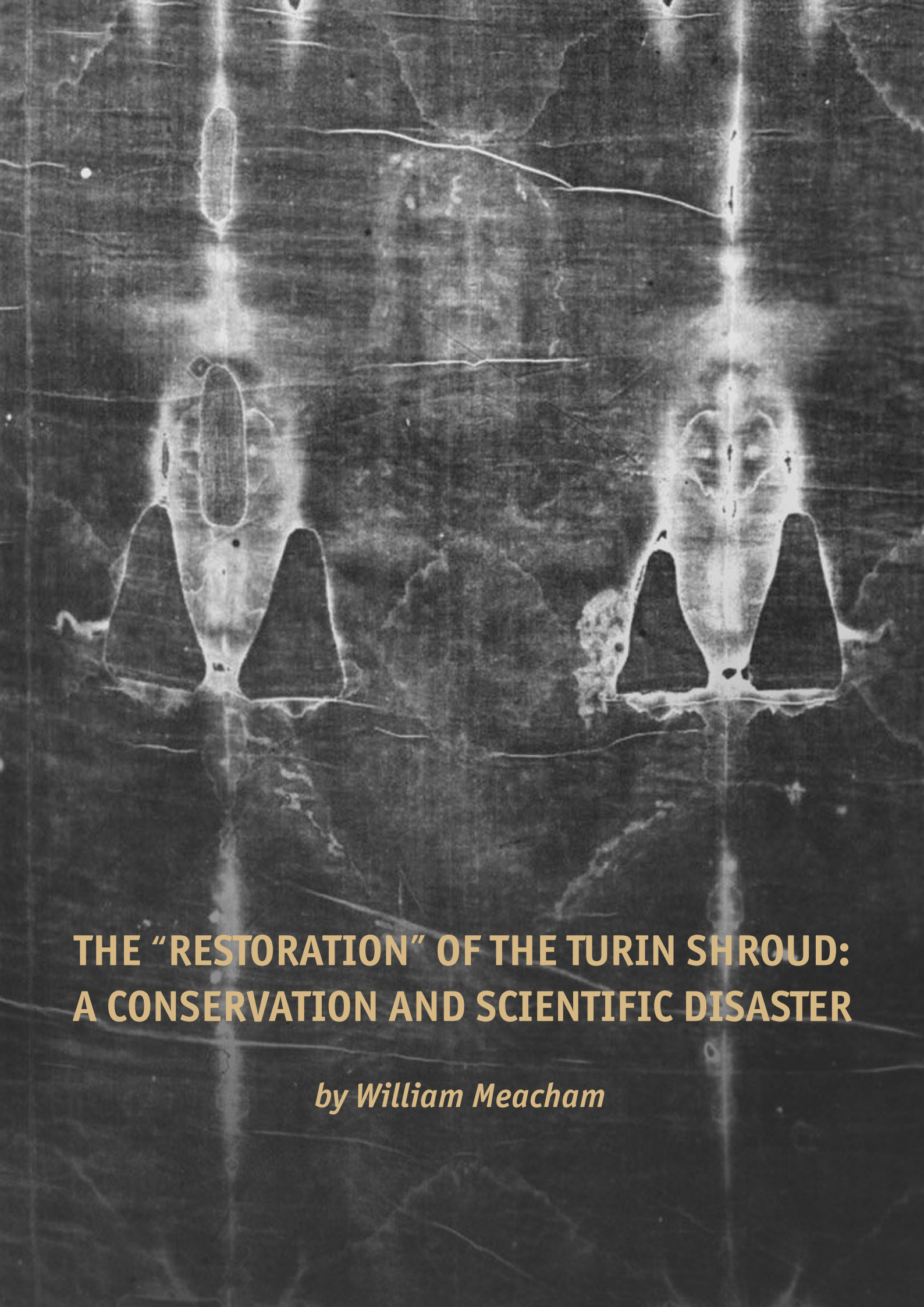


THE "RESTORATION" OF THE TURIN SHROUD: A CONSERVATION AND SCIENTIFIC DISASTER

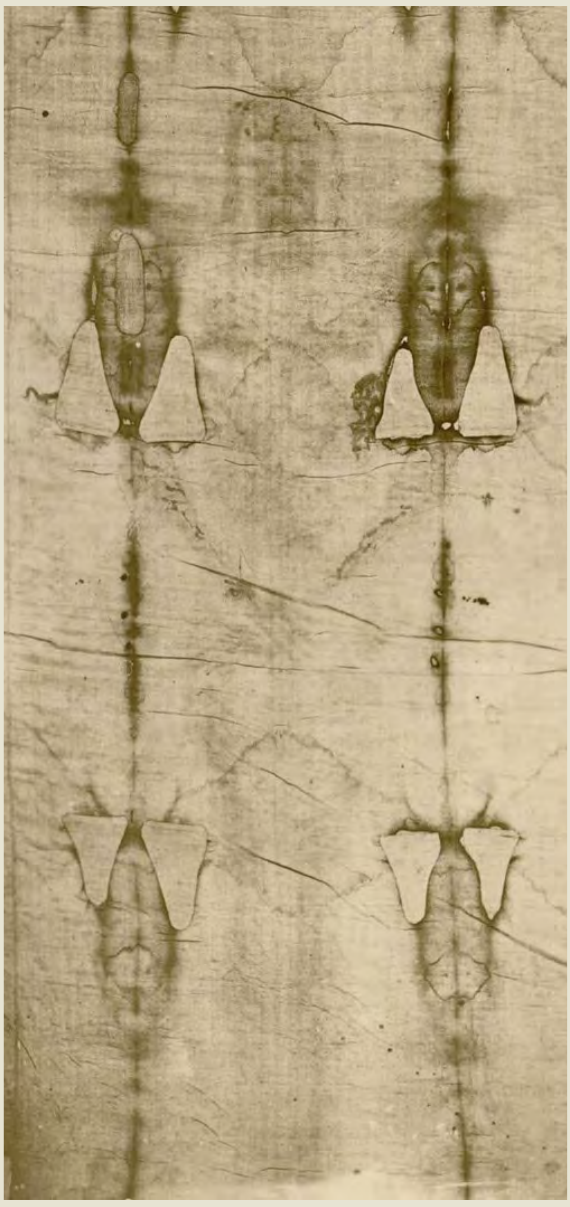
by William Meacham

In 2002 the Shroud of Turin was subjected to a radical intervention aimed at ridding the relic of carbon dust and charred material said to pose a serious threat to the image. Patches that were applied in 1534 to cover holes from fire damage were removed. Vacuuming was done of portions of both sides, and other remedial measures were taken to optimise the appearance of the relic. This aggressive operation was in stark contrast with modern precepts of conservation, and resulted in important scientific data and heritage features being lost, along with great opportunities for sophisticated testing and sampling. The long-term negative impact of the intervention is feared to be substantial; the underlying premise, that the image was threatened, has been shown to be false.

Introduction

Whether ancient or medieval, the Shroud of Turin poses one of the truly abiding mysteries of all archaeological and art historical artefacts. It is the world's most famous textile, and probably also the most intensively studied object in existence, but how the image was formed on the cloth remains unclear. Crucial evidence however may have been destroyed in a "restoration" conducted in the summer of 2002. Unlike the restoration of the Sistine Chapel, over which there were sharply opposing views on the composition of the original work, the Shroud as an historical textile was well defined and the parameters of its on-going study quite clear. This unfortunate event dramatically illustrates the need for close collaboration between scientists, conservators/restorers and curators/owners before initiating aggressive interventions on important archaeological objects. It may also become a classic illustration of things that should not be done.

