RESULTS OF THE ANTHROPOLOGICAL AND CRIMINAL INVESTIGATION ON

THE SOUDARION (CLOTH) OF OVIEDO AND THE SINDONE (SHROUD) OF TURIN

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INTRODUCTION

The Soudarion of Oviedo is an archaeological object that is kept in the Cathedral of Oviedo (Spain). Throughout history, this archaeological object has received several names: Sudarium Domini, Orarium, Pañolón de Oviedo, and Sudario de Oviedo. Traditionally, it was attributed to it a funerary use on the corpse of the historical figure of Jesus of Nazareth, but it was unknown the way it could have been used. This object has been investigated since the year 1989 in a scientific way by the EDICES, applying to it the usual work methodology on ancient textile material, which contains biological material, specifically blood and other body fluids of human origin. The conclusions of such study are that from the scientific point of view, it can be stated that the Sindone and the Soudarion covered the corpse of the same person, not simultaneously but with very little time difference between the use of one and the other; the Soudarion being used previously and the Sindone later. The Soudarion only covered his head, face, neck, part of his shoulders and the upper region of his thorax. According to available data, it was not used as a chin rest to keep the mouth of the corpse closed.

The Sindone of Turin is an archaeological object that is kept in the Cathedral of Turin (Italia), and traditionally, it has been considered that it was used as a burial shroud of the historical character Jesus of Nazareth. The Sindone, apart from human blood and other body fluids presents the body image front and back of the corpse of a male. At these moments, the mechanism of formation of such image is unknown, discarding it is neither a painting nor a protofotography.

Both canvas have human blood and other biological materials, human and not human, as well as biological and chemical contamination. For such reasons, they are materials likely to be used to do research, using the methodology characteristic of Criminology. In this discipline, it is usual to investigate with textile materials stained with body fluids that, somehow, are present in the scene of a crimen in which body injuries are produced, either with the survival of the victim or not, and also even in sexual assaults.

The Soudarion of Oviedo does not show a body image similar to the one it is shown in the Sindone of Turin. However, the pattern of stains, their morphology and their distribution allow us to reproduce the anthropometric and craniometric dimensions of the anatomical regions that were wrapped with this canvas. For such reason, it is posible to carry out a scientific study using the methodology of Anthropology and contrast the results obtained with their equivalents from the Sindone of Turin.

RESULTS OF ANTHROPOLOGICAL RESEARCH ON THE SINDONE OF TURIN.

The Anthropological research on the Sindone of Turin is quite simple for somebody who has the neccesary knowledge and is also accustomed to doing this type of activities. The reason is simple: The Turin canvas shows the front and back image of a human body with the necessary

clarity to achieve succesfully this research. Even so, there are certain limitations , the first one is the total absence of image on the sides of the corpse.

However, this is not an absolute impedimen. The second one is that the sindonic image is a two —dimensional image of a three -dimensional human body. Furthermore , all seems to indicate that the canvas was in direct contact with the most prominent anatomical region, but not with all the body surface. In addition, the fabric is not a rigid surface , it is relatively elastic , deformable and also underwent the gravity effect. Since, apparently, the sindonic image was produced when the set corpse/ canvas were in horizontal position, in supine position. The fabric, in the areas that were in a more remote position of the body, moved downwards due to gravity, for instance, in the neck área in the anterior image. On the contrar, in the posterior image, there are anatomical areas that should be far from the gravity effect, such as the posterior cervical región, the lumbar region and the back of the knees, but it is not like that. Here there is also a body image and therefore, these anatomical structures were also adjusted to the skin surface, probably because the Sindone was held from the outside with some type of bandages. This follows from the fact that the distances taken among the different anatomical regions of the sindonic image cannot always be taken as objective and reliable data, since the effect on the linen of all the above circumstances described makes that the real distances among different anatomical points may be grater or lesser than those recorded on the Sindone itself. This is the cause of the apparent dysmetria and the apparent unnatural position of both arms and legs , as an example . Moreover, the corpse trunk was slightly bent and with the lower limbs partially flexed at his, knees and ankles , as a consequence of cadaveric rigidity , which reproduced the position of the corpse when death ocurred . Another fact to take into account is that the sindonic image has a peculiarity: the anatomical regions close to the midline of the corpse are reflected in a natural position but as soon as we move away from the middle line the image is not so trustworthy. The greater the separation from the medial axis of the corpse , the further away the anatomical structures will be in the reality of what is reflected in the sindonic image . This fact is frequently ignored because researchers that have dealt with this subject unknow it.

