are the favourite sites. Hesitation injuries are also observed in some suicide cases.

5. The person may use more than one method to commit suicide. For example when a suicide may fail to use a knife successfully, he may succeed to hang himself.

6. Certain modes of suicides are favoured. Usually they are less painful and easily accomplished. For example, sleeping drugs, opium are quite frequently used.

7. Presence of weapon at prone position may suggest suicide.

6.28.10.2 Accident

The following points are indicated accident:

1. The source and cause of accident should be near the victim.

2. Absence of motive for suicide or homicide.

3. Tell-tale physical evidence available at the scene or with the victim.

4. Absence of natural cause: disease, etc.

5. Absence of struggle, violence, defence injuries or multiple injuries as in struggle or suicide.
6.28.10.3 Homicide

Homicide is indicated by the following factors:

1. Attempt to hide the corpse.
2. Attempt to dispose off the body.
3. Absconding of the suspects.
4. Manipulation of physical evidence to make it look like suicide or accident.
5. Absence of weapon of offence.
6. Change of the scene.
8. Injuries which could not be self-inflicted or self-caused in accident or in self-defence injuries.

6.29 IDENTIFICATION OF DEATH

What is death? Death is the cessation of life. Life in an individual is sustained by the functioning of the brain, heart and lungs. If these three body parts stop functioning, the person is said to die (somatic death). It takes some time for the body parts of become inactive. When they also die, the person is said to suffer 'molecular' death.

In certain cases identification of death offers no problem. For example when the head is found severed from the body, death has undoubtedly taken place. But certain cases of unconsciousness may mislead. For example, drugged persons, drowned persons, persons suffering from electric shock or
snake bitten persons may give the mistaken impression of death. One has to be cautious. In all such case as the victim must be checked by a medical officer. The following signs may, however, give general guidance:

1. Breathing - the clouding of a mirror placed before the mouth-nose of the victim, may still indicate life.

2. Pulse - Pulse detection is sure sign of life. But the converse is not true. Pulselessness even for half an hour may not mean death.

3. Eyes - Pupils or ball should react to strong light. Circulation of fluid stops, tension of the eye muscle is laxed and clouding of the cornea appears, on death.

4. Muscles should twitch under strong painful stimuli.

5. Plasticity of body tissues - the skin, flesh, etc. lose elasticity and tension. Contact flattenings take place and wounds do not gape.

6.29.1 Brain Death

Artificial respiration and other means to prolong life have added a new dimension to the concept of death. When does a man die? When a person fails to respond to the above mentioned tests, he can be considered dead for all practical purposes. But under external stimuli, a person may respond to some of the above tests and yet he may be dead. Death in such cases is determined
by brain activity. When the brain activity of a person stops, a person is considered scientifically dead. It may be mentioned that brain activity remains even when a person is sleeping or unconscious. The activity stops only when he dies.

The brain activity is detected by a machine called Electroencephalograph (E.E.G.). If the brain remains silent for a number of hours (6 hours), the subject is a dead person. Electroencephalography has to be done by a competent person.

A still surer test is to check circulation of fluids in the brain (cerebral circulation) by injecting radio-active isotope-tagged chemical. If the brain shows no circulation for ten minutes, the subject is dead.

6.29.2 Other Signs of Death

1. Cooling of the body: Body soon after the death cools down and acquires the temperature of the surroundings.

2. Lividity: Due to non-circulation of blood, it accumulates on the lower parts of the body (which are nearest to the earth), giving staining to those parts. The phenomenon is called lividity.

3. Rigor mortis: It is the stiffening of the body after death. It start soon after death (about 4 hours) and continues for a considerable period.
4. Putrefaction: The bacterial growth in humid and hot climate start putrefaction of the body. It is the sure sign of death, but it is too belated to be of any forensic significance to identify death.

5. Miscellaneous: Mummification, adipocere formation, skeletal formation are signs which appear only after long periods.

6.29.3 Time of Death

The determination of the time of death is seldom accurate and therefore, never reliable. It may help in some cases, but in others it can mislead.

In case of death of an infant, the body was found floating in a plastic bag in sea. Post-mortem examination gave the idea that the body of the infant was in water for 2-3 weeks. Later investigations revealed that the body was in water for 24 hours only. It had been kept in lye previously.

The various changes on which the estimation of time of death depends are dependent upon the following general factors:

1. Temperature
2. Humidity
3. Supply of oxygen
4. The state of health
5. The cause of death
6. Environments
As can be imagined, these conditions will vary so widely in each case depending upon the actual field conditions. The estimate of time of death, therefore, can at best always be a rough estimate.

Dogmatic assertions of the time of death should neither be expected nor accepted. However the following changes in the body give indication of the time of death.

6.29.4 Cooling of Body

A lot of work has been done to determine the time of the cooling of the body from normal temperature 98.4°F to the rectal temperature of the body if it is not already that of the surroundings. A large number of formulas have been given a simple one is:

\[ Ti = 98.4^\circ - R \cdot Fr^a \]

\[ Ti = \text{Time of Incidence} \]

\[ R.Fr. = \text{Room Temperature in Farehenheat} \]

6.29.5 Chemical Changes

A number of chemical changes have been studied. For example, variations of potassium content, ascorbic acid, succindihydrogenase have been studied. However, inconsistency of the results does not permit proper estimation of time.
6.29.6 Lividity

Livid stains appear on the lower parts of the body in 0.5 to 2 hours after death and are completely developed in 6 to 12 hours. Lividity is hastened by lingering deaths.

If the body is moved frequently, lividity does not develop.

6.29.7 Rigor Mortis

Stiffening of the body in most of the cases starts after about 4 hours and is completed in about 8 hours. In some cases it may taken even up to 15 hours to complete.

Cold and antiputrefaction drugs and poisons delay the appearance of rigor mortis (Example arsenic, mercuric chloride).

High pressure, temperature, certain alkaloidal poisons (example: Strychnine) and certain diseases hasten the onset of rigor mortis.

The rigor mortis wears off in about 36 hours, though in some cases it may continue even after 48 hours. In others it may wear off in 20 hours. Roughly the time taken for developing complete rigor mortis is equal to the time for which the rigor motis stays. The same time is taken by the body to wear off the rigor mortis as taken for development.
Decomposition of the body passes through various stages which may indicate roughly the time of death. A number of factors such as temperature ideal temperature 20 to 40°, humidity, the health of the victim, the surrounding conditions, affects. Likewise the mode of death is also important. Arsenic, antimony, mercury chloride poisoning delays decomposition of the body. Certain diseases hasten the process.

Internal bacteria is mainly responsible to start the decomposition but external bacteria may invade the body to hasten the process.

Climatic conditions in India vary so much, not only at different places but even at the same place in different seasons, that it is difficult to generalise the decompositional stages. However, the following may act as rough guide:

1. In about 24 hours the abdomen starts extending and acquire greenish tinge which spreads to whole body in about 48 hours. The body also starts emitting foul smell.

