The shroud by Leonardo Da Vinci - Sudari

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Was Turin Shroud faked by Leonardo da Vinci?

By Alastair Jamieson

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The Turin Shroud was faked by Renaissance artist Leonardo da Vinci using pioneering photographic techniques and a sculpture of his own head, a television documentary claims.

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The artefact has been regarded by generations of believers as the face of the crucified Jesus Photo: GETTY/CHANNEL FIVE

A study of facial features suggests the image on the relic is actually da Vinci's own face which could have been projected into the cloth.

The artefact has been regarded by generations of believers as the face of the crucified Jesus who was wrapped in it, but carbon-dating by scientists points to its creation in the Middle Ages.

American artist Lillian Schwartz, a graphic consultant at the School of Visual Arts in New York who came to prominence in the 1980s when she matched the face of the Mona Lisa to a Leonardo self-portrait, used computer scans to show that the face on the Shroud has the same dimensions to that of da Vinci.

“It matched. I'm excited about this,” she said. “There is no doubt in my mind that the proportions that Leonardo wrote about were used in creating this Shroud's face.”

The claims is made in a Channel Five documentary, to be shown on Wednesday night, that describes how da Vinci could have scorched his facial features on to the linen of the Shroud using a sculpture of his face and a camera obscura – an early photographic device.

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The programme says the fabric could have been hung over a frame in a blacked-out room and coated it with silver sulphate, a substance readily available in 15th century Italy which would have made it light-sensitive.

When the sun's rays passed through a lens in one of the walls, da Vinci’s facial shape would have been projected on to the material, creating a permanent image.

Lynn Picknett, a Shroud researcher and author, said: “The faker of the shroud had to be a heretic, someone with no fear of faking Jesus’ holy redemptive blood.

“He had to have a grasp of anatomy and he had to have at his fingertips a technology which would completely fool everyone until the 20th century.

"He had a hunger to leave something for the future, to make his mark for the future, not just for the sake of art or science but for his ego."

Art historian Professor Nicholas Allen, of Nelson Mandela Metropolitan University in South Africa, has called for more tests on the Shroud for the presence of silver sulphate, which causes a reaction with the sun's UV rays.

He said: "If you look at the Shroud of Turin as it appears to the naked eye, you see a negative image of a human being, and if you take a photograph of that you produce a positive image of that human being, which means the shroud is acting as a negative.

"That in itself is a very good clue that it was made photographically."

Radiocarbon dating in 1988 showed the cloth was made between 1260 and 1390.

The programme explains the theory that da Vinci's forgery was commissioned to replace an earlier version that was exposed as a poor fake, which had been bought by the powerful Savoy family in 1453 only to disappear for 50 years. When it returned to public view, it was hailed as a genuine relic, and experts say it was actually the artist's convincing replica.

American Professor Larissa Tracy, of Longwood University in Virginia, told the programme: "Da Vinci had the necessary skills. He knew enough about anatomy and about the physical muscular structure of the body. Da Vinci had all the skills to create an image like the shroud. If anybody had the capacity to work with camera obscura or early photographic technique, it was Leonardo Da Vinci."

However Professor John Jackson, director of the Turin Shroud Centre of Colorado, who believes the item dates from the time of Jesus's crucifixion, dismissed the programme's findings and said the earliest known record of the Shroud appears on a commemorative medallion struck in the mid-14th century and on display at the Cluny Museum Paris, he added.

"It clearly shows clerics holding up the shroud and is dated to around 100 years before Leonardo was born. There is no evidence whatsoever that Leonardo was involved in the shroud."

The professor believes the radiocarbon dating of the shroud was wrong because the sample was contaminated.

Theories of image formation
The image on the cloth is entirely superficial, not penetrating into the cloth fibers under the surface, so that the flax and cotton fibers are not colored. Thus the cloth is not simply dyed, though many other explanations, natural and otherwise, have been suggested for the image formation.

Miraculous formation
Many believers consider the image to be a side effect of the Resurrection of Jesus, sometimes proposing semi-natural effects that might have been part of the process. These theories are not verifiable, and skeptics reject them out of hand. Some have suggested that the shroud collapsed through the glorified body of Jesus. Supporters of this theory point to certain X-ray-like impressions of the teeth and the finger bones. Others suggest that radiation caused by the miraculous event may have burned the image into the cloth. Another cloth known as the Sudarium of Oviedo located in Spain, answers the argument against the veracity of the shroud due to the Jewish custom to separately wrap the head.

