

***An Evaluation of the Techniques used to collect Latent Prints from Documents:
A Case Study in Addis Ababa***

by

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ABSTRACT

The aim of this research paper is to evaluate the techniques used to collect latent prints from documents in Addis Ababa Police Commission and give some recommendations on how to cope with the problem.

The researcher started off by looking at the general orientation of the research and how the research has been done. Then in the next chapter, the meaning and objective of Forensic Investigation, right or mandate to investigate, the meaning of physical evidence and the prints and techniques used internationally to collect latent prints are discussed. In the third chapter, the best method of collecting latent prints from documents and the method and practice of collecting latent prints from documents at Addis Ababa Police Commission Forensic Evidence Collection Department were discussed. Finally, the finding of the research and some critical recommendations were given.

Latent prints from documents are very crucial to identifying the suspects and for legal proceedings or the court process. Even if it is known by the police officers, the techniques and the materials they are using to collect latent prints are with powders which are less effective. According to the research, the Ninhydrin chemical is the best technique recommended to collect latent prints from documents

This research paper gives a truly unique perspective on how latent prints should be collected from documents.

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I, HABTAMU BEKELE SENBETA, declares that “An Evaluation of the Techniques used to collect Latent Prints from Documents: A Case Study in Addis Ababa” is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

HABTAMU BEKELE SENBETA

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CHAPTER ONE

GENERAL ORIENTATION

1.1 INTRODUCTION

Under the Ethiopian Penal Code (2004:11) crime is the commission of an act prohibited or an omission of an act that is required by the penal code of the country. When a crime is discovered, the police service department is responsible for investigating crimes. In other words, it has an obligation to investigate the crime and send a document containing the record of the investigation to the Attorney- General. For the investigation to be successful, evidence from the crime scene should be collected properly.

According to the Locard principle, evidence of the crime and the suspect must be found at the crime scene. For example, prints from fingers, palms and feet are usually found at a crime scene and on the surface of different materials. These types of prints may be found on documents. If documents are seized, they can be collected and examined for prints to identify and individualise the suspect. There are different techniques for collecting these latent prints from documents. However, it has been the researcher's experience as a leader of an investigation team at a crime scene that investigators who collect evidence do not handle documents that are found at a crime scene with the necessary care. Most of the time, investigators simply try to collect prints with magnetic powder and are usually unable to find prints on the documents in this way.

The researcher examined statistics from the Addis Ababa Police Forensic Department Daily duty registration log book (2002 – 2006) for the years 2002/03, 2003/04 and 2005/06. It was found that in 2002/03 among the six crime scenes where documents were collected, latent fingerprints were found on only one document. The data obtained in 2003/04 revealed that no latent prints were found on any of the documents that were collected from seven crime scenes. In 2005/06 documents were collected from eighteen crime scenes. One of them was sent to the Federal Police Forensic Laboratory for investigation but no fingerprints could be found. On the remaining seventeen

documents the forensic evidence collectors had tried to obtain evidence at the crime scene using grey and magnetic powder and succeeded in getting only five. This indicates that there is a problem in using techniques to identify and to collect latent prints from documents. This is partly attributed to the fact that the Ethiopian Police training curriculum only requires evidence collectors to be trained in how to collect prints from documents by magnetic powder. It is with this background knowledge of the problems *vis-à-vis* the collection of forensic evidence that the researcher was motivated to deal with the issue.

1.2 RESEARCH AIMS

The aim of this research was to discover the best techniques for collecting latent fingerprints from documents for the Police Forensic Evidence Collection Department of Addis Ababa.

1.3 RESEARCH PURPOSE

According to Denscombe (2002:25), the statement of purpose indicates the focus and direction of the research and provides criteria for the evaluation of the outcomes of the research. There must be a reason for doing research otherwise there would be no need to spend time, money and effort on undertaking the investigation. Therefore, the purpose of this research includes:

- ☞ Evaluating and reviewing the existing techniques used by the department to collect latent prints from documents, with the intent of weighing up their strengths and weaknesses and of considering ways of improvement
- ☞ Exploring standard techniques used internationally to collect latent prints from documents
- ☞ Suggesting enhanced procedures aimed at improving practices within the criminal investigation department and enabling the department to tackle weaknesses for improved performance.

1.4 RESEARCH QUESTIONS

This research posed the following questions:

- ☞ What techniques are used internationally to collect latent prints from documents?
- ☞ Which is the best technique to collect latent prints from documents in Ethiopia?

1.5 KEY CONCEPTS

Definitions are functional to address an intended meaning of a concept in relation to a particular study (De Beer, 1999:15) and in defining a term or a concept, a researcher begins by asserting the term to convey a meaning whatever the researcher wants it to mean throughout the research (Berg, 1989:29). Therefore, in this research, definitions of key concepts are provided in order to understand and make clear such specific terms in this particular study.

1.5.1 Crime scene

According to Wikipedia (2008), a crime scene is a location where an illegal act took place comprising the area from which most of the physical evidence is retrieved by trained law enforcement personnel, crime scene investigators or in rare circumstances, forensic scientists. Besides, a crime scene is sometimes referred to as a location wherein evidence of a crime may be located. However, it is important to note that a crime scene may not necessarily be the location where the crime took place. Indeed, there are primary, secondary and often tertiary crime scenes. For instance, police may use a warrant to search an offender's home and even though the offender did not commit the crime at that location, evidence of the crime may be found there. In another instance, an offender might kidnap a person at a certain location (primary crime scene), transport the victim (the car is a second crime scene), commit another crime at a distant location (murder, for instance) and then drop the body at a fourth scene.

1.5.2 Physical evidence

For O'Hara and O'Hara (2003:80), physical evidence consists of articles and materials that are found in connection with an investigation and that assist in

establishing the identity of the perpetrator or the circumstances under which the crime was committed, or that support the discovery of the facts. For Swanson, Chamelin and Territo (1996:35) physical evidence is legal evidence that demonstrates facts about the crime for the court process.

In both definitions, there are common elements that physical evidence shows by whom and in what manner a criminal act had been committed. For the purpose of this research, physical evidence is legal evidence that can enlighten us about the crime and the perpetrator and which is discovered through investigation (basically, through the documents that are found at the crime scene and which bear the perpetrator's prints).

1.5.3 Criminal investigation


For O'Hara and O'Hara (2003:5), a criminal investigation is the collection of facts to accomplish a three-fold aim: to identify and find the perpetrator and to provide evidence of his/her guilt by using the three "I's": "information", "interrogation" and "instrumentation".

1.5.4 Forensic investigation

According to Loudon (2005), the term "forensic" pertains to the use of science or technology in the investigation and establishment of facts or evidence in a court of law, or is connected with or used in courts of law. In Glossary of Genetics Terms (2007) forensic investigation is defined as: "of or relating to courts or legal matters". Molecular markers are increasingly common in the context of forensics, both in wildlife and human cases involving identity or relatedness. In an almost similar tone, Czermak (2007:1) points out the word forensic, as corresponding to documents, denotes an argumentative exercise that permits the document examiner to explain his/her findings to the court in a formal manner, consecutively and logically. As said by End Stalking in America (2008) and The State of Queensland (Department of Education, Training and the Arts) (2006), an investigation is the making of inquiries or an examination through the process of collecting evidence by law enforcement officers or the prosecutor to determine if a crime has been committed. By way of summarising the above definitions, one can define forensic investigation as

the collection of facts to identify and trace the suspect and to provide evidence for the court process of any crime.

1.5.5 Fingerprints

Pepper and Gerba (2004:263) define a fingerprint as the raised ridges, which form accidentally during the development of the foetus, that cover the whole of the inner surface of the hand and with regard to footprints, the underside of the soles of the feet. With the almost constant flow of sweat from the friction caused by contact with the ridges, when someone puts their bare hand or foot onto a surface, they leave the ridge marks on the surface. For Berry and Stoney (2001:5), fingerprints are formed because normally the friction surfaces of the human hands and feet are covered with skin structure that takes the form of patterns of ridges. The ridges composing these designs take the form of four major types of minutiae: dots (.), forks (--<), ridge ending (—) and enclosure (— ). These ridge patterns create their image through contact with other materials. The images of the ridges form a fingerprint.

1.5.6 Latent print

Jones, Davies, Russell, Brennan and Bramble (2001:504-51) consider the latent print to be the unseen anatomical record, made by bodily contact of and from the crests of the papillary ridges that are located on the palmer and plantar surfaces of the body and the surface of material.

1.5.7 Latent fingerprint

According to Champod, Lennard, Margot and Stoilovic (2004:106) a latent finger mark is the most common form of fingerprint evidence. The latent finger mark requires a magnification process because of its invisibility to the human eye. For Swanson et al. (1996:97), latent fingerprints is a hidden record on materials formed by perspiration and oil from the internal finger the form of ridges and furrows during friction or contact. Based on the aforesaid explanations, we can conclude that latent fingerprints are fingerprints that cannot be easily seen by human eyes and getting their shapes from internal ridges and furrows of fingers during friction or contact.

1.6 RESEARCH DESIGN AND APPROACH

Generally speaking, research designs can be categorized into two broad classes: quasi-experimental and experimental. Experimental studies are characterized by the ability to randomise subjects into treatment and control groups. This randomisation goes a long way toward controlling extraneous variables that are not included explicitly in the study. Because comparison groups are not always true, randomised control groups in quasi-experimental studies have to control confounding variables explicitly through statistical techniques. For this reason, quasi-experimental studies are sometimes labelled correlation design (Garson, 2008:6). Empirical research on the other hand, is any research that bases its findings on direct or indirect observation as its test of reality. Such research may also be conducted according to hypothetical-deductive procedures (Wikipedia, 2008).