2. After 2-3 days, blisters containing reddish fluid appear. Simultaneously body cavities are filled with gas. The pressure become excessive. Fluid comes out from the body orifices (openings: nose, mouth, rectum, vagina and wounds, etc). Sometimes stomach bursts, but this is rare.
3. Disintegration of body fats and proteins also starts. In about 1-2 weeks, skins, hair and nails are loosened. Softened tissues like brain, liver, kidneys disintegrate and liquefy and flow outside the body. In 4-8 days maggots in the corpse develop into pupae and in 6-12 days they change into flies.

4. Adipocere formation takes place in bodies which receive plenty of moisture (bodies under water or in swamp). The formation is due to the hydrolysis of the body fats to fatty acids which preserve the body tissues. Adipocere formation ordinarily takes 3 to 6 months but under ideal conditions it may take only about one year. Adipocere may be partial or complete. Often it is partial.

5. Mummification take place in dry and hot climates. The body is dehydrated by evaporation of the moisture by dry hot air. Complete dehydration (and hence mummification) may take about a week. Bodies suffering from loss of body fluid prior to death are more prone to dehydration. Bones undergo gradual changes. They lose organic matter first. The become brittle in consequence. Further, changes involve complete destruction of soft bones and rarefaction of tough bones. Skull and teeth are the last to be destroyed.
6.29.9 **Miscellaneous Factors**

In addition to body changes the following factors also help to ascertain time of death:

**6.29.9.1 Watch and Clocks**

If the victim was wearing a watch and if it stopped functioning due to damage in the scuffle it can indicate the correct time of the scuffle and, therefore, possibly time of death.

**6.29.9.2 Bladder Contents**

If a person has been killed in sleep, the bladder contents may give some idea about the time of death. Empty bladder may indicate death soon after sleep whereas a full bladder may indicate death in the early hours. Urine continues to get accumulated in the bladder during sleep.

**6.29.9.3 Stomach Contents**

Undigested or semi-digested food can fix the time of death, if the time and contents of the last meal are known. However, caution has to be exercised. Sometimes the digestion stops due to shock, injury or disease.

**6.29.9.4 Clothes**

The state of clothes on the person of the victim may indicate the time of death. Cotton clothes are destroyed in about 2 year's time, woolen clothes in about 4 years time and silk clothes in about six year's time. However, climatic factors and extent of use etc. change the time table.

Ants and other insects can change the time table completely.
6.29.9.5 Vegetation

If the body has been lying in secluded jungles and vegetation has grown through the skeleton, the death is roughly as old as the age of the vegetation at the tie.

6.29.9.6 Rusting

Iron or steel articles, such as keys, rings, nails, etc. on the person of the deceased rust. The extent of rusting may give rough idea about the time of death.

6.30 CAUSE OF DEATH

A person may die of poisoning and during assaulted by others. They have already been discussed. In addition cause of death could be:

1. Mechanical violence
2. Asphyxia.

6.30.1 Mechanical Violence

Mechanical violence causes internal and external wounds. The ‘wound’ embraces a wide variety of injuries. It is defined as a dissolution or discontinuation of body tissues.

A wound may involve skin, flesh or bones, separately or in combinations. A wound may be simple, grievous or fatal.
Wounds are classified as:

1. Abrasions, grazes, or lacerations.
2. Bruises or contusions.
3. Punctured wounds, and
4. Incised wounds.

6.30.2 Abrasions

Abrasions are caused by the sliding motion of an object due to scratching or rubbing of the skin against the rough surfaces such as floors, walls, stones, trees, wooden pieces, rope, string or any other hard and rough surface. The shape and size of the abrasion vary tremendously. It roughly takes the shape and size of the abrading surface on extended scale due to sliding contact. In abrasions, ordinarily, only the epithelial layer is involved. The injury heals in about two weeks' time without leaving a scar. If however, deeper tissues have been injured due to deeper scoring a permanent scar may be left.

Abrasions are also known as lacerations or grazes.

6.30.3 Bruises

Bruises are also known as contusions.

Bruises are caused by an impact of a blunt weapon like a lathi, club, stone, hammer, shoe, fist, foot or a knee on a body. The impact crushes subcutaneous tissues, rupturing small blood vessels and tearing flesh. Often painful swelling appears at the site.
Bruises are, ordinarily, simple injuries. They prove sometime fatal when some internal organ is crushed. An injury to head, spinal cord or to a vital organ like heart or testis may cause death.

The shape and size of a bruise correspond to the shape size of the weapon of offence if the bruise is examined immediately after the impact. Later, the bruise spreads over. It is often not possible to identify the nature of the weapon from the examination of the bruise alone.

Bruises may be accidental, homicidal or self-inflicted. It is difficult to differentiate between them.

6.30.4 Punctured Wounds

Punctured wounds are caused by pointed and sharp edged weapons like knives, spears, swords, spikes, sickles and axes. Nails, glass fragments, stones and firearm projectiles may also cause such wounds.

Punctured wounds have greater depth than length. Outer dimensions of the wounds are ordinarily smaller than the instrument causing the wound.

Fatal punctured wounds, other than firearm injuries, are often homicidal in nature.

6.30.5 Incised Wounds

Incised wounds are caused by sharp-edged weapons and have clean cut edges. They have greater length than depth.
Some wounds prove fatal because of:

1. Haemorrhage
2. Effusion
3. Shock
4. Complications

Haemorrhage (excessive bleeding) may drain off most of the blood and leave insufficient blood in the body to provide oxygen to various organs especially brain.

The minimum quantity of blood which must be lost to cause death varies according to the health and age of the victim. The blood continues to flow for sometimes even after death if the wound is large at a prone position. The quantity of blood in a pool is not, therefore, true index of the fatal loss, it may indicate the time of injury in other cases.

The rate of loss of blood varies with passage of time. It becomes less and less due to clothing and fall in blood pressure.

6.30.6 Miscellaneous

1. Effusion. It is soaking of internal body tissues with blood. If blood effuses into vital body organs such as brain, throat, lungs or heart, it stops their functioning and death ensures.

Sometimes the wounds causing effusion are not visible, yet they prove fatal (for example head and chest injuries).
2. **Shock.** It is fall of blood pressure due to fright or unbearable sight. It may cause death. There may or may not be any mechanical injuries.

3. **Complication.** Injuries, sometimes, in themselves, are not sufficient to cause death. But they bring in complications in the body functions and cause death. A non-fatal injury may incapacitate a person from moving about. Heat, cold, exposure, hunger or thirst may then the victim. The victim may be already suffering from some ailment which is accelerated by the injuries and bring about death. Negligence in treatment of the injuries may also cause death.

As diminished responsibility is claimed by the culprit in such cases, the medicolegal expert should ascertain and report the same, whenever possible.

6.30.6.1 **Dimensions of Wounds**

Apparent size of a wound may be smaller than the size of the weapon causing it. This is due to the elasticity of the skin. When the weapon is thrust into the body, the skin gets stretched and when the weapon is withdrawn, the skin acquires normal position and give smaller dimensions of the wound. This is noticeable, particularly in punctured wounds. If the weapon is rocked inside, the size of the wound may be larger.
In gaping wound the width of the wound is larger than the thickness of the weapon. The elasticity of the skin is responsible for the 'gapping effect'. It is observed in incised wounds.

The dimensions and nature of the edges of a wound may give some idea about the nature of the weapon.

