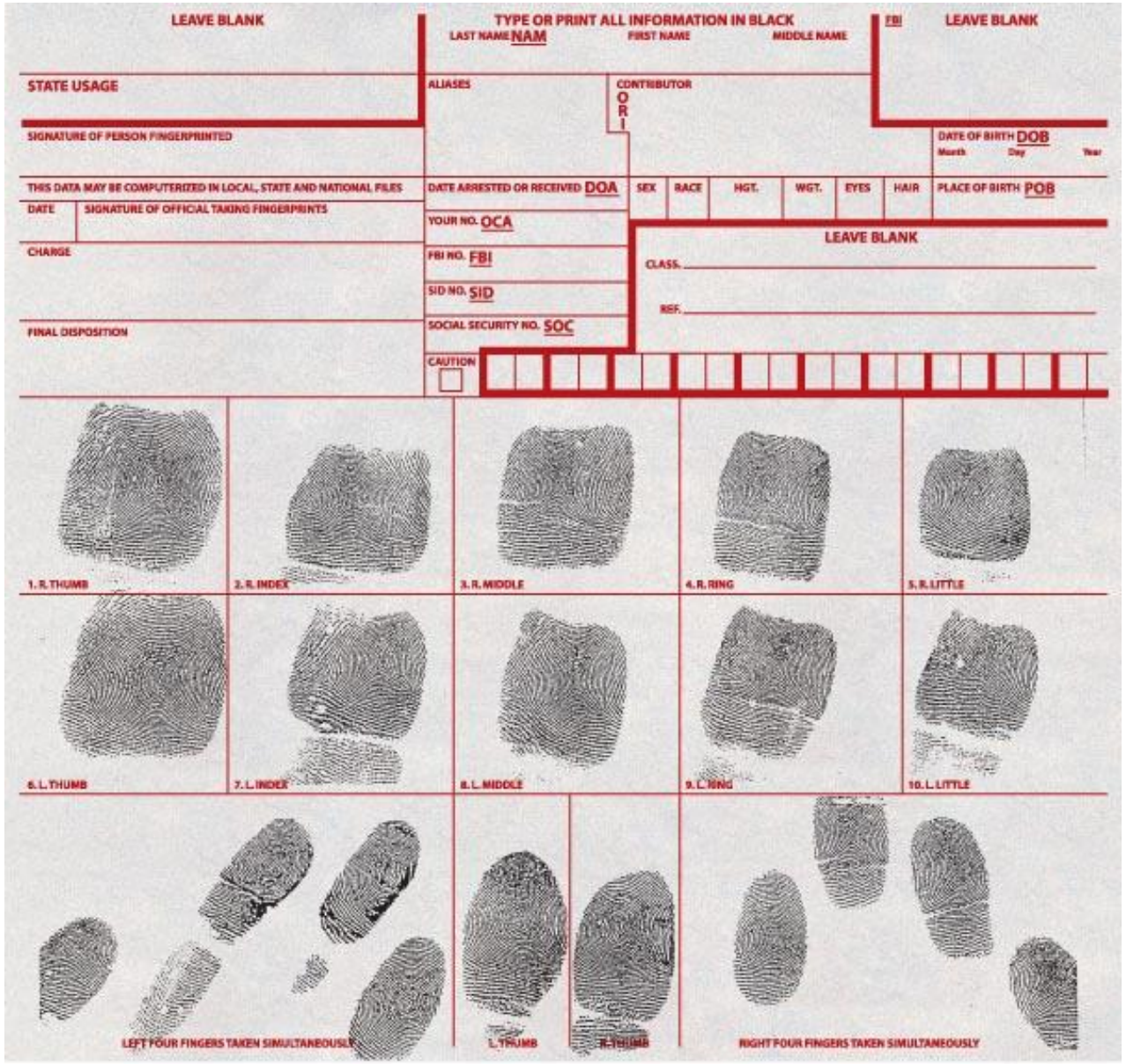
FINGERPRINTS

1. 3rd century(300) B.C. in China-oldest known documents
2. Ancient Babylon (1792-1750 B.C.)-fingerprints pressed into clay tablets marked contracts
3. 1684-Dr. Nehemiah's paper describes the patterns on human hands, including the presence of ridges
4. 1788-Johann Mayer noted that the arrangement of skin ridges is never duplicated in two persons

