

Classification of Footprints*

Human infants are born with indelible stamps of individuality imprinted as ridge formations on their fingers and palms. Likewise, individual ridge formations appear on their toes and feet. Although infants change, develop into adults, and grow old, their individual fingerprint and footprint ridge formations, which they have on bulbs of fingers and toes and on palms of hands and soles of feet, remain immutable and fixed.

The peculiar adaptability of fingerprints has enabled law enforcement agencies to combat crime and broaden the scope of other identification services such as determining the identity of unknown deceased, missing persons, and amnesia victims. Footprints, like fingerprints and palm prints, may also be used for classification in identification matters. Wentworth and Wilder set forth a classification system of footprints in their publication "Personal Identification." The FBI, as noted in this article, has modified that system of classification. While fingerprints are generally accepted as the chief infallible means of identification, the bulbs of the toes and the soles of the feet should not be disregarded.

*An article on this subject first appeared in the September 1948 issue of the Bulletin. Because of its basic value in crime detection and public service, the article has been revised and brought up to date.

their staples flowing or tending to flow toward the great toe side of the foot are designated as Lb and Lc. The Lb type is always used for the right foot classification. The Lc type is always used for the left foot classification. Figures 5 and 6 are typical examples of the Lb and Lc types, respectively.

Type Ld: Loops which have their

staples flowing or tending to flow downward toward the heel of the foot are designated as Ld. Figure 7 is a typical example of the Ld type.

Location of Core in the L Group

Because of the intricacies and varied combinations of ridge details

in the core of loops in footprints, the location of the core was simplified. The core of the L Group in footprints is always placed on top of the innermost recurving ridge as in figures 8 and 9. The technical rules for sufficient recurves and appendages in fingerprint classification also apply to footprint classification.



Figure 6.

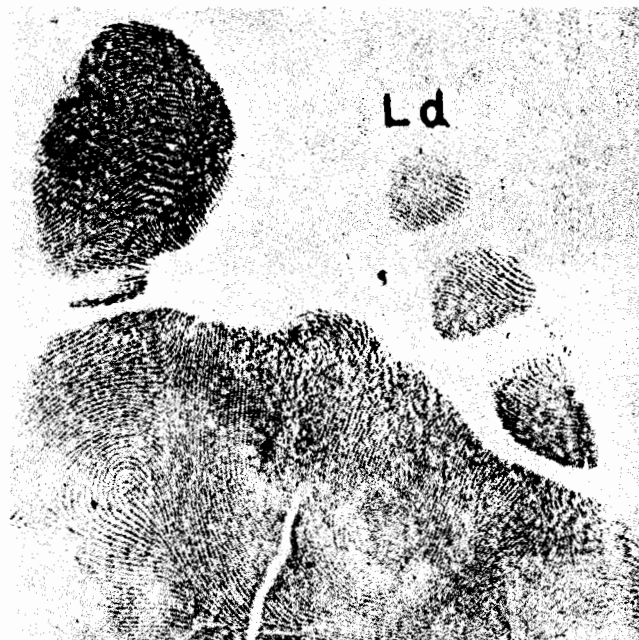


Figure 7.

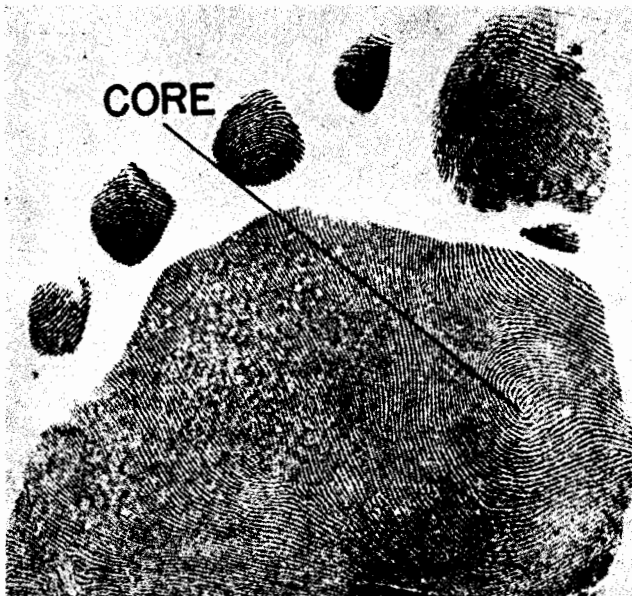


Figure 8.