6.30.6.2 Age of Wound

It is not possible to determine the exact age of a wound but a rough idea may be formed from the following factors:

1. There is a gradual change of colour of a bruised skin. The skin first becomes blue. The colour then starts fading. The time of disappearance depend upon the force of impact, the position of the bruise on the body and the age and health of the person. In some cases, blood clots, do not get dissolved and give permanent blue-black colour unless the same are mechanically removed.

2. Inflammation and puss formation may give some idea about the age of the wound.

3. Healing scars indicate the age of a wound.

4. Formation of callus in bone fractures is useful indication of the age of the injury. The formation is soft to start with. It hardens with the passage of time.
6.30.6.8 Ante or Post-mortem Wounds

Ante-mortem and post-mortem wounds are distinguished from the following factors:

1. Wound inflame and heal only in living tissues. Dead tissues putrefy. The difference is noticeable.

2. The skin loses its elasticity after death. Therefore, the changes associated with the elasticity of the skin, do not take place when the wound is inflicted on a dead body. However, wounds inflicted immediately after death, may look like ante-mortem wounds.

3. Post-mortem wounds do not bleed unless some important vein is cut or the wound is inflicted in a place where blood had accumulated by gravity and flows out from the wound as a natural outlet. Such bleeding is distinguished from the usual bleeding by the absence of spurtling and formation of fibrin. Spurtling and clotting of blood takes place only in ante-mortem injuries.

4. Blood coagulations in about 12 hours after death. If a wound is inflicted after this interval there will be very little bleeding.

5. The edges of the wounds are deeply and firmly soaked in ante-mortem injuries.
6. Bruises cannot be caused on a dead body after a few hours of death. However, sometimes, bruises appear after death for injuries inflicted during lifetime.

6.30.6.4 Fatal Wounds

It is of great forensic importance to establish whether a particular wound is by itself or principally responsible for the death of the victim. This is established through a detailed and thorough autopsy and study of the medical history of the victim. Certain diseases like weak heart, tuberculosis, asthma and haemophilia accelerate deaths. Victims suffering from these diseases succumb to violence more easily than normal healthy persons.

6.31 INCAPACITATION

It is frequently asked whether a victim after receiving a certain injury or injuries could perform the given acts. The medico-legal history is replete with fantastic tales of activities carried by the injured victims who later collapsed and died.

It appears the will-power of the individuals, which vary tremendously, mainly accounts for the unbelievable acts sometimes performed by the injured victims. Ordinarily, any serious injury to a vital organ should incapacitate a person immediately.
Asphyxia means the non-supply of oxygen to the body. It may be achieved by chemical or mechanical means.

If the air inhaled contains very little oxygen, as in rarefied atmosphere at high altitudes, or in air mixed with gases like carbon dioxide and nitrogen, asphyxia results. Carbon monoxide or hydrogen cyanide inactivates haemoglobin, the oxygen carrier in blood, and causes asphyxia. Certain drugs like opium, inactivate the heart and prevent the supply of oxygen to body parts by restricting the blood supply, with fatal results due to asphyxia.

Asphyxia, commonly referred to, is by mechanical means. Suffocation, choking, strangling, hanging, drowning and crushing of the heart and lungs are its various forms.

### 6.32.1 Identification of Asphyxia

Death due to asphyxia is identified from the following observations:

1. **Skin becomes pale.** Minute droplets of blood may ooze out on the face.

2. **Eyes become bloodshot.** Pupils become dilated. The eyes remain partially open. If a section of the eye flesh is examined, it shows minute droplets of blood.

3. **Mouth remains partially open.** Tongue may protrude. Froth is found in mouth, nostril, throat and wind-pipe.
4. Blood is deficient in oxygen.

5. Marks of violence are found on the body. The nature, number and the position of the marks depend upon the mode of asphyxiation. A person dies in about give minutes from asphyxia.

6.32.2 Suffocation

If the inlets of air supply, mouth and nose, are blocked from outside, suffocation takes place. This may be done manually by placing hands over the inlets or closing them with a piece of rag or cloth. If the head is buried in a heap of flood, sand, earth, mud, grains, coal dust, snow, cotton and wool, the person is suffocated.

Suffocation is generally accidental or homicidal. It is rarely suicidal.

Accidental suffocation may kill children, drunkards or person suffering from epilepsy. They may bury their heads in pillows, mud, snow or a heap of flour or dust and die.

Homicidal suffocation carries bruises around the nose and lips as the victim struggle for release.

Being buried alive, accidentally or otherwise, is a form of suffocation. It is ascertained by the presence of foreign matter inside.

6.33.3 Choking

Choking is a variation of suffocation where the inlet passage of air supply is blocked internally.
Choking may be accidental or homicidal.

Accidental choking may occur when something like a marble or a lump of food is swallowed and gets stuck in the air passage.

A few years ago, the Indian Air Force Chief died in Japan due to choking. A piece of meat had stuck in his throat, which choked him to death.

In homicidal choking a piece of cloth or other material is pushed through the mouth depth into the throat. The intention of the culprit may not be murder. He only wants to silence the victim but death may follow.

6.33.4 Strangulation and Throttling

Strangulation involves constriction of the neck muscles. Air passage is blocked and the victim dies constriction of the neck is caused by external force. Hands, or a cord, a string, a rope or a piece of cloth may be used.

The neck is marked where the skin is pressed. The skin becomes soft and red. The marks take the shapes of the item used for strangulation.

The death is caused by asphyxiation. The neck muscles, arteries and bones are also damaged. There may be bleeding from the nose and the mouth.

Suicidal strangulation is rather rare and may be accomplished only by lunatics. Accidental strangulation is sometimes possible. Strangulation is generally homicidal. Sometimes it is preceded by drugging.
Hanging, like strangulation, involves constriction of the neck. The body is hung by the neck through a cord, string, rope, wire or a piece of cloth. No external force is applied. The weight of the body alone is sufficient to cause death through asphyxia. Damage to neck tissues and arteries and dislocation and fracture of vertebrae may take place.

A corpse was recovered in advanced stage of decomposition. Death due to exposure to elements was suspected. However, fracture of the vertebrae was noticed at the time of post-mortem examination. The case was investigated as murder.

Ligature marks found around the neck on the side opposite to the knot indicate hanging. Detailed examination reveals sings of asphyxia and damage to neck tissues and bones.

Hanging was one of the commonest method for suicide in India. Accidental hanging, though rare, is possible, homicidal hanging to simulate suicide is frequent. Even dead bodies are 'hanged' sometimes. They may carry the ligature marks but signs of asphyxia are absent.

DROWNING

Drowning causes asphyxia, though other complications such as dilution and laking of blood, exhaustion, heart failure, hitting against some rock-like hard object may be present. Persons are known to have died even in shallow waters. Presumably the victims were too feeble (due to intoxication, drugging, injuries or diseases) to save themselves.
Drowning is recognized by both internal and external changes. Signs of asphyxia, foreign matter in hands, mouth, and inside, abrasions on fingers, toes, knees and forehead and vomitus constitute external signs.

Internally, froth mixed with blood and sometimes with food matter in the wind-pipe, foreign matter alongwith water in the stomach, haemolysis of blood and distention of lungs and stomach are observed.