Therefore, empirical research was used in this research, since observation was one of the key designs.

For the purpose of this research, a qualitative research approach was adopted. According to Denscombe (2002:27), qualitative research is an approach that is well apposite to social research, where the emphasis tends to be on producing data based on real-world observations. This notion suggests that the research has involved an active attempt by the researcher to critically examine the real situation and look in depth into the issue. The qualitative approach is associated with getting information "straight from the horse's mouth". Furthermore, Creswell (1998:15) states that qualitative research is multi-method in focus, involving an interpretive, naturalistic approach to its subject matter. Hence, this study will examine the subject under discussion and the phenomena in the workplace. To this end, the study made use of case studies, introspection, life stories, interviews and observation. Also, historical, interactional and visual texts that describe routine and problematic events that has meaning in individuals' lives. It is worth mentioning that the personal experience of the researcher has remained the valuable asset and source in the course of this study.

1.7 TARGET POPULATION AND SAMPLING

According to Kenny (1987:5), a population is a set of individuals that meet sampling criteria, while the target population refers to the entire set of population about which the researcher would like to make generalisations. The population is also said to be accessible if it is one that meets the criteria established and is accessible in terms of time, money and the researcher's availability. The target population in this study includes the police officers that are involved in the collection of forensic evidence at a crime scene and in the laboratory, as well as the criminal investigators. The researcher could not use the total population because it is too big and it will take too long to interview all investigators and the research would have been too expensive. For that reason, the researcher decided to use a target population.

The target population of this study includes all thirty forensic-evidence collectors, four supervisors at the Addis Ababa Police Commission and three fingerprint laboratory professionals at the Federal Police Forensic Department because every collector is given the same training, uses the same equipment, applies the same law enforcement principles and follows the same legislature throughout the country. The target population will also serve as the sample for this research.

1.8 DATA COLLECTION

Data was collected through literature, interviewing, observation and case studies. According to Mouton (2001:104), collecting or gathering data is done through a variety of methods. Among these, observation, interviewing, testing and analysing texts are the main methods. For this research the researcher made use of the following data collection techniques:

1.8.1 Literature

A literature study for Mouton (2001:179) is an exercise in inductive reasoning, where the researcher works from a sample of texts that he has read in order to come to a proper understanding of the research questions and the aims of the research. The author read a range of national and international texts to:

- Find new ideas
- Find new practices
- Identify the advantages and disadvantage of new practices

The researcher began a preliminary study of the research topic by consulting the Ethiopian Police College Library and UNISA library to check the topic. These institutions have various types of police investigation books. The internet has also been of great help in that it houses tremendous goldmines of information. No sources with the same topic were identified with the same topic. The researcher broke the topic up into concepts and consulted literature on the related concepts of “physical evidence”, “criminal investigation”, “forensic investigation”, “fingerprint”, “latent print” and “latent fingerprint”. He also consulted the UNISA, Florida Goldfield’s library via e-mail to find material. The literature found was studied to find answers to the research questions.

1.8.2 Interviews

According to Leedy and Ormrod (2005:147), for an interview to be successful, the following steps are very important:

1. Set up the interview well in advance: the researcher arranges for each interview well in advance by making appointments with participant.
2. Send the agenda of questions that the researcher will ask the interviewee: before conducting the interview the researcher sends the schedule or the program to the interviewees for them to prepare themselves.
3. Ask for permission to tape the interview: the interview was not taped but was written down in the researchers own handwriting.
4. The researcher confirmed the date immediately and sent a reminder ten days before the date of the interview
5. Be prompt; follow the agenda; the researcher had a copy of the interview schedule in case the interviewee had mislaid his or hers. The researcher kept to the questions in the interview schedule.

The researcher abided by the above steps and the study followed the given sequence. The interviewees' permission was obtained for the researcher to interview them. Once permission had been obtained, the researcher posed the questions one by one and wrote down each interviewee's response in a one-on-one structured interview. The structured interview had been used to gather the evidence because a fully structured interview requires a fixed sequence of predetermined questions. The structured interview also has the advantage of being held in a social situation where someone who is good at interviewing can build up greater empathy between him/herself and the interviewee leading, it is hoped, to a greater involvement of the interviewee and to better quality data. Data obtained is then more easily compared with less risk of bias occurring simply because different people are being asked rather different questions (Robson, 2000:90). In developing the interview schedule, the researcher used the research question, the problem raised as standard. Meanwhile, the researcher used the same questions for all participants but tried to clarify them according to the interviewer's understanding.

Before conducting interviews, the researcher gave the schedule to five colleagues to check whether the questions are understandable. They verified that the questions are clear, understandable and they were satisfied with the questions. No changes were made to any of the questions.

1.8.3 Observation

The researcher accompanied the evidence collectors on certain murder and burglary investigations by being an active participant at the crime scenes, with the intention of observing the techniques used by the collectors to collect latent prints from documents.

Peripheral observation was used and the researcher observed how the evidence collectors approached, concentrated on, preserved and collected latent prints from documents at crime scenes. This technique, according to Robson (2000:96), involves observing and interacting closely enough with members to establish an insider's perspective without taking part in their

activities. During this observation, the researcher tried to answer the questions as to what techniques the forensic evidence collectors used in order to collect latent prints from documents, by taking notes.

1.8.4 Case study

According to Bouma & Atkinson (1995:110), a case study can answer the question: "What is going on?" The case study allows an investigation to retain the holistic and meaningful characteristics of real-life events (Mouton, 2001:129). Case study methods involve systematically gathering enough information about a particular person, social setting, event or group (Berg, 1989:212).

A case study may be defined as an empirical inquiry that investigates a contemporary phenomenon within its real-life context when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used (Miller & Brewer, 2003:22).

The researcher identified 48 cases from 153 homicide crime cases reported in the year 2004/05. The selection was done by means of the lottery method. Four cases from each month were collected. To evaluate these cases, the researcher drew up a guide to lead him and ensure that each case was evaluated in the same way. The points that were evaluated were taken into account namely:

- Whether there were prints on the documents
- Whether the country of origin is Ethiopia
- How old the documents were
- Exposure of the documents to the elements of nature
- Whether the document was protected

1.8.5 Researcher's Experience

The researcher has seven years experience in collecting forensic evidence at crime scenes and has also worked as a fingerprint analyst after being trained for six months in how to collect forensic evidence at crime scenes and how to

analyse and compare fingerprints. Furthermore, for three years the researcher worked as the head of homicide investigation throughout Addis Ababa. The researcher would be involved in the examination and collection of forensic evidence in at least two crime scenes daily. As an expert witness in Ethiopian courts, he testified once a month in court on average; especially in homicide cases. Thus, the researcher also used his experience in the data collection technique.

1.9 METHOD OF DATA ANALYSIS

Tesch's (1990:142-145) eight-step data analysis process was used to analyse the data of this study:

1. The researcher read through the transcripts carefully and jotted down some ideas as they came to mind to get a sense of the whole.
2. He picked one document, which appeared to be the most interesting and the shortest and went through it, asking himself: "what is this all about?" He focused on the underlying meaning of the information and wrote his thoughts about this in the margin.
3. When working through several documents, he made a list of the topics that emerged and clustered them together. These topics were then written in columns that might be arrayed as major topics, unique topics and leftovers.
4. With these lists the researcher went back to the data. He abbreviated the topics as codes and wrote the codes next to the appropriate segments of the text. From this preliminary organising scheme, new categories and codes appeared.
5. He would then find the most descriptive wording for the topics and turned them into categories. The list of categories was reduced by the grouping of topics that relate to each other. The interrelationships between the categories were shown by drawing lines connecting the categories
6. A final decision on the abbreviation for each category was made.
7. The data material belonging to each category was then analysed.
8. After the above steps were followed it was not necessary to recode the data.

1.10 VALIDITY

Validity concerns the accuracy of the questions asked, the data collected and the explanation offered (Denscombe, 2002:100). Generally, it relates to the data and the analysis used in the research. It refers to the quality of the data and explanations and the confidence the reader might have that they accord with what is true or what is real. "Claims to validity involve some demonstration that the researcher's data and his or her analysis are firmly rooted in the realm of things that are relevant, genuine and real: they act to reassure the reader that the research is not based on poor data and erroneous interpretations" (Denscombe, 2002:100). The qualitative research of this study is backed up by interviews, observations and literature review. The data that was collected through these methods enabled the researcher to get the right information to analyse and interpret in order to reach to the right conclusion.

Literary sources, particularly those concerning the best techniques for the collection of latent prints from documents were read. The researcher also compared and contrasted information obtained from the interviews with that found in the literature and in his observations to point out the best latent-print collection techniques.

The researcher also tested the questions on interview schedule by handing the schedule to colleagues to check for understand ability and applicability. They all were satisfied with the schedule.

1.11 RELIABILITY

Reliability relates to the methods of collecting data and the concern that they should be consistent and not distort the findings. Generally, reliability entails an evaluation of the methods and techniques used to collect the data (Denscombe, 2002:100).

The researcher tried to ensure that the data collection methods are reliable by making sure that the same questions were asked of each interviewee and that all the methods show consistency and stability i.e. if another person in another

time does the same research, he or she should obtain the same final results. To ensure that the findings are not distorted, the researcher relied completely on the data and on using proper data analysis techniques.

1.12 ETHICAL CONSIDERATIONS

Leedy and Ormrod (2001:107-110) state that most ethical issues in research fall into one of four categories:

- Protection from harm: the research participants were not exposed to any form of physical or psychological harm to participate in the research or to answer any question
- Informed consent: participants were told the nature of the research and their privacy is ensured. In addition, in all circumstances that had to do with the participants, their consent were asked
- Right of privacy: the research was conducted by complying with state and federal laws and regulations. Where a participant requested that his/her name should not be mentioned it was respected, and
- Honesty with professional colleagues: moreover, the researcher maintained honesty with regard to what the participants suggested and all literary sources used in the study have been accurately acknowledged.