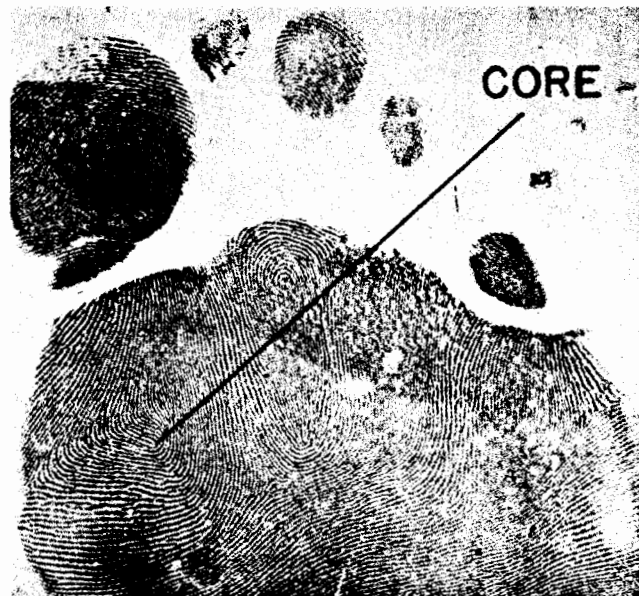


Figure 9.

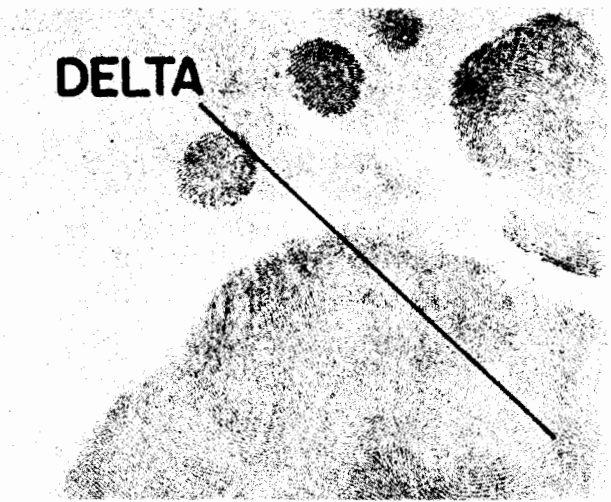


Figure 10.

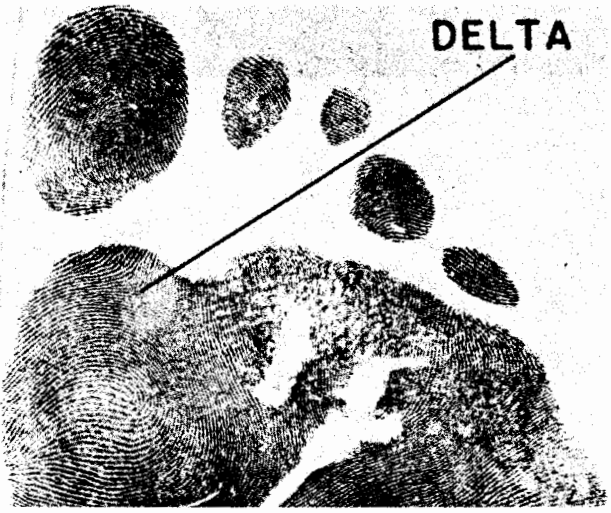


Figure 11.

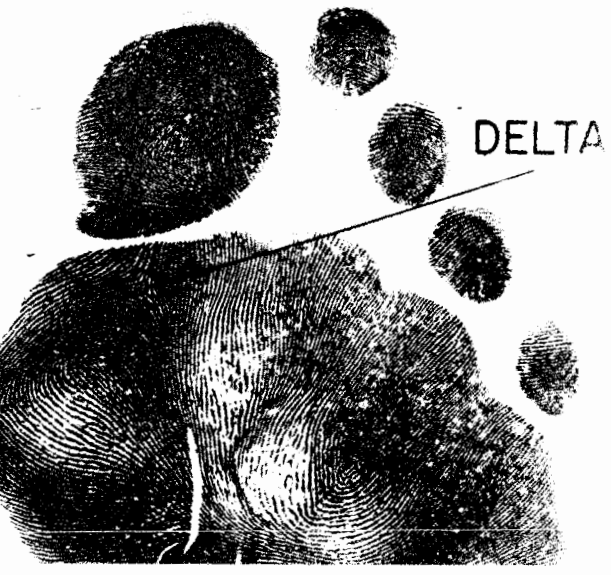


Figure 12.