If the body is submerged under water for a long time, the hands and feet acquire 'washerman's skin' and lungs get swollen and congested.

Drowning is often accidental and suicidal; it is rarely homicidal. It is often difficult to decide whether the drowning is homicidal or not. Answers to the following questions help:

1. **Is the body tied?** If so, it is, ordinarily, homicide. The rope with the knots should be preserved. It may virtually tie the culprit with the murder.

2. **Are there any homicidal tears, holes, stabs or stains on the clothes of the victim?**

3. **Are there some injuries on the body?** If so, were they present before the body was submerged? Or are the injuries due to fall in water and striking against some hard object under water?
4. Are there any fractures or dislocations of bones, bullets or other foreign matter in the body? Could the damage to bones occur inside water due to fall and striking against some hard object?

5. Does the viscera contain poison? The presence of poison indicates either homicide or suicide.

6. Was the deceased of sound mind? Did he have a tendency towards suicide or did he suffer from some disabling disease like epilepsy?

7. Who was interested in his removal?

Sometimes dead bodies are thrown in water for disposal by the murderers. The bodies do not show any signs of asphyxia and there is no foreign matter including water in the bodies.

6.37 BURNING

Heat, ultra-violet rays and X-ray radiations produce burns. The damage to the body tissues depends upon the source of energy, the length of exposure and the health and the part of the body exposed.

Deaths due to burning are generally accidental. The clothes of the victim may catch fire, a kerosene oil stove may burst or an individual may get surrounded by a big fire.
Bride burning has acquired unfortunate proportions in recent times. Usually kitchen accidents are alleged even for murderous burnings. Proper examination of the scene and other evidence can permit differentiation between accidental and homicidal bride burning.

It is at times difficult to differentiate between suicidal and homicidal burning.

A criminal sometimes sets a house on fire and burns a dead body to simulate accidental burning. But post-mortem and ante-mortem burns can be distinguished. The latter contain fluid in the scalds and there is inflammation of the skin around the burns. These signs are absent in post-mortem burns.

6.37.1 Identification of the Dead

The identification of the corpse is necessary to establish the corpus delicti. The same is ascertained from the following:

6.37.1.1 Relatives and Acquaintances

The most reliable identification of a corpse is the one made by relatives and friends. Ordinarily, they do not make mistakes. But when a body has altered greatly, the identity of the deceased should be considered established only if they can indicate specific marks of identity.
Certain documents like personal letters, driving licence, passport, permits and receipts may be found on the person of the deceased. They lead to the identity of the corpse.

In some cases, a document may be 'planted' on the deceased to give the corpse an 'identity' which the culprit may desire. The identity, therefore, established from documents should be confirmed from other sources.

A skeleton was recovered from a pit. The flesh and clothes had completely destroyed by insects, etc. A wrist watch, a steel bangle and a lump of earth suspected to contain a plastic object were recovered. The state of the skeletal remains indicated that the body was lying there for a considerable period. The lump of earth was, therefore, carefully worked to collect its contents. It gave a plastic diary cover containing a crumbled diary, a few coins, bits of currency notes and other papers.

The diary was identified as one issued by a college. The bits of currency notes were found to be at least worth over rupees six hundred. Some of the bits of paper were suspected to be college fee receipts. Comparison of the writings on one of the bits of paper with duplicate carbon copies in the fee receipt book establish original-carbon copy relationship of the documents. The identity of the deceased was, therefore, established. The recovery of a comparatively large amount of money ruled out robbery or planting of the document to mislead the identity.
6.37.1.3 Portrait Parle

The portrait parle of the corpse proves useful. It should be compared with the portrait parle of the suspected deceased or missing persons.

6.37.1.4 Scars

The positions, sizes and shapes or scars, tattoo marks, fracture and deformities are helpful.

A fire at the central apartment building in a city recently completely gutted the third floor and heavily damaged the first and second floors of the structure.

An investigation was conducted by the police department and a member of the fire brigade office to ascertain its cause and account for all building occupants. It revealed the fire had originated in apartment 42 and spread throughout the entire third floor. Careless smoking was the probable cause of the blaze.

6.38 DIFFERENT MODE OF DOWRY DEATH

(1) Suicide by Hanging. Hanging is a form of asphyxial death where there is suspension of the body by a ligature tied around the neck.

Normally the bride who is tortured by has husband or in laws of the family members of the husband, may choose to bring her life to put an end by hang herself. For this she select clothing of wearing like saree, taubbetta, or
rape which ever is available in the house. The person ended life in suicide may leave some suicidal notes which would give some information regarding the commission of an offence.

On examination the following observation was made in forming the opinion.

6.38.1 Post-mortem Appearances

External examination

Consisting of single nails and lips.
Drilling of saliva from the angle of the mouth.
Post-mortem staining in the legs.
The neck is elongated and stretched.

6.39 BURNT BODIES

Human burnt body is sometimes involved in crimes. The burnt may be superficial, severe (or) fatal. This may be caused by sines, explosives, corrosive chemicals (acid all**) or electromagnetic rays (X-rays, ultra-violent etc). The present discussion mainly concern with burn from line direct (or) indirect.

6.39.1 Classification

Burnt are classified as first degree, second degree (or) third degree burnt. In first degree the site becomes rod. No tissues are destroyed nor the burns leaves any scars.
Second degree burns are more severe. The stain is blackened and the hair are scarded. The site is often and permanent scares are formed.

Third degree burns are caused by prolonged contact of the body with naked flame or materials high temperature. Those burn are offer fatal. In some cases the life is saved by amputing the burnt limb ordinarily where the body surface involved in more than 30% the burn proves fatal. Death of the victim is painful. If the victim does not die of shock, immediately, the death may take place in four to ten class. In some cases death have taken place even after six weeks. The time of death depends upon the age, and health of the person, the part of the body burnt, the depth to which the fire (or heat). Has penetrated and the treatment which she received after the burning. Death may also occur indirectly due to medical complication of the body functions and formation of toxins (or) due to suffocation and inhalation of smoke and poisonous gages when the victim is engulfed 5% fire.

6.39.2 Post-mortem or Antemortem burns

Whether the burnt are antemortem (or) post mortem, is an important question. The answer often helps to decide whether a particular death is homicidal or otherwise. It is not infrequent that is persons is killed and the place is set on fire.

6.39.3 The feature which distinguish antemortem burnt from post-mortem burnt

1. Antemortem burnt show inflammation.

2. Old burnt show reparative scars, partial or complete.
3. Antemortem wound is surrounded by a red ring. If the burn occurs within a few minutes after death it may also show the ring.

4. Presence of blisters indicates the antemortem burns.

5. Antemortem burn contain and albumin rich serum where as post mortem boring contain little liquid, instead the vesicle contain air.

6. If a person had died in a fire which engulfed the victim, the air passage contains soot particularly the blood contain carbon monoxide. The absence of these two clues proves the allegation of suicide, or accident in these homicidal cases, where the body is has been burnt often killing the victim. It has proved useful in establishing the gulf of culprits involving murder of young women by their in laws.