The first step of the anthropological investigation of the Sindone was to determine the position of the odd craniometric points, in both former and latter image, for next, -making comparisons with human skulls similar to the one of the Man of the Sindone - to make an estimate of the even craniometric and cephalometric points.

Once we know the distances between the craniometrics and cephalometric points is simple to rebuilt the craneal proportions. The next step is to place the soft parts on the skull. This is something that forensic reconstruction experts can make with with amazing reliability. The last step is to add the bleeding and not bleeding anatomical injuries to face and skull. Following this methodology perfectly standarized, Professor Juan Manuel Miñarro López could reconstruct the appearance of the Man of the Sindone when the sindonic image was formed.

But, Professor Miñarro did not limit himself to make such amazing and trustworthy reconstruction, he went further and despite all the limitations and even despite the whole absence of information in some body regions, specifically on the sides in which- we insist- there is not sindonic image – he was able to reconstruct the entire body.

Time later, he even reconstructed the physionomy of the Man of the Sindone without the wounds that the Sindone of Turin shows, contributing this way to the most trustworthy reconstruction of the Man of the Sindone till today, and all that with a reliabilty that surpasses

to the ones obtained in other before and after attempts , including the images made by artificial intelligence in recent times. In the sculptural works of Professor Miñarro are reflected in an absolute reliable manner, all the anthropological findings and the anatomical wounds seen in the Sindone of Turin, something that does not happen with the same fidelity in the rest of the reproductions made to date.

The final result, not only impresses the viewer, the most important is that it reveals that the Man of the Sindone did not present anatomical deformations, neither asymetries nor body dysmetries. Besides, no parts of his body showed an unnatural position, taking into account that, as everything seems to indicate, he died crucified. And as a consequence, the cadaveric rigidity, kept the position of the body at the moment of ocurring his death in all its details.

On the area next to the buttocks of the sindonic image, some stains with a very different morphology from the rest of the previously described stains do appear. Its cromatism is darker and its aspect is more dense in its central area than the ones caused by blood, whilst in its periphery show a lighter colored fence. The most likely hyphothesis, in absence of confirmation with analytical methods, is that they are faeces coming from an episode of sphincter loss during the dying process of the Man of the Sindone. On the other hand, these stains have a quasi symetrical morphology following its major axis of the body, which allows thinking that they were deposited first on the right buttock region and when it had not dried yet , the Sindone was folded following its major axis, which let such stains to be transferred by contact to the left buttock region.

RESULTS OF THE ANTHROPOLOGICAL RESEARCH ON THE SOUDARION OF OVIEDO

The anthropological research on the Soudarion of Oviedo was much more complex. First, it was neccesary to reconstruct in time and space the way in which the Ovetense canvas covered the corpse , and with the complexity that, always according to the conclusions of the research of the members of the EDICES, it was used in two different positions. Besides, another difficulty is added: anatomical references present in the sindonic image are not available.

However, the blood stains and other cadaveric fluids reproduce some anatomical structures, specifically, nose, nostrils, mouth, orbital pits, and the right auricular pavillion. With these references it could be determined first, the position of the craniometric odd points and next the craniometric pair points. It was already possible to reconstruct the craniometric proportions to, next, adding the volumes given by the soft parts, to reconstruct feature, taking into account the presence of very swollen áreas, specially in the front region, orbital regions and cheeks, particularly the right one. These swellings added distortions factors in measurements that should be taken into account.