Figure 1. The Shroud image. The frontal image on the Shroud as first photographed in 1898. All rights reserved.



How It Happened

For the millions who believed the Shroud of Turin might really be the burial cloth of Christ, October 13, 1988 was the turning point. The results of carbon dating a tiny sample from the edge of the linen sheet were released, and they seemed definitive: the date fell between 1260 and 1390 AD. For the academic world and the public at large, the relic

was deemed to be a fake from the Middle Ages, albeit a very strange one. Despite thousands of hours of scientific study, its image remained unexplained and was the subject of continuing controversy.

In Italy, the general reaction was quite different; most people questioned the carbon dating method rather than the relic. Doubts were widely expressed about its reliability for this particular object. Many felt that its constant handling and exposure in churches would invalidate a carbon measurement; others felt the resurrection might have altered the Shroud's chemistry. Some even proposed a bizarre conspiracy theory, that a British Museum official had switched samples in order to discredit the Shroud [1]. The then archbishop of Turin, Cardinal Anastasio Ballestrero, and his science adviser were crucified in the media for officially accepting the date, while maintaining at a press conference announcing the test results that the Shroud was still a mystery and a precious icon that should inspire reverence. Their uncritical acceptance of the date made it appear that the Church now believed that its Holy Shroud was a medieval forgery.