6.39.4 Accident, suicide or murder

It is important to establish from a given burnt body, whether the death was homicidal or otherwise. The following check points, help:

1. If the burns are post-mortem, the death is homicidal.

2. If the victim carries other injuries than burn it indicates struggle. The death probably homicidal.

3. If the body contain intoxicants (or) sedatives, the death is probably homicidal, though accident cannot be excluded. However, the quality of material taken may prove useful guide.

4. Presence of projection / of this jobs in the body indicate homicide.

5. Examination of the scene of occurrence, the photograph sketches, and description often reveal the true nature of the occurrence.
6.39.5 Class

1. Finger print
2. Track made
3. Miscellaneous traces
4. Initiators
5. Accelerations
6. Combustible matter
7. Healing appliances

The origin of the fire may be through heating appliance (such as stove, furnace etc. It is not destroyed in the ensuring fire. It, therefore, provides useful information resulting to the origin of fire. The location, associates, with debris and condition of the appliance is important in the investigation of origin.

6.39.6 The Problem

Investigation of death due to accidental fire have three important aspects of inquiry.

1. To determine the malicious (or) accidental nature of the fire.
2. To link the culprit with the fire.
3. To establish the extent of fire.

The forensic scientist help is the location of the site of the origin of fire, the nature of initiator, accelerator and the combustible materials. They are able to access the article caused by the fire and help to locate the correct samples of due materials to establish a link between the crime and criminal.
PART II

CASE STUDIES

6.40 INTRODUCTION

The parents of the victim of dowry death, harassment make a claim that the person responsible for their daughter's death should be adequately penalised. During the long court process, however many parents become aware of the fact that their expectations are giving to be shattered. Cross pressures are exerted on witnesses and threats are used to make them drop charges. The process is long and wearing. From filing a complaint with the police to the actual trial may take two or three years even 10 years in the appealing process trialed before the supreme court (Chapter 4). Delays are the rule rather than the exceptions. Some time the dowry death cases are rather difficult in framing the charges to put trial before the court for the cause of natural justice. Circumstantial evidences, findings, fear of the public, false information provided to the investigating agencies due to fear, etc., are some of the reasons to the prosecuting authorities to proceed the case in a proper manner. However the knowledge of forensic science, has helped to solve the cases by submitting technically explanations conducted during the course of field investigation, and interpreting analytical findings and other experts opinion.

Three cases have been taken into account for this work and the process are described in details.
ROUGH SKETCH OF THE WELL.

SKETCH 2-A

BIRD'S EYE VIEW

DIATT DEPOSITION.

ELEVATION (SOUTH)

SKETCH 2-B

WOODEN PLANK.
ROUGH SKETCH OF SECTIONAL VIEW OF THE WELL
(NORTHERN HALF)

SKETCH-3

Parapet Level

Cement Plastered Area

Brick Work

RCC Sleeves (2'9'' Dia.)

RCC Sleeves (2'3'' Dia.)

Dennis

Eccentricity

Broken Edge

Smooth Surface

Water Level
ROUGH SKETCH OF THE SURFACE OF THE CIRCUMFERENCE OF THE R.C.C. SLEEVE (2'9" DIA)

Sketch 4-A

ROUGH SKETCH OF THE BROKEN BLOCK OF R.C.C. (1 1/2" THICK)

Sketch 4-B

Area with bars indicate physical matching with the broken block.

Recently broken area in the edge of the R.C.C. sleeve.
THE LOCATION OF THE TATTERED TEAR (16 CM. LONG)
(NO EVIDENCE OF TEAR/TATTER HAS BEEN SEEN ON THE REAR SIDE)

SKETCH-5-A

ROUGH SKETCH DEMONSTRATING THE ABSENCE
OF TEAR/TATTER IN THE SALWAR CORRESPONDING TO
THE TORN AREA IN KAMEEZ ON RECONSTRUCTION

SKETCH-5-B
ROUGH SKETCH OF THE SALWAR SHOWING
THE LOCATION OF THE TATTERED TEAR (2.5 CM LONG)
(NO EVIDENCE OF TEAR/TATTER WAS SEEN IN THE FRONT SIDE)

SKETCH-6A

ROUGH SKETCH DEMONSTRATING THE ABSENCE
OF TEAR/TATTER IN THE KAMEEZ CORRESPONDING TO
THE TORN AREA IN THE SALWAR ON RECONSTRUCTION.

SKETCH-6B

NO EVIDENCE
OF TEAR OR
TATTERING
OF FIBRES IN
THE KAMEEZ.
I know she done gone nutties if
just the young aunts didn't talk to me
don't have time you people can't
good day, your opinion how
in the world, what should
I know you? You know you all could to carry on a
me, you should stay from going with
come...I know you...goodbye. So
me good goodbye...? I really gives me
right as between us...
Case 1: Gist

This case is a decomposed female dead body was found inside the well in the back yard of the house. Based on the foul smell, noticed by the complainant, it has been reported to the police station. The complainant was aware that, when the body got into the well.

After registering a case by the investigation agency, the body was identified as the lady belonging to a rich family and married recently. The following questions were raised during the course of investigation for filing a case to prosecute the culprit.

Question

1. Whether the death occurred due to drowning (fallen into the well) or somebody murdered and dropped into the well.

2. Who are all responsible for the death i.e. the victim herself committed suicide (or) she might have been murdered.

To answer the above question a detailed work has undertaken.

Material

Observation, identification and collection of clue materials fit for analysis. Interpreting the analytical report and expert’s materials opinion. Direct interview with the peoples concerned were used for the task.
6.40.3 Method

Interaction and making good rapport with the investigating agency were the methodology followed in this work.

6.40.4 Observations made in the Scene of Crime

6.40.4.1 The Location of the Scene of Crime

The scene house faces south with a passage along its western side leading to the well situated in the backyard about 10' 5" south of the 4' 10" high compound wall on the northern side and about 3' 8" east of the 4' 8" high compound wall separating the scene house from the flats in the western side. (Sketch 1) The iron gate of the adjacent.

Western house also leads into a 4' 10' wide passage that runs along the western side of the compound wall. A hand pump was found fitted on a cement platform supported with the compound wall had dirty fungal depositions and there was no evidence of any recent disturbance in the depositions. The house on the eastern side of the scene house remains unoccupied.

6.40.4.2 The Well

The parapet wall of the well was 2' 4" high from floor level. About 3/4th of the circumference of the well formed the greater part of a circle while the parapet wall on the northern side of the pillars was straight. The inner diameter of the well between the pillars was 4 feet while the north-south distance was 3 feet. The parapet wall was about 10" broad and dirty brown.
depositions were found in two areas on the exposed surface of the parapet wall and the depositions were apposite to each other forming a diagonal. The deposits on either side were about 11 inches wide, diagonally covering the width of the parapet wall. (Sketch-2A)

6.40.4.3 A wooden plank about 11 inches in width, 6' 4" in length and about 1 inch thick was reportedly found laid across the well and had been seized during the investigation. On reconstructing the wooden plant by laying it over the deposits and across the well, it was found that the open area of the well on one side of the plank measured 1'5" in width and on the other side the greater t width was 2'5" (Sketch 2-B).