CONCORDANCES OF THE RESULTS OF ANTHROPOLOGICAL RESEARCH BETWEEN BOTH CANVASES

Once finished the anthropological and anthropometric research on the Soudarion of Oviedo and the Sindone of Turin, the moment to confront data had arrived. The conclusions were that such body proportions were coincident both in the Soudarion and the Sindone, a reason why the hypothesis that both canvas covered the corpse of the same person gained strength. Because the statistical probability that two men presented the same anthropometric

proportions and moreover, the same distance among them and in the same body regions, was very remote.

RESULTS OF THE CRIMINAL INVESTIGATION IN THE SINDONE OF TURIN

The criminal investigation in the Sindone of Turin reveals the presence of human blood and other body fluids, as well as the evidence of the use of aloe and myrrh, presumably for funerary purposes. It also appears a high level of biological and non biological contamination.

The genetic study of biological patterns present in the Sindone is very limited because of its age. It is an ancient DNA, very degraded and contamined with DNA outside the corpse, as a consequence of handling the canvas throughout the centuries by an indeterminate but presumably high number of people who, on the other hand, did not take precautions to prevent their genetic material contaminating the Sindone of Turin. In addition, it must be taken into account the probable presence of inhibitors that hinders the replications of extracted DNA. The reality is that the identified DNA fragments are tiny in size. It would be interesting to do new genetic studies neutralizing the mentioned inhibitors and using a suitable methodology in Paleogenetics It would be also convinient to collate the results with those that have been obtained after the genetic study of nuclear DNA and of the mitochondrial DNA in the Soudarion of Oviedo.

Professor Pierluigi Baima Bollone led a genetic study of the blood coming from the Sindone of Turin at the Institute of Legal Medicine of the University of Genova determining that the blood belonged to a male human being but in which appeared a large amount of pollutant nuclear DNA coming from other female human beings. This fact must not surprise anybody because everytime the relic had to be restored, a religious congregation of nuns used to take care of it and even Princess Maria Clotilde of Savoy patched it up at the end of the 19th century.

Another significant fact is that the largest portion of nuclear DNA discovered had 323 base pairs, that is to say, too small to be able to investigate satisfactorily with it. It is ancient DNA, polluted, very fragmented and degraded. The Palinological study has been very questioned due to the methodology used in the past which today is considered obsolete. It would be convinient to do new palinological studies using the methodology agreed upon by the scientific community to next compare the results with the findings of pollens made on the Soudarion of Oviedo.

RESULTS OF THE CRIMINAL INVESTIGATION IN THE SOUDARION OF OVIEDO

The criminal investigation on the Soudarion of Oviedo shows similar results to the ones seen in the Sindone of Turin, and, specifically, reveals the presence of human blood and other body fluids, as well as the evidence of the use of aloe and myrrh together with other products presumaly for funerary purposes. Also, a high level of biological and non biological contamination appears, which, as it was expected, shows similarities with the findings made in the Sindone of Turin but also it has been detected findings that only appear in one canvas.

The composition, location and morphology of the blood stains, and other body fluids, specifically pulmonary edema, saliva, mucus from the respiratory track, pleural fluid and probably also pericardial fluid are compatible with death from postural axfisiation, as well as a great physical abuse before his death. This would include puncture injuries on the scalp similar to the ones that would produce a helmet-shaped Crown of thorns, blunt and incised blunt injuries in the facial región and even a system of stains similar to those that are seen in the Sindone and that have been attributed to impacts by a flagrum taxilatum.

In one of the bottom corners of the Soudarion we can see a complex stain though it is incomplete, because it is in the limit of the fabric. This fabric has been cut in all its perimeter and that nowadays is of smaller dimensions than when it was knitted and used unexpectedly as a funerary canvas. The mentioned stain called **Ricci Stain**, or **Corner Stain** as well, presents in its central área cadaveric blood, and in its periphery, shows another circle of pleural fluid, and probably also pericardial fluid, lighter in colour, almost exempt from blood content and rich in fibrin clots. This area of the Soudarion covered the same anatomical region that produced the stain identified in the Sindone of Turin as probable exit hole of the penetrating wound in the right side and attributed to the thrust.

