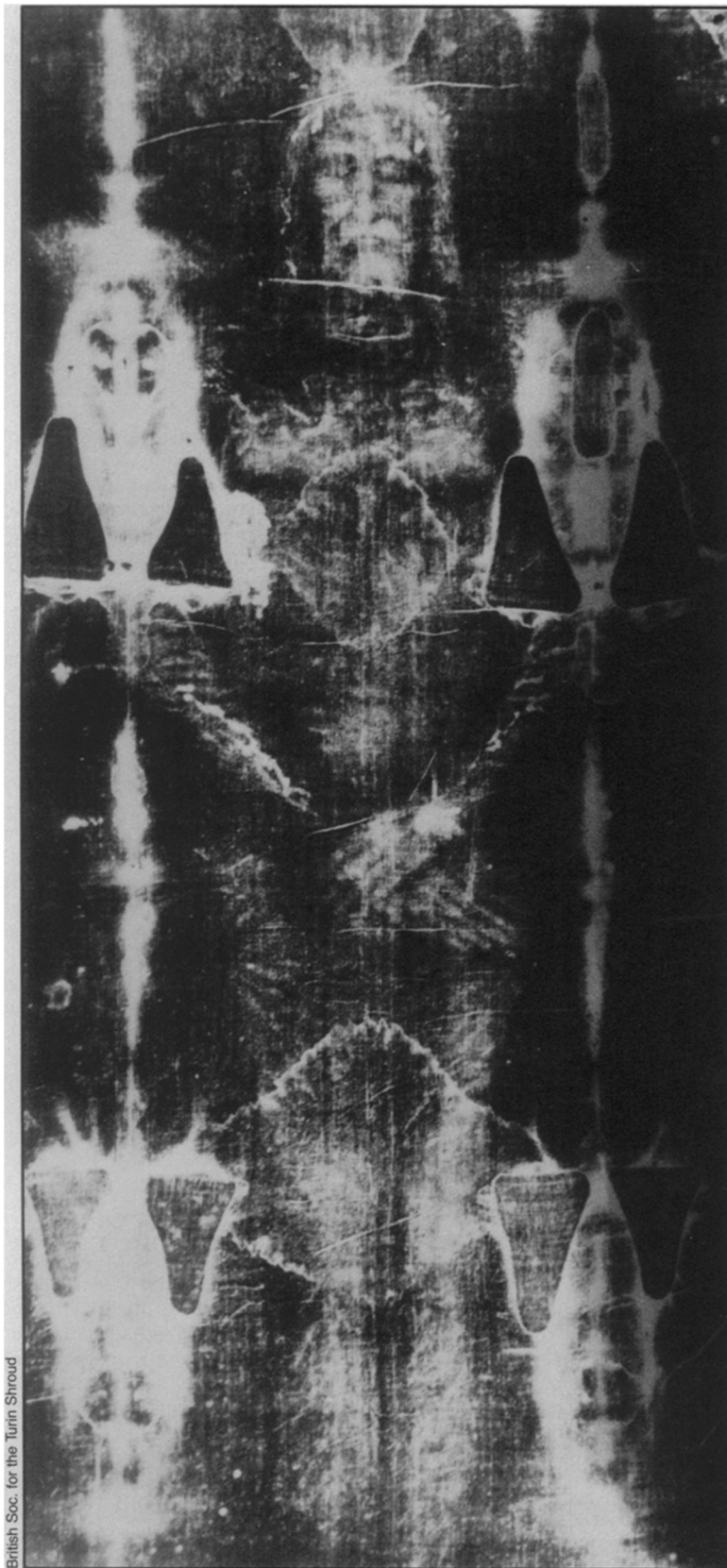


A Shroud of Unknowing



British Soc. for the Turin Shroud

The image of a man's body on the linen cloth kept at Turin cathedral has intrigued the pious, the curious and the dubious for more than 600 years.

Five yards of linen kept on an altar in Turin cathedral are the subject of more precise scientific tests than probably any other religious relic. Devotees say the linen is Christ's shroud. Detractors say it's a medieval fraud. But what can science prove?