1.13 CHAPTER LAYOUT

The chapters of this research are organized in the following manner:

- *Chapter Two:* Internationally used techniques to collect latent prints.

In this chapter, the meaning and objective of Forensic Investigation, right or mandate to investigate, the meaning of physical evidence and prints and the techniques used internationally to collect latent prints are discussed. This chapter also delves into the best method of collecting latent prints from documents and the method and practice of collecting latent prints from documents at Addis Ababa Police Commission Forensic Evidence Collection Department.

- *Chapter Three:* Techniques of collecting latent prints from documents

(with due regard to the nature of the material on which the latent print is found) and the print itself. This chapter explores the best method of collecting latent prints from documents and the method and practice of collecting latent prints from documents at the Addis Ababa Police Commission Forensic Evidence Collection Department.

- *Chapter Five: Findings and Recommendations*

This chapter sets out the final finding of the research and points out some critical recommendations that can provide practical solutions for the identified problem.

CHAPTER TWO

INTERNATIONALLY USED TECHNIQUES TO COLLECT LATENT PRINTS

2.1 INTRODUCTION

Crime is a threat throughout the world. In order to treat crime properly and legally or to reduce the threat, legal officers are responsible for prosecution of suspects with clear evidence. Forensic evidence is the best mechanism in order to point out or identify the suspect. Among these, fingerprints are one of the most widely used forms of forensic evidence. Latent fingerprints are found wherever the suspect touches or holds materials on the crime scene. There are powders and chemicals to magnify latent fingerprints from different materials in order to collect them as evidence. This is especially true when collecting prints from some materials and when latent prints are found, together with other physical evidence, it requires great skill. Generally, latent prints are very fragile and easily destroyed.

In this chapter, the researcher discusses the meaning and objectives of forensic investigation, the meaning of a print, how to collect latent prints from different materials and identifying different ways of collecting latent prints from documents that are accepted internationally.

2.2 FORENSIC INVESTIGATION

Before defining forensic investigation let us first look at the definitions of the terms “forensic” and “investigation” separately. According to wiseGEEK (2008), forensics is a science dedicated to the methodical gathering and analysis of evidence to establish facts that can be presented in a legal proceeding.

For Answerbag (2003-2008), the word “forensic” simply means something that has to do with the law and used for court purpose. The Merriam Webster’s Collegiate Dictionary (2008) views “forensic” as belonging to court judicature argument through scientific knowledge to legal problems. In the Cambridge Advanced Learner’s Dictionary (2008), “forensic” is stated as the study of

physical information connected with crime. Likewise, the Webster's Online Dictionary (2009) views it as pertaining to or used in courts of law. The word is a combination of Latin and German *forensis* of the forum, from Latin *forum*.

According to Wikipedia, the free encyclopedia (2008), "investigation" is the process of inquiring into a matter through research, follow-up, study, or formal procedure of discovery. The term may refer to any of the following:

- Academic or intellectual investigation aimed at the discovering, interpreting and revising of knowledge
- Private investigation undertaken by a private investigator or a detective
- Investigation carried out under official authority by law enforcement personnel

Forensic investigation is a detailed systematic search to uncover facts and determine the truth of the factors (who, what, when, where, why and how) of accidents (Answer.com:2009). The word "investigation" is related to crime for the police duty. The general term criminal investigation holds many branches and also related to the penal code of states. According to the Ethiopia Penal Code (2004:14), crime is a commission of an act prohibited or an omission of an act, which is required by the penal code of the country.

To commit a crime, three major priorities must be fulfilled (Ethiopia Penal Code, 2004:14-15):

1. There should be an advance notice or written prohibited or required conditions in the penal code.
2. There should be an act of commission or omission that is contrary to the penal code.
3. There should be an intention.

In this light, investigation is a search or collaboration of evidence connecting or tending to connect a person (either a natural person or a body corporate) with conduct that infringes the Criminal Law or the policies and standards set by the affected agency (Answer.com: 2009). Crime Scene Investigator Network (2009) defines "crime scene forensic investigation" as those

investigations that gather fingerprints, blood, bodily fluids and other evidence found at the crime scene in order to solve a crime or even determine whether a crime has taken place.

To summarise, as mentioned in chapter one, the word “forensic” as corresponding to documents, denotes an argumentative exercise that permits the document examiner to explain his/her findings to the court in a formal manner, consecutively and logically. As said by End Stalking in America (2008) and State of Queensland (Department of Education, Training and the Arts) (2006), an investigation is the making of inquiries or an examination through the process of collecting evidence by law enforcement officers or the prosecutor, to determine whether a crime has been committed. One can then define forensic investigation as the collection of facts to identify and trace the suspect and to provide evidence for the court process of any crime. Eventually, based on the above definitions, forensic investigation is the process of identification to answer the following questions:

- Has a crime been committed? If so,
- What crime was committed?
- Who did it?
- When and where was the crime committed?
- Why was the crime committed?
- By what material was the crime committed?
- How was this crime committed? Etc.

These questions can be answered by the investigation through two major ways: eyewitness accounts or physical evidence, both of which can be found at the crime scene.

To the question: “What is forensic investigation? One participant replied that forensic investigation is preparing a docket by combining tactical and technical investigation for court purposes. Another participant suggested that forensic investigation is the backbone for crime investigation and court process. It clearly shows the crime and the perpetrator. It can convince people in the legal process. It can also help the judge to judge easily so that the

investigation should be done by police professionals. The other participants could not define forensic investigation because the word “forensic” is rather new to them and Ethiopia. They use technical evidence instead of forensic evidence and also, the researcher could not find the Amharic (the native language) version since the same word (viz. “forensic”) is used in Amharic books at Ethiopian Police University College. They all relate forensic investigation to searching and collecting physical evidence at crime scenes.

2.3 THE OBJECTIVES OF FORENSIC INVESTIGATION

The objectives of forensic investigation are: to establish the element of the crime, to associate/disassociate the suspect with the crime, to reconstruct the crime scene, to ensure that personnel and the laboratory scientists work as a team, to test statements and alibis, to prove an element of the crime, to develop and corroborate the evidence and to reconstruct (Reno, Marcus, Robinson, Brennan & Travis, 1999:29).

The objectives can be explained as:

2.3.1 Identification of the crime, which involves the identification of the type of crime committed and what kind of information can possibly be collected. Recognition or discovery of evidence begins with the initial search of the scene. The search can be defined as “the organized and legal examination of the crime scene to locate items of evidence to the crime under investigation” (Byrd, 2000).

According to Schiro (2007), before the investigators begin examining the scene of the crime, they should gather as much information as possible about the scene. Once again, a slow and methodical approach is recommended. Information is gathered to prevent destruction of valuable and/or fragile evidence such as shoeprints, trace evidence, etc. Once all the information is gathered, a mental plan is formulated to figure out which area is the crime scene and how the crime scene will be analyzed. For Garrett (2003), in order

to analyze a certain crime scene observing, photographing the area and reconstruction by computer program scan are very important.

2.3.2 In gathering evidence, all the clues that show the facts about the crime should be collected and presented to the court. According to Byrd (2009), in order to collect latent fingerprints from a crime scene, the following precautions should be observed:

2.3.2.1 Marking of Latent Fingerprint Evidence

All such evidence should be marked in some distinctive manner, such as is the case with any other type of physical evidence. Precautions should be taken when marking evidence, not to damage or destroy potential latent fingerprints.

- Lifted, developed latent prints should also be marked or sealed in marked envelopes
- Photograph-developed latent fingerprints with and without identifying markings and scale

2.3.2.2 Preservation of Fingerprint Evidence

- The primary precaution in all cases is the prevention of adding fingerprints to evidence, or of destroying those already present
- Most fingerprints will be on paper, glass, metal, or other smooth surfaced objects. Articles containing latent fingerprints must be picked up or touched with the least possible frequency and then only in areas least likely to contain identifiable latent prints, such as rough surfaces
- While gloves or handkerchiefs may be used to pick up such exhibits, any unnecessary contact should be avoided. Although using a cloth to pick up exhibits prevents leaving additional prints on the articles,

the cloth will frequently wipe off or smear any prints originally present, unless great care is taken

- Large articles containing latent fingerprints, such as glass, metal articles and firearms, should be placed on wood or heavy cardboard and fastened down with string to prevent shifting and contact with other objects in transit. Where such evidence is to be examined frequently, a pegboard should be obtained on which wooden pegs can be moved as desired, to support exhibits and keep them from moving. Bottles and glasses may be placed vertically on a board and placed in the bottom of a box. The base of the bottle or glass can be surrounded with nails to hold it in place and the top can be either inserted through a hole in a piece of cardboard or held in position with a wooden board nailed to the container's lid
- Papers and documents containing latent prints should be placed individually in a cellophane or manila envelope. Such a container can be sandwiched between two sheets of stiff cardboard, wrapped and placed in a box for mailing

2.3.3 Individualization and identification of the crime i.e. identifying the suspect or the perpetrator based on the gathered information.

For Lockyer (2003:36), forensic laboratories are crucial to the criminal justice system. Forensic scientists in crime laboratories provide invaluable information that proves to be of a great help in the investigation and prosecution of crime through the scientific examination of physical evidence. Their efforts, carried out to the highest standards of scientific objectivity, integrity and quality, give voice to the “silent witness” of physical evidence and contribute to the cause of justice.

