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Holy Fire and Body Image of the Holy Shroud: Divine Photography Hypothesis

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ABSTRACT

Although the double body image of the Holy Shroud (HS) is still today inexplicable and even less reproducible, various hypotheses have been formulated which attempt to explain at least in part what is observed on the most important Relic of Christianity. Many of these hypotheses refer to an intense energy emitted by the corpse that often comes out of traditional science and calls into question the Resurrection, which obviously cannot be reproduced in the laboratory. This work overcomes this problem by proposing as a hypothesis for the formation of the HS body image an energy source very similar to that which develops every year inside the Holy Sepulcher of Jerusalem: the Holy Fire (HF) which is associated with high intensity electric phenomena. According to the new hypothesis formulated here, the Divine Photography, this electrical energy would have interacted with the body fluids emitted by the corpse to form an image. Some experiments have given very encouraging results which seem to reproduce, even if in small samples, almost all if not all the very peculiar characteristics of the HS body image.

Keywords: Holy Fire, Holy Shroud, Photography, Corona Discharge, Electric Fields, Body Image

1. INTRODUCTION

This work takes into consideration the phenomenon called Holy Fire (HF) that occurs every year in Jerusalem during the Holy Saturday of the Orthodox Easter to explain, by means

of the Divine Photography Hypothesis (DPH), how the double body image of the Holy Shroud (HS) now preserved in Turin, Italy, that still today is not scientifically explainable and even less reproducible, could be explained.

Before going into the details of the proposed hypothesis, the HF and the HS are briefly described also commenting why this image is scientifically inexplicable.

1. 1. What is the Holy Fire?

The appearance of the HF generally occurs around 2:00 p.m. every year of the Orthodox Holy Saturday in the Edicule of the Basilica of the Holy Sepulcher of Jerusalem. There are many steps as outlined below.

-1. The first activity is preparation which includes extinguishing all the vigil lamps in the Holy Sepulcher Basilica and verification that there is nothing that might be used to light a flame around 10 a.m..

-2. At 11 a.m., the door of the Edicule is sealed with wax and Christian Arabs begin singing traditional songs.

-3. At noon the Greek Orthodox Patriarch who will conduct the HF service enters the Orthodox Chapel of the Resurrection and at approximately 12:30 p.m., he begins a procession that will go around the Edicule three times. Then he stops in front of the Edicule and removes his ornate vestments and mitre.

-4. Next, after being handed four new and unlit bundles of 33 candles which will be used to distribute the HF to the attending faithful, the Patriarch enters the Edicule towards the Tomb. At approximately this time electromagnetic phenomenon like series of “trains of lightning” [1] appear outside of the Edicule.

-5. Now alone within the tomb chamber, the Patriarch recites a prayer beseeching the coming of the HF and then he waits.

-6. In 1998 Danish scholar Niels Christian Hvidt interviewed the then Greek Orthodox Patriarch of Jerusalem, Diodorus, about his experience conducting the HF rite. He stated that in the darkness in the inner room of the tomb where Christ was buried he knelt, said certain prayers and waited. Almost immediately, an indefinable light rose from the stone on which Jesus lay. This non-burning light at one point rose to form like a pillar so that he could light his candles from it. So, he went out and set fire to all the people in the Basilica.

-7. The Patriarch exits from the Edicule with the candles miraculously lit by the HF or, as the Orthodox call it, by the “*Uncreated Light*” and he distributes the HF to the numerous faithful present in the Basilica.

The author had the opportunity to personally verify what happened on Holy Saturday of the Orthodox Easter of 2019. He certified with scientific experiments [1] that during the first ten minutes the HF, that had been transferred to him through the pilgrims from the Patriarch, is a miraculous fire characterized by a cold plasma. Although sophisticated laboratory systems could reproduce cold plasma, cold plasma is not reproducible in the environment of the Edicule of the Holy Sepulcher. The author, therefore, considers the HF to be of miraculous origin, and the allegations of its fraudulent origin are unreliable. He agrees with Russian scientists like

Andrey Volkow and Fr Gennady Zaridze who demonstrated the electric connection with the HF.

It is necessary here to clarify what is meant by HF because at least three scientifically different phenomena are frequently called by this same name.