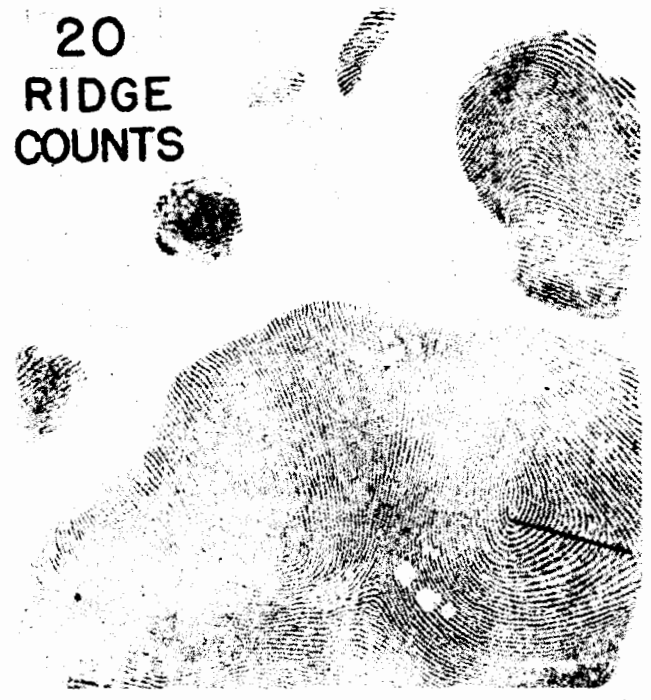


Figure 13.

Location of Delta in the L Group

The rules for location of deltas in fingerprint classification also apply to footprint classification. Inasmuch as more than one delta may be present in the L Group in footprints, the selection of the delta is determined as follows: In the La type the delta on the great toe side of the foot is used as shown in figure 10. In the Lb, Lc, and Ld types the delta directly below the great toe is used as shown in figures 11 and 12.

As previously pointed out, the location of the core of the L Group has been changed from the location in fingerprint classification. The ridge counting of footprints is the same as the ridge counting of fingerprints; that is, all ridges intervening between delta and core are known as the ridge count. Figure 13 shows the location of the two focal points, and the ridge count is obtained by counting the ridges intervening. Neither delta nor core is counted.

W Group

The general classification of whorls is designated W. The W Group is further classified into three types: w, d, and x as follows:

Type Ww: The plain whorl and central-pocket loop-type whorl, as defined in fingerprint classification, make up the Ww type of footprints, an example of which is shown in Figure 14.

Type Wd: The double loop whorl is designated as Wd and is shown in Figure 15.

Type Wx: Accidental whorls designated as Wx include those types of patterns which do not conform to any of the other definitions as found in "The Science of Fingerprints."

Ridge Counting for the W Group

A necessary part of the classifica-

"In some instances, it may become necessary to use footprints for identification, particularly where all fingers or hands are missing because of accidents or other reasons."

tion formula is the ridge count for patterns in the W Group. The procedure for counting whorls is exactly the same as for loops. In this connection the proper delta and the core must be determined. The delta of all types of the W Group is located directly below the great toe as shown in figures 16 and 17.

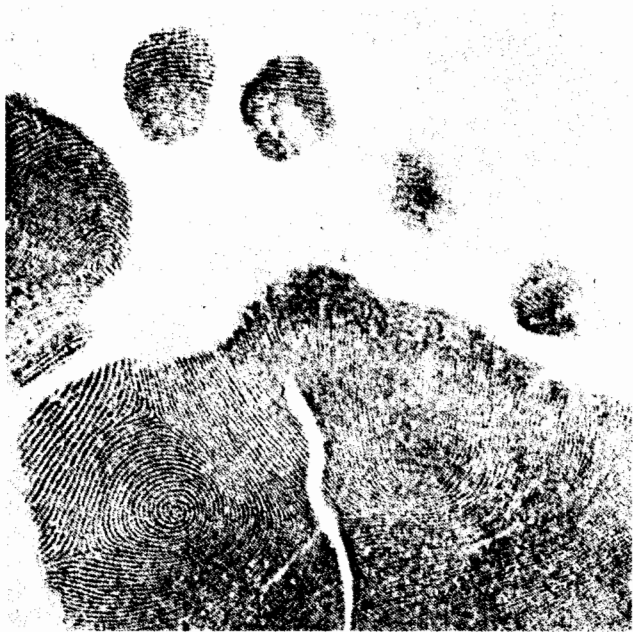


Figure 14.



