

## Fingerprints As Evidence

Presented by  
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### Reasons that most criminals are caught by the Police

- Sometimes it is because they make **stupid mistakes**
  - Using their own car or being recognized by a witness
  - Bragging to others and getting “snitched off”
  - Even dropping identification near the scene or caught with victim’s property on them
- Sometimes because the Police are in the right place at the right time (**getting lucky**)
- Usually it takes “**Good Old Fashioned Police Work**”
  - Simply using your head and processing the scene for physical evidence

### How do we get convictions?

- Confessions
- Witnesses
- Physical Evidence

Of these three, identify the least available to the most available at a typical crime scene such as a burglary, auto theft or even a assault?

### Does a scene still need to be processed for physical evidence if:

- A citizen (**witness**) observes and later identifies a juvenile suspect breaking into and entering a business across the street from her residence and
- Officers arrive to catch the suspect on the parking lot walking away from the business and
- After having the suspect in custody in the squad car, they get him to admit (**confession**) that he broke into the business

### Physical Evidence

- We have established how important physical evidence is to solving and prosecuting a case
- Locating evidence can be difficult, especially with fingerprints
- A flashlight and magnifying glass can be very helpful in conjunction with fingerprint powders
- Most important though is a willingness to make the effort to find the small pieces of evidence such as a partial fingerprint

### Let’s test your powers of observation Count the letter “F”s only

FINISHED FILES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERIENCE OF MANY YEARS

## HUMAN IDENTIFICATION



Branding or Maiming used to mark criminal



Memories of Police Officer or Mug Books



Measure Body Parts by Bertillon System

## Branding or Maiming



In earlier civilizations branding and even maiming were used to mark the criminal for what he was. The thief was deprived of the hand which committed the theft. The Romans employed the tattoo needle to identify and prevent desertion of mercenary soldiers. In some parts of the Arab world this is still practiced today.

## Memory or Photographic “Mug shots”



When communities and neighborhoods were small, law enforcement officers could recognize repeat offenders, or make a good guess when provided with a suspect's description. They knew who the criminals were in the neighborhood or on their “beat”.

Photography lessened the burden on memory but was not the answer to the criminal identification problems. After all, personal appearances change.

## The Bertillon System



Around 1870 a French anthropologist, Alphonse Bertillon, devised a system to measure and record the dimensions of certain bony parts of the body. These measurements were reduced to a formula which, theoretically, would apply only to one person and would not change during their adult life. This system was trusted for well over 30 years.

## Will and William West Case

Very similar in appearance and name, but not the same person



William West



William West



Will West



Will West

## Permanent and Unique

We use fingerprints as a means of positive human identification today because they are both **permanent** and **unique**. Criminals have tried to defeat the permanence of prints for years, such as these attempts from Hong Kong.



RIGHT FINGERPRINT  
RECORDED 1936

RIGHT FINGERPRINT  
RECORDED 1964

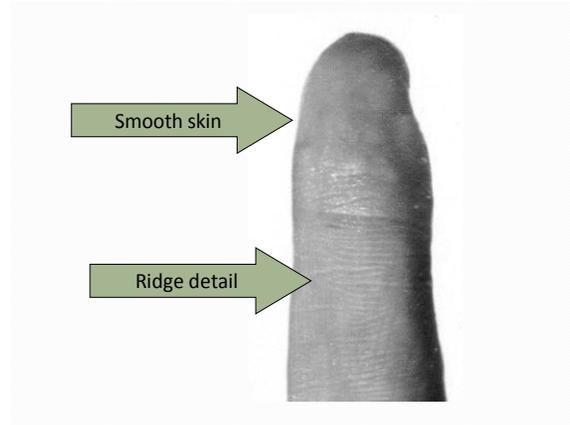


LEFT FINGERPRINT  
RECORDED 1938

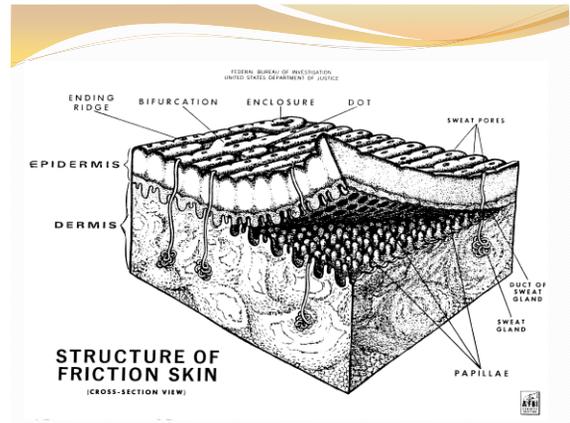
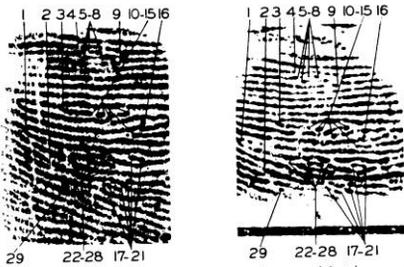
LEFT FINGERPRINT  
RECORDED 1938

## From before you are born, until long after you are dead.....

**Roscoe Pitts** was infamous for his attempt to defeat the permanence of fingerprints. He had all ten of his fingers sewn into slits on the side of his chest for two weeks to graft the smooth skin to his fingertips.