BY DIETRICK E. THOMSEN

When the army of the First Crusade was beleaguered in Antioch and expecting to be wiped out by the Seljuks, a piece of rusty iron was discovered in the excavation of a church foundation. This iron was hailed as the head of the spear that had pierced the side of Jesus Christ as he hung on the cross, and its discovery was touted as a sacred portent for the crusaders.

The Holy Lance, as it came to be called, was immediately denounced as a forgery by an intellectually and politically influential section of the crusaders, who amassed impressive evidence that it had been planted. The controversy over its authenticity entwined the highest levels of ecclesiastical and civil politics.

In the year 1357 a piece of linen cloth about 14 feet long and bearing the dorsal and ventral images of a man's body was exhibited in a collegiate church belonging to the de Charny family in Lirey, France. It was said to be the burial shroud of Jesus, the imprint being that of his body. The cloth was promptly denounced by the Bishop of Troyes, who had jurisdiction in Lirey. The bishop said it was a painted forgery and that he knew how the painter had done it.

The Holy Lance has disappeared from history, but the Holy Shroud has come down to us. Having passed into the possession of the House of Savoy, it moved from France to Italy as their interests moved, and finally came to rest in a special casket on a special altar of the cathedral in Turin, which was the capital city of the House of Savoy before they became kings of Italy and went to Rome. The shroud's current legal owner is the former king Vittorio Emanuele, who lives in Estoril, Portugal, a resort that is a favorite retirement home of former kings and royal pretenders.

The investigators of the Holy Lance could collect only lawyerish evidence. They had no scientific tests to inquire of the object itself where it had come from or what it was made of. They managed nevertheless to build up an impressive indictment for fraud. Today we do have the scientific tests, and, to quote the NEW

SCIENTIST, "Few religious relics or archaeological artefacts have attracted as much scientific interest as the Turin Shroud. . . ." That interest is now being recompensed by increasing willingness to allow scientific studies that could resolve many questions about the shroud. Some were done a few years ago; more are now in progress. And the latest news is that the latest form of radioactive dating, which completely ionizes a small sample of the material (SN: 1/14/78, p. 29), may soon be used to determine the age of the linen for the first time. Use of the technique has been agreed to when it has reached the desired level of accuracy and preferably when determinations can be made in more than one laboratory.

That scientific tests of the shroud should be made at all is a testimony to the increasing precision of such techniques: So many of them are nondestructive or have become virtually nondestructive. It is not merely that this cloth is an important archaeological object (whether it is in fact the shroud or whether it is a medieval forgery), and therefore that it should not be damaged. If it is *the* shroud, then an injury to its material partakes of a desecration.



When Italian taste goes rococo, it puts the Turin Shroud in a reliquary built like this.

It was difficult but not impossible to get permission to do nondestructive testing such as photography from a distance, which began in the 1890s, or the taking up of dust samples from the cloth with pieces of sticky tape. But the removal of pieces of the fabric itself was not authorized until 1973. This is necessary to test the way in which the image was produced and whether there are blood spots on the shroud.

The scene, as described by Ian Wilson in *The Shroud of Turin* (Doubleday, 1978), was extremely reverent. The least amount



Three-dimensional image of the body that made the shroud impressions as reconstructed by Jackson and Jumper.

Jackson and Jumper

possible in the way of threads was carefully removed and the damage darned up by expert nuns — ordinary seamstresses would probably have introduced a certain worldly spirit. Some of the threads were to be taken as far as Brussels for examination by a forensic pathologist, and the ex-king and others had insisted that the removed threads be returned and placed with the shroud again in its casket.

Samples will be taken for the new method of radioactive isotope dating by use of accelerators. Carbon 14 dating, which this is, depends on the fact that living things, like the linen fibers in this cloth, cease to ingest radioactive carbon 14 atoms when they die. Since carbon 14 decays radioactively according to a well-known formula, studying the carbon 14 content of an archaeological sample allows scientists to tell when it died. The usual method is to take a large piece and record the current radioactivity for long enough to tell where on the curve of the formula the sample is. The new method is to vaporize and ionize an extremely small amount and to use acceleration in a cyclotron or Van de Graaff accelerator to count all the carbon 14 atoms in the vaporized amount. This is expected to be much more accurate — when it is perfected — and it demands only a very small

bit of the object to be tested.

