

Unique Nature of the Shroud of Turin Demonstrated by Radiocarbon C-14 Tests in 1988 Revisited. by Carl F. Swinehart

It is unfortunate that the C-14 tests on the Shroud were ever calculated in years because the cry "Fake" should have been anticipated. Just by luck of the draw or the snip, the answers could have been -600 or -60,000 not 690YBP (1950).

After eleven years of name calling, pointless excuses and complex calculations just for age, variance was noted but misdirected to three testers not its meaning. Nobody, yes nobody has asked how both sides could be correct. The exact date or C-14 content is insignificant. The range of 240 or 275 years, about ten times normal for linen and that there is considerably more C-14 than expected are the keys to an explanation that is long overdue.

This variance and excess C-14 show that the Shroud witnessed a unique event not repeated on Planet Earth by 1999. Namely the exposure to a high flux of extremely potent radiation. Like cosmic rays at an unheard of rate. These rays converted N-14 in combined nitrogen in the linen into C-14, many of which escaped, but leaving enough to account for those found in 1988.

Normally linen contains 10 atoms of N-14 for the excess of C-14 found, so there are enough, not knowing the intensity of exposure. In some unknown but real way the wide range of C-14 content has meaning about the uncommon exposure that the Shroud experienced not sloppy test work by three laboratories. They worked with grab samples not homogeneous samples.

I am not proposing more tests on the Shroud until negative ages are found, but I do think the C-14 tests in 1988 join and agree with the other studies like pollen, weaving, etc. to which I now add yet another link to the origin of the linen.

Radiograph images show the linen of the Shroud is much more opaque than the backing, which must be of comparable thickness (Fig 1&2 -Adler et al. 1997). This could mean that the flax for the Shroud grew in an arid climate in fields irrigated with hard ground water such as in the Near East or in Egypt, while the flax for the backing was grown where there was ample rain fall such as Europe.

From the scanning electron microprobe spectroscopy on one fiber, Adler gives an analysis for Na, Mg, Al, Cl, K and Ca. From these we estimate the CO_3^{-2} content and that 2.65% of the cellulose grew from HCO_3^- in the ground water and 97.35% from the CO_2 in the air. A more exact measure of CO_3^{-2} could be made with a 0.01 gram sample for true infrared fingerprint spectrum but from the above the age computes to 2073 YBP for C-14 if the Shroud had not been exposed to enough cosmic rays above normal to show 690 +/- 120 YBP in the 1988 tests.

Duplicating the x-ray densities and analysis of the Shroud by hydroponic growth of flax in hard water and maceration (retting) in sea water should be an interesting study. With linen samples made in this way, exposure to Co-60 gammas may produce color without pigment. Exposures up to 2 X (10 to the sixth power) rad. should be tried and the age measured by C-14 counting. (Article copyrighted 1999)

Reference Adler A D, Alan Whanger and Mary Whanger (1997) Concerning the Side Strip of the Shroud of Turin; <http://www.shroud.com/adler2.html>

**Holes Can Show the Shroud of Turin, Italy and Cloth of Oviedo, Spain are Authentic
with Image Dependent on a Missing Napkin and an Element Missed in Analysis.**

By Carl F. Swinehart, Ph.D.

November, 2000

When all else fails, read the instructions. In this case the Bible, John (20: 6,7) says there were three linen clothes in the tomb after the resurrection of Christ. Matthew (28: 2-4) says of the angel “his countenance was like lightning and his raiment white as snow”.

For this story, the value of white linen, something like lightning and three clothes are important. Also seven pins in Christ’s image on the Shroud in the Oviedo cloth (Wilson, 2000 p. 28) that covered the head of by a right handed person on someone’s shoulders while still on the cross and left on the head under a missing napkin.

To be one hundred percent sure, images of 2.5 cm. pins on the Shroud should be aligned with pairs of black pin holes in the Oviedo cloth with pictures already taken of both. Also the exact location of ten nails or holes for them is needed by instrumental means under the marble covering of the limestone slab in the tomb in the Church of the Holy Sepulchre, Jerusalem.

One old and three new physical items from or in the Shroud connect it with the Holy Sepulchre. These items add to evidence that the Shroud of Turin was the cloth of Edessa Mesopotamia, now Urfa Turkey which was missing after Constantinople was sacked in 1204 by the Crusaders. The Oviedo Cloth moved from Jerusalem in the 7th Century reaching to northern Spain by the way of north Africa with its history complete since 1075 holds the key to authenticity of the Shroud.

The first connection established by Dr. Joseph Kohlbeck, (Wilson, 1998 p 104-106) is by uncommon aragonitic limestone vacuumed from the underside of the Shroud c.1986. X-ray diffraction matches this dust to a hot spring deposit in Jerusalem. The new tomb was hewn out of a vertical west wall left by quarrymen in removing most of the deposit. High above the water table accounting for the action of lightning under ground.

