

# 3-D PROCESSING TO EVIDENCE CHARACTERISTICS REPRESENTED IN MANOPPELLO VEIL

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## Abstract

Tridimensional (3-D) processing can be used to evidence details in images; in this paper this technique is employed to compare the Face of the Manoppello Veil with that of the Turin Shroud. In particular, the 3-D processing of the negative image of the Veil evidences some interesting analogies with the Shroud Face also confirming the results reported in bibliography.

Differences between the Face on the front side of the Veil and the reverse one are also evidenced with this technique.

## 1. Introduction

The Holy Face (hereafter called Face) on the Veil of Manoppello (see Figure 1), supposed by many researchers to be an Acheropita (gr. acheiropoietos “not made by the hand of man”) image of Jesus, is worshipped as a relic in the Manoppello Sanctuary in the Abruzzi region in Italy. The color image corresponds to the traditional presentation of Jesus Face with long hair and a beard, open eyes, half-open mouth and the nose looking as if broken. The image can be seen on both sides of the Veil and because the yarn is very fine the Veil is highly transparent.

Its documented history before the 16<sup>th</sup> century is unknown and scientific examinations are scarce, as recently reviewed.<sup>1</sup> The comprehensive bibliography on the Veil can be found in the reports by Falcinelli<sup>1</sup> and Resch<sup>2</sup> (both available on the Internet) and fundamental facts were described in recent books<sup>3</sup> in a popular manner but also reporting some information arguable from the scientific point of view.

Two opposite opinions were proposed as concerns the nature of the image, probably also because the Veil has a specific feature: when seen at first sight it appears as a normal artistic painting, but after a detailed analysis some characteristics appear that may speak in favor of a supernatural hypothesis of the image formation. At first sight many brushstrokes of different colors are evident speaking in favor of the artifact, but the fact that it is not simple to paint on a byssus fabric also having evident nodes (fabric that should be discharged by a normal painter) and the fact that there are different characteristics on the reverse side of the Veil combined with the still unknown technique employed speak in favor of the Acheropita image.

A number of historians of art<sup>4</sup> and the photographer Falcinelli<sup>1</sup> consider the Veil as a work of art. Some scientists however excluded the use of different painting techniques<sup>2,3,5,6</sup> on

the basis of microscopic and spectroscopic studies.<sup>5,6</sup> Thus, for many scholars not only the mechanism of formation but also the nature of the image is completely unclear.<sup>3,5,6</sup>



*Figure 1. The Manoppello Face as it appears to the naked eye: the front side on the left and the reverse side on the right (courtesy of D. Vittore).*

Some similarities between the Manoppello Face and the Face of the Shroud of Turin (hereafter called Shroud) have also attracted attention in recent years. Their likeness was proposed by Schlömer<sup>7</sup> and next extensively studied by Pfeiffer<sup>8</sup> and Resch.<sup>2</sup> Using a superimposition of two images on transparent foils, it was shown that not only a general appearance but also some details of the Face in both images are consistent. Resch indicated<sup>2</sup> ten congruence points which were used to perfect adjustment of both images one to another.

On the other hand, a comparison of physico-chemical properties of both images based mainly on scientific analysis of the Veil made<sup>5</sup> by the second author in 2001 and including microscopic photography, spectral analysis in a wide range of wave lengths and a test of tridimensionality, indicated some similarities but also fundamental differences in their characteristics.

Similarities involve first of all the shape and the size of the Face as well as some marks of wounds like a swelling on the right cheek. Among the differences the following are remarkable. The very evident bloodstain having the characteristic shape of reversed “3” on the front of the Shroud Face is not present on the Veil Face. A hypothetical painter that would have copied the Shroud Face should have first reproduced this sign; in the opinion of the second author this means that the Veil Face was produced before the Shroud and supposedly perhaps during the Veronica encounter, as suggested also by Resch.<sup>2</sup>

Other differences are the superficial character of the Shroud’s image, i.e., the presence of the image color “only on the topmost fibers at the highest parts of the wave”,<sup>9a</sup> which is not

observed in the case of the Veil's image. The Shroud's image is in monochromatic yellow to light brown color<sup>9b</sup> corresponding to chemical changes (a fast ageing) of linen fibers, whereas the Veil's image is composed of bring-substances of different colors, but still unknown. The Shroud's image is not made of bring-substances<sup>9c</sup> but the color derives from carbonyl groups formed in a dehydration of the polysaccharides layer out of the linen fibers,<sup>9d</sup> which is not the case of the Veil's image. Finally, the Shroud's photographs after the software analysis showed a clear tridimensionality of the image, i.e., the dependence of "the luminance distribution on the clearances between a three-dimensional surface of the body and a covering cloth".<sup>9e</sup> On the contrary, the Veil's image showed only very weak 3-D characteristics<sup>5</sup> as it is shown in Figure 2. Some 3-D feature is probably seen for the hollow of eyeholes and the smashed ending of the nose but in general in this aspect the Veil's and the Shroud's images differ.