The Turin Shroud is a marvelously good example with which the proponents of the accelerator dating method for the virtually nondestructive dating of precious objects can demonstrate their art. The two laboratories that have pioneered this work in the United States, the Lawrence Berkeley Laboratory and the University of Rochester, want to try. Harry Gove, leader of the Rochester work, "would have been ready to do it yesterday," says Walter McCrone of McCrone Associates, the organization that is coordinating laboratory tests of the shroud in the United States. Richard A. Muller, leader of the LBL effort, told SCIENCE NEWS he thinks it will be another year before the method is improved enough.

A fairly accurate date for the linen would be a basic entry into the debate over the shroud's authenticity: It would take more than the eye of faith to see how medieval cloth could have been wrapped around the body of Jesus 1,300 years before. A date in the first century would not vacate the bishop of Troyes's charge of forgery one hundred percent. A clever medieval forger might have availed himself of ancient linen. But medieval forgers were usually not so clever.

Evidence from tests that would convince an archaeologist that the shroud is from the first century would not be proof that it ever wrapped the body of Jesus, though it might strengthen some people's faith to that effect. Evidence that it is a medieval artifact would not necessarily destroy some people's belief that it is a holy relic. We are dealing here with a region of faith. Evidence may support faith, and for some people faith overcomes evidence. After all, many people have believed in the shroud without any scientific evidence and in spite of more than one denunciation by ecclesiastical authority. The higher church officialdom outside Turin still seems to be rather cool to the shroud. Scientific tests so far have not made the shroud go away, and they are unlikely to do so in the future.

But the tests have shown some interesting things. Although the age of the cloth is not definitely determined, the weave is a herringbone twill that is known to have been used for cotton at the time of Christ in the eastern Mediterranean. No other linen example of this twill is known from that time and place, but there are cotton fibers among the linen in the Turin Shroud, indicating that this linen was made on a machine used for cotton.

Pollens in the dust taken from the shroud have been examined by the Swiss criminologist Max Frei, who is considered an expert in identifying the provenance of evidence by the pollens it has picked up. Of the 48 plants he identified, 16 grow in France and Italy, which would be expected from the shroud's known history, but others are desert plants, some from Tur-

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... Shroud

key, some from the Dead Sea region. Frei can thus prove that the cloth was exposed to air near Jerusalem and maybe in Edessa and Constantinople. These are all places that figure in a history for the shroud before 1357 that Wilson suggests in his book. Frei is working on more samples.

Without the image the cloth would be just another piece of old linen. There is no known contemporary portrait of Jesus. Most of the abundant depictions are frankly copies of others that have preceded them. There have been miraculous appearances — not only in the Middle Ages. The most recent is attracting pilgrims to Shamokin, Pa. At least three famous images are attributed to miraculous causes or causes not made with hands (i.e., not painted): the Mandylion of Constantinople (otherwise known as the Cloth of Edessa), the Veil of St. Veronica and the Turin Shroud. Shroud enthusiasts relate a history in which the Mandylion (which came from Edessa in the tenth century and disappeared from Constantinople in 1204) is identical to the shroud and the model for Veronica's Veil.

What the image is and how it was made have been tested and are being tested, but so far the results are simply strange. Photography produced the first surprise: The image appears to be a negative. A painter would most likely have produced a positive. The darkening is not a pigment or dye, because it does not soak into or through the threads. Detractors have suggested a scorch made by a hot statue, and the *AMERICAN HUMANIST*, a magazine dedicated to proving that nothing supernatural can exist — except hidden variables in quantum mechanics — rings in with an article by Joe Nickell showing that similar images can be made by a method approximating brass rubbing. But what is this image? It has been suggested that chemicals in or on the body could have caused some reaction in the cloth, and one attempt to imitate the imprint rubbed aloes and myrrh (the embalming unguents of Jesus' day) on the face of a fresh corpse and took a rubbing. Wilson at one point refers to the images made by the bomb flash at Hiroshima and suggests some kind of flash photolysis, produced by the transfigured body of Jesus at the moment of resurrection.

This comment is echoed by Captains John Jackson and Eric Jumper, professors at the U.S. Air Force Academy, who found three-dimensional information in the shroud that would be consistent with an image made by the body itself (as in flash photolysis) but not in a painting or ordinary photograph. The darkness of coloration of the image seems to be related to the distance between a particular part of the body and the cloth.