The furor in Italy led Ballestrero to take early retirement the next year. His successor, Cardinal Giovanni Saldarini, declared that conservation would be the priority. He asked researchers to be “patient”, a term readily understood to mean that no new scientific studies would be approved for the foreseeable future. Indeed, none have been authorized up to the present. Saldarini brought together a group of five textile experts to advise on conservation, and this group was later formalized as the “Conservation Commission”. It began to address issues related to the optimum preservation of the cloth, one of the most important being how to protect it from Turin's air pollution. A few positive changes were made to the storage conditions, notably that the cloth would be kept

Figure 2. Shroud Face. Negative of the facial image. All rights reserved.

flat instead of rolled on a spool, and it would be kept at constant temperature and humidity in an atmosphere of inert gas, with less than 1% oxygen. A long flat case was specially constructed for this purpose.

However, the Commission was quietly evolving into something very different, and was heading towards calamity. By 2000 only one of the five textile experts remained, and its membership now included several Turinese dignitaries and was chaired by a senior priest in the archdiocese, Mons. Ghiberti. An admixture of good intentions, opportunism and machiavellian scheming would soon lead the Commission down a very different path from that of passive preservation favoured by most modern conservators for very important objects. In a high and deeply regrettable irony, this “Conservation Commission” would wreak havoc on the Shroud.

A new archbishop of Turin was appointed in 1999. Cardinal Severino Poletto is an outgoing and affable man, with mediocre educational background. I first met him at a "conference of world experts" sponsored by the Turin archdiocese in March, 2000, at a villa outside the city. I came away with the strong feeling that Poletto was dynamic and we would soon see further testing of the cloth, particularly a second round of carbon dating. Never in a million years could I or anyone else involved with the Shroud have imagined what was to come.

The truly memorable moment during this conference was a visit to the Turin Cathedral. Poletto met us in the nave and ushered us into a sideroom. It was a heart-stopping moment. There, mounted on a long board at eye level was the famous relic, free of its usual glass display case, and naturally lit from windows high up in the room. A red velvet cordon about three feet away was all that separated us from the relic. My attention shifted back and forth between the bloodstains and the fainter body image, as archaeological and historical curiosity about this intriguing object intermingled with feelings of awe.

This contemplation was interrupted after a while when Poletto and a gaggle of people around him moved up to the cordon. Suddenly, a flash bulb went off and I turned around to see a fellow in a baggy suit holding an old-fashioned press camera with large flash attachment. Horrified, I went over to Prof. Alan Adler, the only American member of the Conservation Commission, and asked him how in the world they could be using flash photography. He shrugged his shoulders, saying it was the official archdiocese photographer. I asked him to try to stop it, but he replied there was no way he was going to interfere, as this viewing was very special. It was surprising that this simple issue had not been considered beforehand and did not seem to bother anyone else. A tripod-mounted camera and fast film would have given perfectly good photographs without the use of a flash, and would have spared the cloth that extra unnecessary exposure to light.

Worse was to come. A delegate was energetically pointing out some feature on the Shroud to Poletto, and they both stepped over the cordon to get a closer view. The delegate suddenly pulled out his ballpoint pen and pointed at the feature. The tip of the pen was less than an inch away from the surface of the cloth. Aghast, I started to intervene, when he lowered the pen. Several other people were watching the proceedings, and no one seemed bothered by the fact that a possible ink stain had been a slight tremble away. When it is recalled that many archives do not even allow ink pens of any kind to be brought inside, one can only shudder at how poor the state of conservation awareness was in Turin.

Yet another conservation issue was raised by American scientist John Jackson after the visit. He had a particular interest in the old creases and "fold-mark patterns" (as he calls them) preserved on the Shroud, and he was very upset over how the cloth was stretched on the board. It was so taut that hardly any of the creases could be seen. He raised the issue at the final plenary session of the congress, saying: *"I can state that storing the Shroud in this condition for a long period of time will destroy forever the precious fold mark pattern, if it has not already done so"*. The response from Commission members was that the mounting on the board was only a temporary arrangement. This apparently was not true. In an article published later by the same individuals it was stated that, unlike in the past "the Shroud was [now] stretched and fixed in a practically definitive position" [2]. In retrospect, these conservation issues were very bad omens.