Figure 15.

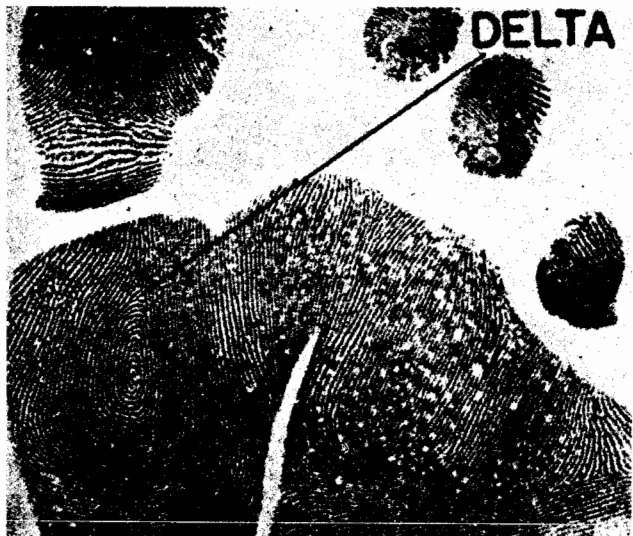


Figure 16.

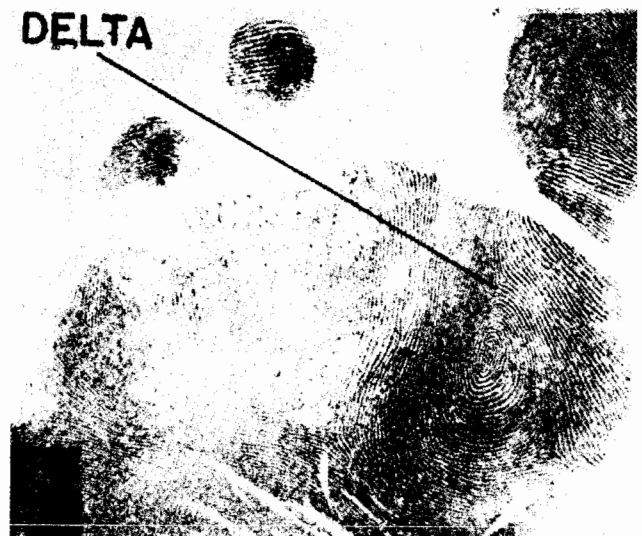


Figure 17.

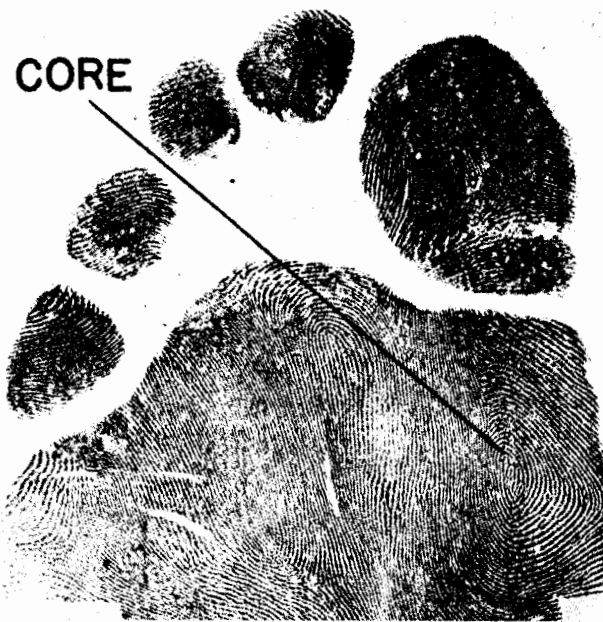


Figure 18.