Furthermore, Lockyer suggests that the criminal justice system increasingly relies on forensic science as new technology emerges at an ever-accelerating rate for the identification/individualization of suspects. According to Lee (1999:5), individualization is unique to forensic science. It refers to personal

identification and is also used to demonstrate that a particular sample is unique, even among members of the same class. It may also refer to the demonstration that a questioned piece of physical evidence and a similar known sample have a common origin. On the other hand, Lee (1999:3) states that identification is a process common to all the sciences and in fact, to everyday life. It may be regarded as a classification scheme, in which items are assigned to categories containing like items and given names.

2.3.4 Involvement in the prosecution process i.e. presentation of the gathered information in such a way that the court understands it.

As the forensic investigator is the person responsible for gathering evidence, he/she has to assist the prosecutor in presenting the evidence to the court. For Deedrick (2001:4) visual aids play a vital role in helping the jury understand complex forensic evidence. Clearly drawn diagrams and well-executed three-dimensional models, along with oversize photos of the crime scene, are frequently used to bring the enormity of a scene down to manageable size.

2.4 THE RIGHT OR MANDATE TO INVESTIGATE

There is a great debate as to who should do the forensic investigations. Some say different professionals can do the examination and they may not be police officials. Historically, crime scene investigators have been sworn police officers but the present trend is toward "civilianizing" this unit - hiring and training non-police personnel. (Forensic & Investigative Sciences Program: 2007:4). All participants said that forensic investigators should be police officers. An investigation can only start as soon as a crime is reported.

To the question: "Who has the right to Investigate?" All participants agree that, according to their viewpoint, only the police have the right to investigate. According to them it is better that all forensic investigators have knowledge of law and police investigation methods. Moreover, one participant said that it is very hard to communicate and get detailed information for investigation

purposes from civil professionals. For instance food qualities, explosives, medicine-related crimes and toxicology are investigated by non-police professionals and as they do not have knowledge of laws and criminal investigation, police investigators and courts have a problem in carrying out investigative communication. These chemists, military people (for explosives) or pharmacists have great barriers of communication. They do not prepare the results as the court needs them.

Ethiopia does not have a ratified law of evidence. The customary law serves as a medium in the law enforcement area. According to Tatek (1996:216), even if we do not find written laws about who should investigate, courts ask and check the experts' legal and judiciary capacity, educational background on the issue and his/her experience or skill. The mandate to decide the expert's authenticity to investigate fully rests on the judges. According to Smith and Bace (2002:33), the court should check whether a certain expert is competent to give a professional analysis. For this purpose, his/her qualifications and experience should be evaluated. Therefore, the experts should verify their educational background on that specific subject, as well as their experience. In addition to this, the court also checks the authenticity of the person to witness (Van der Westhuizen, 1996:281). Furthermore, The Ethiopian Federal Police Regulation (86/1995:6) suggests that the Federal Police Forensic Investigation Department is fully responsible for evidence presented in the court (especially regarding criminal cases).

2.5 PHYSICAL EVIDENCE

Generally evidence, according to Smith and Bace (2002:13), is information that is presented to a court in order to create a clear understanding to a certain factual dispute. This evidence may be classified into two major groups: direct and indirect sources of information. According to Slideshare (2009) direct information is a witness who was present at the crime scene and senses the real happening. It may be the victim and/or plaintiff, witnesses directly present in the event and suspects. Indirect information is **physical evidence** that was left behind at the scene of the crime by the criminal (prints, tool marks, blood, hair and semen) and includes information that was

transferred from the scene to the criminal (scratches, wounds, soil, paint, blood, hair, property of the victim) and location of the objects and letters.

Physical evidence is more reliable, perfect and truthful than the eyewitness. In the police investigation process, this physical evidence is very crucial and it is believed that there will be at least one source of physical evidence at the crime scene i.e. the Locard principle. The police investigator is expected to collect the physical evidence at a crime scene, compare it to the suspect and use it as proof to convince the judge legally in the court process. This process is called forensic investigation.

For Wikipedia (2008), physical evidence is any evidence introduced in a trial in the form of a physical object, intended to prove a fact in issue based on its demonstrable physical characteristics. Physical evidence can conceivably include all or part of any object.

2.6 PRINTS

For Fieldhouse (2008:1), a print is a mark made by an impression, a line, character, figure, or indentation, made by the pressure of one thing on another. For example, the prints of teeth or nails in flesh, the print of the foot in sand or snow. For Wikipedia (2008) there are three types of prints. These are: **Latent prints**, hidden or invisible that are visible only through electronic, chemical and physical processing techniques. Secondly, **patent prints** that are obvious to the human eye and are caused by a transfer of foreign material on the finger, onto a surface and thirdly, **plastic prints** which are friction ridge impressions from a finger or palm (or toe/foot) deposited in a material that retains the shape of the ridge detail.

According to Van der Westhuizen (1996:256), there are three major latent fingerprints, namely visible, invisible and moulded (plastic) prints. A **Visible print** is formed when the skin sticks with colour substance, like wet paint, ink, grease, blood or dirt. This print can be easily seen by the naked eye. This concurs with patent prints mentioned by Fieldhouse. **Invisible prints** are

those prints found by the friction of skin and smooth surface that is not seen by naked eyes. This type of prints concurs with patent prints described by Fieldhouse. **Moulded, plastic or relief** prints are those left in soft substances. This description concurs with plastic prints as described by Fieldhouse.

Bridges (1963:34) defines latent fingerprints as the “marking of oily matter or perspiration from the skin glands, left upon any surface which the hands and fingers may have touched.” According to Phoenix Police Department Laboratory Service Bureau (2008), latent prints are impressions left by the ridged skin on the fingers, palms, toes and soles of the feet of people. The participants other than participant 10 define a latent print as an invisible impression from finger and palm contact with smooth surfaces. Participant 10 (2007) defines latent fingerprints by giving human, natural and scientific elaboration. He said that human body perspiration contains natural elements and the perspiration is more water and less oil together and they remain on objects when a finger or palm touches the object. After the water has evaporated, the oil becomes the ridge producer, which is unseen but visible with reaction of powder or other magnifier. So, the participants and literature agree with the very definition of latent fingerprint, that is, the unseen impression that is formed on objects when touched or held by one’s hands.

The question could be asked: “How can we know our suspect was at a crime scene?” To prove this we should first collect this unseen evidence that has been left behind by human contact with objects. Before every move to collect, we should first think and act as the suspect and understand what things the suspect could touch.

2.7 COLLECTION OF LATENT PRINTS

As discussed above, latent prints are the unseen and/or unnoticed traces created by friction of the skin and any material. For Stevek (2003:8) searching, magnifying, and lifting such prints, is referred to as the collection of latent prints. In order to search for latent prints, the expert should first know the criminals’ entrance, movement and exit. A search for latent prints should start at the perpetrator’s point of entry and continue methodically through to

the point of exit. Being methodical is crucial. Making sure to completely finish with one area before moving onto the next is also of great importance. This will prevent areas from being missed. Moenssens (2007) categorized the development technique into two processes, namely the physical (mechanical) and the chemical process. The physical process involves powdering or iodine fuming the suspected material. The perspired latent print retains or absorbs the powder without fusion. The second technique (chemical) is a direct reaction with the components of perspiration which results in the formation of new colour.

According to Jasuja and Ukpere (2008), in order to collect latent prints, two major actions have to be taken. The first one is the marking of the latent print. All such evidence should be marked in some distinctive manner, such as is the case with any other types of physical evidence. Precautions should be taken when marking evidence not to damage or destroy potential latent fingerprints. Lifted, developed latent prints should also be marked or sealed in marked envelopes and photograph-developed latent prints with and without identifying marking and scale. The second action, according to Jasuja and Ukpere (2008) is the preservation of print evidence i.e. protecting the evidence so that it is not contaminated by other prints nor destroyed. Most prints submitted will be on paper, glass, metal, or other smooth surfaced objects. Articles containing latent prints must be picked up or touched with the least possible frequency and then only in areas least likely to contain identifiable latent prints, such as rough surfaces, while gloves or handkerchiefs may be used to pick them up such exhibits. Any unnecessary contact should be avoided. Although using a cloth to pick up exhibits prevents leaving additional prints on the articles, the cloth will frequently wipe off or smear any prints originally present, unless great care is taken.

Large articles containing latent prints, such as glass, metal articles and firearms should be placed on wood or heavy cardboard and fastened down with string to prevent shifting and contact with other objects in transit. Where such evidence is to be examined frequently, a pegboard should be obtained on which wooden hooks can be moved as desired to support exhibits and

keep them from moving. Bottles and glasses may be placed vertically on a board and placed in the bottom of a box. The base of the bottle or glass can be surrounded with nails to hold it in place and the top can be either inserted through a hole in a piece of cardboard or held in position with a wooden board nailed to the container's lid. Paper and documents containing latent prints should be placed individually in a cellophane or manila envelope. Such a container can be sandwiched between two sheets of stiff cardboard, wrapped and placed in a box for mailing.

Furthermore, Stevek (2003:9) suggests that before doing any physical processing, it is necessary to make a visual examination of the area or piece of evidence by using the beam of your flashlight. This technique is most effective when the beam is angled across a surface (oblique or side lighting). Latent print residue can often be seen (though not always) and prints in dust are most often discovered in this manner. Once latent print residue has been exposed with light, physical processing can begin.

2.7.1 Locard Principle

According to 7th Sense (2008:9), the Locard's principle is applied to crime scenes in which the perpetrator(s) of a crime comes into contact with the scene; he will both bring something into the scene and/or leave with something from the scene. Every contact leaves a trace.