-1. HF1 is the first phenomenon of bluish light above the stone of the Holy Sepulcher which then spreads into the environment; this could be the real HF linked to the Easter phenomenon. We can think that HF1 is a cold plasma produced by an intense electric field: the electrons of the plasma yield energy emitting photons which in turn make visible the bluish light observed.

-2. HF2. The Orthodox Patriarch lights his candles from the HF1. The candles show a yellowish flame named HF2.1. The Patriarch leaves the Edicule of the Holy Sepulcher, and, by contact with other candles of the people present, he distributes this HF designated as HF2.n (with 'n' being the number of passages of HF2 through successive candles $n = 1, 2, 3, 4, 5, \dots, n$) to the entire assembly. We suppose that there are no substantial physical differences among the various HF2.n.

-3. HF3. After about ten minutes from the beginning of the phenomenon, the particular physical characteristics measured for HF2.n tend to change and the flame of the candles tends to the characteristics of a common fire.



Figure 1. The HF2.10 produced by a bundle of 33 candles, taken by the author about after five minutes from the initial ignition, does not burn the beard, nor give a sense of pain.

The HF2.n, which was passed to the first author during the Celebration of Holy Saturday in 2019, is HF2.10 since the flame passed 10 times, starting with the Patriarch, before it reached the author, see Fig. 1.

There may be other manifestations connected with the phenomenon of the HF and Bishop Photiki lists them as: flash of light or lightning; rain, dew or snow; loud noise or whistle, earthquake; cloud or smoke; miraculous lighting of lamps and candles. The vast majority of the phenomena listed may seem strange when considered individually however, if these phenomena are considered globally, the presence of a single source capable of producing them seems to be quite clear: the presence of an intense electric field impossible to explain scientifically, but that can be considered a miraculous event related to the Resurrection of Christ.

Someone tried to provide a scientific explanation, albeit limited, to the phenomenon of spontaneous ignition using materials that ignite spontaneously when in contact with air. Among these, white phosphorus has been proposed: if it is dissolved in a suitable organic solvent, self-ignition is delayed until the solvent evaporates and, from experimental tests, it appears that self-ignition can be delayed even more than 30 minutes.

Of course, this limited explanation does not even address the facts that the fire produced must be cold, that there is the presence of blue lightning in the Holy Sepulcher and that there is the direct control of a policeman in the Edicule.

1. 2. What is the Holy Shroud?

The Holy Shroud (HS), Shroud of Christ or Turin Shroud [2-8] is a handmade 3:1 twill linen cloth, 4.4 m long and 1.1 m wide, on which the front and back images of a human body are permanently and mysteriously imprinted. According to the Catholic Christian tradition, the HS is the burial cloth in which Jesus Christ was wrapped before being placed in a tomb in Palestine about 2000 years ago. The Catholic Christian Church does not impose any veneration requirements of the HS, even though science has been unable to refute what is reported by tradition.

There are some indications that the HS was in Palestine in the first century A.D., and then taken to Edessa (present-day Sanliurfa in Turkey). The coincidence of the HS face with that of Christ on Byzantine coins starting from the VII century A.D. is evidence that the HS was seen during the Byzantine empire.

The HS then appeared in Europe in 1353 in Lirey in France after the Sack of Constantinople in 1204. In 1532, a fire damaged it at Chambéry in France.

In 1988, the HS was radiocarbon-dated to 1260–1390 A.D. [9], but the result is questionable [10-13]. As the process that formed the body image is still unknown, the dating method cannot be rigorously applied, because the environment in which the object under analysis was conserved must be known from a contamination point of view. The imaging mechanism may, in fact, have varied the percentage of carbon isotopes of the TS, thus producing a non-negligible systematic effect [14]. This hypothesis has very recently found a partial confirmation [15] by the absence of nitrogen in blood samples coming from the HS.

Regarding the numerous red stains present on the HS, J. Heller and A. Adler of STuRP (Shroud of Turin Research Project) [16, 17] detected the presence of primate blood, whereas, P.L. Baima Bollone, [18], independently, detected the presence of human blood.

The most interesting feature of the HS consists of the front and back head-to-head images of a full-size human body separated by an image free space, see Fig. 2. This image reveals such

peculiar characteristics that science cannot reproduce all these characteristics on a single cloth [4, 5].