FINGERPRINTS

Impressions (of ridges) made by fingers, toes, feet, and palms

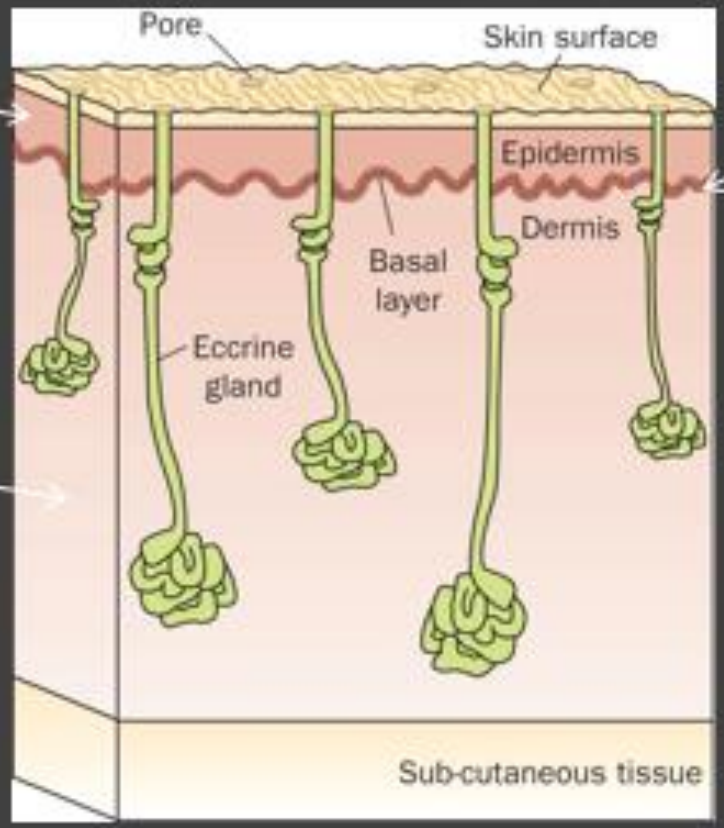
- Ridges help us grip objects
- Ridges are arranged in connected units called *dermal*, or *friction, ridges*
- Fingers accumulate natural secretions and dirt
- Fingers leave create prints on objects we touch



TEN CARD EXAMPLE

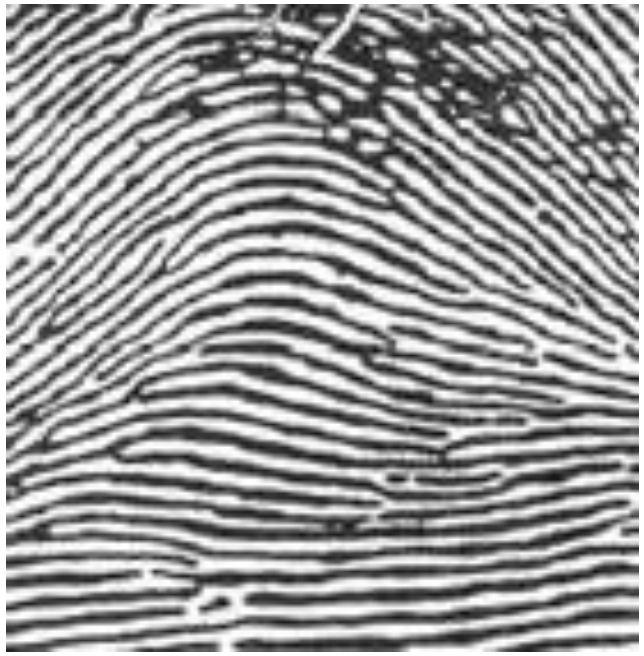
Outer layer - epidermis

Inner layer- dermis



Basal layer

- Basal layer grows faster than the layers above and below it
- Basal layer collapses and folds to form intricate shapes
- Fingerprints begin forming near the 10th week of pregnancy