It should be emphasized here that the 3-D processing was made by Brice 4.0<sup>®</sup>; it is a software that takes as the input a black and white image and converts the various luminance levels of the image into a hypothetical height proportional to those luminance levels, thus forming a 3-D surface; what is reported in the following figures is the 3-D processed surface, shadowed by a pre-selected light point.

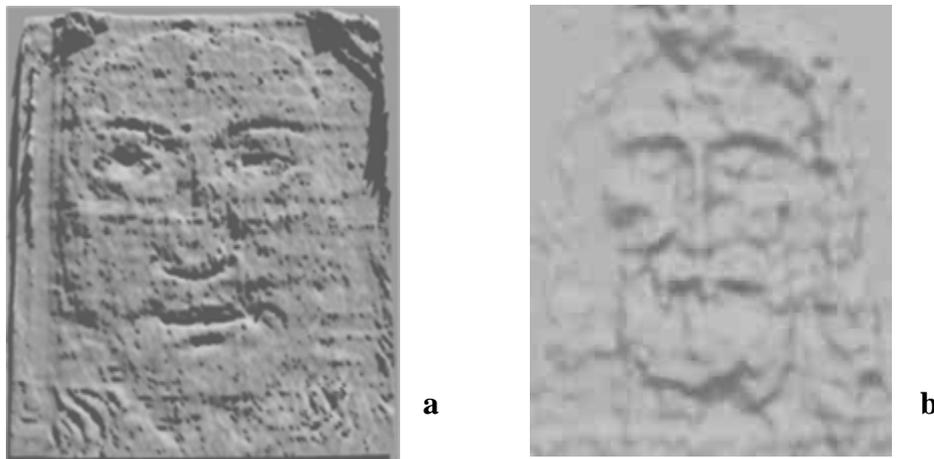


Figure 2. A comparison of 3-D images of the Face<sup>5</sup>: (a) from the Veil and (b) from the Shroud.

It should be remembered here that, as discovered by Secondo Pia in 1898, the Shroud image appears in many body features as if it were a negative image. Thus, the 3-D Shroud images found first empirically by Gastineau in 1974<sup>10</sup> and then mathematically by Jackson, Jumper and coworkers in 1977<sup>11</sup> and investigated later by other groups<sup>12-15</sup> were always obtained from the photographic negative, which corresponds to the normal picture of the Body. The principal aim of this report, as it will be shown in the following section, is to evidence the fact that better 3-D characteristics of the Manoppello Face can be obtained from the photographic negative, in a similar way as was used in the case of the Shroud.

## 2. Negative character of the 3-D image on the Veil

The first author observed that in the 3-D image of Figure 2(a) are shown some areas which should be convex on the relief (because a bright color on the image corresponds to a

short distance from the reference plane) but instead they are concave. Therefore he thought to use a negative image to correct this effect.

The most unusual examples are the eyebrows which cannot be concave and the end of the chin, looking like without the beard which starts much lower and deeper. In contrast to the 3-D image obtained from the Shroud there are some other unexpected concave places, first of all instead of convex moustache at the both ends of the mouth there are black, concave furrows. It is evident that relief obtained from a photographic negative will give the reverse of concave and convex areas. Then, a question arises: are there any hidden negative 3-D characteristics of the Veil's image reverse in the respect to the distance between the body and the screen?

The simple inversion of black and white colors in the image shown in Figure 2(a) is presented in Figure 3. It seems that the obtained result corresponds to the normally expected 3-D relief of the human face much more than those shown in Figure 2(a). Now the eyebrows are convex as well as the beard at the end of the chin, the moustache, in particular on the right side on the picture, also the lips and hair on both sides of the Face. The resulting image also shows better similarity to the image on the Shroud and some characteristic marks known from the Shroud Face can be presumably recognized, as will be discussed later.