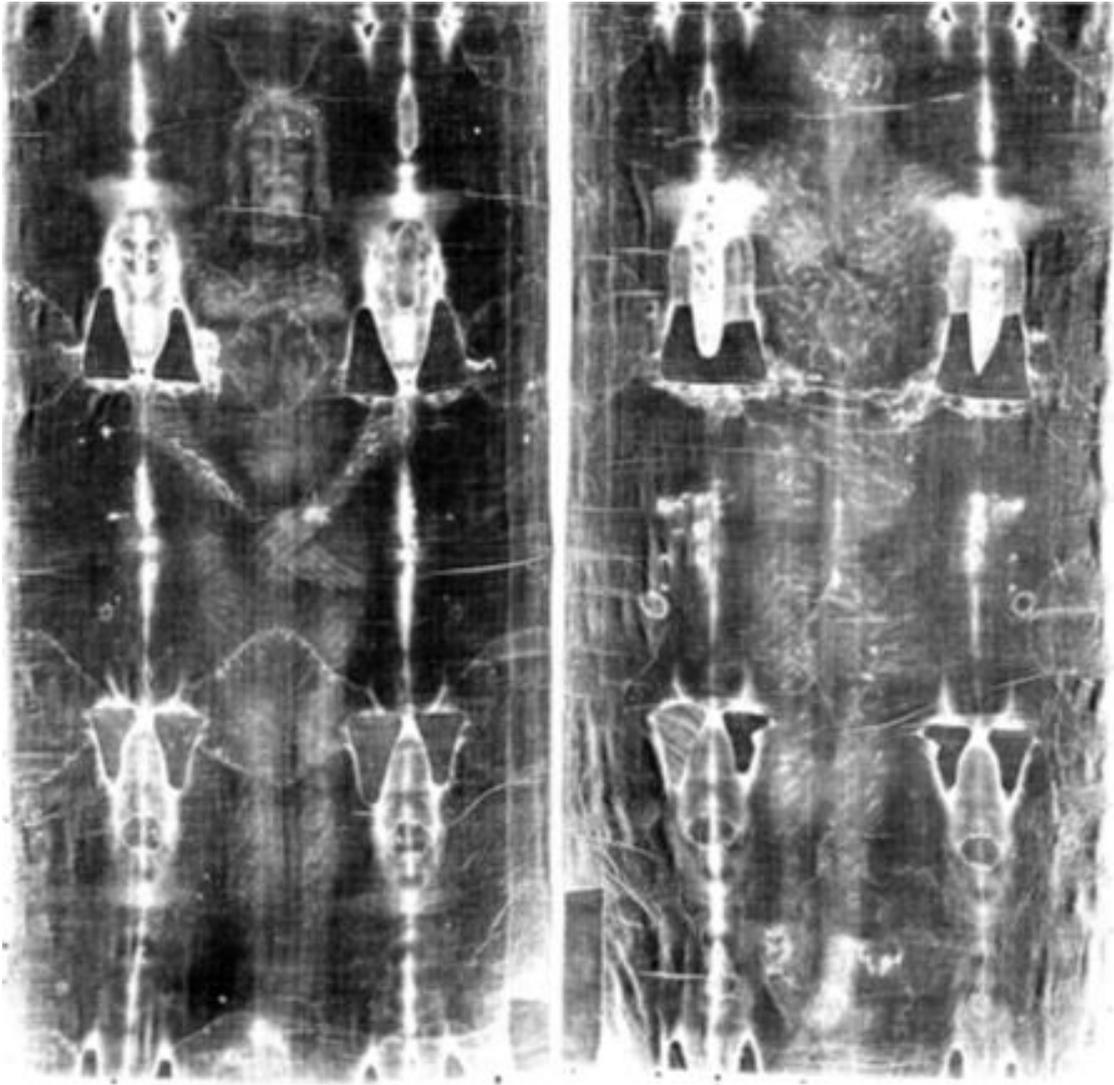


Figure 2. Front and back images of Jesus of the HS in the photographic negative (G. Enrie).

The image is more visible in the negative than in its natural sepia color. Since the image lacks a sharp outline, observers must be at least one meter away from the cloth to see the image. The image shows a man that was about 30 years old with a beard and long hair who was wrapped in the HS after his death. The rigid corpse was laid out on half of the HS, while the other half was then drawn over the head to cover the body. Two images were left, one dorsal and one frontal. By means of a computer analysis, it has been verified that the frontal and dorsal imprints of Jesus of the HS are anatomically superimposable on a manikin and the Man's racial features correspond to Semitic [19].