ARCH

About 5%

WHORL

About 30%

of the population

LOOP

About 65%

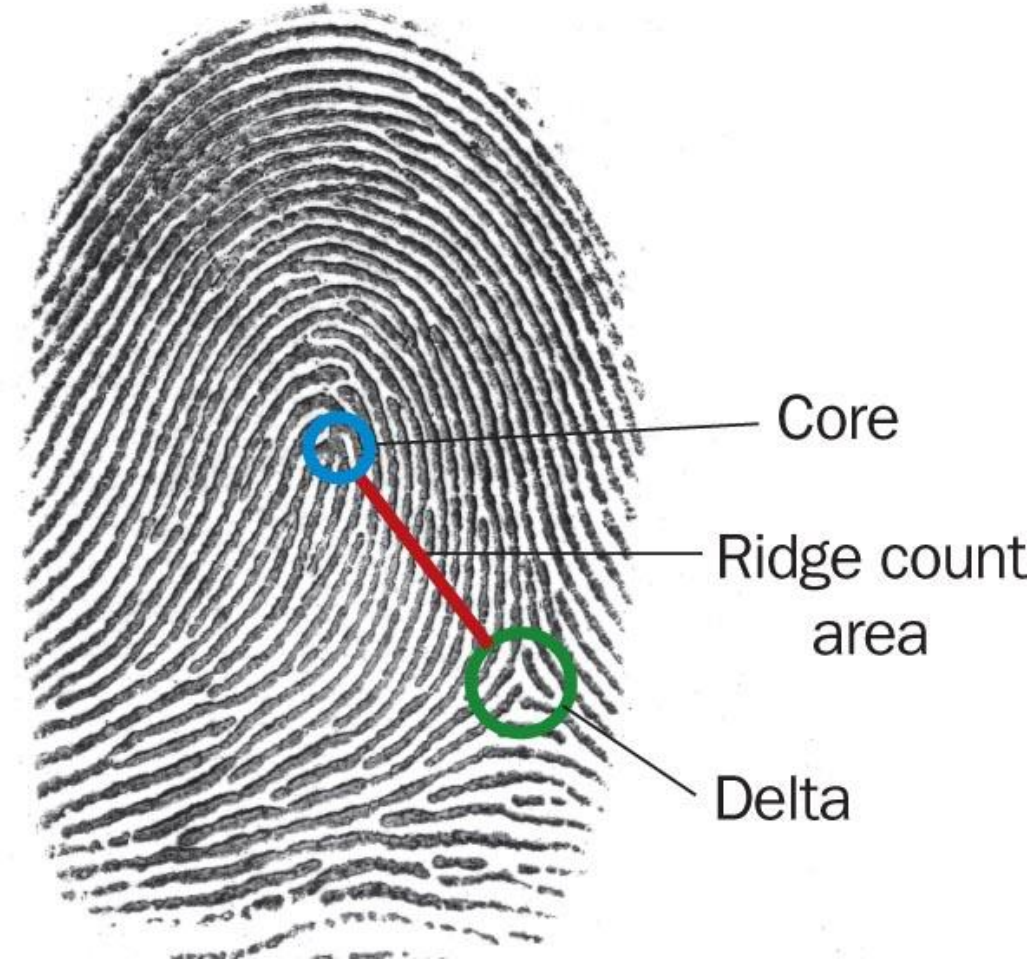
Forensic examiners look for

- **Core**
  (the center of a whorl or loop)
- **Deltas**
  (triangular regions near a loop)

