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FINGERPRINT ON THE VENUS OF DOLNÍ VĚSTONICE I

ABSTRACT: *The Venus of Dolní Věstonice I (Gravettian, 25,000 B.P.) was discovered on July 13th, 1925 in Dolní Věstonice, South Moravia (Czechoslovakia), during Moravian Museum excavations. The figurine, made from fired clay, about 11.5 cm high, represents a woman with a plump figure. More than 75 years after its discovery, a fingerprint on the left side of the figurine back was analyzed. The dimensions of the fingerprint are 3×5 mm and it is possible to recognize seven lines. The structure was identified as a negative of human friction skin based on the minutiae, ridge breadth, and other markers. Epidermal ridge breadth correlates with the age during growth period of an individual. We elaborated the original method for age estimation from fingerprint ridge breadth and used it to estimate the age of the fingerprint owner. The ridge breadth varies from 0.34 to 0.43 mm with an average of 0.37 mm. The estimation of age is 11.13 years. With respect to the preciseness and limits of the method the age of the fingerprint maker was somewhere between 7 and 15 years. This estimation is valid if the age/ridge breadth relation in the Paleolithic was similar to the present day one. It is also important to realize that the maker of the fingerprint may not be identical with the creator of the artifact. It is quite hard to believe that such a figurine as the Venus of Dolní Věstonice I could have been a work of beginner or even of a child. However, this approach has great potential to specify social circumstances of ceramics production.*

KEY WORDS: *Fingerprint – Venus of Dolní Věstonice I – Gravettian – Epidermal ridge breadth – Age estimation*

INTRODUCTION

The Venus of Dolní Věstonice I (*Figure 1*) was discovered on the 13th of July 1925 in Dolní Věstonice (*Figure 2*), South Moravia (Czechoslovakia) during the Moravian Museum's excavation directed by Professor Karel Absolon. It is a figurine made of fired clay, about 11.5 cm high, representing a curvaceous female form. The figurine was found in the central fireplace in the upper part of the Dolní Věstonice (locality of DV I) settlement. It was discovered split in two unequal pieces, resting about 10 cm apart (Absolon 1938, 1939, 1945, 1949). The figurine has been dated as Upper-Paleolithic of Gravettian Culture, whose peak period was between 27 and 24 thousand years ago. The Věstonice Venus became world famous because of the exceptionality of the used material (world's oldest ceramics, first ceramics ever!) and its typological uniqueness (*Figure 3*).

In summer 2000 there was an article by Dr. Slavomír Brodesser in the daily newspaper *Mladá fronta DNES* dedicated to the 75th anniversary of the discovery of the Věstonice Venus (Brodesser 2000). The author cited one of the discoverers, technician Emanuel Dania, who mentioned the "obvious dactyloscopic imprint at the spine, where the ancient artist left a fingerprint before the firing" (Dania 1962). We have been researching fingerprints on ceramic materials for some time, and we considered ourselves competent to verify the newspaper's information, and to analyze this feature with the help of the original methodology developed by Králík (2000), with a systems approach (Novotný 1991), and to add to this prior research on Gravettian art (Oliva 1997). The fingerprint is interesting because it had not yet been described in any relevant literature. As far as we know, the fingerprint was neither mentioned by Karel Absolon, nor appeared in any



FIGURE 1. The Venus of Dolní Věstonice I, immediately after discovery (1925, Archive of Moravian Museum).



work analyzing Upper Paleolithic ceramic fragments or figurines. Yet the fingerprint is on the surface of one of the most famous archaeological finds in Moravia, one that was discovered more than 75 years ago.

As a part of the Moravian Museum's research, the Věstonice Venus was screened and an analysis of the images was conducted from the paleodermatoglyphic perspective.

(N.B. Paleodermatoglyphics is the study of fingerprints, palm-prints or footprints – so-called papillary terrain or friction skin – on prehistoric objects, mostly ceramics, with the hope of gaining some biological or other characteristics of the people who made the prints. Bartsocas 1982).