The body image features will be commented in the details in Section 2 as they are at the basis of the formulation of the DPH.

2. BODY IMAGE FEATURES OF THE HS

From the more than hundred peculiar features of the double body image visible on the HS, the following 24, see Ref. [5], have been extracted to test the most important formation hypotheses that will be discussed in Section 3.

- Body Image

F1. The body image is due to chemical reactions of the polysaccharides composing the linen fibers: oxidation, dehydration and conjugation, and therefore it is not compatible with being a painted image.

F2. The body image has the tones of light and dark reversed, which gives it many features of a photographic negative.

F3. The frontal body image has almost the same brownish color intensity of the back image.

F4. The luminance distribution of both front and back body images can be correlated to the clearances between the body surface and the covering cloth thus producing a 3D effect.

F5. The protruding parts of the face, like eyeballs and tip of the nose, are better represented than the hollows.

F6. The body image is present in body-sheet noncontact zones, for example, between nose and cheek.

F7. The frontal image, at least in correspondence with the face and probably of the hands, is doubly superficial. This means that the fabric presents a superficial image on one side, no image in the middle, and another superficial image on the opposite side.

F8. Ultraviolet radiation produces no fluorescence of the body image.

F9. The body image has a resolution of $4.9 \text{ mm} \pm 0.5 \text{ mm}$ ($0.19 \text{ in} \pm 0.02 \text{ in}$), but no well-defined contours. So, while details such as nose and lips are visible, the body image seems to disappear when looking at it from a distance less than about 1 m (3 ft).

- Human Body

F10. The rigor mortis of the body is detectable in particular on the back image near the glutei.

F11. Putrefaction signs are absent on the body image.

F12. The HS shows signs of wrapping a man.

F13. The wrapping sheet shows image distortions in correspondence of hands, calves and torso.

F14. The hair appears soft, not matted (hard and crusty), as the result of soaking with blood or aromatic substances.

- Colored Fibers of the Linen Fabric

F15. On a thread, the colored fibers are concentrated only on the uppermost portions.

F16. The colored fibers are absent on the threads crossing in the cloth's weave.

F17. The image fibers are adjacent to non-image fibers: striations are evident on the threads.

F18. In the crevices where threads cross each other there is a concentration of color intensity.

F19. The color is uniform around the cylindrical fibers' surface, whereas intensity variations appears along the fiber's axis.

F20. While the cellulose of the lumen is colorless, the color is evident on the 0.2 μ m (about 0.000008 in) thin layer that can be recognized as the primary cell wall of the fibers.

F21. No cementation between fibers or signs of capillary flow appear in the image areas while it can be detected in the bloodstains area.

- *Bloodstains*

F22. The red stains are predominantly composed of blood and frequently surrounded by serum haloes. A transposition of blood clots by fibrinolysis is supposed for many of these stains.

F23. As no image appears under the bloodstains, we must suppose that these formed before the body image.

F24. Some blood dripped from the corpse to the fabric in correspondence of the elbows where it traced rivulets outside the body image.

3. HYPOTHESES OF THE HS BODY IMAGE FORMATION

While it is impossible, up to now, to reproduce a copy of the HS having all the features listed in Section 2, several scholars proposed different interesting hypotheses of body image formation that can partially reproduce these characteristics. A critical analysis of the most interesting hypotheses is performed here below in agreement with Ref. [5].

3. 1. Artistic Reproduction Hypothesis

Some scholars assert that the body image on the HS could have been produced by an artist who could have painted it or produced it from a bas relief, or through the use of more elaborate techniques such as using acids, see Ref. [20].

Nevertheless Ref. [5] evidences the huge difficulties that a hypothetical artist would have run into in order to obtain results similar to the HS, especially at the microscopic level.

3. 2. Direct Contact Hypothesis

Other scholars, among whom was J. Volckringer, proposed a body–cloth direct contact mechanism as an explanation of the image formation, in a way similar to the leaves imprint in old herbaria. However, this hypothesis fails to consider that the HS image exists even where the cloth would not have been in contact with the body, like, for example, the space between the nose and cheeks.

3. 3. Gas Diffusion Hypothesis

Paul Vignon first in 1902, and others later, proposed a diffusion mechanism (vaporigraph hypothesis) to explain the formation of the body image. Specifically, he proposed that decomposition gases (ammonia vapor) developed between the corpse and the linen sheet which could have reacted with the cloth, triggering a chemical reaction of the linen. Raymond Rogers with Anna Arnoldi [21] proposed a mechanism based on the Maillard reaction.