The second connection is holes called “poker holes”, (Markwardt, 1998), (Wilson, 1998 p.66), now known to be pin and nail holes enlarged by something “like lightning” where cloth was held on the body. Most were pinned from below so that the ends of the pins are next to the stone slab of the tomb. When lightning struck the electrical field around the metal pin instantly charred the cloth making an elongated hole 1 x 1.5 cm. with very black inner edge and no frayed or raveled threads.

Fig. 4 of Mottern (1980) shows four pin holes for two pins in the bottom layer in the Shroud at the right side. This is a radiograph by x-rays in which the holes are black. In the field of view, there are 10 spatter holes .025 to .16 cm in diameter. Actually the smallest of these holes may have been pulled open by sticky tape. Heller (1981) found Fe_2O_3 , that may be from iron pins but did not give the location on the Shroud.

Wilson (2000) p 136-137, shows two black edged spatter holes 0.2 and 0.1 cm. in diameter. These are a second form of spatter holes from energy thrown off the end of a pin and look like smaller pin holes. The stone slab in the tomb was marked by sparks of metal oxide from the ends of the pins. This action by something “like lightning” (St. Matthew 28: 2-4) can be duplicated in detail in a microwave oven.

Caution: The overload breaker does not protect all circuits every time. In my oven part of the LCD used in resetting no longer operates.

St Matthew’s sources must have been watchmen hired by Chief Priests who “Became as dead men” before the women came and found the stone rolled back.

A feature in the bottom half of the Shroud are ten nail holes. They held the cloth to the stone so the body could be placed. Eight burned free when lightning struck but the two under the body may have been pulled.

Both nail and pin holes show in back lighted pictures on page 71 of Wilson, (2000 except for the ends cropped off by the printer. These pin, spatter and nail holes are the third connection with the resurrection not previously recognized.

Without moving the stone slab, in the tomb, in the Church of the Holy Sepulchre has a very complex history for the structures around it. Its authenticity and existence of marks are well documented. Before his death in 959 Constantine Porphyrogenitus (rightful heir to the Byzantine throne usurped by Romans) covered the dusty limestone slab with marble leaving three peep holes so pilgrims could see the marks (Wilson, 1998 p 268).

In checking the marks or peep holes and nail holes with a copy of the Shroud of Turin allow for shrinkage of about 3%. From its content of soluble salts by Adler (1998) the linen is "as woven"; not washed, but heated in vegetable oil, Maroni (1997) as infrared spectra run by Adler (1996) verify, Swinehart (2000).

Pictures of the Shroud of Turin show an increase in image density and contrast at a straight line at the collarbone. Also the face is more easily seen than the back of the head. The first set of pin holes at the shoulder could have held the missing napkin of 84x53 cm. Because there are no corresponding holes in the top layer of the shroud. This could have been the Mandylion of Edessa. If so its image would have been right to left of the Shroud and it would have two pairs of holes 5-7 cm. apart separated by 61 cm. to match the Shroud.

Adler (1996) matched the blood type and spot shape for the Oviedo cloth and the Shroud, but holes for about 20 pins in the cloth are in pairs 1 cm. apart while all in the shroud are 5-7 cm. apart. However the face on the Shroud shows seven 2.5 cm. pins in the life size picture by Giuseppe Ernè in 1931 (Wilson, 2000 p. 28). The back has a jumble of allergy blotches and four pins (ibid p. 57) at approximately .34x enlargement. The top of the head and back should be compared with the same for the Oviedo cloth to search for specific images of pins on the Shroud for pairs of black spots on the Oviedo cloth.

This is the fourth physical connection and not previously pointed out, even if the image formation has not been duplicated.

Radiant energy seems to be part of the image and one might expect the image to be dimmer through the napkin and be wrong. There are at least 12 kinds of radiation for how they react with matter and the high mineral content of the "as woven" Shroud linen could make it different from a washed napkin. Especially if a little vinegar or lemon was used in washing. To duplicate the linen of the Shroud, Adler (1997) gives 8.7% Na, 0.9% Mg, 2.0% Al, 3.1% Cl, 4.3% K and 8.5% Ca.

As Compounds most likely present:

Sodium Bicarbonate = 23.8

Sodium chloride = 5.1

Magnesium Carbonate = 3.1

Alumina (bayer process) = 5.7

Potassium bicarbonate = 11.0

Vaterite CaCO_3 = 21.3

This is based on weight as indicated but that leave only 30% for cellulose and nitrogen compounds. If the base were carbon content multiply the above by 0.4.