METHODS

Because the figurine is priceless, it can only be studied by nondestructive methods. For scanning we used macrophotography (a Praktica B100 electronic camera with macro, Olympus SZH 10 stereoscopic microscope with an Olympus zoom and a Kodak DS 260 digital camera). Lighting was provided by a halogen lamp and pointed source of light from a microscope. Calibration of the images was provided by square of calibrated paper. The area of the fingerprint was screened in several enlargements (3–30×), with different directions and angles of descending light. We photographed the Věstonice Venus in its original case, sometimes adjusting its posture by inserting mustard seeds in an appropriate container.

DESCRIPTION AND TRASEOLOGY

The original surface of the figurine was polished; the present surface is complex, with many irregularities, traction lines, scratches and unstuck places. Although there are many structures that resemble epidermal ridges, only one of them is positive. At the back of the figurine, there is a compilation/sequence of several parallel lines, which truly suggest a print of epidermal ridges (*Figure 4*). From the paleodermatoglyphic perspective it is a fragmentary



FIGURE 2. Locality of Dolní Věstonice I (Gravettian 27,000–24,000 years ago).



FIGURE 3. The Venus of Dolní Věstonice I (2001).

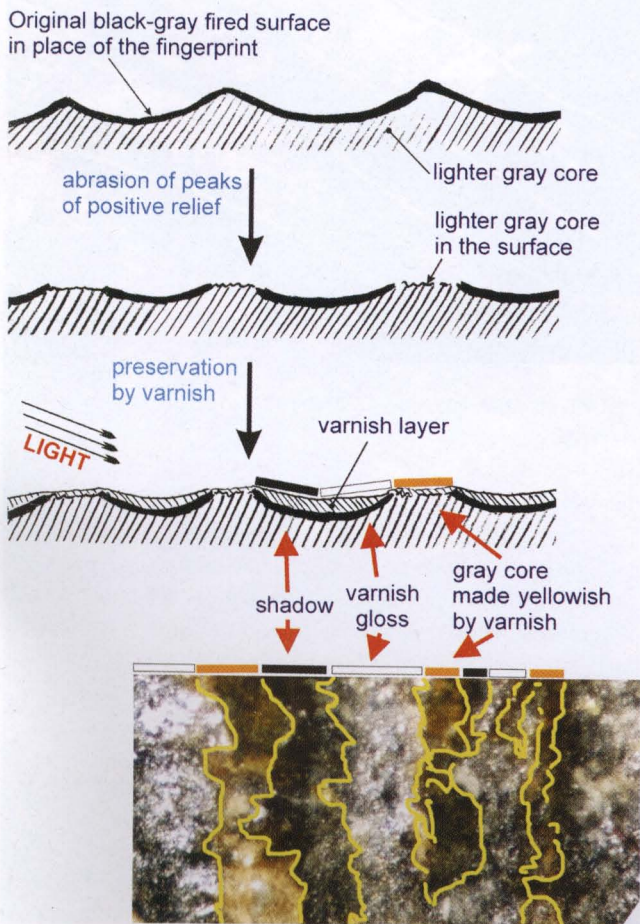


FIGURE 5. Schematic analysis of the figurine's surface within the area of the fingerprint.