Working with a microdensitometer tracing of a photograph of the shroud and live male subjects draped with a similar piece of cloth, they were able to determine a

relationship between depth of tone in the image and distance from the body. "The image making process must have acted through space," Jackson says, "independent of the body and any chemicals present. That is, it must have been a form of radiation which permeated the cloth and left the imprint. Hopefully our research will help us understand the image forming process."

From the information, Jumper says, "We have recently constructed a life-sized sculpture of Jesus with what we feel is a high degree of reliability and accuracy." It shows a couple of curious things. The eyes are covered with round objects, which might be coins used for the purpose in the Jewish burial ritual. On the forehead is an oblong shape that might be the tefillin or phylactery that pious Jews bound (and still bind) on their foreheads for morning prayer. (They are also buried with it.) Capt. Kenneth E. Stevenson, also of the Air Force Academy, is researching this suggestion. The group feel that they could make a better statue using a computerized milling machine and filtering techniques to correct for noise and cloth drape distortion. Another group member, Maj. John D. German, is checking into that.

The figure on the Turin Shroud bears all of the stigmata mentioned in the Gospels, which does not in itself mean anything since a forger would have been careful to provide them. But there is one particularly curious thing about these wounds: The nails for the hands run through the wrists. This had been alleged against the shroud, because the traditional depiction of crucifixion had shown the nails through the palms. But the discovery in Jerusalem of the bones of an actual crucifixion victim, one Jehohanon, shows that the nails were driven through the wrists. It would have been hard for a medieval forger to know this.

All of the apparent wounds on the figure, the crucifixion nails, the crown of thorns, the scourging marks and the lance wound in the side, show what could be blood flows. Tests have been made to see whether these apparent stains show traces of blood residues. The results so far are negative, and this is one of the serious pieces of evidence alleged against the shroud. But, says McCrone, "They didn't even use the most sensitive reagents available then." New tests are proceeding. They include spectroscopy, X-ray fluorescence, X-ray transmission and infrared thermography. It is hoped they can distinguish among the metals in blood, sweat, dyes, aloes and myrrh.

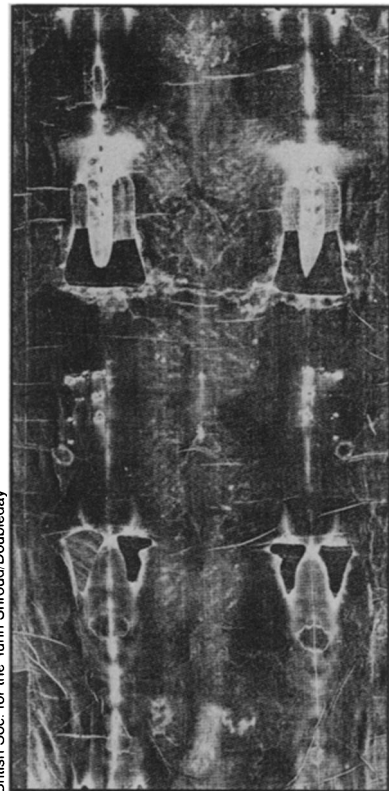
McCrone feels that when all the current tests are completed the shroud will be well vindicated: "If the data come out right, there are not many people who could doubt — There aren't too many now."

"And all shall be well, and all manner of thing shall be well." The attitude of a famous mystic (Lady Julian of Norwich) is perhaps not too far out of place. The piece



Dom Bosco Filmstrips/Doubleday

How the shroud might have been wrapped as imagined by the artist Clovio.



British Soc. for the Turin Shroud/Doubleday

The dorsal image on the cloth. Is it a fraud? A contact print? Or a radiogram?

of evidence for the shroud that is usually passed over in silence is its numinous effect on many who see it. Numina are not subject to acceleration in cyclotrons or immunological tests. Yet they are there. Why did so many people accept the shroud before there was any scientific evidence and against the denunciations of the two successive bishops of Troyes? Granted that numinous phenomena are beyond the definition of science at the strictest, approaching a case of this kind with a mindset that rigidly refuses to consider spiritual phenomena defeats the enterprise. A relic without numinous effect is just another archaeological survival and is interesting mainly to museums. It is because the numinous effects are there that all this fuss got started in the first place. □