For work on image formation these salts should be taken into account and Allen (1995 or 1996) says “the negative image itself is essentially the enigmatic discoloration of the uppermost fibers of the linen threads which constitute the Shroud’s fabric. This image has not penetrated the threads on the sense that it is not visible on the underside of the Shroud”.

If neutrons with just the right energy were evolved in resurrection they could have been modified by washed linen clothes and absorbed near the surface of the “as woven” Shroud. Chloride with a cross-section of 33.3 in the highest absorber of the elements reported by Adler. He could have missed Boron or the rare earths.

Even though Lithium at 71 absorbs and can be found in mineral springs in fertile areas it should have been reported with Na and K , if present. Boron at 700 is a better choice for absorbing thermal neutrons and the high value placed on white cloth, 17 centuries before chemical bleach could have justified the extra work.

Flax grown with hard groundwater to account for 8.5% Ca would have been taken some distance into a desert in Asia Minor to a borax pond and submerged as bundles for ritting for about a month. The white fibers separate from the woody stems and seeds were spun and used “as woven” for the Shroud (sindon).

For himatta and sudarium (napkins) the harsh feel was softened by scratching with a wire tool while still on the loom and washing with a little lemon.

The brightest places on the Shroud’s image are bruises or blotches from allergy or stress not blood per Wilson, (2000 p. 70) or Adler (1996). These are located in the image on the forehead, back of the head, arms and small of the back. At nails in wrists and feet, the image is also bright but the blotches in back of the head are important because they are also on the Oviedo cloth (Adler, 1996). This needs a new study because it proves both were on the body during resurrection. Infrared is capable of telling the difference between stain, image and scorch. Finding an image on the Oviedo cloth is of primary importance. Also it is quite possible that infrared spectra can find the change in hydroxyl frequencies for an image in the scratches on the “reverse” side of the Oviedo cloth. Even though previous studies failed to find a face (Guscin, 1998 p.21).

Copies printed light of the face on the Shroud (Wilson, 2000 p 28) show disks in the eyes. These Francis L. Filas identified as coins. “Ruined” leptons issued by Pontius Pilot after 29 AD (Guscin, 1998 p 41-43). Guscin questioned the exact meaning of “ruined” for a new coin with letters still visible. If the word for “ruined” could also be translated simulated (not for circulation) and if the metal were copper rather than bronze, silver or gold. This would be consistent with the use of ‘C’ instead of ‘K’ in an partial inscription. Also if neutrons were involved in the image formation, copper coins would be hard to see because copper is transparent to them.

Summary

Previously I have shown how the C-14 content of the Shroud could increase and give a falsely young age (Swinehart, 1999 & 2000). There are six physical reasons for the Shroud of Turin being the cloth of Edessa until 1204 (Swinehart, 2000).

Now three new and one old items of physical evidence show that the Shroud of Turin covered a body in the Holy Sepulchre when it was struck by something “like lightning” and with a napkin left in the resurrection of Christ according to the four Gospel’s accounts.

The image on the Shroud shows seven common pins on the face and hair and a jumble of pins and folds at the back of the head. Exact alignment of a pin in the shroud’s image to two black spots or holes in the Oviedo cloth is needed for proof of authenticity. Along with locating nails or holes in the stone slab at the Holy Sepulchre.

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The Truth will out

The Shroud of Turin was the Cloth of Edessa in 675 Traceable to the Holy Sepulchre not a Medieval Fake

The Pyramids are not 374 Years older than History

**Radiocarbon dating Needs to Come into the 21st Century
Based on 2000 with Samples not Changed by Transport at High Altitude**

By
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July 2000

Physical evidence that the Shroud of Turin was the Cloth of Edessa bridges gaps in history for the location of the Shroud all the way back to the Holy Sepulchre in Jerusalem. Edessa, now Urfa Turkey located 110 miles east of Antioch in Mesopotamia was an early center for Christians. This may have accounted for the burial cloth of Christ having been sent there by the Apostle Thomas.

For this connection the Shroud has yielded at least six items, five of which are traceable to the Cloth of Edessa and there is some hope that the missing corners can also be identified by their binding thread.

The Jerusalem connection is by way of very uncommon aragonitic limestone dust vacuumed from between the Shroud and the holland cloth backing c1986, Wilson (1998) p 104-106.

An explanation for the so called “poker holes” since they do not line up when the Shroud is folded flat is five long pins. Two of these held the cloth on each side near the midpoints and one at the feet. They could have been commonly used for grave cloths. If exposed to micro waves or radar beams, these pins will burn linen exactly like the poker holes and may mark the stone slab leaving a residue. The pins throw off sparks differently at its point than at its head and may not scorch between the holes. In the Holy Sepulchre, the stone slab has been covered with thin marble leaving three holes to show the marks. Data may exist for the analysis of the residue. Tests on the Shroud should include both poker hole edges and burnt linen from the 1532 fire. These should be tested for trace elements and thermoluminescence.

