FINGERPRINTS

History :

1) First systematic attempt by French police expert, Alphonse Bertillon
2) Bertillon Called it Anthropometry
3) 1892, Francis Galton published his classic textbook Fingerprints : no computers, but literally CARDS IN A FILE.
4) 1903, Will West and William West could not be told apart using Bertillon system, but fingerprints could distinguish them.
5) After this incident, fingerprinting was started to be used and training American police included this, in 1904.

Fingerprint principles :

1) Individual characteristics. They are unique and no two fingerprints have been found to possess same characteristics.
2) Fingerprints remain unchanged
3) They have ridged patterns that permit them to be systematically classified. (linking subjects to crime scenes)

PRINCIPLE 1 : Individual characteristic

Ridge characteristics are called “minutiae”. There are average as many as 150 minutiae on the finger.

This is based on theoretical calculations, and no 2 have ever been found identical.

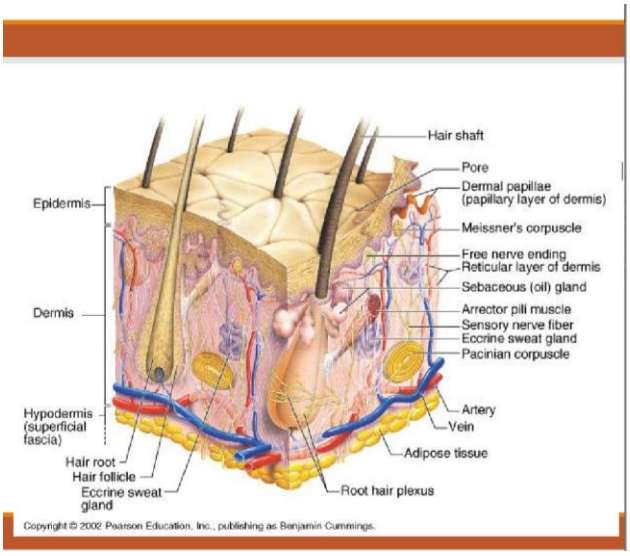
Studies on the statistics of ‘partial’ matches have not yet been conducted’.

North American Investigation : no valid basis exists for requiring a predetermined minimum number of friction ridge characters in order to establish identification.
So there has to be point by point comparison in judicial proceeding to conclude the crime scene fingerprint can’t be ruled out as originating from the suspect.

PRINCIPLE 2 : Fingerprints remain unchanged

- ⇨ Ridges are formed for improving grip and reducing slippage
  Dermal Papillae is the layer of cells between epidermis and dermis that is responsible for determining the form and pattern of the ridges on the surface of the skin. This is formed in human fetus! And remain unchanged forever.

⇨ Ridges actually have sweat glands and then the sweat perspiration on the skin, so when finger touches, we leave sweat. When we touch a hairy portion of the body, the 'oil' is also transferred on the surface leaving the ridge pattern-a fingerprint.



PRINCIPLE 3 : Fingerprints are classified.

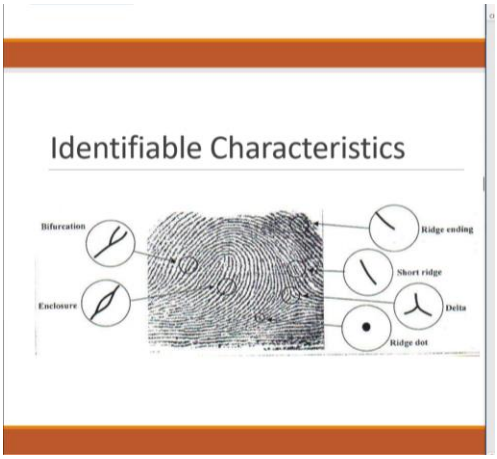
All fingerprints are divided into three classes on the basis of their general pattern: loops, arches, and whorls (L.A.W.)

1) Loops
2) Whorls
3) Arches

LOOP

➔ A loop enters from one side, loops around and exits from same side.
➔If the loop opens toward the little finger, it is called an ulnar loop.
➔If the loop opens toward the thumb, it is called a radial loop.

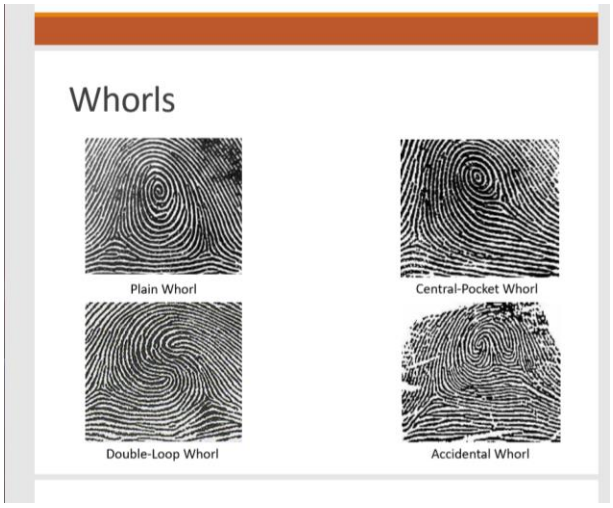
A single fingerprint can't say which loop it is.
All loops must have one delta, which is the ridge point at or directly in front of the point where two ridge lines (type lines) diverge.