In all the Surface of the Soudarion can be seen a complex pattern of holes attributed to sewn with needle and thread. (In fact, during the investigation, some fragments of cotton thread tresspassing many of these holes were recovered, the rest were presumably lost in the past. At least some of them, probably were collected for pious purposes, in order to have some relics coming from the Soudarion). Some of these orifices appear in areas that covered the scalp of the corpse. The most probable hypothesis is that they were used with the purpose of fixing the position of the Soudarion as much as posible, so as not to be moved or changed its position and, above all, that it could fall onto the floor and was lost with all its blood content. On the contrary, many other orifices are not found in hairy áreas and according to its situation pattern the most probable hypothesis is that they were produced once the Soudarion was removed from the corpse, and once folded several times on itself, it was sewn with needle and thread to fix this new position of the canvas and thus keep it in a reduced space.

In the case of the Soudarion of Oviedo, the results of the genetic investigation of nuclear DNA have shown that the fragments are smaller in size than those detected in the Sindone of Turin, which limits even more research possibilities. However, a large portion of mitochondrial DNA has been isolated, which, in general, is better preserved than nuclear DNA.

Specifically, human mitochondrial DNA with a high state of degradation belonging to the region HV1 (1624-16365) was discovered. Also, DNA belonging to a contaminating ascomicete fungus, the Aracnomyces Minimus, was discovered.

An attempt was made to isolate DNA from the linen of the Soudarion of Oviedo, but the organic matter of plant origin has a DNA proportion very inferior to the one which is possible to find in organic matter of animal origin. The final result is that it could not be detected fragments of organic DNA of sufficient size to be able to be identified and studied.

The presence of a great amount of aloe and storax (a variety of myrrh) has been seen in the blood stains. Also it has been detected the presence of pollen compatible with Helichrysum, which in the past, had been morphologically identified wrongly as *Gundelia Tournefortii*. It must be mentioned the fact that - according to Dioscorides and Pliny the Elder - to shroud the corpses of Kings in Middle East during the 1st century AD, next products were used: Laudanum, Cistus, Lentiscus, Terebinth, Aromatic Galbanum and Helichrysum.

In the Soudarion of Oviedo, being a very ancient object, and as it was expected, high levels of organic contamination (human and not human) and also inorganic have been found. It should be noted that it has been found the presence of small fragments of limestone with the same chemical composition to the rocks of Jerusalem today. But, in addition, as it was expected, fragments of limestone with the same chemical composition of the cathedral of Oviedo also have been found.

The lists of findings would be endless. In short, it will be mentioned the presence of cat hair ,rat hair, plaster, different types of wood,, aloe, myrrh, incense and melt myrrh (probably burnt closely for liturgical purposes), beeswax, ancient and moder, synthetic and natural textile fibers, microparticles of different metals and above all iron, silver, gold, Thalium (probably used as a rat poison in the middle of the 2O th century), micrometeorites of ferrous and carbonaceous composition, fly ashes, and not metalic elements such as sulfur.

THE PROBLEMS OF CARBON-14 (C14) WITH TEXTILE MATERIAL

It is a well known fact among researchers that the determination of the age of textile materials with the Carbon 14 method (C14), with much frequency, show dating very far from reality. Well known examples are the Soudarion of Oviedo and the Sindone of Turin, among others.

Mr. Felipe Montero Ortego, a chemist of the EDICES, while he was investigating the tissue of the Soudarion of Oviedo, saw that many of the fibers of linen of the surface had a dark colour, almost black. By gently pulling on one of them with a pair of tweezers, he discovered it was much more fragile than the fibers that did not show this chromatic change. So, he isolated some of these fibers and observed them under the optical reflection microscope to discover that they did not show the same aspect as the rest of fibers because its surface was irregular rather than smooth and its colour was definitely dark. Therefore, he named them ***"BLACK FIBERS"***. The first hyphothesis about the origin of these fibers was the posible bio-deterioration of the same ones as a consequence of the action of various microorganisms, responsible for incorporating organic matter of the natural textile material back into the biological carbon cycle. In short, to the life cyrcle.