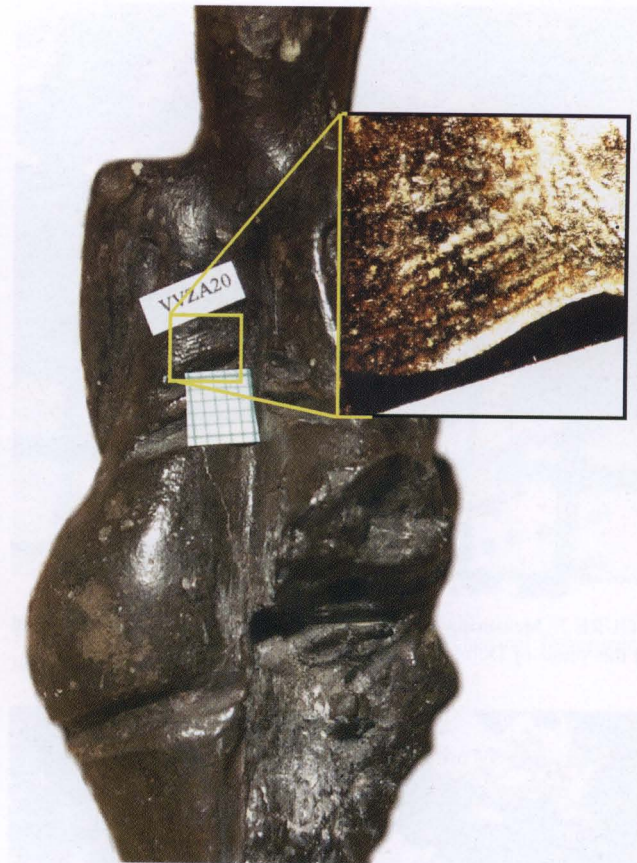


FIGURE 4. Back view of the Věstonice Venus with marked area of the fingerprint and the fingerprint in detail.

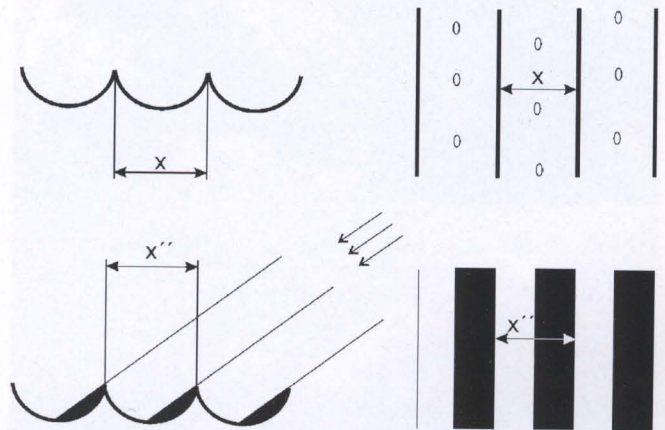


FIGURE 6. Scheme of the epidermal ridge breadth definition on an original friction skin (above) and on a plastic fingerprint on ceramic (below); in projection (right) and in section (left).

fingerprint, which, because of the small size of the impression, is at the edge of identifiability. The fingerprint is located on the left side of the figurine's back, immediately above the upper diagonal crease, where the dermal ridges of the fingerprint are almost parallel with this crease. The dimensions of the fingerprint are 3x5 mm and it is possible to recognize seven lines.

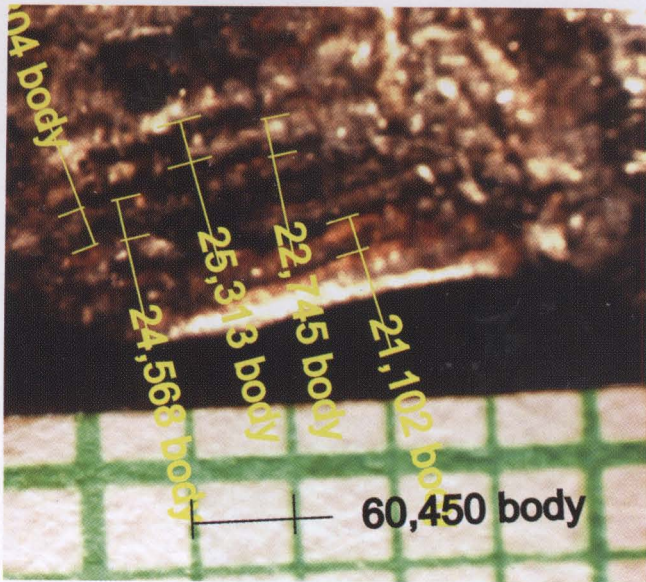


FIGURE 7. Measuring of the epidermal ridge breadth of the fingerprint on the Venus of Dolní Věstonice.