6.41 INNER ASPECT OF THE WELL

6.41.1 On the inner aspect, the parapet wall extended to a distance of 2'9" followed by smooth cement plastered area extending to 6'1". From this level onwards rough brick work extended to about 17 feet downward. The brick work ended at a depth of 25'10" from the level of parapet wall. At this level on off-set was found. Beyond this level the depth of the well was covered with 2'9" diameter concrete sleeves upto a distance of about 5 feet (Sketch-3).

6.41.2 These circular concrete sleeves were found positioned eccentrically with reference to the circumference of the brick work rendering the off-set uneven in its width (Sketch-3). The maximum width along the circle was 11" and the minimum width was 4". Brick and organic debris were found in this space (Sketch -4A). The circular concrete sleeve was 2'9" In diameter in its inner side and the surface breath along its circumference was 1/12 inches in
width. Most of the area along the circumference of the sleeve was rough and
the edge of this sleeve was projecting well above the level of the off-set
rendering this rough edge as the most prone obstruction for a body falling
downward (Sketch 4-A).

6.41.3 The 2'9" diameter R.C.C. Sleeves had been followed with 2'3"
diameter R.C.C. sleeves extending up to the base of the well conveying a depth
of about 5 feet. The inner surfaces of the concrete sleeves were relatively
smooth. The total depth of the well was 36 feet from the level of the parapet
wall and the depth of water was about 2 feet (Sketch 3).

6.41.4 A broken block of concrete about 14 x 7.5 x 4 cm. in size had been
recovered from the off-set and a part of it revealed evidence of recent breakage
while the other part measuring about 13 cms. In length revealed evidence of
exposed existence. This surface was rough with irregular and moderately sharp
stony and cement edges. (Sketch 4B).

6.41.5 During the course of further examination of the well, a portion of the
exposed area in the circumference of the 2' 9" diameter R.C.C. concrete sleeve
was found broken and missing. The missing area measured about 23 cms. in
length. (Sketch 4-A).

6.41.6 The broken block of concrete described in para 4.2 above physically
fitted with the corresponding part of the broken portion in the circumference
of the concrete sleeve.
6.42.1 The dead body was highly decomposed. A multi colour design "Salwar-Kameez" was found worn by the deceased. The skin was peeled off in most of the areas and the scalp hairs had come off the scalp. A vertical lacerated wound was found the inner aspect of the left ankle. The body was further examined at autopsy room. The height of the deceased was 1.5 mts.

6.42.2 The Medical Officer who conducted the autopsy had recorded the following injuries.

(i) Incised looking type of laceration a) 5 x 1 x 1/4 cms. b) 4 x 1 x 1/4 cms. seen on right frontal region of scalp, the outer end touching the hair margin.

(ii) A vertical laceration over inner surface of left ankle 11 x 3 cms. bone deep extending on the lower part of left leg.

(iii) Brushing of tissues on lateral aspect of right gluteal region 6 x 3 x 2 cms.

(iv) Bruising of tissues on inner aspect of right ankle 7 x 6 x 1 cms.

(v) Circular and elliptical old healed scars on (a) right side of chest below the breast. 2 x ½ cms. 9 b on right hypochondrium 4 x 3 cms. (c) on middle of right side of abdomen 4 x 3, 3 x 2 cms.

(vi) A depression 1 x 2.5 cms. seen on right frontal bone near lower part of coronal suture.
6.43 EXAMINATION OF THE CLOTHING

6.43.1 The clothes worn by the deceased include Salwar, Kameez, a bra and panties. The Salwar and Kameez had an inner cotton lining completely covered by the outer colour designed synthetic cloth. The multicolour designed "dupatta" reportedly fond hanging on to the inner brick wall of the well was also examined. The clothing were intact and the hooks and eyelets of the salwar, kameez and the bra were also intact. The kameez was about 1.1 mts. long.

6.43.2 The body of the kameez between the arm holes measured about 38 cms. while the lower hem forming the circumference measured about 2.5 mts. and thus was more loose compared to the portion of the kameez pertaining to the chest region. (Sketch 5-A).

6.43.3 The salwar was about one meter in length and the waist circumference was about 1.20 mt. and had been provided with a waist tape. The bottom of the salwar pertaining to the ankle region had multilayered and repeatedly stitched thick band as its hem and this measured about 2.5 cms. in width. The circumference of the salwar at the ankle level was about 29 cms. (Sketch 6-A).

6.43.4 On preliminary examination, the salwar and kameez including the lining cloth in the left ankle did not reveal evidence of blood stains. However, the inner layer of the lining cloth in the kameez and salwar revealed patches of skin sticking onto it.
6.43.5 Careful examination of the Kameez and Salwar revealed tattered and torn portions of the following descriptions:

(i) In the Kameez two irregularly tattered and torn areas, one about 2.5 cms. long and the other about 3.5 cms. long were found on the right front side about 22 cms. above the level of the lower hem. Above the level of the second tear small patches of tattered areas extended linearly up to a distance of about 10 cms. Fibre tattering was more conspicuous in some of the areas while in certain other areas evidence of tattering could not be made out. (Sketch 5-A).

(ii) The overall disposition of the tattering described above was slightly diagonal with the two tattered tears being situated from at a lower level and the partly tattered fibers in the fabric extending upwards and side wards covering a total length of about 16 cms. (Sketch 5A). The fibre edges in both the tears revealed evidence of tattering and were devoid of uniformity in fibre disposition. There was no evidence of any directional dragging of fibers.

6.43.6 On reconstructing the Salwar with the Kameez, it was found that the cloth layers of the Kameez in the from upper right thigh region did not reveal evidence of tear or tattering which could correspond to the tears and tattering in the salwar described above (Sketch 5-B).
6.43.7 The outer synthetic cloth of the salwar revealed evidence of tattered tear in the rear right region about 17 cms. below the upper level of the salwar. The tattered tear was about 2 cms. in length. The fibre edges in tear revealed evidence of tattering.

6.43.8 The inner cotton lining cloth of the salwar in the rear right region revealed a tattered tear that corresponded to the tear in the outer synthetic cloth. This tear was 2 Cms. in length.

6.43.9 The inner lining cloth of the salwar corresponding to the right ankle revealed a tear about 1.5 cms. in size. This tear was found on the medial aspect of the salwar and was about 13 cms. above the level of the lower hem of the salwar.

6.43.10 On reconstructing the salwar with the Kameez, it was found that the cloth layers of the salwar in the rear right region did not reveal evidence of tear or tattering which could correspond to the tattered tear in the Kameez described above (Sketch 6-B).

6.44 RECONSTRUCTION OF THE TORN MANUSCRIPT BITS OF PAPER

6.44.1 Torn bits of manuscript recovered from the house of the deceased were examined. These torn pieces were reconstructed and this reconstruction indicated that these torn pieces originally formed a single pieces of two sheets of foolscap size paper removed from a ruled and bound note book.
6.44.2 All the available torn pieces could be physically matched and yet certain portions were still missing.

6.44.3 The writings in the reconstructed material indicated the depressed frame of mind of the writer. The signature "Rajalakshmi" is preceded by the sentences:

"Nobody has tortured me or done anything to me. I am ................ his on myself on ............... responsible my ................ mother in law, ............... chandana are all ................