These holes and marks are a physical connection for the Shroud of Turin to the Cloth of Edessa and the Holy Sepulchre. Also indicated is the radiation involved in the resurrection had an extremely wide energy range 6.0×10^{-8} for the pins to 6.0×10^5 eV for making C-14 out of N-14, Swinehart (1999).

The Shroud yielded 26 varieties of mid eastern flower pollen and plant parts (straw and hay) in 1973 and 1978 with sticky tape. These could have become fixed to the Cloth of Edessa after it was boiled in oil, drained on straw and covered by flowers by the crowd of onlookers. Even though most were Moslim in 675 they respected the old relic for having saved Edessa from seige by the Persians.

The varieties of flowers can tell when and for long a time fresh flowers were added. This and the kind of vegetable oil could be significant for replication the test and avoiding spontaneous fire if folded too soon.

Muroni (1997) gives reference that the test by fire and boiling in oil was ordered by the fourth Caliph Muawiyah in 675. This caliph headed the Mohammedan religion and expanded the Muslim Empire from Damascus, 290 miles south west of Edessa.

First hand accounts of this test for paint may not exist, it was a mission that failed. Still it must have had a place in how Muslim’s regard Christ. Passing the test certainly saved the Cloth from distinction through the “iconoclasm” that lasted to about 743, Wilson (1998) p 267.

Gold coins issued by the Byzantine Emperor Justinian II based on the Cloth of Edessa resemble the image on the Shroud of Turin, Wilson (1998) p 267.

In 787, Leo, Lector of Constantinople at the Council of Nicacea says that he visited Edessa and saw “the holy image made without hands reved (spoiled as by nails) and adored by the faithful”, Wilson (1998) p 267. The same as the Shroud. This may be testimony but the image is physical and the only one reversed before photography c. 1800.

Today we have so many negative images that it is difficult to understand problems with description of the Cloth and Shroud. Resorting to specific like hands not reved or thumbs not showing. Possibly the best image description was by Nicholas Meserites in 1201 for the Cloth of Edessa in Constantinople before the city was

sacked in 1204 and the Cloth was missing. He invented a greek word that translates to “outlineless”. The Shroud was outlineless until 1898 when Secondo Pia took its first official picture and realized the image was reversed, Wilson (1998) p 145 & 146.

If the Cloth was folded at the resurrection the image may not have been discovered until it was at Edessa for a time.

Boiling in vegetable oil (olive, palm or linseed) in 675 (120-130°C) prolonged the life of the Cloth and left a resinified residue insoluble in toluene. This residue was found by the infrared spectra for 20 fibers removed from different places on the Shroud of Turin in 1978 and 1989.

Alder (1996) ran 19 of these spectra on single fibers taken by sticky tape and washed in toluene. Of these 19 he published 4 as representative. Along with a fiber from a warf thread of a radiocarbon sample that he may not have washed in toluene. All five show cellulose that has been heated to different temperatures and a substantial amount of resinified vegetable oil.

These curves show that Lambert’s Law for the path length and Beer’s Law for concentration should not be used to compute amounts from absorbance ratios. Wave lengths of bands are not changed and the vegetable oil resin is definitely more than normal in untreated linen.

For his interpretation of these spectra Fig 1 of Alder (1996), he was misled by the long list of possible compounds found by his computer search. He did not run linen fibers treated with hot vegetable oil.

An extensive study of linen from different sources and treatment with olive, palm, and linseed oils to different temperatures is needed before more work on the Shroud is considered. For the new work, spectra should be run 4000 to 200 cm^{-1} on KBr pellets made by the Wick-StickTM and True techniques, Swinehart(1999) to identify the vegetable oil and temperatures reached by the crystal forms of CaCO_3 , $\text{Al}_2\text{O}_3 \cdot x\text{H}_2\text{O}$ etc. CaCO_3 in linen is vaterite but can change to aragonite or calcite. The connection between the Shroud of Turin and the Cloth of Edessa by infrared needs no more tests on the Shroud.

Another possible connection is the two missing corners at each end of the side seam on the Shroud. They must have been slashed off by a single pass of a razor sharp cutlass by the Caliph’s envoy for his test by fire. When the smoke smelled of paint, linseed oil, as it should, he proceeded to heat the Cloth of Edessa in a bag in oil. We know it was stuffed in a bag because the limestone dust from Jerusalem was not all removed.

One indication that the repair was done in Edessa, that can be confirmed is by the linen thread added. Fine stitching on the cut edge resembles a salvage Alder (1997). Also the missing corners could have been described in records of the transfer of the Cloth of Edessa to Constantinople in 943, Wilson (1998).