"The Shroud has been restored"

Indeed, a major catastrophe was about to befall the Shroud. Totally unbeknownst to anyone outside a small circle in Turin, an aggressive, invasive operation officially termed a "restoration" was being planned. The work was finally carried out in secret during June and July of 2002. But word leaked out, and in August a Rome newspaper ran a story by its Vatican reporter that the Shroud had undergone a radical intervention [3]. As details emerged from the Turin archdiocese, it was confirmed that patches covering the 1532 fire damage and a backing cloth added at that time had been removed, and "dusts and residues" had been cleared away. People were shocked, unable to believe that such an invasive procedure could have been allowed to take place, since there had been so much emphasis in recent decades on the need for non-intrusive, non-destructive testing.

While very little of this news was carried by international agencies, the press in Italy was buzzing with stories, speculation and debate about what had been done to the Shroud. A very senior political and academic figure, Francesco Sisinni, wrote an important piece asking: *"Did this important object, on whose material and historical authenticity scholars from every part of the world have worked tirelessly, and, above all, in front of which millions of faithful from all over the world have kneeled, really need to have undergone such a massive intervention?"* [4]. Turin was clearly on the defensive, and announced that all would be explained at a press conference in mid-September, at which time photographs of the "restored" Shroud would be available.

Jackson circulated an email with very powerful criticisms, pointing out that *"it is essential that scientific information resident on the Shroud be preserved. The only people qualified to know what that information is are people who have spent years, if not their lifetimes, thinking about the Shroud in a scientific sense"*. It was increasingly clear that there had been no outside consultation or peer review of this intervention. An American textile chemist and original member of the Conservation Commission, Jan Cardamone, was surprised and shocked at the news. Textile conservator Sheila Landi of England, also an original member of the Commission, had the same reaction. Even two textile specialists resident in Turin and well acquainted with the Shroud were not consulted.

It transpired that the one textile expert left on the Commission was the person who had carried out the work. Rumor had it that she and Ghiberti had become the dominant force within the Commission. According to Landi, who attended several meetings in the 1990s, the atmosphere was characterized increasingly by manipulation: "All they wanted was people who said what they wanted to hear" [5]. This led to Landi's decision to withdraw in 1997. Jan Cardamone remained available but was not invited to attend further meetings. It is not clear what happened to the two Italian textile conservators, but by 1999 the Swiss Mechthild Flury-Lemberg was the only textile expert left in the group. This may have been as in the Chinese saying, "one mountain can only have one tiger". Other individuals with close links to the inner circle around Poletto were recruited onto the Commission, from fields totally unrelated to textiles or conservation.

Flury-Lemberg is a soft spoken woman, and an old-style restorer with a Teutonic inclination for neatness. It is unclear to what degree she persuaded others of the need for "restoration," but one observer remarked that it was a good thing that there was no articulate dry cleaner on the Commission. She believed in her methods, of course, and a large portion of responsibility lies with the other mem-

Figure 3. Madame Flury-Lemberg at work on the "restoration" of the Shroud (photo courtesy of Telesubalpina TV, all rights reserved).

bers of the Commission and those in the Vatican who did not seek any outside advice.

Poletto was clearly disturbed by the raging controversy, and invited the delegates from the 2000 Turin conference for a private viewing of the "restored Shroud", followed by a press conference the next day. Both events followed the same script: opening remarks by Poletto and Ghiberti preceded the main presentation by the scientific adviser, Prof. Savarino. His case was most unconvincing, especially his casual summation: "The Shroud was filthy. I certainly wouldn't sleep in a sheet in that condition". At this there was a smattering of nervous laughter, but most did not know whether to laugh or cry. To the layman, and obviously to the aggressive restorer as well, cleaning must seem a good and necessary thing. Some conservators have said that "dirt is not the problem, cleaning is the problem". Often it is not even attempted. Another remark by Savarino was equally shocking. He said that an effort was made to smooth out the creases, but "unfortunately it was not entirely successful". I repeated his Italian word *purtroppo* (unfortunately) out loud with the inflection of a question, and he nodded. He apparently was unaware of their possible historical value.