Wherever he steps, whatever he touches, whatever he leaves, even unconsciously, will serve as a silent witness against him. Not only his fingerprints or his footprints but his hair, the fibers from his clothes, the glass he breaks, the tool mark he leaves, the paint he scratches, the blood or semen he deposits or collects. All of these and more bear mute witness against him. This is evidence that does not forget. It is not confused by the excitement of the moment. It is not absent because human witnesses are. It is factual evidence. Physical evidence cannot be wrong, it cannot perjure

itself and it cannot be wholly absent. Only human failure to find study and understand it can diminish its value (7th Sense, 2008:10).

According to 7th Sense (2008:9), "The transfer of evidence refers to Locard's exchange principle. Edmond Locard (1877-1966) was the founder and director of the Institute of criminalistics at the University of Lyons in France. He believed that whenever a criminal came into contact with his environment, a cross-transference of evidence occurred. He believed that "every criminal can be connected to a crime by dust particles carried from the scene".

2.8 LATENT PRINT EVIDENCE

According to Latent Print Evidence Collection Guidance (2008), latent print evidence can typically be divided into two major categories, namely Porous and Non-porous. *Porous* evidence, such as paper, unfinished wood, cardboard, etc., is normally conducive to the preservation of prints because latent print residue can soak into the surface. *Non-porous* evidence, such as plastic, glass, metal, foil, etc., is much more fragile because the latent print residue may just be lying on the surface. Even the slightest handling can "wipe away" a latent print on non-porous surfaces. A third category deals with borderline or questionable surfaces. If you are not sure whether a drop of water would soak into a surface, go ahead and treat it as non-porous. You may otherwise "wipe-off" valuable latent prints during shipment to the lab. Many latent prints are destroyed on shiny magazines and shiny cardboard cigarette cartons by failure to treat them as non-porous.

For Lennard (2001:5), in a given set of circumstances, the choice of the best detection techniques, or sequence of techniques, will depend on several factors that include the nature of the surface (e.g., porous, non-porous, rough or smooth), the presence of any particular contaminants (e.g., blood), environmental factors (e.g., whether or not the surface is or has been wet) and the likely age of any evidential finger marks.

Van der Westhuizen (1996:257-280) discusses the sequential order in which latent prints should be collected. Magnifying is the first step: latent fingerprints should be magnified in order to be collected. The object should be clean and smooth. Great care is required in order to get latent fingerprints. Powders or chemicals are used to magnify hidden or latent prints. In order to begin to develop the unseen print, the first alternative is that a small amount of powder should be used on the area of examination. By observing the development of the latent print, enough powder should be used. One should be careful not to use too much powder, in order not to delete the ridges; too little powder should not be used either. The brushing should be light and follow the line of the ridges.

Taking a photograph is the second step: After developing the print, it becomes visible. Photography is the best way because the collector may make a mistake and destroy the print in the process of collecting. Then collecting the print by tape follows.

Armor Forensic (2007:4) mentioned some latent print collection methods like Crystal Violet powder (gentian violet), a protein dye, which stains the fatty portions of sebaceous sweat a deep purple colour. It can be used to visualize latent prints on the adhesive side of all types of tapes, i.e. duct tape, Scotch tape, masking tape, black electrical tape, etc. Fluorescence examination can also be used when the contrast between the latent prints and the background is not sufficient for adequate photography.

According to Jasuja and Ukpere (2008:10), there are a large number of methods to visualize latent fingerprints. These methods vary from the very simple powder and the iodine method to the most modern and expensive methods, using the argon ion laser. Each method has its own advantages and limitations. None of these methods can be used for each and every type of surface bearing the latent fingerprints.

For Stevek (2003:4), to process nonporous surfaces, the first thing to choose is the proper colour powder: black for white or light colour surfaces, white for

black or dark colour surfaces, fluorescent for multi-colour or grainy surfaces. Then the powder should be stirred with the handle of the brush to break up clumps. Following this, the bristle tips need to be lightly coated by dipping the brush into the powder (wide-mouth powder jars are best for this to prevent unnecessary bending of the bristles). If one is working above a horizontal surface, sprinkling the powder from the brush over the area to be processed would be advisable. If one is, however, working below a horizontal surface, or on a vertical surface, it is important to gently apply the powder directly to the surface.

Home Office in Van der Westhuizen (1996:257-280) lists each technique with its pros and cons. The surface type is very crucial in order to identify which technique is going to be used. The discussion below sheds more light on this matter.

2.8.1 Smooth and rough non- porous surface

For such types of material, visual examination, Fluorescence (ultra –violet and laser equipment), Sudan black and Gentian violet are the main techniques to use in order to magnify.

2.8.1.1 Fluorescence

This is a chemical magnifier that requires great care. It emanates from light. Van der Westhuizen (1996:263) classifies fluorescence examination into two categories: ultra-violet and laser examination. The equipment requires professional training but these light sources illuminate fingerprints and supply better contrast for photography. This examination can be used on most surfaces and it is non destructible. The chemicals that are used in the equipment i.e. methylated spirits and zinc chloride require great care because they are highly flammable with toxicity and are corrosive to human tissue respectively.

In order to magnify fingerprints with this equipment:

- Switch on the light source
- Place the article in the viewing cabinet or switch off the lights

- Select the wavelength, power of illumination and appropriate viewing filter
- Illuminate the article and observe through the viewing filter
- Photograph useful fingerprints and repeat the process with other combinations of illuminating colour and appropriate filter are the main procedures.

According to Latent Fingerprints Procedures Manual (2007), while lasers were first used successfully as monochromatic light sources to induce fluorescence, high intensity lights or alternate light sources with a large concentration of blue or green wavelengths filtered to remove other frequencies have been used to duplicate the controlled illumination below 540 nm blockage. In many instances, the results of laser detection and xenon arc lamp detection are the same but fluorescence is determined by light wave frequency and intensity. While some material readily fluoresces with low power illumination, others require greater intensity before fluorescence is induced.

The very advantage of this method is its non-destructiveness and it is safe to use. Whereas its weakness is less sensitiveness, it needs a dark place to develop and it is costly.

2.8.1.2 Sudan Black

It is a dye that stains fatty components which are very sweaty, greasy or watery to yield a black image. It can be used on surfaces like glass, metals and plastics. The advantage is that it is cheap, non-toxic and can be used on badly contaminated surfaces. It also has a negative side; it is insensitive to uncontaminated fingerprints, very messy and ineffective on dark surfaces. The precaution here is that it is highly flammable (Saviers, 2000:1).

2.8.1.3 Gentian Violet

Gentian Violet is a dye made of methyl violet and crystal violet. Gentian violet is best for adhesive surfaces. It is effective, cheap and a simple process but the reaction is very toxic and not suitable for large surfaces. Great care should

be taken to use it because it is very toxic on skin, flammable and of narcotic character (Wikipedia, 2008).

2.8.2 Paper and Cardboard

Armor Forensics (2007:53) states that for dry paper and cardboard Fluorescence, Powders, Ninhydrin, Physical developer, and Zinc Chloride Formula could be used. On wet paper and cardboard, fluorescence and physical developers are the best magnifiers.

2.8.2.1 Powders

According to Latent Fingerprints Procedures Manual (2007), powders are more effective depending on the applicator, the nature of the powder, the care and expertise, to operate and to photograph. Using powders is good because it is rapid, cheap and can be used at the scene. Powders are less effective on older prints. Also the powders can easily affect forensic evidence, which are found on various materials. Moreover, it requires care as to the amount of powder to be used. Even if it is less toxic, it is advisable to wear a dust respirator. It is also advisable not to smoke when using Aluminum powder. There are many types of powder, which differ in their nature and colour. Therefore, generally, we should use the opposite colour to the material in order to observe or look at the magnified print.

Stevek (2003:4) suggests that after applying the powder, it is important to begin brushing lightly in a circular motion. If ridge detail (the lines of a latent print) becomes visible, the brushing should be changed to the direction in which the ridges are flowing. It is not advisable to brush across the ridges. It is also worth noting that latent prints on nonporous surfaces are fragile and can easily be destroyed. Once the latent print has been sufficiently developed, photographs should be taken as the first step in preservation. This is particularly true of latent prints developed on grainy or textured nonporous surfaces (vehicle dashboards, painted surfaces, vinyl, etc.) where lifting may not secure the print.

According to the researcher's experience and observation in lifting a print, the excess powder should first be blown away from the surface. Then, anchor one end of your lifting tape or hinge lifter to a spot on the surface near the print slowly and firmly press the tape or lifter over the print. If the tape or lifter is not properly aligned or begins to develop air pockets, do not try to start over once the tape or lifter has been committed to the latent print. This may result in the destruction of the print. A second piece of tape or a second lifter overlapping the first, can correct alignment problems before you lift and air pockets can be removed after the lift has been secured to a background by piercing the bubble with a pin and squeezing the air out through the hole.

As stated in the Latent Fingerprints Procedures Manual (2007:3), application of dry powders to a nonporous surface is a critical balance of sufficient colouring agent to adhere to the residue without obliterating the development of the friction ridge formations. This process is commonly called dusting and employs a brush or wand. Heat-generated particulate or suspension-deposited particles need no applicator. Selection of dry powder applicator is based upon the properties of materials used in the construction of the applicator and the damage potential of those materials. Brushes are used for standard powders while ferrous metal powders are normally applied with a magnetic wand.

2.8.2.2 Ninhydrin

For Brazoria County Sheriff's Department (2007:4) ninhydrin reacts to amino acids, a substance humans sweat from hands unlike fat, which is the reaction component of iodine. This reaction will remain for a very long time on a surface, especially on paper. To give an idea of how long it will last, the way it would be tested, a new mixture of ninhydrin was used on a few cancelled checks that had not been handled for 3 to 6 months. It developed prints with good mixture. It is a process that reacts with the amino acid content of a latent print. The result of the reaction may appear to be orange to purple in colour. It is effective when applied to very old prints and suitable for simple usage.

