

# LESSON 2-5: PRINT PATTERNS

## A LESSON ON IDENTIFICATION OF FINGERPRINTS

Since 1901, fingerprinting has been used as a method of positively identifying individuals. Because no two people have the same fingerprints, a good print can help solve a crime.

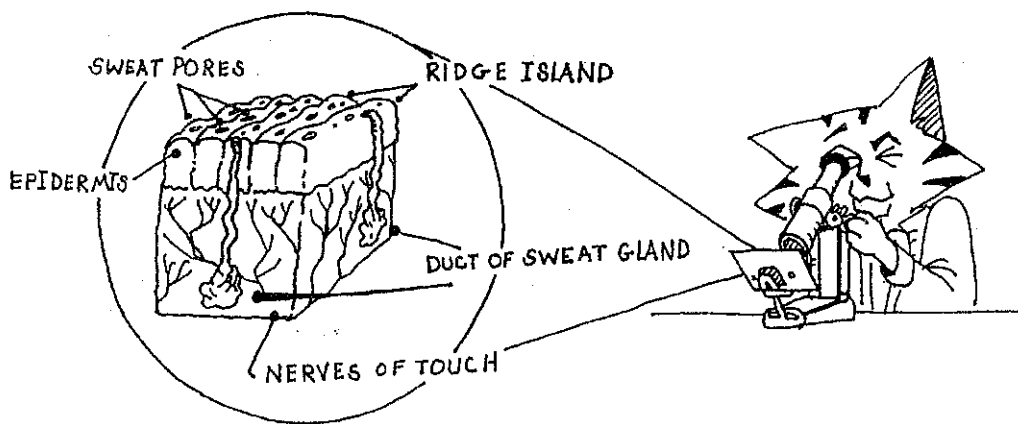
Fingerprints are impressions created by ridges on the skin. On the tips of fingers, palms of hands, and soles of feet, the skin has tiny ridges that provide traction to help us grip things. Everyone has a unique pattern of skin ridges. These ridges form before a baby is born, and maintain their pattern throughout life. As you grow, the pattern gets larger, but it does not change.

### *Skin Deep*

Skin is made of two distinct layers: the dermis and the epidermis. The dermis, which is the deepest layer, contains sweat glands, oil glands, nerves, and blood vessels. Above the dermis, the epidermis is made of several layers of cells that are arranged along ridge patterns. The outer-most cells of the epidermis are dead and they generally dry out and fall off.

### *Lots of Latents*

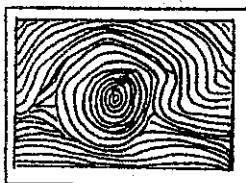
When a person touches an object, the perspiration, oils, and amino acids on his or her skin are transferred to that object. Sometimes an impression of the ridge pattern is left in the deposit. This impression is called a *fingerprint*. Such prints are usually not visible to the naked eye, so they are called *latent*, or hidden, prints.



## Do You Loop, Whorl, or Arch?

Fingerprints have general patterns of ridges that allow them to be classified and compared. All fingerprints are divided into three large groups, based on their ridge pattern:

- a. loops are found in 65% of the population      b. whorls are found in 35% of the population      c. arches are found in 5% of the population



## Save the Prints

Latent fingerprints at a crime scene must be located and preserved. There are two basic techniques for finding fingerprints: dusting and chemically fixing.

- ◆ Hard surfaces such as glass and tile yield prints when lightly dusted with powder. Fingerprint powders come in a variety of colors so that the investigator can always apply one that will contrast with the surface holding the print. The powders can be brushed in place with either a camel-hair or fiberglass brush.
- ◆ Chemicals can be used to help find fingerprints on many types of smooth surfaces. Iodine was the first chemical used by investigators to develop fingerprints. When solid iodine is heated, it produces a purple vapor that interacts with a component of the fingerprint to reveal a print. The print begins to fade as soon as iodine fuming stops. To preserve it, the print can be photographed. Or, it can be sprayed with starch to create a purple print that will last several weeks or months.

Another chemical used to visualize fingerprints is ninhydrin. Ninhydrin reacts with amino acids in the print to form a blue-purple color. Most prints are visible within two to four hours after spraying with ninhydrin.

Silver nitrate makes prints on many surfaces visible. Some of the residue in a print is salt, or sodium chloride. The chloride ion of salt will react with silver nitrate to produce silver chloride. Silver chloride is colorless, but can be seen with an ultraviolet light as a black or reddish-brown color.

Super Glue<sup>®</sup> fuming produces good prints on nonporous surfaces such as metal, leather, and plastic. In this technique, Super Glue<sup>®</sup> is heated in an enclosed area that contains the evidence in question. Prints appear in an off-white shade.