*Figure 3. The 3-D image of the Manoppello Face from Figure 2(a) with the reverse colors, i.e., corresponding to the 3-D image obtained from the photographic negative.*

However, taking into account the low 3-D feature of the Veil's image, some details seen in Figure 3 can represent simply artifacts. The processing made by the second author from negative photographs taken from the front and the reverse sides of the Veil is shown in Figure 4. Basically, the 3-D characteristic is low for both positive and negative photographs, but those obtained from negatives represent (at least in some parts) more accurately the normally expected concave relief of the human face. Thus some 3-D features of the Veil's image are better evidenced by the negative image.

There are some differences in details of the image shown in Figure 3 and the corresponding top right image in Figure 4. The eyes, resembling the Shroud's Face, with evident protuberances in correspondence of the eyelids (as discussed in ref. 16) are seen only in Figure 3 and thus they are perhaps artifacts. The mouth is more closed in images obtained from negatives (Figure 3 and right images in Figure 4). Of course, in Figure 4 the upper lip in the images on the right (obtained from negatives) corresponds to the position of mouth in the images on the left obtained from positives. Nevertheless, some other details are similar in all the images obtained from the front as well as the reverse sides of the Veil. Thus, it can be interesting to compare the Shroud Face and that of the Veil taking into account the negative

character of 3-D images even if such a comparison is not conclusive because of possible presence of artifacts due to the low 3-D characteristics shown in Figure 4.



*Figure 4. 3-D images of the Manoppello Face from positive (left) and negative (right) photographs of the front (top) and the reverse (bottom) sides of the Veil.*

### **3. Comparison of the 3-D image on the Veil with the Shroud's image**

In general, the Face from the Veil, with its unsymmetrical cheeks which are not separated from the hair, looks a little broader than that from the Shroud. Nevertheless, a number of characteristic details and marks of wounds known from the Shroud's images<sup>17</sup> (the normal photograph as well as the 3-D relief) can be recognized in similar areas on the Veil's image, although their shapes and sizes are not identical. These characteristic marks detected by the first author are shown in Figure 5. Marks of wounds include: a swelling of both eyebrows (1) and a crosscut of the left eyebrow (2), a triangular-shaped wound on the right cheek close to the nose (3), a swelling of the yoke bone below the left eye (4), a swelling below the right eye (5), the swollen nose and a deformation of the nose septum with the bruised cartilage (6), and a swelling of the upper lip (7). Other characteristic marks on the Shroud Face which can be easily identified in Figure 5 include: a forked beard (8), a hairless area between the lower lip and the beard (9), an enlarged left nostril (10), a few strands of hair at the top of the forehead (11), and maybe also a transverse streak across the forehead (12), which is however not clear in the images in Figure 4.

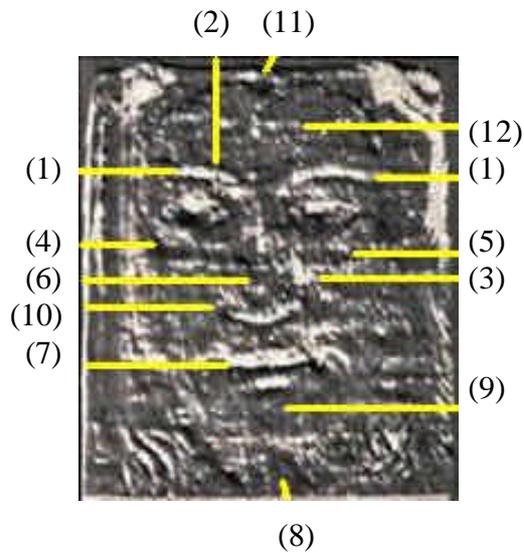


Figure 5. The negative 3-D image of the Manoppello Face with characteristic marks known from the Shroud's image. Numbered marks are explained in the text.

#### 4. Differences between the front and the reverse sides of Manoppello Face

An interesting fact detected by the second author when studying the characteristics of the Manoppello Face is that the front side of Face is very similar to the reverse one, but it is not its mirror reflection. In particular, there are some details that evidence some differences that are not easy to explain; for example, Figure 6 shows a detail of a hair lock in the middle of the forehead and Figure 7 shows the corresponding 3-D processing.