Carbohydrate layer
A scientific theory that does not rule out the association of the shroud with Jesus involves the gases that escape from a

dead body in the early phases of decomposition. The cellulose fibers making up the shroud's cloth are coated with a thin carbohydrate layer of starch fractions, various sugars and other impurities. This layer is very thin (180 – 600 nm) and was discovered by applying phase contrast microscopy. It is thinnest where the image is and appears to carry the color, while the underlying cloth is uncolored. This carbohydrate layer would itself be essentially colorless but in some places has undergone a chemical change producing a straw yellow color. The reaction involved is similar to that which takes place when sugar is heated to produce caramel.

In a paper entitled "The Shroud of Turin: an amino-carbonyl reaction may explain the image formation,"[10] Raymond N. Rogers and Anna Arnoldi propose a natural explanation. Amines from a human body will have Maillard reactions with the carbohydrate layer within a reasonable time, before liquid decomposition products stain or damage the cloth. The gases produced by a dead body are extremely reactive chemically and within a few hours, in an environment such as a tomb, a body starts to produce heavier amines in its tissues such as putrescine and cadaverine. These will produce the color seen in the carbohydrate layer. But it raises questions about why the images (both ventral and dorsal views) are so photorealistic and why they were not destroyed by later decomposition products (a question obviated if the Resurrection occurred, or if a body was removed from the cloth within the required timeframe).

Auto-oxidation

Christopher Knight and Robert Lomas claim that the image on the shroud is that of Jacques de Molay, the last Grand Master of the Order of the Knights Templar, arrested for heresy at the Paris Temple by Philip IV of France on October 13, 1307. De Molay suffered torture under the auspices of the Chief Inquisitor of France, William Imbert. His arms and legs were nailed, possibly to a large wooden door. According to Knight and Lomas, after the torture de Molay was laid on a piece of cloth on a soft bed; the excess section of the cloth was lifted over his head to cover his front and he was left, perhaps in a coma, for perhaps 30 hours. They claim that the use of a shroud is explained by the Paris Temple keeping shrouds for ceremonial purposes.[6]

De Molay survived the torture but was burned at the stake on March 19, 1314, together with Geoffroy de Charney, Templar preceptor of Normandy. De Charney's grandson was Jean de Charney who died at the battle of Poitiers. After his death, his widow, Jeanne de Vergy, purportedly found the shroud in his possession and had it displayed at a church in Lirey.

Knight and Lomas base their argument partly on the 1988 radiocarbon dating and Mills 1995 research about a chemical reaction called auto-oxidation, and they claim that their theory accords with the factors known about the creation of the shroud and the carbon dating results.

Photographic image production

Some viewers see a strong resemblance between this alleged self-portrait of Leonardo da Vinci and the Man of the Shroud.

Skeptics have proposed many means for producing the image in the Middle Ages. Lynn Picknett and Clive Prince [11] proposed that the shroud is perhaps the first ever example of photography, showing the portrait of its alleged maker, Leonardo da Vinci. According to this theory, the image was made with the aid of a "magic lantern", a simple projecting device, or by means of a camera obscura and light-sensitive silver compounds applied to the cloth.

However, da Vinci was born a century after the first documented appearance of the cloth. Supporters of this theory thus propose that the original cloth was a poor fake, for which da Vinci created a superior hoax and substituted it, although no contemporaneous reports indicate a sudden change in the quality of the image. There exists in the Turin Library an image of an old man, thought to be a self portrait of Leonardo da Vinci, and because this image depicts a man with prominent brow and cheekbones and a beard, some have seen in it a likeness to the image on the Shroud and suggested that as part of a complex hoax, (and to thumb his nose at the Church) da Vinci may have placed his own portrait on the Shroud as the face of Christ.

It should be noted that Picknett and Prince's theories, appealing as they are to the imagination, are not taken seriously by most academic scholars. They are based upon many suppositions. It is not at all certain that the figure represented in the Turin Library's drawing is actually Leonardo da Vinci. The notion proposed by them that da Vinci was a non-Christian heretic or pagan is similarly rejected by historians.

Painting

In 1977, a team of scientists selected by the Holy Shroud Guild developed a program of tests to conduct on the Shroud, designated the Shroud of Turin Research Project (STURP). Cardinal Ballestrero, the archbishop of Turin, granted permission, despite disagreement within the Church. The STURP scientists conducted their testing over five days in 1978. Walter McCrone, a member of the team, upon analyzing the samples he had, concluded in 1979 that the image is actually made up of billions of submicron pigment particles. The only fibrils that had been made available for testing of the stains were those that remained affixed to custom-designed adhesive-backed tape applied to thirty-two different sections of the image. (This was done in order to avoid damaging the cloth.) According to McCrone, the pigments used were a combination of red ochre and vermilion tempera paint. The Electron Optics Group of McCrone Associates published the results of these studies in five articles in peer-reviewed journals.[12] STURP, upon learning of his findings, confiscated McCrone's samples and brought in other scientists to replace him. In McCrone's words, he was "drummed out" of STURP, and continued to defend the analysis he had performed, becoming a prominent proponent of the position that the Shroud is a forgery.