To use ninhydrin on an object, usually paper and wood products, or those things that will not react well with powders (i.e. porous materials), simply spray the ninhydrin on the object and allow it to react. Reaction time varies with the surface, amount of amino acid and environment but you should wait at least 24 hours for the reaction to fully take effect. The downside of using ninhydrin is that it may take weeks to magnify, it may react to other forensic evidence and it has a corrosive character on human tissue. Ninhydrin mixtures are an inhalation hazard and extremely flammable. Another caution to be considered about ninhydrin is that it will cause most inks to run (this is because of the acetone base; acetone is the stuff used in most nail polish removers, super glue removers etc), so you should not use this process on things which may be examined for other reasons, such as handwriting analysis.

2.8.2.3 Physical developer

For Chesapeake Bay Division of the International Association for Identification (2007:8), this is a multi-solution (50 grams Maleic acid powder dissolved in 2 litres of distilled water), multi-step process that can be used as a follow-up to ninhydrin cases. This is the technique of choice for paper currency items and porous items that may have been wet. It is a silver based aqueous reagent, not only used on papers and cardboards but also on raw woods. It is not good to use it on non-porous surfaces, rather it is best to use it on wet paper and on those we do not find anything by applying Ninhydrin.

In Armor Forensics (2007:1) it is said that Physical Developer is a silver-based liquid reagent which reacts with lipids, fats, oils and waxes present in fingerprint residue. Physical Developer is a productive means of developing latent prints on porous objects. However, it is the last of the processes in the regular chemical sequence. Paper items are generally treated with DFO (the chemical reagent 1,8-diaza- plus 9-fluorenone, commonly known as DFO) first if a Forensic Light Source is available, then with Ninhydrin. The items are processed with physical developer at last. When we look at its harmfulness, it does not cause strong damage on human beings except mild irritation and skin allergy. Some chemicals (especially ferric nitrate and Maleic acid) are

irritants and silver nitrate is corrosive on human tissue and stains skin and cloth.

2.8.2.4 Zinc Chloride Formula

According to International Association for Identification (2007:2), Zinc chloride is applied as post-ninhydrin in order to improve the strength of the fluorescence of the ridge detail for viewing and photography. When viewing the enhanced ridge detail, two approaches may be utilized: (1) The Zinc chloride colour-shifted ridge detail may be darkened with the appropriate wavelength and viewed without any barrier colour filter, or (2) the appropriate wavelength may illumine the latent print, which is viewed with the appropriate barrier colour filter. Zinc chloride treated ninhydrin ridge detail colour-shifts to an orange colour.

2.8.3 Plastic packaging

According to International Association for Identification (2007:2), in order to magnify plastic (polythene), mostly fluorescence, vacuum metal deposition, powders, super glue, small particle reagents and Sudan black reagents are the main magnifiers.

2.8.3.1 Vacuum Metal Deposition

Todd (2007:5) points out that this technology has long been proven to recover prints where no prior processes were able. These prints are also higher in quality with greater definition when compared to those of other techniques. The process is effective on the aqueous and sebaceous materials normally found in prints, thus making it the preferred process with new evidence, as well as evidence that are 20 years old. Vacuum Metal Deposition is able to recover marks with only trace amounts of substances that compose every print. This process uses the metal coating technology for the evaporation and deposition of thin layers of gold and zinc onto surfaces to develop latent prints. It may be used on plastics, leather, glasses and photograph negatives. It is good to use because it is reactive for both old and new prints but it is costly and requires expertise for proper operation.

2.8.3.2 Super Glue

It is a vapor of the reagent as a white deposit. Some argue that in this process fingerprints on the human skin can be collected (Van der Westhuizen 1996:277). For Stevek (2003:3) super glue fuming (cyanoacrylate) does not only develop latent prints but it also acts as a preservative of latent prints by stopping evaporation. As super glue fumes harden latent print residue on non-porous surfaces (making latent prints less fragile) this process can be used prior to sending items to the lab for further latent print processing. The easy access and use makes this magnifier preferable but it is less sensitive to old prints and it must be used in a fume cabinet.

2.8.3.3 Small particle reagent

According to Saviers (2000:4) Small Particle Reagent is another name for Molybdenum Disulfide (MoS₂). Small Particle Reagent is a physical development technique where small black particles adhere to the fatty substances left in fingerprint residues. This solution has been used successfully on paper, cardboard, new metal, rusty metal, bricks, rocks, concrete, plastic, vinyl, wood, galvanized metal and glass. However, as is the case with any latent print development process, the results will depend on the amount of residue deposited by the finger. In this process, suspension of fine molybdenum disulphide particles with a detergent solution in order to immerse or spray is prepared for magnification. It is very cheap, non-toxic and easy to use. The negative aspect of this magnification process is that it can damage the material on which the latent fingerprint is found.

Chesapeake Bay Division of the International Association for Identification (2007) states that a reagent for latent print processing of items that are wet when recovered can be made use of. It is also suggested for use on items where latent print powders are ineffective. This reagent can effectively work on items which have been soaked in liquid accelerants. The active ingredient (Molybdenum disulfide) is applied either by spraying or dipping. This technique requires a large work area that will be subject to messy conditions. The reagent is best for collecting latent prints on documents.

According to the researcher's observation and that of all the participants, forensic evidence collectors in Ethiopia use gray powder most of the time for almost all types of materials and rarely black powder for white materials.

2.9 THE BEST TECHNIQUE(S) TO COLLECT LATENT PRINTS

As we have seen in 2.2, every technique of collection has its own advantages and disadvantages. In order to identify the best technique(s) to collect latent print, we should know the nature and the colour of the material that carries the latent print.

The researcher will now compare and contrast the techniques that are listed in each type of material according to the above section:

2.9.1 Smooth and rough non porous surface

According to Armor Forensics (2007:53), there are three techniques to magnify latent prints on such surface viz. Fluorescence (ultra –violet and laser equipment), Sudan black and Gentian violet. Fluorescence (ultra –violet and laser equipment) needs a dark place to develop, it is costly and it needs expert care but it is non- destructive and safe to use. Sudan black reagent is insensitive for uncontaminated fingerprints, very messy and ineffective on dark surfaces and also, it is highly flammable but it is cheap, non- toxic and can be used on badly contaminated surfaces. Gentian violet is very toxic and is not suitable for large surfaces but it is effective, cheap and involves a simple process.

Therefore, one can conclude by looking at the pros and cons of each technique for smooth and rough non-porous surface, the Gentian Violet process is the best method.

2.9.2 Paper and Cardboard

Arrowhead Forensics (1997-2007:12) suggests that fluorescence, powders, Ninhydrin, Physical Developer and Zinc chloride can be used on paper and cardboard to magnify prints. Fluorescence (ultra –violet and laser equipment) need dark places to develop, it is costly and it needs expert care but it is non-

destructive and safe to use. Powders are less effective on the older prints. They easily affect forensic evidence which is found on the material but it is rapid, cheap and can be used at the scene. Using Ninhydrin may take weeks to magnify, it may react to other forensic evidence and it has a corrosive character on human tissue but it is effective on very old prints and improves simple usage.

Physical developer, especially Ferric nitrate and Malleic acid are irritants and Silver nitrate is corrosive on human tissue and stains skin and cloth. Generally it does not cause much harm to human beings except irritation and skin allergy but it can magnify a print that is not found by Ninhydrin. Therefore, we can conclude that physical developer and Ninhydrin processes are best in laboratory and powders are preferable at crime scenes.

2.9.3 Plastic packaging

Katz (2005:8-10) argues that Fluorescence, vacuum metal deposition, powders, super glue, small particle reagents and Sudan black reagents are the main magnifiers. Fluorescence (ultra –violet and laser equipment) need dark places to develop. It is costly and it needs expert care but it is non-destructive and safe to use. Vacuum metal deposition is reactive to both old and new prints but it is costly and requires expert knowledge for operation. Powders are less effective on older prints. They easily affect forensic evidence that is found on the material but they are rapid, cheap and can be used at the scene.

Super glue is less sensitive to old prints and it must be used in a fume cabinet but it is cheap and easy to use. Small particle re-agents can damage the material that the latent fingerprint is found on but it is very cheap, non-toxic and easy to use. Sudan black reagent is insensitive to uncontaminated fingerprints, very messy and ineffective on dark surfaces; it is highly flammable but cheap, non-toxic and can be used on badly contaminated surface.

Therefore Fluorescence examination and vacuum metal deposit are the best types of magnifier on plastic bags.

2.10 SUMMARY

As we have seen, there are many methods of magnifying latent prints from different materials. The technique depends on the material where the latent print is found and also the print itself. As we have observed above, two optional techniques of collection for one type of suspect material can be applied. We have also looked at each technique's advantages and disadvantages.

Even though fluorescence examination can be applied in almost all types of suspect materials to magnify latent prints, it is very costly. In addition, there should be a dark place or room for magnification. Moreover, the ultra -violet and laser equipment which is used in the development process, requires professional skill. There are also some chemicals which are best for magnification but require extreme caution because of their toxicity. Therefore, it is highly advisable to use these magnifiers with utmost care. It is better to use other non-toxic but weak developers, rather than tampering with techniques that embody health hazards.

