Fingerprints

The fingerprints shown in the table below are examples of pattern types as defined in the Henry system of fingerprint classification. This system is named for its inventor, Sir Edward Richard Henry, and has been in use in most of the English-speaking world since the early 20th century. This classification system allows for the searching of unknown fingerprints by classifying each print according to the rules as set out by Henry. Forensic Identification Services of the Toronto Police used this system for many decades, until the implementation of the AFIS computerized system in 1989. The AFIS classification system is known as "Autoclass" and is based on Henry. The Autoclass system is actually simpler because all patterns from Whorl to Accidental (except the Lateral Pocket Loop), as shown in the table, are classified as Whorls. This is because the system is computerized and thus does not require the same degree of breakdown as is required in a manual system such as Henry.

Arch

Tented Arch

Ulnar Loop (right hand)

Radial Loop (right hand)

Ulnar Loop (left hand)

Radial Loop (left hand)

Whorl

Central Pocket Loop

Double Loop

Lateral Pocket Loop

Composite

Accidental

Home Unit Main Index email: Unit email: Webmaster

CHECKED 24 HR. SHEET

340

LEAVE THIS SPACE BLANK RMS

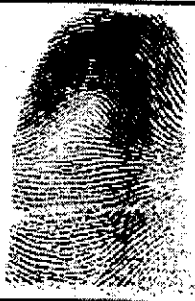
Name MALCOLM LITTLE

Alias

No. Color BLACK Sex MALE

Classification 9 r A

Ref. 1 a R

1.—Right Thumb	2.—R. Index Finger	3.—R. Middle Finger	4.—R. Ring Finger
			

6.—Left Thumb	7.—L. Index Finger	8.—L. Middle Finger	9.—L. Ring Finger
			

Four fingers taken simultaneously

Left hand

Amputations RMS

Four fingers taken

Right hand

Left Thumb	Right Thumb
	

Impressions taken by Pfc. John F. Koch #6818

Classified by

Verified by

Prisoner's signature

Malcolm Little

Speckin Forensic Laboratories
The Forensic Specialists

Fingerprints

Fingerprints can have several different applications in litigation. The first is showing a person was in a particular place, such as a crime scene. Other evidential values which are often overlooked are fingerprints on anonymous notes or other documents where someone denies a connection to or authorship of a particular document. We have the ability to develop fingerprints which have been on paper for up to several years.

The theory for the use of fingerprints and palmprints as a positive means of identification is based on two principles:

- 1) They are **"permanent"** in that they are formed in the fetal stage, prior to birth, and remain the same throughout lifetime, barring disfiguration by scarring, until sometime after death when decomposition sets in.

- 2) They are **"unique"** in that no two fingerprints, or friction ridge area, made by different fingers or areas, are the same (or are identical in their ridge characteristic arrangement).

This display below points out some of the parts of a fingerprint and the characteristics used to identify them (ridge ending, bifurcation, enclosure, short ridge and ridge dot).

Legend

1) **Ridge Ending**
2) **Bifurcation**
3) **Enclosure or Island**
4) **Flexure crease**
5) **Ridge dot**
6) **Core**
7) **Delta**
8) **Short Ridge**

Presentation Exhibit

A comparison is made by searching the inked (known) fingerprint and the latent (unknown) fingerprint for corresponding ridge characteristics.

These ridge characteristics have to be of the same shape, the same type, occupy the same relative position and possess an adequate number of identification point with no unexplainable differences in both the inked print and the latent print before a positive identification can be made.

INKED FINGERPRINT

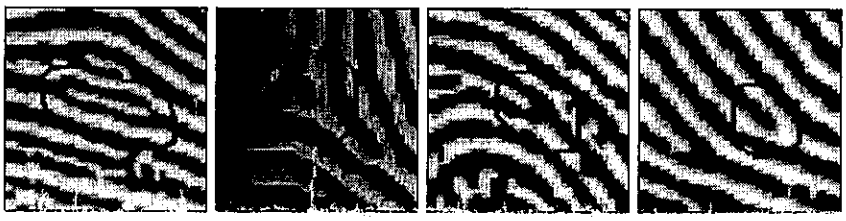
LATENT FINGERPRINT

msinke@4N6.com

5

Fingerprint Identification

Identification by fingerprints relies on pattern matching followed by the detection of certain ridge characteristics, also so known as Galton details, points of identity, or minutiae, and the comparison of the relative positions of these minutiae points with a reference print, usually an inked impression of a suspect's print. There are three basic ridge characteristics, the ridge ending, the bifurcation and the dot (or island).



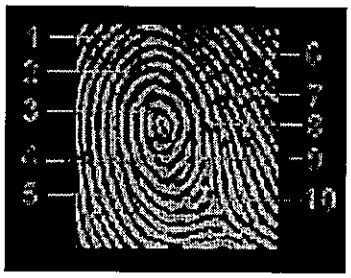
Island Dot Bifurcation Ending Ridge

Identification points consist of bifurcations, ending ridges, dots, ridges and islands. A single rolled fingerprint may have as many as 100 or more identification points that can be used for identification purposes. There is no exact size requirement as the number of points found on a fingerprint impression depend on the location of the print. As an example the area immediately surrounding a delta will probably contain more points per square millimetre than the area near the tip of the finger which tends to not have that many points.