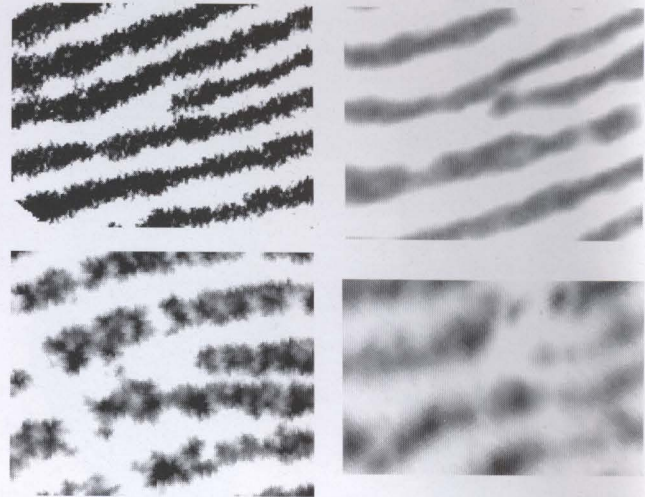


FIGURE 8. Four examples of *minutiae* in recent fingerprints.

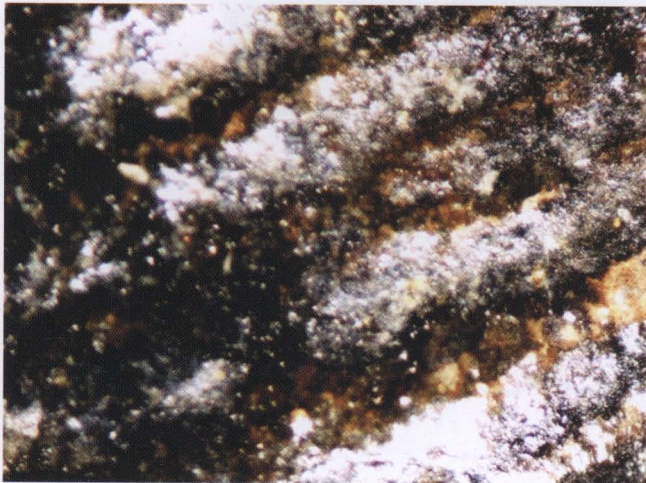


FIGURE 9a. *Minutia* on the back of the Věstonice Venus; original image.



FIGURE 9b. *Minutia* on the back of the Věstonice Venus; highlighting of ridges.

The color of the surface where the fingerprint is located is black-grey. The core of the figurine is grey. The highest peaks of the fingerprint's positive relief – corresponding with the *sulci cutis* of friction skin – have been abraded so the more significant differences in the terrain have disappeared and the lighter grey ceramic material from the core appears on the surface. This supports the evidence that the fingerprint originated before the firing of the figurine (Figure 5).

After its discovery, the surface of the Venus was covered (conserved) with a varnish layer. This caused further levelling of the original surface, by filling in the negative relief, and led to a subsequent difficulty in photographing it. The surface is considerably glossy. Moreover, the varnish

is slightly yellowish or orange. The light glossy parts are negatives of dermal ridges, the dark parts are the shadows of remains of the positive relief and the orange-yellowish parts are erased parts of positive relief with grey core matter.

PALEODERMATOGLYPHIC IDENTIFICATION

Without any apparent dermatoglyphic pattern there is no direct evidence that the print is a real fingerprint. There are, however, some markers that, under certain conditions, can identify even the tiniest fingerprint as a negative of human epidermal ridges.

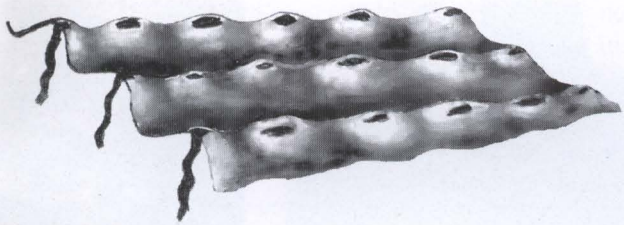


FIGURE 10a. Longitudinal corrugation of epidermal ridges in a model of friction skin.

1) Epidermal ridge breadth

The *epidermal ridge breadth* of the fingerprints in ceramic material is defined as the distance from the edge of the shadow of the ridge to the edge of the shadow of the adjacent ridge, measured upright/vertically to their direction (Figure 6). The ridge breadth of the Věstonice Venus fingerprint ranges between 0.34 to 0.43 mm, which is within the range for contemporary populations (Figure 7).