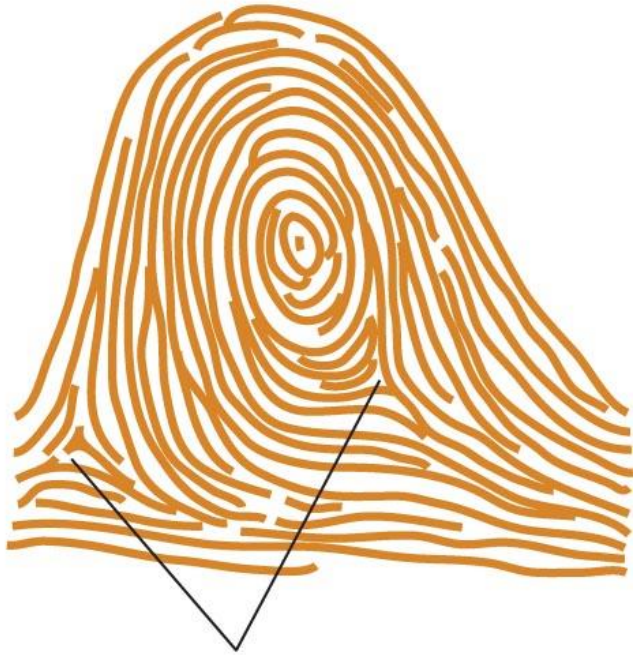
Ridge count

Counting from the core to the edge of the delta

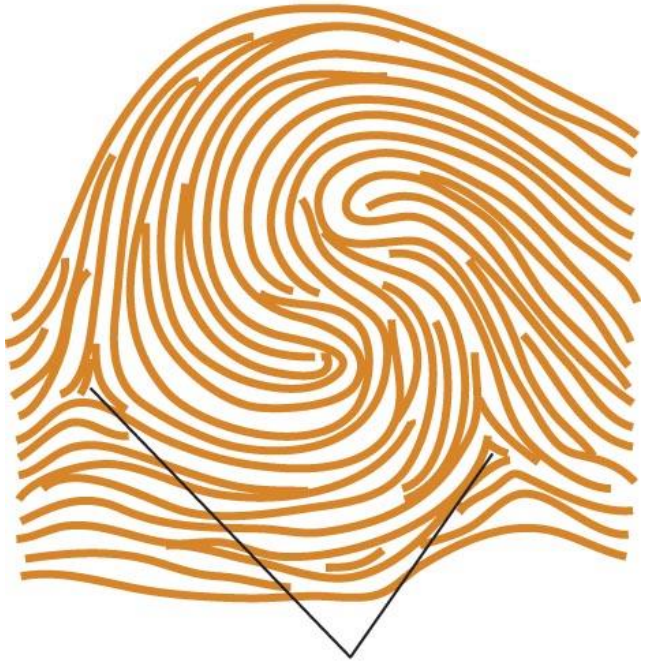
Distinguishes one fingerprint from another