Other microscopic analysis of the fibers seems to indicate that the image is strictly limited to the carbohydrate layer, with no additional layer of pigment visible. Proponents of the position that the Shroud is authentic say that no known technique for hand-application of paint could apply a pigment with the necessary degree of control on such a nano-scale fibrillar surface plane.

In the television program "Decoding The Past: The Shroud of Turin", The History Channel reported the official finding of STURP that no pigments were found in the shroud image, and multiple scientists asserted this conclusion on camera. No hint of controversy over this claim was suggested. The program stated that a NASA scientist organized STURP in 1976 (after being surprised to find depth-dimensional information encoded within the shroud image); no mention of the Holy Shroud Guild was made.

Solar masking, or "shadow theory"

In March 2005, Nathan Wilson, an instructor at New Saint Andrews College and amateur sindonologist, announced in an informal article in Books and Culture magazine that he had made a near-duplicate of the shroud image by exposing dark linen to the sun for ten days under a sheet of glass on which a positive mask had been painted. His method, though admittedly crude and preliminary, has nonetheless attracted the attention of several sindonologists, notably the late Dr. Raymond Rogers of the original STURP team, and Dr. Antonio Lombatti, founder of the skeptical shroud journal Approfondimento Sindone. Wilson's method is notable because it does not require any conjectures about unknown medieval technologies, and is compatible with claims that there is no pigment on the cloth. However, the experiment has not been repeated and the images have yet to face microscopic and chemical analyses. In addition, concerns have been raised about the availability or affordability of medieval glass large enough to produce the image, and the method's compatibility with Fanti's claim that the original image is doubly superficial.

Using a Bas-Relief

Another theory suggests that the Shroud may have been formed using a bas-relief sculpture. Researcher Jacques di Costanzo, noting that the Shroud image seems to have a three-dimensional quality, suggested that perhaps the image was formed using an actual three-dimensional object, like a sculpture. While wrapping a cloth around full life-sized statue would result in a distorted image, placing a cloth over a bas-relief would result in an image like the one seen on the shroud. To demonstrate the plausibility of his theory, Constanzo constructed a bas-relief of a Jesus-like face and draped a wet linen over the bas-relief. After the linen dried, he dabbed it with ferric oxide and gelatine mixture. The result was an image similar to that of the Shroud. Instead of painting, the bas-relief could also be heated and used to burn an image into the cloth.

Second Image on back of cloth

During restoration in 2002, the back of the cloth was photographed and scanned for the first time. Giulio Fanti and Roberto Maggiolo of the University of Padua, Italy, published findings that describe an image on the reverse side, much fainter than that on the other side, consisting primarily of the face and hands.[13] Like the front image, it is entirely superficial, with coloration limited to the carbohydrate layer. The images correspond to, and are in registration with, those on the other side of the cloth. No image is detectable in the dorsal view section of the shroud.

Supporters of the Maillard reaction theory point out that the gases would have been less likely to penetrate the entire

cloth on the dorsal side, since the body would have been laid on a stone shelf. At the same time, the second image makes the photographic theory somewhat less probable.

Analyses of the Shroud

Radiocarbon dating

In 1988, the Holy See permitted three research centers to independently perform radiocarbon dating on portions of a swatch taken from a corner of the shroud. All three, Oxford University, the University of Arizona, and the Swiss Federal Institute of Technology agreed with a dating in the thirteenth to fourteenth centuries (1260-1390), although recently published chemical analysis (see below) indicates that the sample used was invalid (it is possible that the material used may have come from one of the patches used to repair it from fire in 1532 - all the patches were removed during a restoration in June 2002). The scientific community had asked the Holy See to authorize more samples, including from the image-bearing part of the shroud, but this request was refused. One possible account for the reluctance is that if the image is genuine, the destruction of parts of it for purposes of dating could be considered sacrilege. Another possible explanation is a reluctance to have the shroud definitively dated.

Radiocarbon dating under typical conditions is a highly accurate science, and for materials up to 2000 years old can often produce dating to within one year of the correct age. Nonetheless, there are many possibilities for error as well. It was developed primarily for use on objects recently unearthed or otherwise shielded from human contact until shortly before the test is conducted, unlike the shroud. Dr. Willi Wolfli, director of the Swiss laboratory that tested the shroud, stated, "The C-14 method is not immune to grossly inaccurate dating when non-apparent problems exist in samples from the field. The existence of significant indeterminate errors occurs frequently."