The supposed Maillard reaction is similar to caramelization and results from a reaction between an amino acid and a reducing sugar. It must be pointed out that Ref. [21] hypothesizes that the sugars necessary for the reaction were left on the HS from the manufacturing process, but we know that the color is uniformly distributed around the external circumference of the single linen fiber (Features F19 and F20). Since there is contact between fiber and fiber within the thread, precisely in this contact area, the thickness of the filler material, hypothetically deposited during the manufacturing procedure, should be greater for capillarity.

Secondly, Ref. [21] supposes that the amines were produced by the decomposition of the corpse, but this goes against the evidence of the HS (Feature F11) as the corpse was wrapped with antiputrid substances for no more than forty hours, thus not allowing the formation of putrefaction gases.

The third problem pertains to the temperature in which the Maillard reaction develops, because, from experimental results of Ref. [21] a temperature of 66 °C (151 F) was needed to properly color a linen fabric while the corpse temperature does not exceed 25 °C (77 F) or less.

Experimental results reveal the poor image-making, and in particular, the following features are not satisfied: F4, F5, F7, F9, F11, F14, F17, F18, F19 and F20.

3. 4. Radiation Hypothesis

Given that the body image is visible on the linen fabric where there was certainly no contact between the body and the cloth (Feature F6), many scholars have supposed that it was a radiation, i.e. a phenomenon acting at a distance, to form the body image.

John Jackson supposed the “Fall-Through Hypothesis”, see Ref. [22]: the body wrapped in the HS became radiant with energy, predominantly of vacuum ultraviolet range and visible light, and, at the same time, the body became mechanically transparent which allowed the HS to fall through the radiant body as a result of gravity.

This hypothesis appears to be congruent with many body image characteristics, but it clearly adds two miracles: first, that the body gave off radiant energy and, second, that the body became mechanically transparent. The hypothesis seems to also have some problems in reproducing Features F4, F14 and F17-F20 but worth of note is the fact that it predicted Feature F7 detected some year later in Ref. [23]. Other scholars, see Ref. [24], used excimer lasers to test part of Jackson’s hypothesis. However, this laser was unable to satisfy Features F7 and F20. Moreover, it only colored a small area of a few square centimeters (about a square in).

Various hypotheses based on a radiative source of different kinds have been proposed by different scholars, but all of them, excluding those related to electric fields presented in the next Section 3.5 and that related to the "Fall Through" hypothesis, seem unable to satisfy the Features F7 and F15 and therefore are not considered here.

3. 5. Corona Discharge Hypothesis

A particular radiation hypothesis is related with the Corona Discharge (CD) produced by an intense electric field; it was first hypothesized by Arthur Loth in 1900 who supposed a bolt of lightning to explain the body image and it is described in Ref. [25] also with experimental results, see Fig. 3.

Some scholars such as Francesco Lattarulo and Giovanna De Liso proposed a CD of natural origin perhaps related to an earthquake. Other scholars like Oswald Scheuermann, Giovanni Battista Judica Cordiglia, and Eberhard Lindner supposed an electric phenomenon

similar to CD of the corpse wrapped in the HS, however, they had no success in explaining the physical cause of the radiation. Some of them referred to the energy produced by the body of Jesus during the Resurrection and Alan Adler [26], to explain the CD, supposed the presence of a ball lightning in the sepulcher. We note here that Feature F7 is precisely a feature of images produced by CD. Therefore, the hypothesis of CD triggered by an intense electric field seems one of the most reliable explanations even if Feature F20 has not yet been obtained in the experimental results.

This is where the electrical discharges measured in the Holy Sepulcher that produce HF come into play: what cannot be reproduced in the laboratory can be observed every year in Jerusalem. It is precisely this fundamental point that binds the HF to the HS and to its body image which has, thus far, not been reproducible by human means.



Figure 3. On the left, a 1:2 scale manikin built on the results of numeric experimental studies on the HS. On the right, the negative frontal body image obtained from a HS-like sheet enveloping a similar manikin covered with conductive paint and put through a 300,000 V electric field. The negative pole has been, in this case, directly connected to the foot on the manikin. The ground consisted of a plate over the manikin. CD happened in correspondence with the linen sheet.