The Byzantine Emperor Romansus sent an army 700 miles to Edessa. His general agreed in negotiating with the Muslims to perpetual immunity from attack, pay 12,000 pieces of silver and release 200 Muslim prisoners if the Bishop with the army accepted and received the Cloth on the Emperor’s behalf. Although there were attempts by the few Christians to hand over copies. Do any records indicate how the Bishop was satisfied he had the right Cloth of Edessa or someone may have described it on receipt in Constantinople? Missing corners are unique physical features but the side seam is not.

Alan Adler with Alan and Mary Whagner (1997) pose six unanswered questions about the side seam and missing panels. My answer for the first four is they were made by the weaver in about 20AD. They made burial cloths of different sizes including 1.1x 4.5 meters. With no hems but with no restriction on seams. For the last two questions the 4th Caliph’s envoy slashed off two corners for testing by fire in Edessa in 675.

The weaver like his ancestors on the same loom, for more than 500 years also made two sizes of himatta, 2x3 meters and 1.5x2 meters without seams or hems. To drape smoothly over the left shoulder and around the body of Greeks.

I am not a sindonologist but the radiographs in Alder (1997) show a very straight 4mm flat seam on the Shroud that could only have been made in the weaver's factory. It has two rows of small stitches with linen thread so even in length that it as made by counting threads.

There is a 10 of 11 chance that the Shroud has just one true salvage edge. Even though the cut corners were bound with linen in 675 they were repaired by someone making a binding with stitches so fine it resembles a salvage. The thread added should have a different analysis.

On the Shroud the cut corners are held to the backing cloth by irregular stitches. The thread is not visible by x-rays because it must be cotton like the holland cloth backing.

Before the invention of the cotton gin which removed linters with seeds, the diameter of the hand carded thread varied between 0.1 to 0.45 mm in the Shroud's holland cloth vs. a uniform 0.15 mm for its linen. Since the xanthate swelling test can not be expected to form beads for ancient cotton the changing diameter and infrared spectra may be the only difference from linen. Any mildew or attach to the surface of the cotton fiber prevents the formation of a "string of pearls" in caustic solution plus carbon bisulfaide that new cotton develops under a microscope.

I have pointed out how neglect of the effect of radiation over 0.6 MeV lead to the disastrous medieval date for the Shroud in 1988, Swinehart (1999). Not all radiation were considered for example 4.3%K in the fiber would have emitted 9.32×10^9 of 1.460 MeV gammas per gram by 1950. Also the operating voltages for the x-ray tube of Mottern (1980) does not convert to say no C-14 would be generated in radiographing the Shroud.

We are indebted to Maroni (1997) for references to the testing of the Cloth of Edessa in 675 and for the numbers 150.62+- 0.75% and 157.9 +- 0.6% 14C for "modern linen". These results clearly demonstrate how cosmic radiation makes C-14 out of nitrogen compounds in linen, cotton, wood etc. during growth, processing, transport and shipment of samples by air.

The David H Koch, Pyramids Radiocarbon Project (1999) got 78 wrong dates for the Pyramids in 1984 and 163 more in 1991 that were older than history averaging 374 years. They failed to take into account how acacia wood grew along the Nile in a desert.

In the future, transportation by air should not be considered as long as there are nitrogen compounds present because shielding from cosmic radiation is too heavy. Probably the only way is to ignite a weighed amount in quartz to 1000°C under argon or 10% hydrogen plus 90% argon. Air transport should not be used even for short flights unless nitrogen compounds are removed. Most charcoal samples should not contain nitrogen but it could be a good precaution for charcoal also.

With each sample or site information on annual rainfall, ground water analysis for bicarbonate etc. should be requested along with analysis for CaCO_3 , KHCO_3 , $\text{M}^{+3}\text{FCO}_3$, NaCl background radiation, K-40, cosmic rays etc. With this information the results can at least be qualified to avoid problems even if exact answers can not be computed.

Conclusions

- The Shroud of Turin was for about 1200 years the Cloth of Edessa not a medieval fake and has physical connection to the Holy Sepulchre.
- The Pyramids in Egypt are not older than history by random numbers from zero to 800 years.
- Errors in radiocarbon age can be explained by the chemistry of plant growth and radiation over 0.6MeV.
- Better dates in the 21st Century should be based on 2000 and include sample treatments for transport by air.
- Alternate dating methods such as thermoluminescence should be perfected to avoid triboluminescence, a reason for poor results in the past.

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**Using Neutrons to Explain the Images on Three Linen Cloths From the
Resurrection of Christ**

By Carl F. Swinehart, Ph.D.