The chemical study of these black fibers found that they were coated of **Amorphus Carbon**, and this amorphus carbon could have two distinct origins:

- For centuries, the Cathedral of Oviedo, and especially the Holy Chamber, the place where the Soudarion of Oviedo has been kept, were lit by oil fuelled votive lamps. The waste from the oil combustion, in a secular manner, were deposited on the surface fibers of the Soudarion, making it more appetizing to attack by micro-organisms responsible for bio-deterioration. Such combustion waste contributed modern Carbon -14 to the tissue fibers in a continuous way until recent dates.

- These very microorganisms responsible for bio-deterioration, not only fed on combustion waste but also on the same linen fibres and on all biological material added, including blood and other human body fluids. As a consequence of their metabolism, they destroyed the original tissue and deposited on it their own metabolic wastes, the equivalent to the faeces of higher beings, contributing this way and again, modern Carbon -14 which was deposited continuously and for centuries on the linen fibers.

On the other hand, experimentally, Mr. Felipe Montero Ortego, reproduced the standard cleanin, a method applied to textile material, prior to Carbon -14 testing. Such method is very aggresive, using acids and alkalis at high temperature to remove all types of biological contamination added to the textile material under study, with the consequence that the weight of the material, after undergoing this cleaning, is reduced to something less than half the original weight. This fact has no effect on dating, as long as no added circumstances occur.

Mr. Felipe Montero repeated this very cleanig method using exclusively black fibers and observed that such cleaning method had no effect absolutely on such fibers; neither removed the amorphus carbon added in secular way nor reduced the initial weight of the pattern.

This added circumstance is relevant in the final computation of the total Carbon-14 accounted, because the original Carbon 14 is reduced in a something more than a half and the modern Carbon 14 added to the fibers is not eliminated.

Probably, this is not the unique cause of the problems of Carbon 14 with textile material but it is one of the most relevant and of course, its effect is added to the rest of the causes; some of them, well known, others hypothesized, and others, at the moment unknown.

CONCORDANCES OF THE RESULTS OF CRIMINAL INVESTIGATION IN BOTH CANVAS

The criminal investigation carried out on the Sindone of Turin and on the Soudarion of Oviedo has been based, to the posible extent, on the usual research protocols agreed upon by the scientific community. However, frequently, such protocols do not contemplate the enormous range of possibilities that circumstances may have produced in general, and more precisely, in both objects. For these reasons, researchers have seen the need to be creative to overcome these deficiencies.

The same can be told of analythical methods. Paleogenetics is a new field in which there is still much to do. This is because researchers frequently must have designed their own experiments y their own analytical methodology.

All studies applied to ancient textile material contaminated with added biological material have been done.

Researchers have designed new studies in the hope that the technology is up to the needs and dificulties that these studies entail.

The small size of the patterns, the dificulty to obtain them, its age, and the high level of organic and inorganic contamination make difficult but not impede the scientific investigation of these archaeological objects.

Despite all the mentioned limitations, the results of the research on the Soudarion and the Sindone, using criminalistic methodology are concordant. This situation is compatible with the hypothesis that both canvas covered the corpse of the same person.

CONCLUSIONS

From the point of view of Anthropology and Criminology, the Soudarion and the Sindone, and also from the Legal and Forensic Medicine, in the light of today scientific knowledge and, based on the information contained in the Soudarion and in the Sindone, which has been found throughout multidisciplinary scientific investigation, it is shown that both canvas contained the corpse of the same person.

If it was not enough, the mathematical and statistical comparison of the aforementioned information, which was made by the Mathematician member of the EDICES, Professor Peinado (2023) also confirms this circumstance.

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