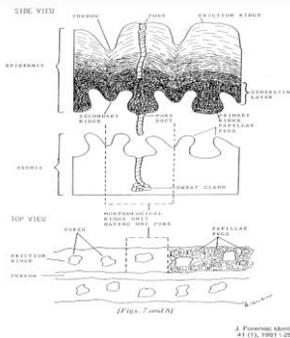


Even with the smooth skin grafted to his fingertips, Pitts was identified using the second joint



## Sweat, oils & other waste

Friction skin, located on our hands and feet, are the only places on the body with these ridges and without hair. The furrows are the low spots between the tops of the ridges. The tops of the ridges are lined with pores that constantly exude sweat.



## What are Latent Prints Made Of ?

The invisible material is made up of 98.5%

**WATER**

And 1.5%

**CHEMICALS**

## Can I See Latent Prints at the Crime Scene?

- The word “**Latent**” means hidden or invisible
- You usually are not able to see them until they are processed with powders or chemicals
- Telling someone that there is no chance for prints because you don’t see any is a mistake

## Where and How to Look for Latent Prints at a Crime Scene

- Talk to the complainant and make your own observations to determine the following:
  - The point of entry, the point of exit and the path taken between the two
  - The object of the attack, what was the suspect after, what objects are out of place or appear to have been handled or moved
- Start by looking for flat, smooth surfaces that are not covered in undisturbed dust. These types of surfaces provide the best chance for prints.

## Looking for the Invisible

- Latent prints can sometimes be made visible by shining a flashlight across a surface at an angle
- Try various angles from almost flat, up to perpendicular to the surface

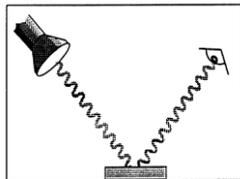


Figure 1

Remember, just because you don’t see any latents, doesn’t mean there aren’t any.

## There are Three Types of Prints Found At a Scene

- **Latent** prints are the **hidden** or invisible prints that must be processed by some means that will make them visible to the human eye
- **Patent** prints are the **visible** prints made in blood, grease, motor oil, etc, and **should** be photographed before attempting to recover.
- **Plastic** prints are those that we find **impressed** into something soft like putty, a bar of soap, or window glazing. They must be photographed and a cast made using some type of molding compound.

## How Can You Make a Latent Print Visible ?

- By changing the color of the latent print to something other than the color of the surface that it is on
- Remember to use the “**rule of contrast**”. Simply processing a dark colored surface with a light colored powder, or a light colored surface with a dark powder
- Chemicals can also be used
- We have to develop the print so that the human eye can see it

## Water or Chemicals Can Become Visible !

- The water from the sweat, or the oils from the glands allow powder and/or super glue fumes to stick to the latent prints, making them visible to the human eye.
- Chemicals can be used to develop latent impressions that are absorbed into paper, cardboard, untreated wood or cloth.
- Using specific chemicals can create contrast that the human eye can see.

## Powder sticks to moisture

This is an enlargement of a latent fingerprint developed with black fingerprint powder. The ridges have been made visible by the powder sticking to the moisture of the latent, then lifted with tape and placed onto a white lift card for maximum contrast. You can even see the pores!



## Working with the 1.5% Chemistry in the latent residue

### Sequence for Processing Porous Surfaces

- You can use multiple methods on porous surfaces, but they must always be done in the proper sequence, such as these common chemicals
  - **Magnetic powder** may work if impressions are fresh
  - **Iodine** (reacts with fats & lipids)
  - **Ninhydrin** (reacts with amino acids) or DFO
  - **Silver Nitrate** (reacts with salts) or Physical Developer
- Each reacts with different chemicals in the residue – you could develop different prints with each treatment!