The "restoration" of the Shroud was diametrically opposed to modern textile conservation practices, as for example described by Orlofsky and Trupin [6]. The cloth was handled every day for a month without gloves; no gowns, lab coats or hair nets were worn; no clean room controls were instituted;

visitors, photographers, teams of technicians and TV crews trooped through; the cloth was illuminated by lamps without filters, shining for long periods directly on the cloth at close range; the relic was subjected to considerable stresses in the removal of patches and backing cloth, and addition of a new backing cloth. Furthermore, the operation was not a true restoration back to original either, but a series of radical, invasive alterations and cleaning operations for cosmetic and misinformed conservation purposes.

Even if the cloth were a proven medieval relic, with no image at all, the 1534 repairs should have been retained. Flury-Lemberg commented on this issue in very strange terms: *"The conservation [work] of the poor Clare sisters from 1534 is certainly of historical interest and therefore needs to be analysed and noted for future research, but it does not present a value in its own right. The same is true for the conservation measures of 2002"*. [7]

It is very surprising to have repairs nearly five hundred years old equated with those done a few years ago. The patches and backing cloth were visible elements of a rich heritage that had intrinsic value as part of the history and commonly recognized identity of the relic. It was recorded that the nuns carried out the mending of the precious relic after the fire of 1532 with great reverence and care, praying as they worked. Old additions to or repairs of an object become part of the object to be preserved unless 1) they pose a definite threat to it, or 2) they seriously detract from the appreciation of the original. There would be little disagreement among conservators on this point. It would be a very foolish conservator who would erase medieval graffiti from a Roman temple in the name of return to the original. Even on cosmetic criteria, retention of the patches would have been sensible; Flury-Lemberg herself wrote that the patches covered "big ugly holes left by the fire". [7]

The argument has been made before that even with a backing cloth on the Shroud it was hazardous to mount the relic in a vertical position for display. As the Shroud is now stored laid out flat in a glass case, this would also be the best manner to exhibit it according to Cardamone, i.e. with observers moving around it in small groups, or on a walkway above it. To remove the existing backing cloth only to replace it with another seems to be the height of folly, and no real advance on the repair work of 1534. Further, the whiteness of this new lining detracts from the image. The eye is struck by the stark contrast of white spots (lining visible through the holes) on straw coloured ground (the Shroud) that makes the sepia body image seem even more faint. To compare the Shroud before and after, see www.shroud.com/examine.htm.

In the months following the unveiling, a consensus of critique took shape. The main points were:
1) that the patches had been piously sewn on 450 years ago (according to legend the nuns who sewed them used golden needles and maintained constant prayer during the work) and thus constituted part of the Shroud's heritage;
2) that scientific data had been lost due to poor planning and/or ignorance;
3) that opportunities for sophisticated scientific research were squandered; and
4) that great stresses were put on the cloth during the month-long handling, unstitching and restitching, and exposure to lights.

In 2003, comments from prominent Shroud researchers began to be posted on www.shroud.com/restored.htm, and most were scathing. Ray Rogers, a nationally prominent chemist formerly with Los Alamos National Laboratory, declared "as a result of the restoration… a large amount of potentially critical information has been lost forever". Paul Maloney, archaeologist, stated his virtual certainty that the restoration was unnecessary. Dr. Frederick

Zugibe, former Chief Medical Examiner of Rockland County NY, expressed chagrin that the restorers did not wear gloves and dust-free clothing. In an email Rogers stated he believed that the action would go down in history as "Poletto's desecration".

Flury-Lemberg [7] published a coffee table book about the work in which a spirited defence was mounted, claiming that the Shroud was threatened by a process of progressive weakening and loss around the charred areas, and by oxidation due to the carbon dust particles spreading through the cloth. The problem for these claims was that the chemical processes she feared were unknown to science [8]. And the extensive photographic record since 1898 did not reveal one iota of evidence for any loss of fabric around the char. Such claims would not have survived the standard procedure of evaluation by peer review, but this was not done since the plan to conduct radical surgery on the relic had been kept a jealously guarded secret.

Data Lost

Ever since the first scientific examination of the Shroud in 1933, there has been a great and entirely proper emphasis on non-invasive techniques. Modern conservation shares this emphasis, as noted above, and for important archaeological objects there would be extreme reluctance to employ invasive methods, e.g. for cleaning, that would put information at risk. Ideally, there should be close collaboration between the archaeologist or museum curator and the conservator. In the case of the Shroud, this should have meant direct consultation with the experts from various fields who have studied the cloth and know the types of data it contains, and most importantly, how this data needs to be collected, extracted or preserved.