February, 2001

Web page: <http://go.to/swinehart>

One only needs to explain each item in pictures to know that the Shroud of Turin, Italy and the Cloth of Oviedo, Spain are authentic. This with other physical evidence place them with the missing Mandylion of Edessa, now Ufra Turkey in the Holy Sepulchre during the Resurrection.

It helps at age ninety-three to have an eye restored to 20/20 vision, take the Bible and historical accounts seriously, disregard previous explanations and live in the Atomic Age after J. Chadwick's discovery of neutrons in 1932.

Clearly printed pictures in Wilson (2000) include the life-size face of Christ on page 28 by Guiseppe Enrie in 1931. This is printed negative to the Shroud with a contrast that brings out the herring-bone weave and shows seven 2.5 cm pins as bright lines. Pins are confirmed by Vernon Miller's picture in 1978 in Lambert (1984) and possibly Pie's in 1898, printed in the same way. Barrie Schwort's picture on page 31 (Wilson 2000) is printed too dark to show pins but blotches on both sides of the neck are clear.

From these sources the image on the Shroud which we call Primary show the following in order of descending brightness:

1. Lines for creases at approximately 20 cm. intervals. These are limestone powder bound in resinified vegetable oil made at Edessa in 675 when stuffed in a bag and boiled in oil per orders from the 4th Caliph Muawiyah in Damascus. (Muroi, 1997) and (Swinehart, 2000).
2. Blotches on forehead, neck, back of head, arms and small of back. Black or blue bruises or from allergy or stress.
3. At nail wounds in wrists and feet.
4. 2.5 cm. pins appear as bright lines.
5. Nearly horizontal flow of light gas from blotches at back of head and over the breadth of the upperback.
6. Herring- bone weave
7. Hair powdered with spice as a moderator.
8. Copper coins, "ruined" tiptons issued by Pontious Pilot 29 – 32 AD or simulated
9. 2.5 cm. pins as a shadow line.

Heat and other radiation from the reaction of neutrons in making the primary image also can make a secondary image in cloth that the neutrons have just come through.

Making the primary image is additive for brightness but for the secondary there are both threshold and rate factors. Normally the two images will not be exact mirror images but for pins, the line can be either light or dark in both.

Adler (1996) reported a similarity for "wound" stain on the Shroud and Oviedo cloth at about 3x. He did not recognize that they could be images but we need better prints and a larger field of view for an opinion.

We know that the missing Mandylion of Edessa existed. It was the third cloth in the Tomb (John 20:6,7). Black edged pin holes for long iron pins are in the Shroud where it was held to the bottom half.

It was a second 84x53 cm. sudarium of washed linen from which the neutron absorber, boron had been removed. The secondary image on the Mandylion was of the face. For the Oviedo cloth, it is just the back of the head and has gone unrecognized until now.

Neutrons are plentiful, they account for half the weight of the Planet Earth. Still they were not discovered until 1932. Today so many free neutrons and sources work for us that it is a surprise that they were overlooked as image forming agent for the Shroud.

Energetic alpha particles acting on a light metal like beryllium set free fast neutrons. When slowed by a moderator that does not absorb them they become thermal with degrees between.

Both kinds of neutrons are light weight, fast moving, uncharged atomic particles that react with a limited list of specific isotopes like Li-6, B-10 etc.. Fully thermelised it is a gas 1/29th the weight of air. This accounts for the vertical flow in still air, as in a sealed tomb with a cold body neatly covered with cloth. From the neck they rose 15 cm. and through two layers of linen cloth.

We know nothing about the physics of resurrection or why neutrons were set free. Once outside the body, their movement and reactions are predictable and most of three days were needed. The resurrection ended when the earth shook and angles came with a field of microwaves, "countenance like lightning"(Matthew 28:2-4). Making black holes in both cloths. For nails, pins, and sparks from the ends of the pins.

Two angles must have worked fast to put out the fires and solve the maze of pins with only a small rip in the Oviedo sudarium.

Guscini (1998) describes pinning this cloth over the head after Christ's death and the time for transport to the Tomb from nasal discharge on the sudarium. To this I add more detail that has to do with image formation and physical evidence.

Joseph of Armanthaea, a suburb of Jerusalem (John 19:38) was old and a rich counselor. He used his own new tomb and custom assembled burial kit. Also his servants trained to do a neat job burial by Jewish customs.

His kit must have contained:

1. A 437 x 111 cm. Sindom of "as woven" white linen from flax growing with hard water and retted in an Asia Minor borax pond. No hems but seams to fit the new tomb.
2. Two 82 x 53 cm. Sudaria. Scratched on the loom and washed with lemon to get a soft feel. No hems or seams like hemetta.
3. Ten hand made nails with large heads.
4. Ten long (10cm) iron pins.
5. Approximately 20 hand made $2.5 \pm .2$ cm. pins of hard drawn copper or brass. Some with a head large enough to show its image.