CHAPTER THREE

THE BEST TECHNIQUE TO COLLECT LATENT PRINTS FROM DOCUMENTS IN ETHIOPIA

3.1 INTRODUCTION

In the previous chapter, many methods and techniques for collecting latent prints were mentioned and discussed. The method which is chosen will depend on the material on which the latent print is found and the print itself. In this chapter, the researcher tried to explore the best method of collecting latent prints from documents and the method and practice of collecting latent prints from documents at the Addis Ababa Police Commission Forensic Evidence Collection Department. The chapter includes the practical application of the Federal Police Forensic Laboratory to collect such prints from documents. In addition, the advantages and disadvantages of each technique used at the crime scene and in the laboratory are mentioned.

3.2 THE COLLECTION OF LATENT PRINTS FROM DOCUMENTS

As maintained by Physical Evidence Handbook (2006:3), finding fingerprints on documents is difficult since their surfaces have porous and absorbent properties. Latent prints left on these types of surfaces are "absorbed" and will not be destroyed by contact with another surface.

Under the Addis Ababa Criminal Investigation Bureau there is a department that is in charge of collecting evidence at crime scenes. According to the Addis Ababa Police Commission Department's Duties and Responsibilities Manual (2007:5), the department has the duty to collect evidence at crime scenes and to send it to the Federal Police Forensic Laboratory for comparison purposes. Since there is only one forensic evidence laboratory in the country, the evidence that needs a chemical reaction is sent to this laboratory from across the country. According to Giovannetti (2008) documents are one of the most important and sensitive types of physical evidence found at crime scenes. This may include anonymous letters, extortion notes and indecent or threatening letters. Such documents must be

handled with care; officers should avoid applying pressure and making indentations. They should not attempt to repair damaged documents or smother burning documents and avoid using water to extinguish flames. Package each item in a separate plastic envelope or large paper envelope.

According to my observation and the response of the evidence collectors to the question: "What materials are you using to develop latent fingerprint from documents?" The Addis Ababa police commission evidence collector team use only powders to collect latent fingerprints from documents. Most of the time, the collectors use magnetic powder to magnify latent prints from documents. There are two professionals qualified for this duty. Based on the researcher's experience and the interviews held, latent print collection and comparison is only done by the Federal Police Forensic Evidence Laboratory, which is the only laboratory using chemicals to magnify latent prints and mostly this laboratory uses Ninhydrin chemicals.

Responding to the question regarding the techniques that are used to collect latent prints, all respondents, except one, replied that they used magnetic powder. Only one respondent said he uses golden and aluminum powder to magnify latent prints from documents. Speaking about the advantages and disadvantages, the participants pointed out that the powder is less effective than chemicals, such as ninhydrin and they believed that the evidence on documents is very fragile and easily destroyed. Furthermore, they said that there are latent fingerprints on papers that are found at crime scenes (especially those that are touched by the suspects) since documents have the power to react with the sweat of human hands.

According to the forensic evidence data registration of the Addis Ababa Police Commission, the forensic evidence collection department (2002/03 & 2006/07) has the following data: In 2002/03, from six crime scenes investigated, documents were gathered and fingerprints were found on only one document. In 2003/04 from seven documents that were found, no prints were found. Whereas in 2006/07, documents were gathered from 15 crime scenes but latent prints were only found on five documents.

To the question: “What techniques are used to collect latent fingerprint from papers?” all replied that there are two methods of collection of latent prints on documents used by the Addis Ababa Police Commission Forensic Evidence Collection Department and Federal Forensic Evidence Laboratory. The powdering technique was used by both the Capital City Police Department and the Federal Police Laboratory but the chemical technique was only applied in the Federal Police Laboratory.

According to the researcher’s observation, forensic evidence collectors collected latent prints from documents by magnetic powder and they did not bring the documents to the office to try and use other chemicals. The reason for this is not clear, but it is possible that the long distances might play a role in this.

3.2.1 The Powdering Technique

Aluminum Magnetic powder and Super glue fuming (Hamilton in Van der Westhuizen, 1996:277) are good techniques in order to collect latent prints. According to the participants, these methods were used but are not practical due to the lack of materials. Collection of latent fingerprints from documents is one pack, which requires great care. Like others latent prints, the collector can use powdering for developing prints but using chemicals is the best and most secure technique.

To the question: “Why do you assume that there will be latent fingerprints on documents?” All participants believe that there will be latent fingerprint if the objects are touched. The criminal act at crime scenes is full of stress, so the suspect will touch many things. Touching leaves evidence, whether there is a disorder or not and the collector should search for prints.

The forensic evidence collectors responded to the question: “What techniques do you use to collect latent fingerprint from papers?” They stated that they use mostly aluminium and black powder at crime scenes for almost all materials and they use magnetic powder for documents. Even if they have knowledge

of many powders, it is not available for their use. Most of the time they prefer to search for latent fingerprints at the crime scenes, as this helps in that it is advantageous to collect prints immediately (they are not exposed to damage). It is important to collect prints at crime scene because they are easily destroyed through transportation. Although it is advantageous to collect them there, this also has its own problems. Some latent prints can be better magnified and use other chemicals than powders.

When the researcher observed the participants crime scene kits, they did not have plastic bags or other package materials. So they either try to collect samples there, or bring them to their offices and send them to the lab without any packaging. This is particularly true when they find documents touched by suspects. They try to magnify these by using magnetic powders or they bring them without being enclosed in an envelope and send them to the laboratory. The laboratory also has no special preservation place.

According to the researcher's experience and observation, the forensic evidence collectors use different powders to magnify and collect fingerprints from materials depending on the colour of the material. The powders they use are opposite in colour to the materials. Some powders may work well with some equipment but they may not be important for others. This shows that all powders are useful to magnify latent prints but no single powder can be a magnifier for every latent fingerprint.

There are some powders that are used by the professionals at a crime scene and in the laboratory. Among these, magnetic powder is the main powder to magnify from documents. Only one participant suggests that he is using golden and aluminium powder to magnify from documents, according to the document colour. The researcher also suggested that from his experience aluminium, golden, black and white powders can be used for document magnification. The powders are decided upon depending on the colour of the paper. If the paper is white, it is better to use magnetic or black powder, whereas if the paper is black, the powder should be aluminium, white or golden powders.

3.2.2 The Chemical Techniques

As discussed in chapter two, there are many ways of magnifying latent prints from documents. Among these chemical magnifiers, Ninhydrin and Silver Nitrate chemicals are the main types used in laboratories. According to the participants from the Federal Police Forensic Laboratory, to the question: "What techniques do you use to collect latent fingerprints from documents?" The respondents replied that they were using Ninhydrin and Silver nitrate chemicals. Since Silver nitrate was affecting their health, they stopped using it and have been using ninhydrin for a long time. According to the Federal Police Forensic Laboratory experts, they stopped using ninhydrin because of laboratory problems. When asked to elaborate on how to use the ninhydrin chemicals, they answered that the solution is sprayed onto the paper and left for several days at high temperature. The document changes to pink and the prints turn a deeper shade of pink.

The researcher did not see observe the forensic evidence collectors and laboratory professionals using the chemicals.

3.3 ADVANTAGES AND DISADVANTAGES OF TECHNIQUES USED TO COLLECT LATENT PRINTS FROM DOCUMENTS

Regarding the question of the advantages and disadvantages of the techniques used to collect latent prints from documents, all the Addis Ababa Police Forensic Evidence collectors responded that since they only use the powder technique to magnify prints from documents, it needs some caution. Brushing the document or spraying the powder is the method to magnify. The advantage of a powdering technique is that the collector can easily check the document on the scene and save it from contamination. The other advantage of this powdering technique is that it is easily movable. One can use it at any temperature and it magnifies immediately. However, it is disadvantageous because the powder is not powerful enough to magnify unless the document was touched very recently and documents by nature easily react with the

sweat that creates the print. After magnifying the latent print, the next step should be photographing, which should be conducted in the laboratory.

To the question: “What are the advantages and disadvantages of the techniques they use to collect latent prints?” The answer could not be determined. The participants could not answer the question. The view of the researcher (based on his observation and experience) is that the Addis Ababa Police forensic evidence collectors fail to collect latent prints from documents due to the age of the powders (they are too old). The quality of the brushes and the reluctance or negligence of collectors also plays a role. Sweat is easily absorbed and reacts with paper. They all believe that there should be latent prints on paper but powder does not always react to the sweat easily and the quality of their equipment can easily delete the fingerprints.

Regarding the question about the advantages and disadvantages of the techniques they use to collect latent prints, the Federal police Forensic Laboratory participants replied that these techniques have their own positive and negative sides. The positive side of the solutions, like ninhydrin, is that they are powerful enough to magnify the old prints that were touched many years back. The silver nitrate only magnifies the latest latent prints and also, its poisonous power is much less than the ninhydrin. The negative side of using chemical techniques to collect latent fingerprint from papers is:

- It needs days for magnification
- It destroys the document written on the papers
- It does not separate the old from the new prints

In addition to the above, one participant replied that fingerprints easily develop if there is contact after spraying ninhydrin even though the paper is dry.

According to the observation and experience of the researcher, chemical magnifiers need a special room that protects light. Some chemicals need days and others need dark spaces. The laboratory does not have a special room for this purpose and therefore, it is almost non-functional. This is the reason

why the forensic evidence collectors at crime scenes are frustrated and they do not give much attention to crime scene papers in order to be tested in the laboratory and they simply try to collect evidence by using powders.

3.4 OTHER AVAILABLE TECHNIQUES TO COLLECT LATENT PRINTS FROM DOCUMENTS

To the question: "Are you aware of any other technique for the collection of latent fingerprints from documents?" All laboratory experts have knowledge of Iodine fuming, silver nitrate inking process and heating techniques.