3. 6. Medieval Photography Hypothesis

N. Allen [27] to explain the HS body image hypothesized a permanent photographic negative on linen made in the Middle Ages which used the following substances: silver nitrate solution, ammonia solution, linen cloth and a natural quartz biconvex magnifying glass to focus the image of a deceased on a linen sheet placed in a darkroom and illuminated by direct sunlight for a few days.

A negative image would have formed on the TS impregnated with silver nitrate solution which would have been fixed by immersing it in an ammonia solution.

In addition to the fact that a photograph of this type is incompatible with the wrapping distortions found in the HS image (Features F12 and F13), this hypothesis does not satisfy Features F1, F4, F7, F17, 18, F20, F22, F23.

4. THE DIVINE PHOTOGRAPHY HYPOTHESIS

In 2019, the author [1], after analyzing in person the effects of HF2.10 on linen fabrics, see Section 1.1, formulated an initial hypothesis which relates the body image formation of the HS to the HF2.10, but some differences were successively detected between the experimental results and the body image of the HS. For this reason, a new formulation of the Divine Photography Hypothesis (DPH) is here presented in reference to the HF1.

We saw that one of the most reliable hypotheses for the formation of the HS's body image is one which is based upon CD. However, this hypothesis fails to explain some of the peculiar characteristics of the body image and is based on a high intensity electrical phenomenon which does not lend itself to a natural explanation for how such an electrical phenomenon could have occurred within a 2000-year-old sepulcher when the electric current had not yet been discovered.

To complete the explanation of the formation of the body image, the hypothesis of a chemical (Maillard) reaction of Section 3.3 based upon the contact between sugars and amines is, therefore, added to the hypothesis of CD formulated in Section 3.5.

We also saw that the HF is a very particular energetic phenomenon produced by intense electric fields that is scientifically unexplainable in a natural environment free of particular gases, but it repeats regularly every year in a particular place, the Holy Sepulcher. So, the energetic phenomenon of an electrical type, necessary to reproduce the image of the HS, is associated with the energy of the HF to arrive at a more complete explanation of the body image formation.

Here below is presented the DPH first describing the assumptions and then describing initial conditions, substrate reagents, energy, image transfer, 3-D effect, reaction and development. Additional details can be found in a book in press of the same author with Robert Siefker, entitled "*The Holy Fire and the Divine Photography: the Image of the Holy Shroud of Christ*" of Jenny Stanford Publishing.

4. 1. Assumptions

-1. The HS wrapped the body of Jesus Christ when He was laid in the rock-cut Sepulcher now enclosed by the Edicule of the Holy Sepulcher of Jerusalem.

-2. The Holy Bible, especially the Synoptic Gospels, provides us with realistic indications on how the events relating to the Passion, Death and Resurrection of Jesus Christ took place. In agreement with the Gospel of John [19:39] a mixture of myrrh and aloes weighing about one hundred pounds was used for burial and some scholars, see Refs. [28-29], detected the presence of aloe and myrrh on the HS. It is therefore possible to think that these substances, which are also composed of sugars, were used to form a particular amalgam of anti-putrid substances to be spread around the whole corpse before wrapping it in the HS.

-3. The amalgam of antiputride substances could have played a very important role in the formation of the body image; this could, in fact, have been a means of transmission between the cadaver and the sheet also of the post-mortal fluids exuded from the cadaver such as urea.

4. 2. Initial conditions

-1. The image was imprinted on a linen fabric probably previously treated to make it softer.

-2. The kidneys of Jesus, during the scourging, were seriously compromised with consequent production of a severe uremia that produced a considerable excess of urea in the blood.

-3. The corpse of Jesus unnailed and removed from the cross was then carried to the tomb where it was cleansed and smeared with an amalgam of anti-putrid substances including aloe and myrrh. This amalgam filled the empty space between the corpse and the HS that wrapped it and imbibed the HS too.

-4. The corpse remained wrapped in the HS for 30-40 hours placed in the humid environment of the tomb. In this period of time, the corpse exuded fluids rich in urea.

-5. The urea exuded from the corpse was absorbed by the amalgam which moistened the HS and then impregnated the linen fabric. Depending upon the thickness of the amalgam, and, correspondingly, the distance between the human body and the sheet, the concentration of urea varied from one area to another. Depending precisely on this concentration of urea, the three-dimensionality of the body image was, subsequently, imprinted on the HS.