So a loops, has a loop and a delta!

WHORLS :

1) Plain – one ridge
2) central pocket loop
3) double loop
4) accidental – not sure what that is

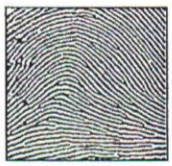


ARCHES :

1) Plain – enters from one side and goes high and exits other side
2) Tented – same as plain but with a sharp up thrust, like a 90 degree.

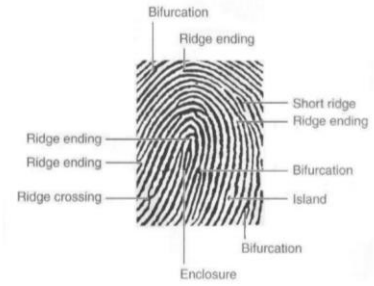
Arches

Plain Arch

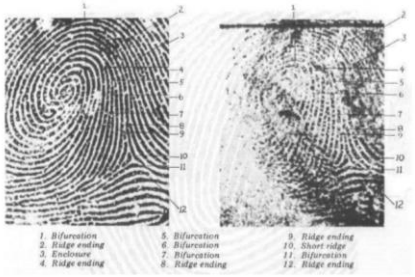


Tented Arch

Minutiae



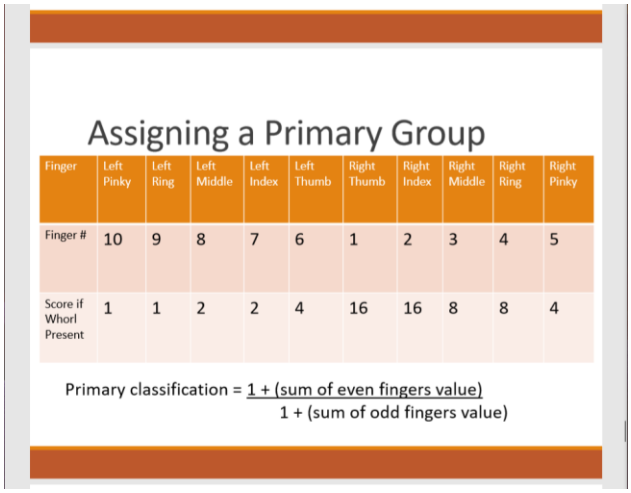
Police roll vs crime scene



How we identify is like, oh there is bifurcation on one in the roll and same way in the crime scene print. So matching the characteristics between the roll fingerprint and the crime scene one.

THE HENRY SYSTEM

➔Requires all 10 prints
Primary Classification
First, fingers are paired up, placing one finger in the numerator of a fraction and the other in the denominator.
The presence or absence of the whorl pattern is the basis for the determination of the primary classification.
➔If a whorl pattern is found on any finger of the first pair, it is assigned a value of 16; on the second pair, an 8; on the third pair, a 4; on the fourth pair, a 2; and on the last pair, a 1.
Any finger having a loop or arch is assigned a 0.



After values for all 10 fingers are obtained, they are totaled, and a 1 is added to both the numerator and denominator.
The fraction thus obtained is the primary classification.
Approximately 25 percent of the population falls into the 1/1 category; that is, all their fingers have either loops or arches.

A Henry fingerprint classification system can't identify an individual; it will merely provide the fingerprint examiner with a number of candidates, all of whom have an indistinguishable set of prints in the system's file

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AFIS

⇨ Ability of a computer to scan and digitally encode fingerprints so that they can be subject to high speed computer processing.

TYPES OF FINGERPRINTS

1) Exemplar – Deliberately Taken (i.e. ink print records taken)
2) Patent – Visible prints as a result of foreign transfer material like
3) Plastic – found on soft surfaces(impressions)
4) Latent – Not visible unaided eye

Visible Prints :

➔ made when fingers touch a surface after the ridges have been in contact with a colored material such as blood, paint, grease, or ink.

→Plastic prints are ridge impressions left on a soft material, such as putty, wax, soap, or dust.
➔Locating visible or plastic prints at the crime scene normally presents little problem to the investigator, because these prints are usually distinct and visible to the eye

Latent Prints :

➔Once the finger touches a surface, body perspiration and/or oils present on the finger ridges are transferred to that surface, leaving an impression.
➔Prints deposited in this manner are invisible to the eye and are commonly referred to as latent or invisible fingerprints

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Detecting Fingerprints :

➔ Latent : powder
➔ Print on porous surfaces-chemical