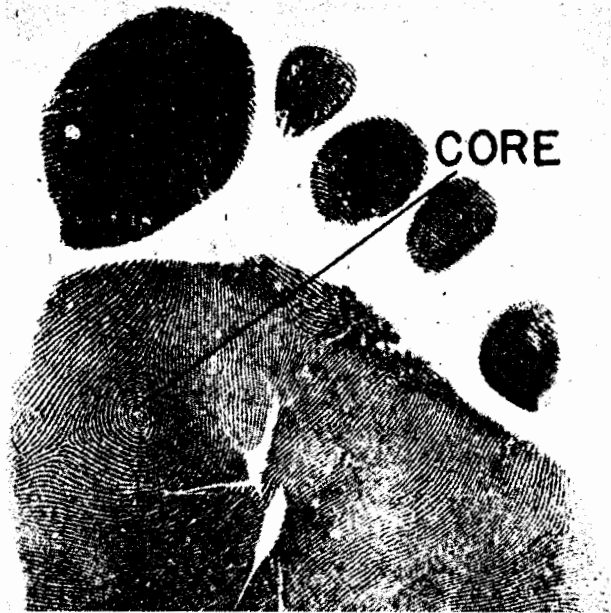


Figure 19.

Location of Core in the W Group

The core of the Ww type is located on the innermost recurring ridge on the delta side as shown in figures 18, 19, and 20. The Wd type is counted from the delta to the core of the upright loop, figure 21. Where the loops of a double loop are horizontal, the nearer core to the delta is used. The

Wx type of whorl may have two or more cores; the ridge count of this type is made to the core that has the least number of ridges intervening from the delta.

Classification Formula

The numerator portion of the classification formula of footprints is

always the pattern group and its sub-classifications of the right foot; the denominator portion is the pattern group and its sub-classifications of the left foot.

Primary

The symbols O, L, and W represent the patterns on the ball pattern areas

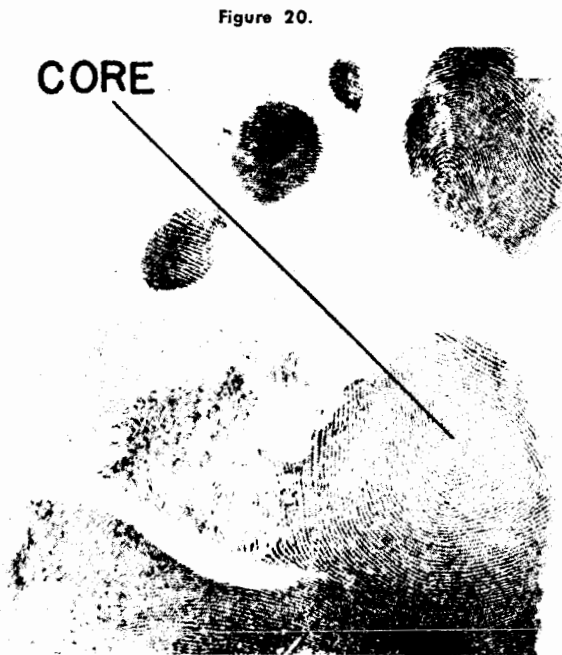


Figure 20.

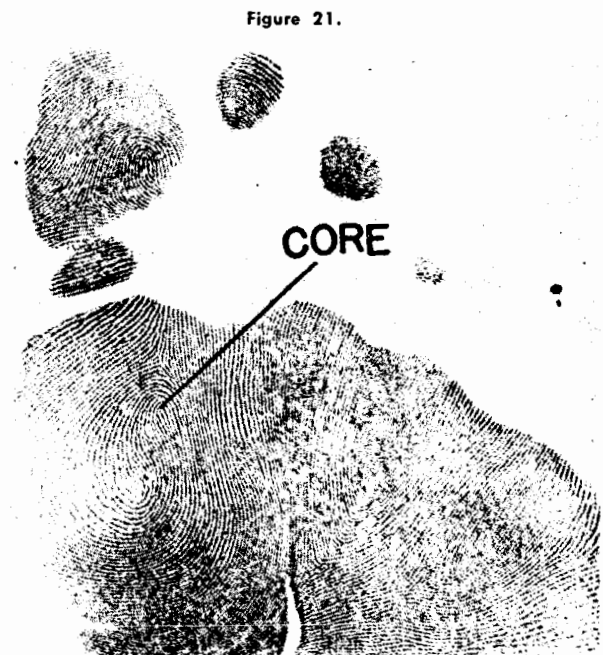


Figure 21.

and are considered in the primary classification. They are always written in capital letters.

O L W etc.
O O O

Secondary

The secondary classification is obtained by using the various types of the O, L, and W. The secondary or group type is always placed to the right of the primary, the right foot classification over the left foot classification.