4. 3. Substrate reagents

-1. The amines from urea formed the first part of the substrate for the DPH all around the linen fibers.

-2. Urea hydrolyzed by CD, which also heated the environment to temperatures around 50-100 °C, (122-212 °F), produced amines.

-3. Sugars from the aloe and myrrh contained in the amalgam were absorbed in the thin uniform outer layer of polysaccharides of the flax fibers forming the second part of the substrate layer for the DPH.

4. 4. Energy

-1. During the Resurrection, there was a light very similar to the HF1 and an intense electric field generated a CD. Instantaneously, the Body of Jesus became mechanically transparent with respect to the HS that collapsed under the force of gravity onto the sepulchral stone.

-2. The CD connected with the blue lightning of the HF1 produced light or energy necessary for the “photography” to form.

-3. The electric field produced electrons which were concentrated mainly at tips and protuberances of the linen fibers of the threads of the HS's fabric. The fibers, thus hit by the electron beam, produced selectively localized chemical reactions on the fibers closest to the emitting human body; therefore, striations due to the selective reaction along the charged fibers were produced. The chemical reaction took place circumferentially to the affected fibers, because the electrons are distributed along the whole surface of the most charged fibers.

4. 5. Image transfer

-1. The directionality of the electric field (like CD, having the lines of forces perpendicular to the emitting body, the human skin) allowed information relating to the human body to be encoded on the HS with sufficient resolution.

4. 6. 3-D effect

-1. The image intensity principally depends upon CD that follows an inverse square law with distance, typical of electric fields. Therefore, the parts of the body in contact with the linen sheet undergo a greater number of chemical reactions that tend to darken the fibers. The chemical reactions of the linen are reduced as the sheet stays away from the body, thus, encoding the three-dimensional information related to the body-cloth distance.

-2. The urea absorbed by the amalgam placed between the body and the sheet, which is the prime reactant of the Maillard reaction, reduces its concentration as the body-cloth distance increases, thereby, decreasing the browning of the linen fibers.

4. 7. Reaction

-1. The cold plasma in the Holy Sepulcher (similar to HF1) which contains negative ions, produced CD which caused amines and sugars to react at low temperature (<200 °C, <392 °F) to form the body image of the HS.

-2. Reducing sugars interacted with amino acids of the urea dissolved in the wet environment of the HS fabric, giving rise to the initial products of the Maillard reaction: a latent image resulted on the linen fabric.

4. 8. Development

-1. With time, the invisible defects produced by the Maillard reaction activated by the HF1 energy on the linen fibers oxidized and produced a visible image. In fact, initial products of the Maillard reaction lead to progressive browning of the HS fibers. In other words, the latent image produced on the HS linen slowly develops in time generating the double body image of the HS.

5. RESULTS

To verify the DPH, several laboratory tests were carried out by subjecting a 50 mm (1.99 in) bronze medal of John Paul II wrapped in a linen fabric to voltages ranging from 20 kV to 30 kV in the High Voltage Laboratory of the Department of Industrial Engineering of the University of Padua directed by prof. Giancarlo Pesavento. Many tests performed also varying the arrangement of the experimental apparatus have provided also some disappointing results

because it is not easy to find the optimal combination of the different conditions of exposure of the sample to the generated electric field and the optimal concentration of the substances used for the test such as urea, aloe and myrrh, but some results appear satisfactory.