Savarino stated at the unveiling in Turin that "nothing was lost or thrown away, everything was kept". I tried in the space of about two minutes to ex-

Figure 4. Vacuuming. Vacuuming of dirt and carbon dust. (photo courtesy of Telesubalpina TV, all rights reserved).

plain to him why it is not simply retaining every particle of debris and dust that is important, but it is above all the structure of the evidence that must not be lost, and that the manner in which samples are collected is vital. It would be useless for example to present an archaeologist with all the objects from a site in a giant bag, with all stratigraphic and contextual information lost. During this "restoration" of the Shroud we are told that the debris and dust was collected and saved "in more than 30 glass containers". This makes it clear that a tremendous amount of information has been lost, since all 25 burn holes under the patches plus the four sets of "poker holes" were scraped and vacuumed, front and back. There should have been several hundred divisions of this material for rigorous study.

To cite an example, pollen from the Middle East has been identified from the Shroud, apparently in small clusters, but previous collection techniques have been faulty. Other particulate material – plant and insect debris, traces of natron, aloes, etc. – has also been identified as important for study. And yet, the vacuuming was done all around the edges of the burn holes, with no microscopic search of the areas carried out beforehand. Micro-remains that could have been identified and extracted by micromanipulator with precise provenance were instead aspirated into the container along with all the other debris from that general area.

Worse still is the destruction of the charred edges of the burn holes. Here the structure of evidence is crucial, and it was deliberately reduced to fluff. The Commission was said to have decided that no cutting would take place, and this would have moderated somewhat the loss of data if that decision had been strictly adhered to, and only loose particles were aspirated away. It was thus shocking to discover that intact segments between small holes or around the edges of larger holes had gone. Ghiberti wrote: "*Cutting away the charred parts to get back to the undamaged cloth would have produced an unnatural and devastating effect. It was decided to use tweezers to remove material which tended to give way when pulled and to reach the brownish borders* ..." [9]

This is a new method for preserving ancient textiles – material which tends to "give way" when pulled is removed! A photograph in Flury-Lemberg's book shows a scraping tool lying beside a pile of tiny bits of charred fibre in front of the "brownish border"

Figure 5 a, b and c. Before and After. On the left are X-rays taken in 1978, showing the burnholes under three of the patches. On the right are the shapes of the holes after 'restoration' (X-rays courtesy of William Mottern, all rights reserved).

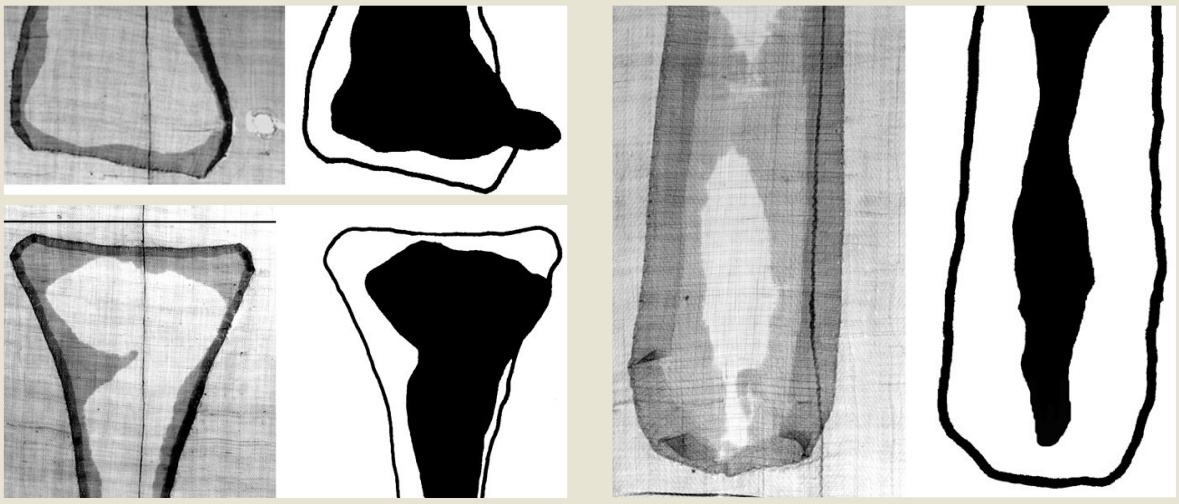


Figure 6. Pokerholes in 1978. The uppermost set of 'pokerholes' as photographed in 1978 (copyright Barrie Schwortz, all rights reserved).