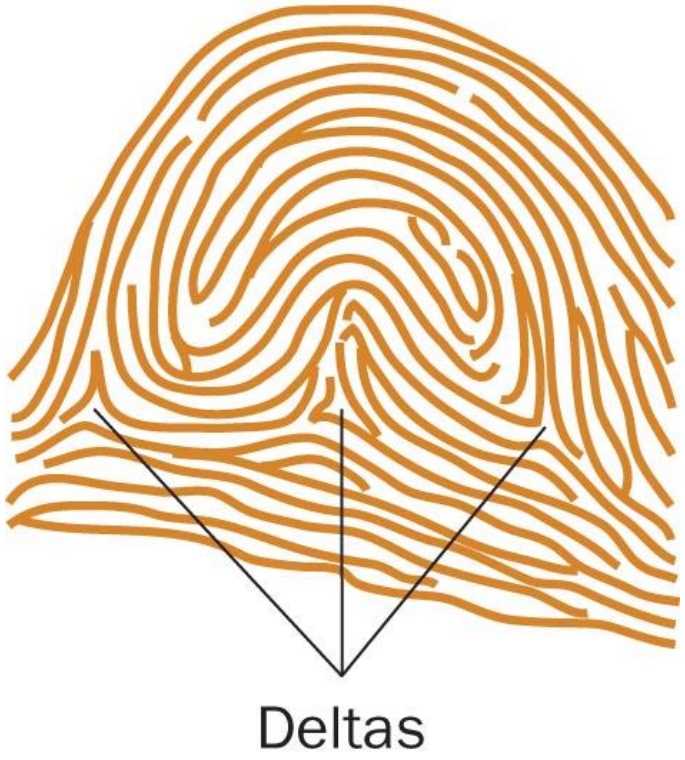
Central pocket loop whorl



Double loop whorl

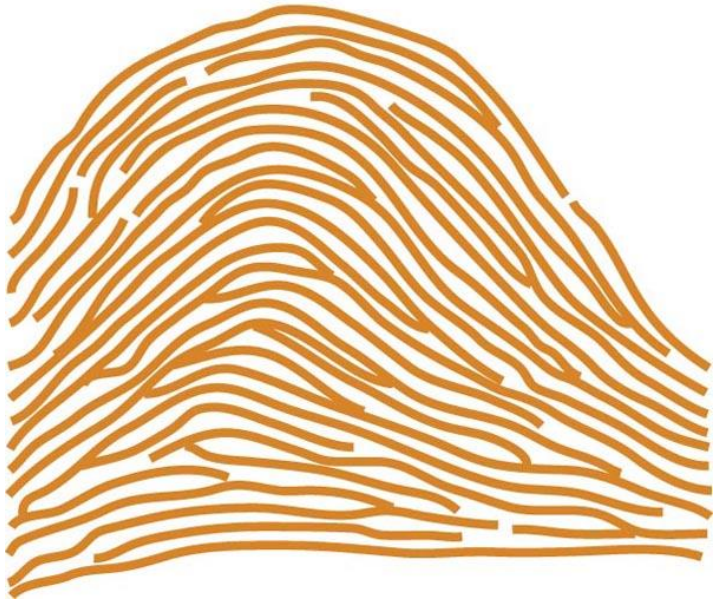


Accidental whorl

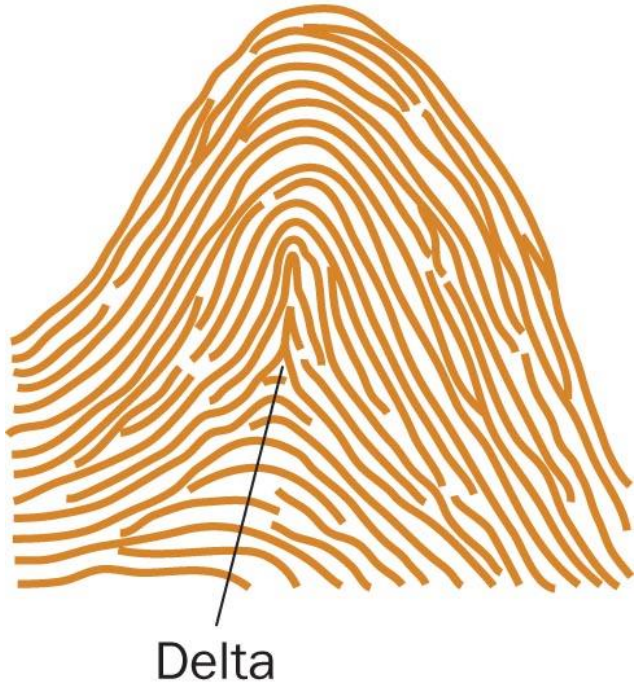


Whorl patterns:
2% central pocket
4% double loop
0.01% accidental

Plain arch



Tented arch



Arch patterns:
4% plain
1% tented

Name	Visual Appearance
1. Ending ridge (including broken ridge)	1. 
2. Fork (or bifurcation)	2. 
3. Island ridge (or short ridge)	3. 
4. Dot (of very short ridge)	4. 
5. Bridge	5. 
6. Spur (or hook)	6. 
7. Eye (enclosure or island)	7. 
8. Double bifurcation	8. 
9. Delta	9. 
10. Trifurcation	10. 

There are 3 types of prints that investigators look for at crime scenes:

1. **Patent fingerprints**–visible prints transferred onto smooth surfaces by blood or other liquids
2. **Plastic fingerprints**–indentations left in soft materials such as clay or wax
3. **Latent fingerprints**–made visible by dusting with powders or the use of chemicals

LATENT FINGERPRINTS

Chemical	Uses	Application	Latent Print
Ninhydrin	Paper	Object dipped or sprayed in Ninhydrin. Wait 24 hours.	**Purple-blue** print
Cyanoacrylate vapor	Household items: plastic, metal, glass, and skin	Heat sample in a vapor tent.	White print
Silver Nitrate	Wood Styrofoam	Object dipped or sprayed in Silver Nitrate.	**Black** or **reddish brown** print under UV light
Iodine Fuming	Paper Cardboard Unpainted surfaces	In a vapor tent, heat solid iodine crystals.	**Brownish** print (fades quickly) Must be photographed or sprayed with a solution of starch

Can fingerprints be erased?

Only temporarily; they will grow back if removed with chemicals

Is fingerprint identification reliable?

Yes, but analysts can make mistakes

Can computers perform matches in seconds?

No, but the FBI's Integrated Automated Fingerprint Identification System (IAFIS or AFIS) can provide a match in 2 hours