3.4.1 Iodine Fuming

According to all participants, documents can be treated in an iodine fuming. The iodine fuming magnifies the latent print with dark brown patterns but it does not magnify as quickly as powders. It needs an hour or more to magnify at room temperature. It can be speeded up by heating but this is less satisfactory in the magnification on papers. For greasy papers, iodine fuming is more preferable. It is more guaranteed than the powdering technique but the iodine vapour is poisonous. Therefore, it is riskier than the powdering technique. It is also not long lasting, therefore it requires photographing immediately. Fuming is not practical for collecting latent fingerprints from papers in the Federal Forensic Laboratory because of the lack of the chemical, its poisonous effect and it also damages the written document/papers (Forensic Investigation, 2009).

3.4.2 Silver Nitrate

According to the response of Addis Ababa police technical evidence collectors and The Federal Police Forensic laboratory experts, both groups know this technique. As mentioned above, this technique was widely used in the Federal Police Forensic laboratory. According to Forensic Investigation (2009), the paper is immersed in the solution and left to dry in a dark place. After drying, it should be exposed to sunlight or ultra violet rays until the print becomes dark, then photographing follows. If the document or written material on the paper is needed, the paper can be returned to its original position by

immersing in mercuric chloride. The participants highly criticized the use of silver nitrate because it is hazardous to one's health. The silver nitrate technique requires days - especially in wintertime.

3.4.3 Inking process

Only one of the Federal Forensic Laboratory professionals (Solomon G/ Egziabher) replied that he is aware that the Inking process and Heating treatment are the best for developing latent prints on papers. He continued his elaboration that the inking process does not react with the oil that is secreted from the finger that creates the impression. When this suspected paper is immersed in the ink, only the untouched part of the papers react with the ink and the ridges do not react with the ink. This gives the negative fingerprint, which then magnifies the positive one by powders. The ink process is advantageous for very old prints and the ink is easily available. He added that the ink, which is produced from pyrogallol and osmic acid in solution, is best for developing fingerprints. The remainder of the participants did not have knowledge of any other technique to use when collecting latent fingerprint from documents.

One participant from the Federal Forensic Laboratory replied that one other method of developing latent impressions on paper is "heat treatment". This treatment of heat produces dark brown ridges due to the organic substances in body wax becoming carbonized in the absence of sufficient oxidation. The paper may be protected by placing it between two sheets of mica held together with metal paper clips. No further suggestions were made by other participants.

3.5 THE BEST TECHNIQUE TO COLLECT PRINTS FROM DOCUMENTS

According to three participants (when asked which technique(s) is/are the best) powders are very quick and are not dangerous to health but the possibility of magnifying with powder is not very effective. Furthermore, they added that even if it is safe to use, it is better to use the ninhydrin chemical although great care should be taken with this process. Moreover, the

ninhydrin magnification process is best for fresh documents. In addition, it is good to use the Inking process for old prints. The other participants did not offer any viewpoints.

3.6 SUMMARY

There are powders and chemicals available to magnify latent fingerprints from materials collected as evidence. Especially when collecting them from documents, great care and skill are required. The evidence on documents is very fragile and easily destroyed. All participants believe that there are latent fingerprints on documents which are found at crime scenes. This belief concurs with the Locard principle. As the researcher observed from the professional participants and statistical data, they have been less than effective in collecting latent prints from documents.

The evidence collectors at crime scene are using old powders and the experts at the laboratory use only Ninhydrin chemicals and magnetic powder without a properly designed room. The experts are aware of different techniques of collection from documents but they do not use their skills appropriately. The justice department should give proper attention to this matter.

CHAPTER FOUR

FINDINGS AND RECOMMENDATIONS

4.1 INTRODUCTION

So far, the researcher has attempted to address the problems associated with collecting latent prints from documents found at the crime scene and tried to illustrate a modified and best method of collection. In this chapter, the conclusions based on the findings of the study are presented together with recommendations that are believed to be solutions to the aforementioned problems.

The aim of this research was to discover the best techniques for collecting latent fingerprints from documents for the Police Forensic Evidence Collection Department of Addis Ababa. The research questions were:

- ☞ What techniques are used internationally to collect latent prints from documents?
- ☞ Which is the best technique to collect latent prints from documents in Ethiopia?

4.2 FINDINGS

The findings are based on information that was obtained from the participants interviewed, the viewpoints of national and international sources and the researcher's own observations.

Research question 1:

What techniques are used internationally to collect latent prints from documents?

- Powder and chemicals are the main techniques used to magnify latent prints from documents.
- The main powders that are used to magnify latent prints from documents are magnetic, aluminum and black powders.
- Chemicals such as Ninhydrin and Silver Nitrate are the most widely used techniques to magnify latent prints.

- Other techniques like Iodine fuming, the silver nitrate inking process and heating techniques used to magnify latent prints from documents were identified by the participants.

Research question 2:

Which is the best technique to collect latent prints from documents in Ethiopia?

- In terms of speed (time consumption) and health, powders are very quick and are not hazardous to health but the possibility of magnifying with powder is less effective than chemicals.
- In terms of reliability chemicals, particularly Ninhydrin and silver nitrate are the best techniques.

In this research it also became clear that:

- Latent prints that are found on documents are very fragile and easily destroyed. All participants believe that there are latent fingerprints on documents which are found at crime scenes. This belief is totally congruent with the Locard principle.
- On the effectiveness of collecting latent prints from documents, it is observed that the collectors are not so effective and latent prints tend to be impractical and overlooked as evidence.
- It is discovered that there are many methods of magnifying latent prints from materials and these methods vary on the basis of the nature of the material on which the latent print is found and also on the nature of the print itself. However, as far as the evidence collectors at crime scene are concerned, in most of the cases they use old powders to collect latent prints from materials, while the experts at the laboratory use only Ninhydrin chemicals and magnetic powder without any room especially designed for this purpose.
- What is paradoxical is that although the experts are aware of different techniques for collecting latent prints from documents, in practice they rarely use their skills appropriately.

- From the literature it was established that forensic investigation is a science dedicated to the methodical gathering and analysis of evidence to establish facts that can be presented in legal proceedings.
- From the literature it was also established that the word “forensic” simply means something that has to do with the law and used for court purposes. It refers to the study of physical information connected with crime.
- The majority of the sample does not know what forensic investigation is.
- From the literature it was also established that the objectives of forensic investigation are to establish the elements of the crime, to associate/disassociate the suspect with the crime, to reconstruct the crime scene, to investigate how personnel and the laboratory scientists work as a team, to test statements and alibis, to prove the elements of the crime, to develop and corroborate the evidence and to reconstruct the crime.

4.3 RECOMMENDATIONS

Addis Ababa is the capital city of Africa, since the African Union’s Headquarters is located in the city. This shows that there are lots of diplomats and representatives of various countries in the city. Therefore, the government should secure peace and security of individuals. One of the disclosures of democracy is also shown through fair and fast judgment. In order to practice equality and justice, there should be vivid physical evidence that can identify the suspect of a crime. Among the physical evidence, latent prints that are found on documents at crime scenes are critical for forensic investigation. This evidence is the most neglected forensic evidence at Addis Ababa Police Commission. Therefore, to improve the effectiveness of this evidence the following recommendations are made:

Research question 1:

What techniques are used internationally to collect latent prints from documents?

- It is recommended that the latest powders (magnetic, aluminum and black powders) that are used internationally to magnify latent prints from documents should be used to magnify latent prints from documents in Ethiopia.

Research question 2:

Which is the best technique to collect latent prints from documents in Ethiopia?

- Chemical magnifiers (particularly Ninhydrin and Silver nitrate) are the best techniques to magnify latent prints from documents as long as the above recommendation is fulfilled.

It is also recommended that members of the Federal Police of Ethiopia be trained in the meaning and objectives of Forensic Investigation as they have very little knowledge on the two topics.

4.4 CONCLUSION

Based on the findings of the study, the following conclusions were established: The department within the Addis Ababa Criminal Investigation Bureau, which is in charge of collecting evidence at crime scenes, is the only forensic evidence laboratory in the country. The evidence that needs a chemical reaction is sent to this laboratory from all areas. Some of the documents that are sent for investigation to this centre include anonymous letters, extortion notes and indecent or threatening letters. According to the researcher's observation and also the response of the evidence collectors regarding the materials they are using to develop latent fingerprint from documents, the Addis Ababa Police Commission evidence collector team reported that they only use powders. The respondents added that most of the time they use magnetic powder to magnify latent prints from documents. However, there are only two professionals qualified for this duty. According to the researcher's experience and the interviews held, latent print collection and comparison is only done by the Federal Police Forensic Evidence Laboratory, which is the only laboratory using chemicals to magnify latent prints and mostly this laboratory uses Ninhydrin chemicals.

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APPENDIX

Forensic Investigation

(If necessary, please use extra paper)

INTERVIEW SCHEDULE

Section A

1. Are you a forensic Investigator?
2. Do you have any experience in forensic investigation? If yes, for how long have you served as a forensic investigator? How many years of forensic investigation experience do you have?
3. Did you undergo basic forensic investigation training?
4. Did you receive training in the collection of latent fingerprints from paper?
5. Do you have any experience in collecting latent fingerprints from materials? Did you ever in your collection experience.....?

Section B

1. What does forensic Investigation mean to you?
2. What is the meaning of forensic?
3. When do you have to investigate?
4. Who has the right to investigate?

Section C

1. What is the meaning of collection of latent fingerprints?
2. What is the meaning of collection of latent fingerprints from paper?
3. Why do you assume that there will be latent fingerprint on paper?

Section D

1. What techniques do you use to collect latent fingerprint from paper?
2. What are the advantage and disadvantages of the techniques you use to collect latent prints?
3. Are you aware of any other techniques of collecting of latent fingerprints from paper?
If yes, what are these techniques?

Why do you not use them?

4. Which technique(s) is/are the best one?