6. Two “ruined” copper tpton coins issued by Pontious Pilot 29-32 AD
7. Spice powder

After Christ’s death, while still on the cross, coins were placed under the eyelids. Hair was dusted with spice powder and one of the sudarium was placed to cover the head and pinned with 2.5 cm pins so that Fig 9 on p 36 (Gussin,1998) was out at the back of the head.

In the tomb, the sindom was nailed to the stone slab in 10 places into wooden pegs in holes made for that purpose. The body was brought in feet first and placed on a thick layer of spice. Nichodemus, another rich man, contributed 100 pounds of myrrh and aloes (John 19:39). The head was straightened and covered with the second sudarium placed across the head from shoulders up but not under the back of the head.

More spice was applied. Unknowingly this use of spice improved the detail of the image acting as a moderator where the sudaria did not cover.

The top half of the Sindon (Shroud) was drawn over and pinned from below with long pins in a symmetrical way that left no gaps.

The pattern mislead many to think it was folded in four layers and punched several times with a red hot poker dipped in pitch. The absence of gaps allowed the image forming process to work and also accounts for why none of the 10 long pins in the Shroud show while the many of the 2.5 cm pins in the Oviedo Cloth do.

The 2.5 cm pins in the path of neutron flow acted like a lens does for light. Depending upon the distance, it either made a shadow or a bright line. At the back of the head, there are many of both kinds depending upon which layer of cloth the pin is in on both primary or secondary images.

We need to know more about the weave and needle work on both cloths to know their maker and why the sudaria pass neutrons and the sindom does not. From Guscin, 1998 p. 57, the weave and twist could be the same but the herring-bone of the Shroud does not show on the Oviedo Cloth. Still the scratches in one side of the Oviedo both are colored indicating a trace absorber.

Previous study concludes that there was no image or inscriptions on the Oviedo cloth (p. 21) but they were wrong about pins. With the correct narrow band pass filters, pictures in false- color may show the difference between image vs. stain and primary vs. secondary image.

For the neutron absorbing impurity in the Shroud, boron can easily be missed. In reporting the results of the scanning electron microprobe spectroscopy, Alder and the Whangers (1997) failed to include elements that were looked for and not found.

Summary

Little more than the images of pins in published pictures are proof needed to back this new explanation which changes so many things from the past interpretations.

Recognition of the secondary image at the back of the head is new for the Oviedo Cloth. For the missing Mandylion of Edessa, the secondary image was of the face and its existence is shown by pin holes for long iron pins in the bottom half of the Shroud and its function as a moderator.

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Delayed Recognition of Image on Linen

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April, 2002
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The Crown of Thorns tells a new story. By images of its parts on the Shroud of Turin, Italy, The Cloth of Oviedo, Spain, and the missing Mandylion of Edessa (now Urfa Turkey). This adds authenticity to the Resurrection of Christ, the Bible and physical connection of the Shroud with the Holy Sepulchre in Jerusalem.

Image of cut wire loops shows several things about the Crown of Thorns. Its construction and that the Shroud was opened the next day; part way through the healing and imaging forming processes. This is a new explanation from published pictures of the Shroud and Oviedo Cloth.

On the day following the crucifixion, the Chief Priests and Pharisees came to Pontious Pilate concerned lest the body be stolen. For a claim Christ is risen. "Pilate said to them (Matthew 29:65,66) Ye have a watch: go your way, make it as secure as ye can. So they went, made the sepulchre sure, sealing the stone and setting a watch".

This being the next day, the Watch or Priests or Pharisees, having been given Joseph's property for three days would want to identify the body. To attract the least attention, they could have commandeered Joseph's servant to open and close the Shroud. This "garden" was a new expensive cemetery using custom design burial kits.

Opening of the Shroud required pulling four nails, removing ten long pins from below. Removing the Mandylion and unpinning pleats in the Sudarium just to see the face and part of the Crown of Thorns.

The healing and image forming processes were well advanced but the image on both sides of the Mandylion went unnoticed in the dark tomb and dark spice powder on it. Nicodemus gave 100 pounds (70 lb. avd.) (John 19:39). Generous use of this powder and two thicknesses of washed linen moderated emitted neutrons for absorption by an impurity in the as woven Shroud (Swinehart, 2001).

Neutrons made a primary image on the as woven Shroud by reaction with an absorbing impurity B-10, Li-6, Cd113 or rare earth and on both sides of washed napkins as a secondary image by recoil x-rays.