O1 Ww Wd etc.
La Lc Ld

Final

The ridge count of the L or W appearing on the right foot is the final classification. It is placed to the right of the primary and secondary classifications as part of the numerator.

La 32 Ww 25
La Ww

Key

The ridge count of the L or W appearing on the left foot is the key classification. It is placed to the left of the primary classification as part of the denominator.

Lb 32 Ww 25
25 Lc 38 Ww

The complete classification would be as follows:

Key	Primary	Secondary	Final
	La	42	
26	Wd		

Filing Footprints

It is important that the footprints should be filed properly by classification formula. The first separation in

the sequencing of the footprints is by the primary classification. The O is followed by L and then the W. The complete sequence by primary is as follows:

O L W O L W O L W
O O O L L L W W W

Within each primary classification they are further sequenced by the

secondary and by final and key if present.

The complete sequence of the denominator including primary and secondary is O1, O2, La, Lc, Ld, Ww, Wd, and Wx.

The complete sequence of the numerator is O1, O2, La, Lb, Ld, Ww, Wd, and Wx. For each of the primary



Figure 22.

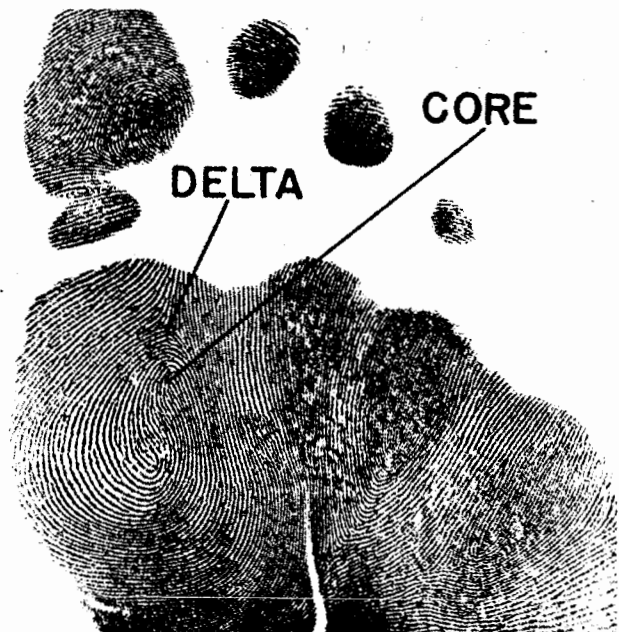


Figure 23.

and secondary classifications in the denominator, the sequence of the numerator is completely exhausted before continuing with the next sequence of the denominator.

When the sequence of the primary and secondary classifications is as follows:

There will be no final or key:

O1 O2 O1 O2
O1 O1 O2 O2

These will have only a final:

La Lb Ld
O1 O1 O1
Ww Wd Wx
O1 O1 O1

La Lb Ld
O2 O2 O2
Ww Wd Wx
O2 O2 O2

These will have only a key:

O1 O2 O1 O2
La La Ww Ww
O1 O2 O1 O2
Lc Lc Wd Wd
O1 O2 O1 O2
Ld Ld Wx Wx

These will have a final and key:

La	Lb	Ld	La	Lb	Ld
La	La	La	Ww	Ww	Ww
Ww	Wd	Wx	Ww	Wd	Wx
La	La	La	Ww	Ww	Ww
La	Lb	Ld	La	Lb	Ld
Lc	Lc	Lc	Wd	Wd	Wd
Ww	Wd	Wx	Ww	Wd	Wx
Lc	Lc	Lc	Wd	Wd	Wd
La	Lb	Ld	La	Lb	Ld
Ld	Ld	Ld	Wx	Wx	Wx
Ww	Wd	Wx	Ww	Wd	Wx
Ld	Ld	Ld	Wx	Wx	Wx

Within each primary and secondary classification, the prints are filed numerically by final; within the same final the key is sequenced numerically.

La 31 precedes
28 La

La 31
32 La

The above outline is a simple system for the classification of footprints; it is for general information of identification officers.

It is realized that further subdivisions can be made. In this connection the whorls can be further classified as to the formations of the core, namely, spirals to the left, spirals to the right, circular, oblong, etc., and other various subdivisions.

Figures 22, 23, 24, and 25 are examples of fully classified footprints.