Annexure

6.44.4 Preliminary examination of the writings indicated the probability of 3 pens having been used for the purpose.

6.44.5 Despite the missing portions the letter had striking characters of a suicide note.

6.44.6 Apart from this long letter, two more letters could be partly reconstructed from the torn bits.

6.44.7 The house in which the deceased lived was also searched with the object of locating the missing portions of the torn pieces. The effort proved futile.

6.44.8 The note book from which the reconstructed sheet had been removed was located in the house of the deceased husband's room.

6.44.9 Sheets of paper containing repeated writings of "Sri Ramajayam" and "Om Sri Kamatchi Namakha' etc., two sheets of paper with "Sri Ramajayam"
written on them and four letters in different period respectively and an Indian passport bearing with the signature the deceased were located in the house. On preliminary examination the writings in these documents and the signature in the passport were found to be similar to the writings and signature found in the letter described in para 7.3.

6.45 INFERENCES DRAWN

6.45.1. The observation in para 6.36.2 indicate that the well is accessible either through the iron gate i the scene house or through the iron gate in the house on the western side where an ascending stepwise provision exists in the hand pump (Sketch 1).

6.45.2. The observations in para 6.36.3 indicate that the well had sufficient opening even after laying the wooden plank across the parapet wall and that opening could permit a human body.

6.45.3. The observations in para 6.37.2 and 6.37.3 lead to the inference that the rough stony and sharp cement edges of the surface of the RCC sleeve form the projecting edge of an offset and thus is prone to obstruct a falling human body since the diameter of the well below this level is only 2'9" i.e. too narrow to permit a free fall of a human body.

6.45.4. The observations in paras 6.37.4, 6.37.5 and 6.37.6 lead to the inference that a recent force had acted on the exposed edge of the R.C.C sleeve leading to fracturing and splitting of a block of concrete.
6.45.5 Preliminary examination of the tattered tear described in paras 6.39.5 indicated that such a linear 16 cm. long tear can be caused when a human body clothed with the Kameez falls on the R.C.C. edge of the sleeve.

6.45.6 The conspicuous lack of correspondence of them tears in the Kameez with that in the salwar described in paras 6.39.6 and 6.39.10 lead to the inference that the Kameez hem had been flown away from its natural position. Further, the hem circumference had been too loose (para 6.39.2) that it could be easily flown. It is thus inferred that the body ahead been air borne (rendering the hem to fly away) while landing on the R.C.C. sleeve edges.

6.45.7 From the point of view of the inference in para 6.42.6, it is seen that the location of the injury described as No.6.43.3 is consistent with the tattered tears in the salwar and kameez.

6.45.8 The final sentences in the reconstructed letter precede the signature. Although certain words are missing, the final sentence as well as the content in the lengthy text lead to the inference that the letter can be a suicide note.

6.45.9 The use of multiple writing instruments lead to the inference that the writer had been probably writing with hesitation.

6.46 PLAUSIBLE RECONSTRUCTION SUGGESTED

The inferences in paras 6.37.1, to 6.38.1, indicate the probability of free fall of the body into the well. Further, in the light of the inferences in para 6.44.2 to 6.44.9 suicide death was confirmed.
CASE II

6.47   BRIEF

Gist

In this case, a complainant to the police reported that a lady had committed suicide by self immolation by pouring kerosene at terrace of her in law's house in the morning hours. Counter complainant also represented that she might have been murdered by her in laws. To solve this problem, a thorough study of observation and preliminary analysis and the facts are forwarded.

6.47.1 Materials & Methodology

Inter action, rapport with the investigation agency.

Crime scene observation, collection of clue materials relevant for analysis. Interpreting the findings to form opinion.

During the course of examination of the crime scene, the following observations were made.

6.47.2 The crime scene is the open terrace measuring abut 13.9 x 8.4 m and the staircase with a head-room opens into the verandah through a north facing single wooden door provided with an iron grill door. The overhead tank occupies the north eastern corner of the terrace and about 88 cm high parapet covers the periphery of the terrace. The floor of the terrace is provided with Mangalore square exiles. Cloth inner,nylons as well as iron, were found on the south western part of the verandah.
On the west of the staircase head-room, an area of the floor about 3.1 m x 1.4m revealed blackening ('A' in the enclosed sketch). The periphery of this zone of blackening did not reveal any stain indicating spillage of accelerant. However, in this zone of blackening as well as in the nearby areas, there was no other charred remnant or burnt materials indicating consistent/static burning of my foreign material such as pieces of cloth etc., The only foreign material (Photo-1) a charred bit of glossy paper revealing coloured printed impression from this blackened zone was carefully examined. This paper remnant had been recovered from an area ('B' in the sketch) (Photo-2) that revealed an impression similar to the dimension of match box). The boozes of the matches available in the victim's house were brought and on careful examination, the charred paper remnant was found to be a portion of the label in the box of matches of the brand "Sugandhi" available in the house (Photo-3). After photographing the correlating similarities the box of matches revealing the label was also collected for preservation as an exemplar sample.

On the eastern side of the zone of blackening and adjacent to the wall of the head-room ('C' in the sketch) was found an impression about 20 x 10 cm in size with peripheral blackening (Photo 4). This impression was found to be similar to the dimension of the base of the plastic kerosene cane that had been recovered from that place in a disfigured state due to fire. However the cane had not been completely charred or burnt and there was residual kerosene still
left in the cane. The disfigured state of the cane indicates that
burning had not been consistent in this zone. The capacity of the
disfigured cane appeared to be 5 liters.

6.47.5 The photographs of the crime scene that had been taken while the
dead body was 'in situ' were studied. The photographs revealing the
above zone of blackening also revealed a nylon cloth line (Photo 5)
and fallen towards the floor. The cloth line pieces that had been
recovered on revealed ends with evidence of melting due to fire.

6.47.6 About 9 m north east of the above zone of blackening and about 60
cm west of the parapet wall were found drops of blood, along with
patches of blood stains, revealing a pattern of multiple of droplets
('D' in the sketch) (Photo 6). The western face of the parapet wall
reveals two areas of smoke deposition, evidencing active upward
burning ('E₁' in the sketch). Broken pieces of bangles, charred pieces
of synthetic cloth, blouse hooks, safety pins etc., have been recovered
from the blackened area ('F' in the sketch) near the blood stains and
small pieces of glass were still found in the zone.

6.47.7 The eastern parapet wall revealed blood stains vertically on its
upper and western surfaces ('G' in the sketch) and in general, the
areas of these stains corresponded to the areas of the major smoke
deposition described on the western surface of the parapet wall ('E₁'
in the sketch) (Photo 7). the upper surface of the parapet wall reeled
three areas of blood stains ('H' in the sketch) and all were smudges
with additional drops on one of them. The drops on the upper surface of the parapet wall were almost circular, while the drops of blood on the tiles of the floor revealed conspicuous astral rays (Photo-8). The smudge pattern on the upper surface of the parapet wall indicates transfer of oozing of blood during contact, while the pattern of drops wound below indicate the flight of sprinkled blood. The pattern of smudges, the distance of travel of blood and their proximity to the areas if active burning as indicated by smoke depositions on the sides of the parapet wall lead to the inference that the probable source of bleeding could be from the hands of the victim.