## Two Basic Types of Surfaces

- First analyze what type of surface you are processing
  - **NON-POROUS** – Any surface that does not absorb moisture is a non-porous surface. Such things as glass, bottles, guns, aluminum cans, car doors and rearview mirrors.
  - **POROUS** – Surfaces such as paper, cardboard, untreated wood and cloth

## NON-POROUS SURFACES

- Most common of the two surfaces
- Don't handle without gloves on!
- Prints rest on top of the surface, so care must be taken when handling these items
- If you are not processing the item at the scene, package properly so you don't destroy the prints by wiping them away
- Avoid paper and plastic bags if possible
- Instead, use a cardboard box and secure the item
- If you or another officer inadvertently handled the item and possibly left your prints on it, document or let the latent examiner know

## POROUS SURFACES

- Again, do not handle without gloves on!
- Most porous items will need to be packaged and later processed with chemicals
- Items should be placed inside of a large envelope (don't fold item), paper bag or zip-lock bag and transported to a lab setting to be treated with chemicals that make the prints visible.
- If "handwriting" of evidentiary value is found on papers, the item should be examined by a Document Examiner before processing for prints since some chemical processing can cause the ink to run.

## Why are Latent Prints So Valuable?

- Totally unique to one individual.
- Easy to compare & identify – no special equipment or long processes needed as with most other forms of physical evidence such as DNA or trace.
- More "knowns" to search against than any other form of physical evidence.
- Simple methods can be used to recover them at a crime scene.
- They are accepted in court as positive identification.

## What Is A.F.I.S. ?

- **A**utomated
  - **F**ingerprint
  - **I**dentification
  - **S**ystem
- A.F.I.S. is a high speed sorting computer which tells the operator that instead of looking at every finger on every fingerprint card, look at specific fingers on specific cards for a possible match
  - This saves a huge amount of time
  - A.F.I.S. **Can Not** positively identify fingerprints, a qualified expert is needed

## Some other A.F.I.S. facts

- Local AFIS systems (those from individual police or sheriff's departments) may have a few thousand or a few hundred thousand fingerprint cards in their database.
- State AFIS systems may have several hundred thousand or even a million fingerprint cards available for searching.
- The F.B.I. has a huge database with millions of fingerprint cards on file.
- No other form of physical evidence has databases this large in hopes of finding a match.

## Elimination Prints Should Be Submitted Along with Latents!

L. Little	L. Ring	L. Middle	L. Index	L. Thumb
<b>COMPARISON AND ELIMINATION FINGERPRINT RECORD</b>				
R. Thumb	R. Index	R. Middle	R. Ring	R. Little

## Make sure the rear of the form is filled out with pertinent information

Fingerprints of persons who have a legitimate reason to have been around a crime scene are called "Elimination Prints."

Fingerprints found at a crime scene will be compared with these, and if they match, they may be "eliminated" from further consideration.

SUBJECT FINGERPRINTED: \_\_\_\_\_ D.O.B \_\_\_\_\_  
 CASE INFORMATION: \_\_\_\_\_  
 ADDRESS: \_\_\_\_\_ LATENT CASE # \_\_\_\_\_  
 INVESTIGATOR: \_\_\_\_\_ DATE: \_\_\_\_\_

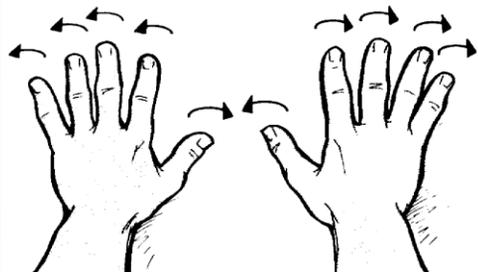
## Fully Roll Each Finger From Nail to Nail



Example of a properly rolled fingerprint

## Easiest Way to Roll

*Thumbs to the inside  
 Fingers to the outside*



## How much is enough?

It's nice to have a latent print with this much ridge detail, but you can identify a print with less. Most latent prints are **partial** prints.

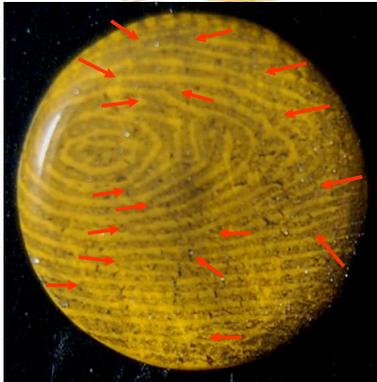


## Can these be identified?

Latent impressions on thumbtacks



Yes, 17 level two ridge characteristics are marked, and several others exist.