In image 1 we see part of a fully rolled fingerprint. Notice that the edges are cut-off so you can safely assume that this is not a fully rolled impression. If you take a look at image 2 you can see that I have sectioned out the centre portion of this impression and labelled 10 points of identification. That was not all the points found but simply the ones that could be mapped easily without cluttering up the image.

1

Image 2 when measured 1:1 is just over 1/4" square. If you look closely you should be able to identify 10 additional points that were not mapped with the lines. In all I counted 22 points of identification on this 1/4" square section of the

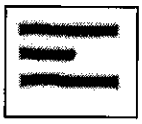
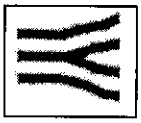
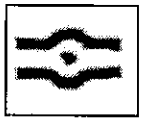
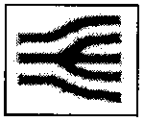
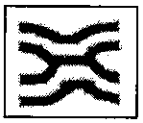
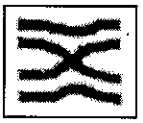


2

impression. One thing to note here, you might be under the impression that making a fingerprint comparison is relatively easy but you should keep in mind a couple things.

First, image 1 and image 2 are both taken from the same image. In real life you would have impressions made at separate times and subject to different pressure distortions. Secondly, these images are relatively clean and clear where many of the actually crime scene prints are anything but clear. Last you have to consider that this is an easy comparison because you are blessed with having a core pattern and a delta when in some cases you may have a latent that could be a fingertip, palm or even foot impression.

Basic and composite ridge characteristics (minutiae)

Minutiae	Example	Minutiae	Example
ridge ending		bridge	
bifurcation		double bifurcation	
dot		trifurcation	
island (short ridge)		opposed bifurcations	
lake (enclosure)		ridge crossing	
hook (spur)		opposed bifurcation/ridge ending	

TOP OF PAGE

FINGERPRINT PATTERNS AND CLASSIFICATIONS

PLAIN ARCHES

In plain arches the ridges enter on one side of the impression and flow or tend to flow out the other side with a rise or wave in the center.

TENTED ARCHES

Tented arches are similar to plain arches with the exception that the ridges in the center form a definite angle; or one or more ridges at the center form an upthrust; or they approach the loop type, possessing two of the basic characteristics of the loop but lacking in the third.

ULNAR LOOPS

Ulnar loops are those types of patterns in which the loops flow in the direction of the little fingers.

RADIAL LOOPS

Radial loops are those types of patterns in which the loops flow toward the thumbs.

DOUBLE LOOP

The double loop consists of two separate loop formations, with two separate and distinct sets of shoulders and two deltas.

PLAIN WHORL

A plain whorl has two deltas and at least one ridge making a complete circuit, which may be spiral, oval, or any variant of the circle. An imaginary line drawn between the two deltas must touch or cross at least one of the recurving ridges within the pattern area.

CENTRAL POCKET WHORL

The central pocket whorl consists of one or more recurving ridges, or an obstruction at right angles to the inner line of flow, with two deltas between which an imaginary line would cut or touch no recurving ridge within the pattern area. The inner line of flow of a central pocket loop is determined by drawing an imaginary line between the inner delta and the center of the innermost recurve or looping ridge.

ACCIDENTAL WHORL

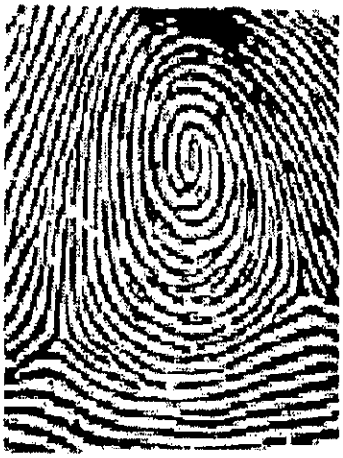
The accidental whorl is a pattern with two or more deltas, and a combination of two or more different types of patterns exclusive of the plain arch. This classification also includes those exceedingly unusual patterns which may not be placed by definition into any other classes.