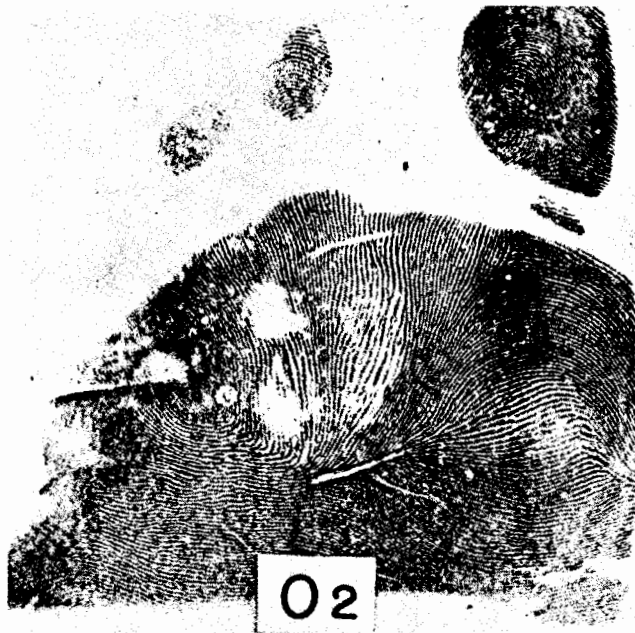


Figure 24.

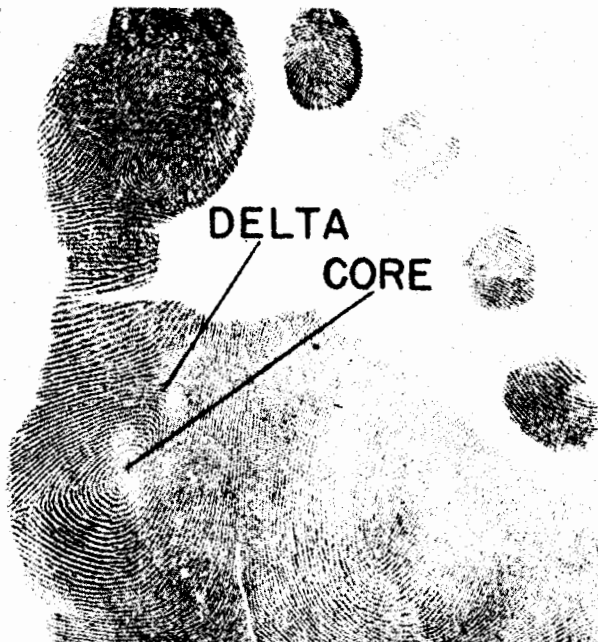
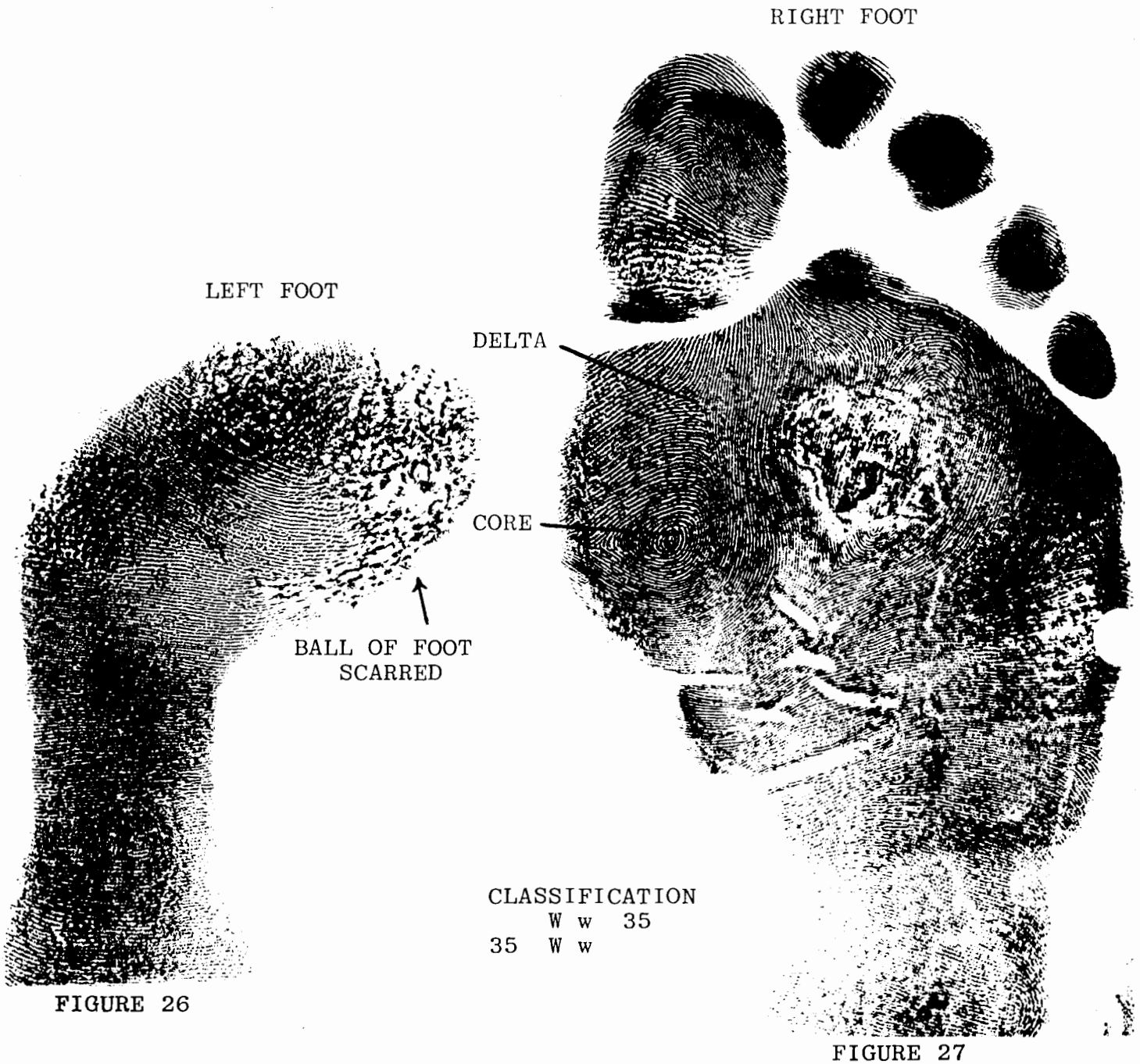