Process non-porous items from least destructive method to more destructive

- Visual examination
- Inherent fluorescence by laser or alternate light source (includes UV)
- Cyanoacrylate followed by dye stain or powder
- Powders
  - Magnetic is generally less destructive than conventional due to brush contact
- Always photograph developed latent impressions after each process

## Types of Fingerprint Powder

- **Conventional** – comes in various colors and usually applied with a fiberglass brush
- **Magnetic** – comes in various colors and is applied with a magnetic wand
- **Fluorescent** – comes in various colors, a feather brush works well for application, but a forensic light source (ALS) is needed to be used correctly
- **Bi-chromatic** – aka: Dual Use and Dual Contrast
  - A mixture of black and gray powders made in both conventional and magnetic types
  - Can be used on both light and dark surfaces

## Basic Dusting Equipment

- **Types of powder**
  - Black Conventional & White Conventional powders
  - Black Magnetic & White Magnetic powders
- **Fingerprint brushes & wands**
  - 1 fiberglass brush for each color of conventional powder
  - 1 Magnetic applicator (magnetic wand)
- **Lifting cards (Backer Cards)**
  - White standard & Black standard 3" x 5" lift cards
  - White palm & Black palm print 5" x 7" lift cards
- **Lifting tape**
  - 1 1/2" - 3M brand plastic lifting tape
  - 4" plastic or conventional palm print tape

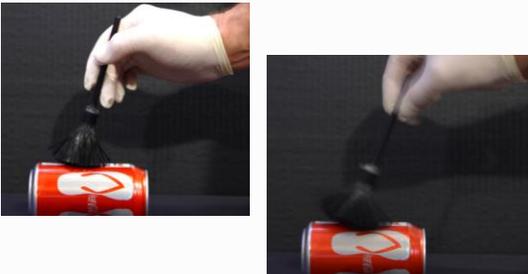
## When Dusting, Be Careful!

- Use a light touch and avoid excessive brush contact
- Use the tips of the brush, not the sides
- Over-brushing or the spinning/twirling method can easily fill in the furrows or even wipe portions away!
- Always keep an eye on the area for developing prints
- As prints appear, slow down and continue to process to increase the quality of the print
- If you start to fill in the spaces between the ridges or wipe the prints away, stop immediately!

## Break in New Brushes



## Sweeping motion can be less destructive than twirling or spinning the brush



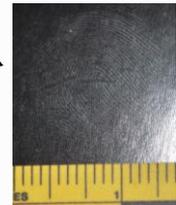
## Fluorescent Powders

- Fluorescent powders are good for “photographic purposes” on multi-colored backgrounds and textured surfaces that are difficult to lift from
- If fluorescent powders are used, the room should be darkened for best results
- An alternate light source (ALS) is needed to properly light the powder application/development
- If no ALS is used, the impression is easily over-powdered lowering it's quality
- If you use fluorescent powder, always photograph the impression prior to lifting using the ALS as the light source
- The impression will not be as easy to see on a lift card unless it's illuminated with the ALS

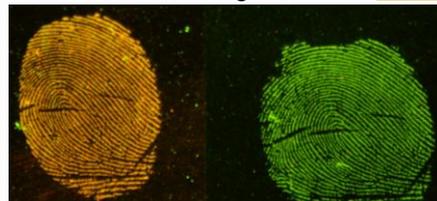
## Fluorescent Powders



Fluorescent Powder  
under white light



Fluorescent Powder  
under ALS light



## Textured Surfaces

Latent prints developed on textured surfaces with powder can be difficult to lift. Lifting with conventional tape will yield a lift similar to this. Notice the white spaces that break up the continuous ridge flow.

Instead, use a plastic tape, Diff-Lift tape, gel lifters, AccuTrans or even gel glue.



## AccuTrans



AccuTrans Regular Lift Tape



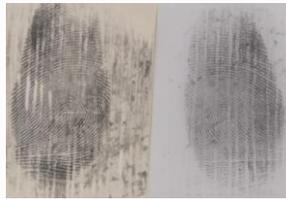
Notice how the lift is improved with continuous ridge flow



Gel Glue Roll 'N' Glue



Gel Lifter Diff-Lift



## Documentation of a Latent is Critical

Latent prints have to be positively identified to an individual and proved to have been developed on specific items of evidence to have value to your case.

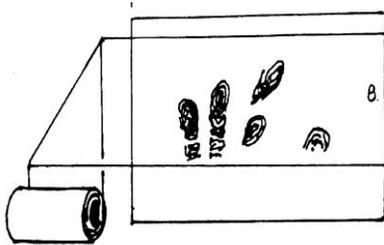
BACK OF LIFT CARD

Properly fill out the rear of the lift card to thoroughly document your lifts. Be detailed! Photographing the impression before lifting is recommended.

Date	Crime	Case No.	— Sketch and/or Remarks —
Victim			
Address of Incident:			
Location of Latent Prints Lifted			
Prints Lifted by:		ID No.	
<small>Lifting Power Company 1-800-832-0300</small>			

MOUNTING THE FINGERPRINT LIFT ON A CARD

Always lift simultaneous impressions as a group, with one piece of lifting tape when possible!



Any questions at this time?