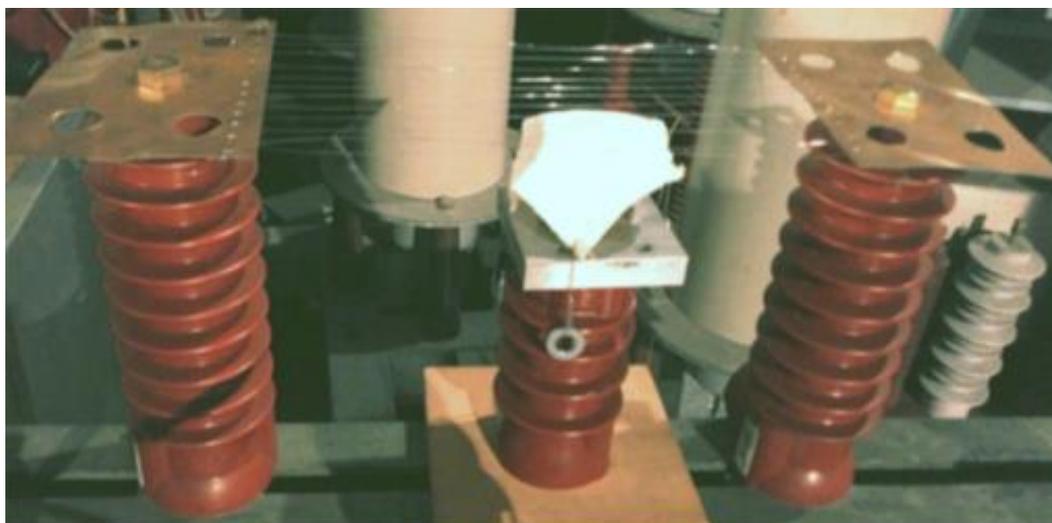


Figure 4. Experimental apparatus for the tests of DPH. A negatively charged bronze medal (25 kV) covered by a dry linen sheet previously impregnated with urea and myrrh is posed on a wooden support over the central red insulator. To increase the medal-sheet contact, two masses have been hung at the corners of the sheet. The two lateral insulators, instead, support a metal grid which is connected to the ground.



Figure 5. Experimental result seen in UV of the test described in Fig. 4 where a bronze medal subjected to CD produced a doubly superficial image on linen sheet. On the top the two

superficial images, front and back. On the bottom, the two images are directly compared with that of the bronze medal (on the left the image is mirrored).

Perhaps the best result obtained is that which was produced by the experimental apparatus shown in Fig. 4 where a linen sheet, after being impregnated with urea, was also impregnated with an alcoholic solution of myrrh and then dried; it then wrapped the medal. The experiment lasted for 24 hours. The resulting image is shown in Fig. 5 seen in UV. Fig. 6 also shows some 3D features of the image in question.

Since the experimental results reflect the features considered for the HS body image, it can, therefore, be concluded that, at least at the size of a bronze medal, the DPH is verified at an experimental level.



Figure 6. 3D rendering of the image of medal shown in Fig. 5.

6. CONCLUSIONS

It is well known that the double body image of the HS is still today not explainable and even less reproducible in all its extremely particular characteristics. However, various hypotheses of image formation have been formulated which attempt to explain at least partially what we observe on the most important Relic of Christianity.

The most realistic hypotheses refer to an intense radiation emitted by the corpse wrapped in the HS and for this reason most of them go beyond the purely scientific sphere because it does not appear that a corpse can emit radiation of such intensity. Consequently, many of these hypotheses refer to a phenomenon that comes out of traditional science, the Resurrection, which obviously cannot be reproduced in the laboratory.

This paper overcomes this problem by proposing as a hypothesis for the formation of the HS image an energy source very similar to the one that develops every year on Holy Saturday of the Orthodox Easter inside the Edicule of the Holy Sepulcher in Jerusalem: the HF. It is a fire connected with electromagnetic effects of high intensity which, during the first ten minutes

has a cold plasma that does not burn hair and beard of persons. In fact, it is not difficult to think that this miraculous phenomenon which is reproduced every year and which is measurable with scientific means is very similar to what happened on Easter Sunday about 2000 years ago.

According to the new hypothesis of DPH formulated here, the energy of electric type, connected to the CD, would have interacted with the body fluids exuded by the corpse to form an image on the HS. Anti-putrid substances such as aloe and myrrh, acted like a photographic film where the body image would have formed through a Maillard chemical reaction, which took place between the reducing sugars contained in the linen fabric and the amines contained mainly in the urea exuded from the cadaver.

Complete experiments have not yet been performed to verify this hypothesis due to the difficulty of accessing the Holy Sepulcher on the Holy Saturday, but some experiments conducted in the High Tensions laboratory of the Department of Industrial Engineering of the University of Padua under the guidance of prof. Giancarlo Pesavento have provided very encouraging results that seem to reproduce, even if in samples of reduced sizes, the very peculiar features of the HS body image.

The author is therefore convinced that the DPH here described and also supported by some experimental results can be the right avenue to the explanation of the body image on the HS. Additional details can be found in a book in press of the same author with Robert Siefker, entitled “*The Holy Fire and the Divine Photography: the Image of the Holy Shroud of Christ*” of Jenny Stanford Publishing.

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