Figure 25.

CLASSIFICATION OF SCARRED FOOTPRINTS



The classification of completely scarred or obliterated footprints is handled very much in the same manner as for fingerprints. Figure 26 reveals a badly scarred ball area on the left foot. The scarification is so severe that it is impossible to classify this print with any degree of certainty. Therefore, the classification of the opposite footprint, Figure 27, is arbitrarily applied as the classification for the left footprint also. The footprint in Figure 27 is classified as a 35 count plain whorl.

In the event both footprints show complete scarification in the area which must be classified, Figure 28, or one foot missing which is opposite a footprint scarred in this manner, it shall be necessary to assign the arbitrary classification of a plain whorl with a ridge count of 1. The classification would appear as

W w 1
1 W w in this case.

RIGHT FOOT

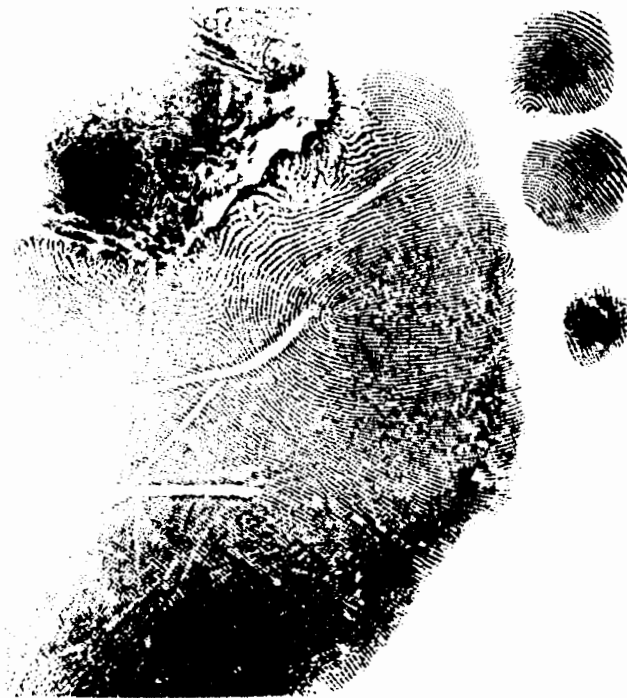


FIGURE 28