Figure 7. The uppermost set of 'pokerholes' being scraped. The edges of the 'pokerholes' being scraped clean of char in 2002 (photo courtesy of Telesubalpina TV, all rights reserved).

which had become the new man-made edge of the burn hole. When this slide was shown at the unveiling its effect was "devastating". Unfortunately, instead of cutting, the "restorers" chose to scrape away several dozen square centimetres of charred cloth around the edges of the burn holes. Since they wanted the frayed look, it would have been better for science if they had cut the small segment first, and then done the scraping.

The invasive (some would say "brutal") nature of this operation was seen painfully clearly in a programme on Italian television which shows a few seconds of scraping around one of the so-called "poker holes" – small burns which pre-date the 1532 fire. This clip can be seen at www.hku.hk/hkprehis/shrdvid2.htm along with other clips showing the unnecessary exposure to light and constant touching of the cloth during the "restoration". These small so-called "poker holes" for example are often thought to have been the result of burning pitch or some acidic substance being dropped onto the folded cloth and eating through four layers. Any residues that might have remained on the inner edges of the holes is now dust residing in a container, the structure of their original in situ deposit destroyed.

There is another category of evidence that might have existed in situ in the charred material at the edges of the burn holes that was scraped away and pulverized. The intersection of the body image and bloodstains with the charred area was, in the view of several scientists, crucial for the future study of those phenomena, especially if any paint, pigment or other substance was used to create or touchup the body image or bloodstain. The physical and chemical changes that the deposits would have undergone in the thermal gradient from light scorch to char is most important, and diagnostic pyrolysis products might have remained in trace amounts. Whatever evidence there was is now jumbled together with the carbon dust and bits of fibre. Rogers termed this "a terrible, discouraging loss". To make matters worse, Savarino relates without comment that certain scientific measurements were made on the underside – reflectance, fluorescence and Raman spectra – but after the carbonized deposits and brittle brown fibres around the edges of the holes had been scraped away.

There are several other types of data that have been lost. One is the particulate evidence on narrow ledges of cloth beneath the patches that were effectively sealed since 1534. There was general vacuuming and mixing of material from the sealed and adjacent open areas. The ultrasonic vaporizer (mentioned by Ghiberti) may have disturbed and dispersed particulate deposits. Sophisticated measurements should have been made to compare the degree of oxidation of the linen in and outside the sealed areas, and on the underside of the cloth, to quantify how much the exposed area has degraded due to exposure to light during the last 468 years.

Finally, there are old fold marks and creases, important for studying how the Shroud was stored in earlier times. One prominent crease below the neck area is believed by some to date to the 7th century, from similar lines in an image thought to have been copied from the Shroud. As noted above, during the "restoration" an attempt was made to smooth these creases by applying weights onto the cloth; the creases were said only to have been "eased" and remain visible. But new sewing on each of the burn holes puts different tensions on the cloth, as does its new flat storage, and many of the old weaker creases may not be visible for much longer. Shockingly, an important point where an old crease ran under a patch and into a brittle charred area, indicating that the crease pre-dated the 1532 fire, was scraped away.

Damage to the Relic?

Of infinitely greater danger to the Shroud than its carbon dust, the invasive "restoration" put enormous stresses on the cloth, even with all the care in the world in handling it. It has often been remarked that ancient objects will last for centuries to come if we can just keep our hands off them. Through all of its known history prior to 2002, the Shroud has benefited from the conservative nature of the church hierarchy towards relics; it was seldom exhibited in public, the cloth was stored in a container in the dark, and handling has been minimal. These are very good historical conditions for the preservation of a textile. Alas, the temptation to improve or set things right is difficult to resist. The director of the Vatican Museum reportedly remarked in relation to the Sistine Chapel restoration: *"We could not resist the temptation to go ahead with it"* [cited in 10].