Moreover, the breadth of two adjacent epidermal ridges should be roughly the same. Ridge breadth changes continuously from one area to the other. The biggest changes are apparent in the area of flexion creases, *triradii*, and *minutiae*. In the case of the Věstonice Venus the differences in breadth between two adjacent ridges are in agreement with the friction skin of contemporary humans.

2) Minutiae

Minutiae are small variations from the strictly parallel direction of the ridges, irregularities of direction, discontinuities and branching (Figure 8). Frequently a *minutia* is a place where a new ridge is incorporated into a

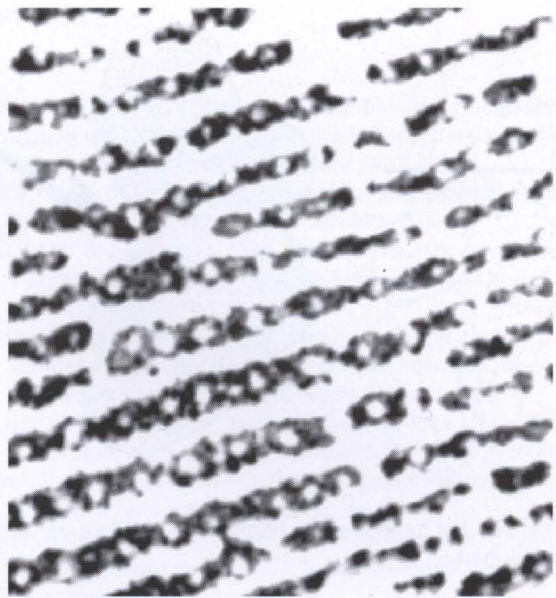


FIGURE 10b. Longitudinal corrugation in a classical fingerprint – bead-like character.

stream of running ridges. In the case of the Věstonice Venus, despite the limited area of the fingerprint we are able to recognize one such *minutia* (Figure 9).

3) Bead-like characteristic

The epidermal ridge is not absolutely smooth. During development this is caused by papillary elements – around the sweat pores – and spaces between the elements where the ridge is lower. With children (and adults with



FIGURE 11a. Bead-like character of epidermal ridges of the fingerprint on the Věstonice Venus; original image.



FIGURE 11b. Bead-like character of epidermal ridges of the fingerprint on the Věstonice Venus; highlighting of the bead-like character.

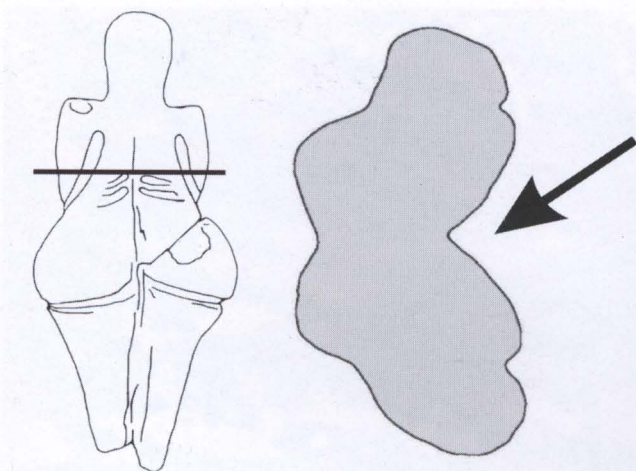


FIGURE 12. The location of the fingerprint in the deep concavity of the Venus's back.

developmental defects) the ridge on a print appears to be composed of separate dots (so-called dotted ridges). The longitudinal differences (corrugation) do not fully disappear in adulthood. When the ridges are imprinted onto a plastic material and the print is appropriately illuminated, the ridges appear to consist of beads on a string, one after another (Figure 10). We can observe this *beaded character* of the ridges on some images of the Venus fingerprint (Figure 11).

The above-mentioned criteria confirm that there is undoubtedly a print of epidermal ridges on the Venus of Dolní Věstonice I. The location of the fingerprint in the deep concavity of the Venus's back indicates that the print originated from a fingertip or a finger ball (Figure 12).