After the body was recognized, largely from part of the Crown of Thorns the burial was replaced. However the stained napkin was turned to get a clean area over the face. This resulted in an image on the Shroud for the cut wire at the back of the crown. It can be seen in a black on white copy in the upper right (Wilson, 2000 p57 (.38x)).

On the Oviedo Cloth, there is only a single image of the cut wire on both faces which Guscini named "some kind of hairpin" (Guscini, 1998, p 36 (.62x), p 20(.13x) and p.24 (.16x)) also (Wilson, 2000, p 74(.21x)).

Wire from the front of the Crown shows at the side of the head as two bright dots and 32 mm. of bent wire in every photograph of the face on the Shroud. The two dots are 3 mm.

apart and could be the shift in the wire when changing the napkin. No other parts of the image show double but the healing of blotches etc. may have been complete in the first day.

The Crown of Thorns was a ring not a "Cap of Spikes" (Wilson, 2000 p 57). Six holes .04 mm. and smaller in the Oviedo Cloth have no color change and are on a line from the center to the back of the head.

Since the cut wires are the same size front and back, the thorned branches must have been 6 mm. in diameter over a 20 - 25 cm. length. Meaning the plant grew fast when there was water then shed its leaves like *Euphorbia splendens*. This is a change from a plant called "crown of thorns" based "upon some kind of hairpin", physical evidence.

To duplicate these wires for holding the crown together. Strip covering from wire twistum for closing a plastic bag. Make one turn around two 6 mm. twigs twist the ends tightly for 4 turns and cut. Then cut opposite the twist. The last cut frees the twigs. After the last is removed the wire is free to unscrew in one direction to make different shapes. There is only one position for the image of the back wire on the cloth of Oviedo. For the first day there the napkin was not between the crown and the Shroud. It must have been so after the head was straightened.

In closing, the servant placed the napkin between the Crown and the Shroud and covered the face with the clean part. This did not use any 2.5 cm. pins. When he started to gather them the man in charge insisted that all of Joseph's property be left. The servant placed pins in the cloth, one over the eye and dropped at least four around the head leaving images on the Shroud (Wilson, 2000 p57).

At the conclusion of the Resurrection when the Angel came with garments as white as snow and countenance like lightning. The microwave field made black 1x1.5 cm. holes for 8 nails and 40 for 10 long pins in the Shroud where metal went through the linen. Also 2 mm. holes were the microwave field left the pin and many .1 mm. holes where fused Fe_2O_3 struck the cloth from sparks thrown off the ends of pins. All with very black edges erroneously called "poker holes" (Wilson 2000 p 136-137) and Swinehart 2000).

These black edged holes have been duplicated in my microwave oven. One trouble with the red hot poker dipped in tar theory is the great differences in size of poker and keeping it red hot without electric power.

In the area of the head the Angel must have turned down the power. Even so one pin on the Oviedo cloth burned one 1.5 cm. hole with a fused edge. Others made black marks as different from the thorn holes.

For at least a year my attempts to match black marks on the napkin with the images of 2.5 cm. pins on the Shroud have failed. Now the reason is that the pins moved. With the cut wire from the back of the Crown and knowing there were two periods we have located the exact position of four pins from the face on the Shroud to marks on the Oviedo Cloth.

This shows that the napkin was turned over to use a clean area from its first position as determined by Monsignor Ricci (Guscin, 1998 p31 (.41x)). Neither position shows an image on the napkin. The recoil energy from the image on the Shroud was all absorbed by the Mandyllion or spice powder.

My prediction that traces of primary image can be found in the scratches on the reverse face of the napkin still holds for the correct photography.

Finding the images of cut wires all but disposes of the blunder by STURP in testing the Shroud for C-14 and finding a medieval age.

From the Shroud aragonitic limestone dust was removed like the uncommon deposit at the Holy Sepulchre. But the 10 holes for nails driven into the stone slab could be matched to the unique design.

These marks were covered with thin marble in the 10th Century. Instrumental means should locate them in the 21st. Allowing for shrinkage when the shroud was boiled in vegetable oil in 675 at Edessa.

The primary image on one side of the Shroud and the secondary images on both faces of the two napkins are unique. They are a combination of a vaporgraph using a very light gas and a radiation source. In 1201 AD, this was called "outlineless" or today 3-D effect at a little more than full scale spreading outward from a center line.

Light or lenses were not used in any way and it is not a photographic negative. The picture is improved by reversing dark to light but changing left to right confuse a match between the clothes.

We estimate the thickness of the spice powder on either side of the head to be over 1.2 cm. Pins dropped in to give a shorter image on the Shroud bottom. This layer also accounts for the varied back, not a Roman scourge.

Once separated from the last twig, these wires fell apart. No other explanation or use is plausible than to make a lowly crown of thorns. Which has a tale to tell in these two wires.

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