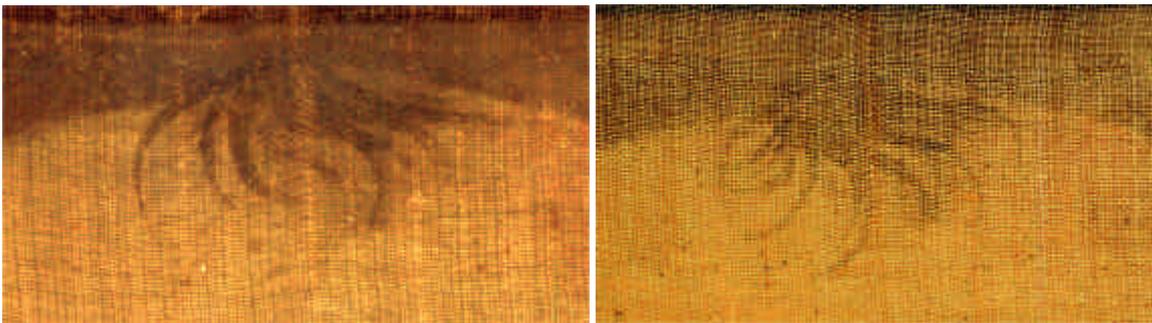
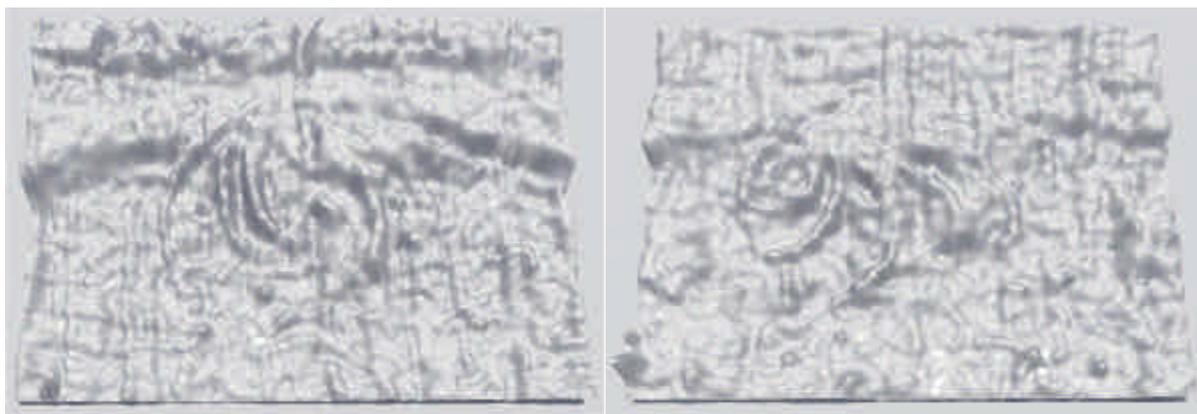


Figure 6. Detail of hair lock in the middle of the forehead corresponding, respectively, to the front side of Face on the left and to the reverse one (mirrored for more direct comparison) on the right (courtesy of D. Vittore).



*Figure 7. 3-D processing of a detail of hair lock in the middle of the forehead corresponding, respectively, to the front side of Face on the left and to the reverse one (mirrored for more direct comparison) on the right.*

The different representation of the hair lock on the two Faces (obtained from the both sides of the Veil) is interesting because up to now it has not been reproduced in a similar fabric and therefore it is one of the particularities that speak in favor of the hypothesis of an Acheropita image. In fact, it is still unexplained how an artist could have painted a sign on a face of this very fine Veil and a different sign on the reverse side without impressing the same sign on both sides (the capillarity of the byssus yarns must not be neglected).

## **Conclusions**

In this paper a 3-D processing was employed to analyze the Manoppello Face and to make some comparisons with the Shroud Face.

The comparison of images reported confirms general similarity of the wounds and other marks on them, which supports earlier observations described in the literature. However, the very different physico-chemical characteristics of the two images confirm that they were formed in different ways and probably also in different circumstances.

The results shown in Figure 5 additionally corroborate the hypothesis that both images represent the Face of the same tortured Body.

The image processing confirms in general the weak 3-D characteristics of the Veil's image, but also evidences some 3-D characteristics of some details such as the hair lock on the forehead. However, some 3-D features of the Veil's image are related to its hidden negative character.

Finally, it is shown that the 3-D processing could be helpful to draw a comparison of different details of the front and the reverse sides of Face on the Manoppello Veil and this processing could be used in the future to better evidence the enigmatic differences typical of an Acheropita image.

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