Loop (65%)

Whorl (30%)

Simple (plain)Arch (5%)

Double loop

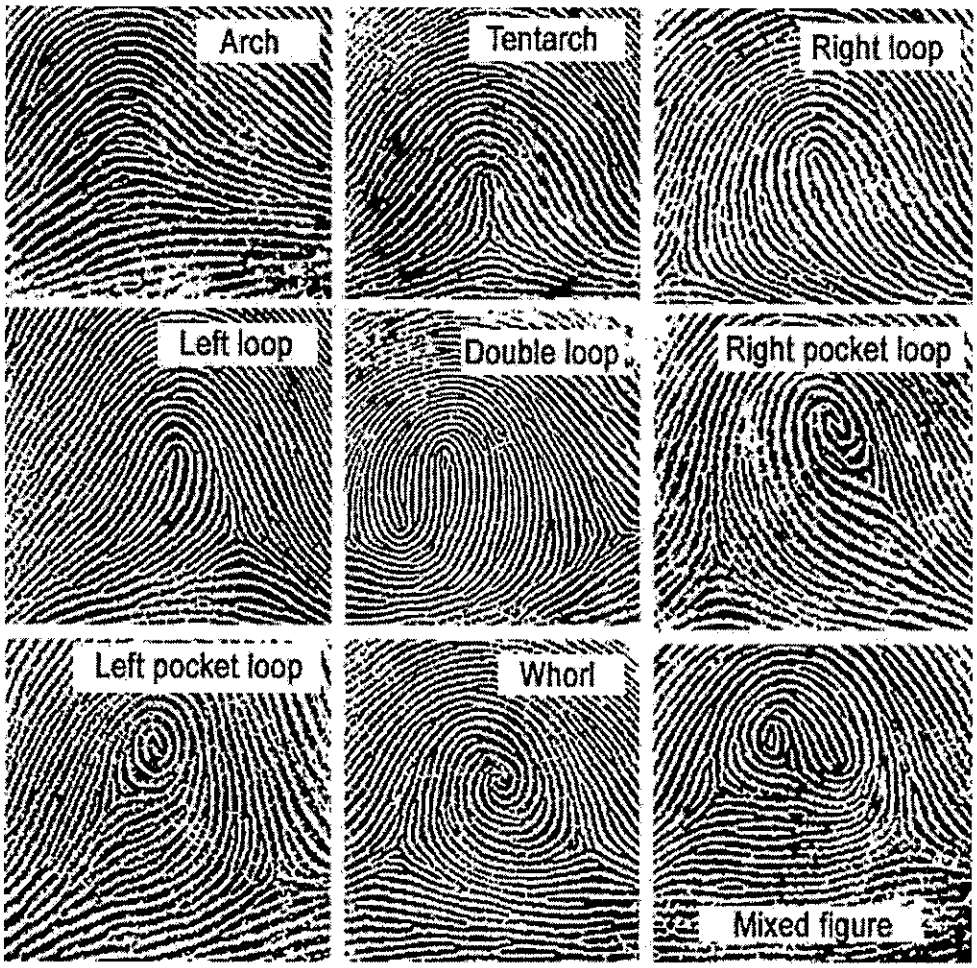


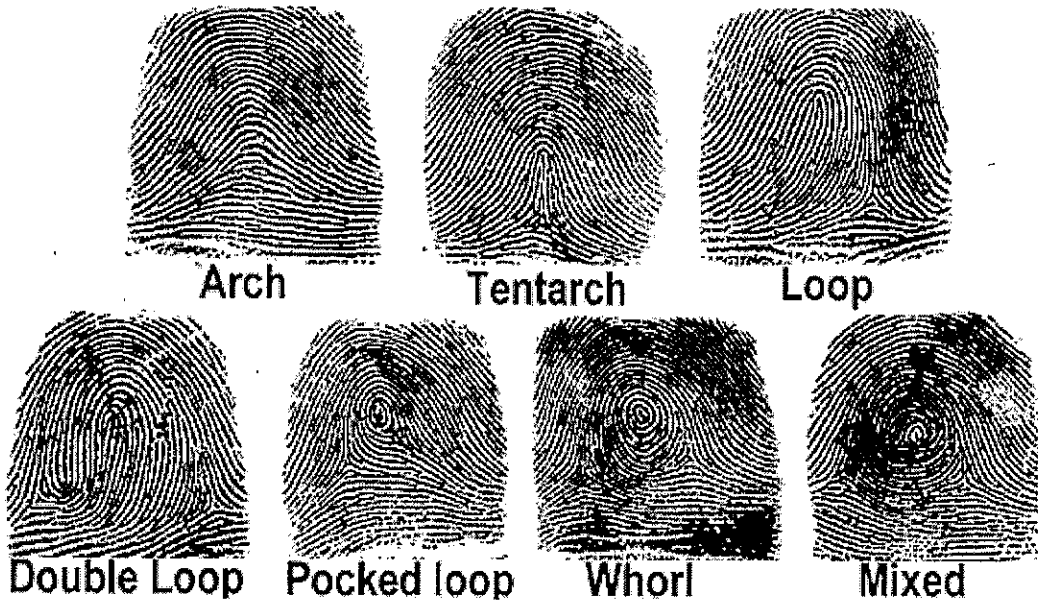
Spiral or shell whorl

Tented arch

Central Pocket Loop
(peacock's eye)

Target Whorl




Arch
Tentarch
Loop
Double Loop
Pocked loop
Whorl
Mixed