DERMATOGLYPHIC ANALYSIS: AGE ESTIMATION

We could detect only the epidermal ridge breadth and *minutiae*. Since there is only one *minutia*, we could only analyze the breadth of the epidermal ridges. Epidermal ridge breadth, just like the other metric characters, correlate with age during the growth period of the individual (Loesch, Czyzewska 1972; David 1981). Thus we used the ridge breadth to estimate the age of the fingerprint owner.

The mean breadth of the fingerprint ridges is 0.37 mm, with a standard deviation of 0.029 mm. Adjusting the figure to the pre-shrinkage state of the ceramic material (clay shrinks during drying and firing – on average by 7.5 %) the mean ridge breadth comes to 0.40 mm, with a standard deviation of 0.031 mm. Using an equation for the epidermal ridge breadth growth published by Kamp *et al.* (1999):

$$y = 614x - 112$$

(y – age in months, x – ridge breadth in mm)



FIGURE 13. Who was the creator of the perfect masterful figurine? Who was the originator of the fingerprint? Who really touched the figurine at the time of its origin?

we arrived at an estimation of the age of 11.13 years. Experiments have shown that this kind of age estimation yields results that diverge from the real age by only 1.9 years, with a standard deviation of 1.36 years. The majority of the estimates never vary by more than 4 years from the real age. Therefore, the age of the Venus fingerprint maker lies between 7 and 15 years. If the relation between the epidermal ridge breadth and age was the same in the Upper Paleolithic times as it is now, this fingerprint could hardly belong to an adult male. With greater accuracy regarding the shrinkage of the ceramic material, the age estimate can be shifted more towards adulthood. This permits us to consider a young adolescent female or even a young adult female. Women, on average, have a lower epidermal ridge breadth but, unfortunately, for the time being the sexing of a fragmentary fingerprint is not possible.

DISCUSSION

As far as the interpretation is concerned, the most important thing to remember is that it is the one and only fingerprint available, and very small in size. It might represent an extreme point of variability, thus the mean ridge breadth of this person would have been rather different in reality. The risk of the distortion of the ridges while the clay was still in a soft/wet state is also higher with a solitary print. Our age estimation is conditioned by two qualifications: 1) that the shrinkage of the ceramic material was really about 7.5 %, 2) the variability of epidermal ridge breadth in the population from which the maker of the fingerprint came is the same as found in the Central European population of the end of the 20th century AD.

It is also important to remember when interpreting the results, that the maker of the fingerprint may not be the creator of the artifact. It is quite hard to believe that such a masterful figurine as the Venus of Dolní Věstonice I could have been the work of a beginner or even of a child (Figure 13).

The shrinkage of the ceramics during drying and firing can be estimated experimentally. The variability of the epidermal ridge breadth of the Moravian people, however, cannot be studied experimentally. We are currently analyzing other fingerprints found on several other ceramic artifacts from Gravettian localities in Moravia. If the majority of the fingerprints consistently have sub-adult breadth of ridges, we will need to consider the involvement of women and/or of children in the creation of these oldest ceramics. This may lead to a change in our present ideas about what the women and the children actually did in the distant past.

CONCLUSION

In conclusion, the meta-methodological question may be raised why the fingerprint on the Věstonice Venus was not mentioned in any work that dealt with fingerprints on Paleolithic fragments and figurines from Dolní Věstonice and Pavlov (Sládek 1994; Szilvássy 1983; Valšík 1951; Vlček 1951). It could have been the Czech proverbial "darkness under the candle". More likely, the fingerprint on the Věstonice Venus is just the tip of the iceberg. The vast majority of fingerprints on archaeological finds have remained unnoticed probably because there has been no need to pay any attention to them. Fingerprints or palm-prints are indeed the most natural prints on any ceramic object made by the human hand. But, if the prints only indicate human presence, they are of little value to either anthropologists or archaeologists. This has been changing with the development of new paleodermatoglyphic methods and meta-methodological approaches.

Although this work provides more questions than answers, it suggests that even a fragmented and poorly preserved fingerprint can be subjected to some basic paleodermatoglyphic methods of analysis.

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