Bacterial residue

Several phenomena have been cited that might account for possibly erroneous dating. Those supporting image formation by miraculous means point out that a singular resurrection event could have skewed the proportion of Carbon-14 in the cloth in singular ways. Naturalistic explanations for the discrepancy include smoke particles from the fire of 1532 and bacterial residue that would not have been removed by the testing teams' methods.

The argument involving bacterial residue is perhaps the strongest, since there are many examples of ancient textiles that have been grossly misdated, especially in the earliest days of radiocarbon testing. Most notable of these is mummy 1770 of the British Museum, whose bones were dated some 800 – 1000 years earlier than its cloth wrappings. Pictorial evidence dating from c. 1690 and 1842[14] indicates that the corner used for the dating and similarly several evenly-spaced areas along one edge of the cloth were handled each time the cloth was displayed, the traditional method being for it to be held suspended by a row of five bishops. These small areas of the cloth had increased likelihood of contamination by bacteria and bacterial residue. Bacteria and associated residue (bacteria by-products and dead bacteria) carry additional carbon and would skew the radiocarbon date toward the present.

The nuclear physicist Harry E. Gove of the University of Rochester, who designed the particular radiocarbon test used, stated, "There is a bioplastic coating on some threads, maybe most." According to Gove, if this coating is thick enough, it "would make the fabric sample seem younger than it should be." Skeptics, including Rodger Sparks, a radiocarbon expert from New Zealand, have countered that an error of 13 centuries stemming from bacterial contamination in the Middle Ages would have required a layer approximately doubling the sample weight. Because such material could be easily detected, fibers from the Shroud were examined at the National Science Foundation Mass Spectrometry Center of Excellence at the University of Nebraska. Pyrolysis-mass-spectrometry examination failed to detect any form of bioplastic polymer on fibers from either non-image or image areas of the shroud. Additionally, laser-microprobe Raman analysis at Instruments SA, Inc. in Metuchen, NJ, also failed to detect any bioplastic polymer on shroud fibers.

Chemical properties of the sample site

Another argument against the results of the radiocarbon tests was made in a study by Anna Arnoldi of the University of Milan and Raymond Rogers, retired Fellow of the University of California Los Alamos National Laboratory. By ultraviolet photography and spectral analysis they determined that the area of the shroud chosen for the test samples differs chemically from the rest of the cloth. They cite the presence of Madder root dye and aluminum oxide mordant (a dye-fixing agent) specifically in that corner of the shroud and conclude that this part of the cloth was mended at some point in its history. Plainly, repairs would have utilized materials produced at or slightly before the time of repair, carrying a higher concentration of carbon than the original artifact.

A 2000 study by Joseph Marino and Sue Benford, based on x-ray analysis of the sample sites, shows a probable seam from a repair attempt running diagonally through the area from which the sample was taken. These researchers conclude that the samples tested by the three labs were more or less contaminated by this repair attempt. They further note that the results of the three labs show an angular skewing corresponding to the diagonal seam: the first sample in

Arizona dated to 1238, the second to 1430, with the Oxford and Swiss results falling in between. They add that the variance of the C-14 results of the three labs falls outside the bounds of the Pearson's chi-square test, so that some additional explanation should be sought for the discrepancy.

Microchemical tests also find traces of vanillin in the same area, unlike the rest of the cloth. Vanillin is produced by the thermal decomposition of lignin, a complex polymer and constituent of flax. This chemical is routinely found in medieval materials but not in older cloths, as it diminishes with time. The wrappings of the Dead Sea scrolls, for instance, do not test positive for vanillin.

Raymond Rogers' 2005 paper provided apparent chemical proof that the sample cut from the Shroud in 1988 was not valid.[15] Also in the paper, his determination of the kinetics of vanillin loss suggests the shroud is between 1,300 and 3,000 years old.

This aspect of the controversy can likely only be settled by more radiocarbon tests, which, as noted, the Holy See does not presently allow, citing sacrilegious damage to the relic. In his 2005 paper, Rogers suggests that elemental carbon in pieces of charred material removed during the restoration in 2002 could be used to date the shroud if cleansed using concentrated nitric acid.

Material historical analysis
According to master textile restorer Mechthild Flury-Lemberg of Hamburg, a seam in the cloth corresponds to a fabric found only at the fortress of Masada near the Dead Sea, which dated to the first century. The weaving pattern, a 3:1 twill, is consistent with first-century Syrian design, according to the appraisal of Gilbert Raes of the Ghent Institute of Textile Technology in Belgium. Flury-Lemberg stated, "The linen cloth of the Shroud of Turin does not display any weaving or sewing techniques which would speak against its origin as a high-quality product of the textile workers of the first century."