The lighting has been mentioned above. Apparently, ordinary desk lamps without filters were used at very close range, ca 30 to 40 cm. Instead of being bounced off walls or ceiling, the lighting was aimed directly at the cloth. Close flash photography may also have been done. Light is of course a great danger to the preservation of any historic textile, and especially for the Shroud whose image consists of advanced yellowing and degradation similar to that produced by aging. One can only wonder to what degree the non-image surface fibres have

Figure 8. Ghiberti. Mons. Ghiberti, chairman of the Conservation Commission, speaking on Italian television with the Shroud laid out in the background (photo courtesy of Telesubalpina TV, all rights reserved).

been further aged by this month-long illumination. It was thus extremely painful to watch Ghiberti, as chairman of the Conservation Commission, giving a television interview in front of the Shroud, while a lamp shines on the cloth unattended. He was speaking about the measures then being taken to conserve the Shroud.

Another danger may be posed by the new backing cloth. It was said to have been washed to de-size and soften, and tested for chemical residues by Savarino, but no other information is given. How sensitive were the tests, and for what chemicals? Flury-Lemberg writes that the cloth had not been bleached, but Cardamone believed that the new backing cloth could be a bleached cotton, as there were small black specks or "neps" present (a nep is a small knot of entangled fibres). Introduction of a new material of whatever type, whether free of bleach and sizing or not, introduces new impurities and constitutes a radical change that may have an unforeseen impact on the relic over time.

The greatest damage may come from handling without gloves. From the video clips that are available, it appears that the cloth was touched thousands upon thousands of times during the course of the "restoration". Flury-Lemberg responded to criticism of this fact thus: "*Anyone who has held these fine silk organzine threads and the corresponding needles in their hands will understand immediately that we could not wear gloves for the needlework. […] If the restorer cannot feel what he is doing with his fingertips he cannot do a good job*". [7]

While this could be a strong argument for keeping restorers well away from any historic textile, one can only wonder if sewing really does require more sense of touch than brain surgery. Dr. Frederick Zugibe, medical examiner for 30 years in New York, wrote: "I stressed the fact that there was no excuse for not wearing fine surgical gloves because even eye surgeons and micro surgeons wear them during extremely delicate surgical operations" [11]. The argument for sensitivity does not explain why the cloth was touched innumerable times simply to provide pressure, and during the vacuuming. Several close-up photographs and video clips reveal fingers constantly being placed on the cloth to hold it steady. If bare hands were truly required for stitching, one wonders if any consideration (impact assessment) was given to the risk that this might pose in the long term. Most of the sewing was for mounting the new backing cloth, which as we have seen was not urgently required and could have been dispensed with altogether.

Textile experts advise that gloves should be worn when handling any important or historic textile. The Institute of Conservation (ICON) recommends: *"Wear fine cotton or thin vinyl gloves when handling or touching the textile and remove jewellery that may snag"* [12]. In a factsheet published in 2001, the Scottish Museums Council warned: *"Damage from touching however is usually gradual over time. Textiles absorb salts and fatty substances from skin and eventually they discolour, stiffen and weaken fibres."* [13].

In 1978, the scientists involved in the study of the cloth were required to wear cotton gloves.The 2002 "restoration" would thus represent a regression in this regard. It is certainly true that the Shroud has often been handled throughout its history, but that fact cannot justify continued barehanded touching today when the contamination effects are known. It is quite possible that the Shroud was touched more times by bare hands, and exposed to more light, in one month of 2002 than in its entire history as a relic. The devout nuns in 1534 were careful to preserve every part of the precious cloth, even blackened remnants protruding into ugly holes. The 2002 "restoration" was, alas, a regression in this regard as well.

Conclusions

Nothing can insure that any object or the information it contains will survive, but conservation parameters are well known. Many of these were violated in the ill-considered "restoration" of the Shroud. The image on the Shroud presents a unique and very complicated conservation challenge, and it can only be met by the highest standard of scientific collaboration. This needs to be addressed in a methodical, scientific manner, subject to rigorous peer-review at an international level.

Deep concerns over the "restoration" led a group of 52 Shroud researchers to petition the Vatican in 2006. They requested that "an international commission of respected scientists and other knowledgeable persons be appointed, to advise on all matters relevant to the Shroud's conservation, scientific testing and long-term preservation as an object of study". It was suggested that representatives of the Pontifical Academy of Sciences and the Vatican Museum be included. There was no response to the petition.

Seeking to justify the aggressive "restoration", Flury-Lemberg cited the words of the late Prof. Adler: "*If we are remiss in undertaking conservation/ preservation studies and measures on the Shroud of Turin, future generations will have every right to castigate us for failing to meet our responsibilities. History will not be kind to us*" [14]. Sadly, his words were not heeded, the studies were not undertaken, and history will indeed not be kind to those responsible.

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