6.47.8 About 1.1 meters south of the blackened area with charred debris and bangle pieces ('F' in the sketch) was found another zone of blackening ('T' in the sketch) followed by yet another area of blackening ('J' in the sketch) about 1.2 meters further southward. These two zones of blackening indicate the consistent burning of the lying body in contact with these areas. Corresponding to these areas, the western face of the parapet wall revealed multiple areas of smoke deposition ('E₂' in the sketch) evidencing upward direction.

6.47.9 An area of the floor about 2.7m west of the caster parapet wall and about 2.1m south of the northern parapet wall revealed a patch of intense blackening with drops of blood ('K' in the sketch). About 1.8m south of this area was another area of blackening ('L' in the sketch).
6.47.10 There was no evidence of any foot print or any other patterned impression except patterns of smoke deposition indicating active burning. An irregular pattern with peripheral blackening (‘M’ in the sketch) was seen on the floor about 2.5 meters west of the two areas of blackening described above (‘K & L’ in the sketch). This impression was about 2.7 m east of the western parapet wall and about 5.8 m north of the zone of blackening (‘A’ in the sketch). Careful examination of this area led to the collection of an irregular charred flake of synthetic cloth material which had a contour that precisely superimposed with the impression bordered by smoke deposition (Photo 9) that was found on the floor. Furthermore, this charred synthetic cloth flake revealed evidence of bluish fibers with weave pattern similar to those that were found in the charred flakes of synthetic cloth about 1.2m west of the eastern parapet wall (‘F’ in the sketch). The fact that the pattern of smoke deposition could be superimposed with the contour of the charred cloth flake unequivocally indicates that the piece of cloth had been aflame in this area and that the flake had not been transferred to this area after burning.

6.47.11 There were evidence of blood stains both in the form of smudges as well as in the form of droplets in the outer surface of the wooden door (Photo 10) and walls along the sides of the stair case up to the basement level in the ground floor (‘N’ in the sketch). Characteristically, the vicinity of these blood stains revealed black streaks or patches of carbon indicating that the blood transfer had been accompanied by transfer of dark soot particles.
The observations recorded above corroborated the evidence of charring etc.

The Relative of the deceased who injured was examined in her residence. Both her hand revealed burns with one or two skin deep lacerated injuries reportedly caused by the broken edges of the glass bangles attempted to save the victim.

6.48 PLAUISIBLE RECONSTRUCTION

6.48.1 The zone of blackening (‘A’ in the sketch) on the terrace south west of the staircase ahead-room could be the point of initiation of fire as evidenced by the charred remnant of match box label in the midst of a superficially burnt floor surface and disfigured kerosene can with residual kerosene.

6.48.2 The above of blackening (‘A’ in the sketch) lacks any charred pieces of cloth and thus does not indicate evidence of consistent burning of a static human body.

6.48.3 The extensive blackening (‘A’ in the sketch) can be attributed to superficial burning of kerosene in the absence of any other inflammable material such as cloth or fibre.

6.48.4 The snapping of nylon cloth line indicates damage due to fire.

6.48.5 The location of the dead body as revealed in the photographs and as indicated by the zone of blackening market as ‘F’ in the sketch is about 9m north east of the zone of blackening indicated as ‘A’ in the sketch. these findings suggest that the victim was mobile.
6.48.6 The evidence of charred cloth piece ('M' in the sketch) about 5.8 m north of the zone of the blackening ('A' in the sketch) and about 5 m west of the location of the dead body as reeled by the charred debris and photographs ('F' in the sketch) indicates the path of movement of the mobile victim ablaze.

6.48.7 The pattern of smudges of blood stains on the surface and the edge of the parapet wall ('H' in the sketch) indicates probable attempt by the victim to hold the parapet wall as a support during the final struggle. The patterns of drops and droplets of blood ('G' in the sketch) in the vicinity of these smudges indicate sprinkling of blood rather than arterial spurting.

6.48.8 The smudges and the droplets of the blood stain on the wooden door and along of the walls of the staircase ('N' in the sketch) were all accompanied by transfer of streaks of carbon deposition indicating that these blood stains have been transferred in the presence of soot deposition or charred traces. Thus, the presence of transferred carbon particles supports the proposition of blood stain transfer after burns and does not support the possibility of transfer of blood stains from injuries prior to the incidence of burning, be it the injuries sustained by the injured or the deceased.

6.49 **PLAUSIBLE RECONSTRUCTION SUGGESTED**

By observing the movement of victim from the seat of fire and subsequent impression formed, clue materials found near by, indicated the death had caused by self immolation.
CASE III

6.50  BRIEF

Among dowry deaths, a number of incidents are reported due to stove bursting. Here the problem arise during the course of investigation whether the burst has actually happened. But every time the laboratory reports the condition of the stove as working. An attempt was initiated by conducting the carbon variation examination formed in the burst stove as to confirm the fact.

6.51  MATERIALS AND METHODOLOGY

Scene of crime, Burst pump stove, and unburst pump stove, other related clue materials found near the crime scene.

Physical examination of the burst pump stove, its burner and the carbon formed on the stove was examined by carbon detector.

6.52  DEFINITION

Burst means breaking effect that would be exerted suddenly and violently by expansion of contents and concentrated pressure.

6.53  CASE

A death report due to stove bursting registered by the police was taken for analysis.
6.53.1 Need for the Examination

For framing the charge sheet it is necessary to confirm the bursting nature of the pump stove.

6.53.2 Pump stove working principle

The pump stove was low priced and was normally used by the poor people for domestic purposes like cooking etc. The pump stove consists of following accessories:

1. Container for filling the inflammable
2. Burner
3. Nostrile
4. Stand provision to keep vessels for cooking
5. Pump piston

The pump stove is ignited by means of lighting either by matches or lighter. For uniformity in flames, pressure has to be maintained by pumping the piston.

Sometimes excess pressure or block in the nostrils would be caused for bursting and due to this excess flame exerted out and the person who is cooking may lead to death due to burn injuries.

The pump stove was examined in the following aspects.

1. Nature of burst
2. Bursting wherein originated in this stove.
3. Extent of burst
4. Effect of burst.
6.53.3 Nature of Burst

The excess flame was uneven in manner, and the inflammable particles was spilled all over.

6.53.4 Bursting Effect

The place of burst was carefully examined and located in the side portion of the burner. The crack, blister, and the excess formation of carbon soot was found. Further no secondary effect was found.

6.53.5 Extent of Burst

It was informed that the flame exerted at a height of 5' in and around of the pump stove. Due to this the victim sustained burn injuries on her face and clothings.

6.53.6 Effect of Burst

The spilling of inflammable (Kerosene Oil) and soot formation was found on wall portion and the same was preserved for examination. The soot material collected from the suspected burner was analysed to know the amount of percentage of carbon content. Similarly ten numbers of burner from various places collected were subjected to carbon content present. The difference in weight of the burst burner and unburst burner are noted. Based on the observation, it was reported that the stove would have been burst.

6.53.7 Conclusion

The reports in the forementioned three cases submitted to the concerned offices were helped in proceeding correct line of investigation.
Chapter VII

Conclusion