

**1992-2002:**

**Ten years of important events in the history  
of the Holy Shroud**

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July 23<sup>rd</sup>, 2002: a historical date for the Shroud (fig. n. 1), the precious cloth which has been preserved in Turin since 1578 and on which is imprinted the frontal and dorsal image of the corpse of a scourged and crucified man that has always been identified with Jesus of Nazareth.

On July 23<sup>rd</sup>, 2002 a very intense and important ten year period for the Shroud came to its conclusion. This period was marked by historical events of extraordinary importance: two public expositions (1998 e 2000) (fig. n. 2) during which a huge crowd of pilgrims (four million) came to Turin to see the Shroud; the inauguration of the new premises (fig. n. 3) of the “Museum of the Shroud” (1998) in the crypt of the Church of the Holy Shroud in Via San Domenico n° 28, Turin (fig. n. 4), which is the only public museum in the world dedicated to the precious relic; a terrible fire (1997) (fig. n. 5) which destroyed the Guarini Chapel of the Shroud and which threatened the Shroud’s safety; and above all the radical change in the state of the conservation of the Shroud achieved by means of a gradual, thoroughly pondered step by step process.

Until the 17th century the Shroud (which is an almost rectangular linen cloth about 440 cm long and 113 cm wide) had been preserved folded over several times and in different

ways which changed over time and which left their traces on the cloth. During the night between 3 and 4 December 1532 (fig. n. 6) a terrible fire broke out in the Sainte Chapelle of Chambéry where the Shroud was kept. At that time the Shroud was folded in 48 parts in such a way as to form a rectangle of about 36 cm by 28 cm. This may be deduced from the layout of the holes in the cloth (fig. n. 7) caused by the falling of a drop of molten metal from the casket in which the Shroud was kept. Moreover the fire caused the scorching of an edge of the folded cloth which is visible on the Shroud in the two dark lines parallel to its longest side. Two years later the Poor Clare nuns of Chambéry were given the task of repairing the cloth damaged by the fire. From April 16th to May 2nd, 1534 the Poor Clare nuns stitched the Shroud to a linen cloth (the so-called Holland cloth) in order to consolidate it and then sewed several patches (fig. n. 8) onto the Shroud to conceal the holes due to the fire. Some other patches (which are recognizable by the different color of their cloth) were added afterwards (almost certainly in the 18<sup>th</sup> century) (fig. n. 9) to cover further tears which had appeared in some points near the old patches and along the scorched lines.

From the end of the 16<sup>th</sup> or the beginning of the 17<sup>th</sup> century (but surely starting from 1694, when the Shroud was definitively placed in the Chapel designed by Guarino Guarini (figs. n. 10-11) which is located between the Cathedral and the Royal Palace of Turin the Shroud was no longer kept folded but instead rolled up round a wooden cylinder (fig. n. 12) and put in a precious wooden casket plated with silver and embellished with semiprecious stones and enamels, which is now on display in Turin in the Museum of the Shroud (fig. n. 13).

In 1992 the then Turin Archbishop and Papal Custodian of the Holy Shroud Card. Giovanni Saldarini – following the suggestions of his predecessor Card. Anastasio Ballestrero and of the Holy See, owner of the Shroud – appointed an international scientific Commission composed of some of the most important experts of ancient textiles and distinguished scholars of the Shroud; this Commission was subsequently completed by other members. Among them we remember in particular the late lamented Prof. Alan D. Adler (fig. n. 14), who was indubitably one of the greatest scholars of the Shroud, and Dr. Jeanette M. Cardamone, Dr. Mechthild Flury Lemberg, Dr. Sheila Landi among others. The Commission was entrusted with drawing up a broad and in-depth analysis in order to discuss and solve the very complex, important and pressing question of the conservation of the Shroud.

The works of the Commission began on September 7<sup>th</sup>, 1992 with a private exposition of the Shroud and with the first report which was drawn up at the end of a three-day work meeting. Studies and discussions among scholars continued in the following years and ended

with a final report discussed and drawn up during a conclusive meeting held in Turin on February 23<sup>rd</sup>-24<sup>th</sup>, 1996 (fig. n. 15). This report was sent to the Papal Custodian of the Holy Shroud and to the Holy See, owner of the Shroud. In this report the Commission examined in detail the conditions of conservation of the Shroud and provided a series of suggestions and absolutely necessary conditions for its best conservation. These may be summarized as follows:

- a) The Shroud must be laid out flat and in a horizontal position, free of stress and tension.
- b) It is necessary to remove from the Shroud the red silk cloth and the outside border in blue silk with the two silver strips.
- c) The Shroud must be preserved in a bullet proof, airtight case, in which the air must be substituted with an inert gas in order to stop the progressive darkening of the cloth due to the oxidation process and which causes a progressive reduction in the visibility of the image. The case must be kept in a totally dark place and its inside temperature, humidity and pressure must be monitored.
- d) It is necessary to study in depth the question of the removal and substitution of the Holland cloth and of the possible removal and replacement of the patches with the aim of improving the conservation conditions and assuring the mechanical and chemical stability of the Shroud fabric.

The proposals of the Commission obviously imposed a new way of conservation which was totally different from the one that had been adopted over the last three centuries (when it had been rolled up round a cylinder) and above all the necessity to build a new and very large conservation and display case. The whole operation was obviously extremely problematical and complicated because there were several difficulties that had to be overcome in both the design and the execution phases.

During the night between April 11<sup>th</sup> and 12<sup>th</sup>, 1997 a terrible fire almost completely destroyed the Chapel of the Shroud (fig. n. 16), where a long work of restoration was coming to its conclusion. Fortunately, in order to permit the work of restoration in the Chapel, on 24 February 1993 the Shroud had been transferred to the choir of the Cathedral (fig. n. 17) and consequently the fire did not damage it at all. The official recognition after the fire took place in the Turin Archbishopric on April 14<sup>th</sup>, 1997 (fig. n. 18).

In spite of the several difficulties and unexpected events, the construction of the case was finished on time and on April 17<sup>th</sup>, 1998 (fig. n. 19) for the first time the Shroud was put

into the new case ready for the public exposition that was held to celebrate the first centenary of the first photograph of the Shroud. Over two million and a half pilgrims arrived in Turin from April 18<sup>th</sup> to June 14<sup>th</sup> to visit the Shroud.

The case was a parallelepiped which was 4640 mm long, 1380 mm wide and 282 mm high and which weighed about 2,500 kg (fig. n. 20). The lower and lateral surfaces were made of a double layer of ballistic steel and the upper surface was made of thick, bullet-proof, laminated glass. The case stood on a trolley that weighed about 2,500 kg which permitted the case to be moved and rotated into the right position during public expositions (fig. n. 21). Before being inserted into the new case (fig. n. 22) the red silk cloth and the outside border in blue silk with the two silver strips (fig. n. 23) were removed from the Shroud. Inside the case the Shroud was sewn onto an untreated, Molton cotton cloth and placed on a light aluminium support sliding on runners. It could be taken out of the case through an airtight door on one of the two smaller lateral surfaces of the case.

On August 12<sup>th</sup>, 2000 the new exposition organized on the occasion of the Jubilee began (fig. n. 24). It was the longest exposition in Shroud history, because it ended on October 22<sup>nd</sup> after 72 days (with the addition of two extraordinary days, October 28<sup>th</sup> and 29<sup>th</sup>, in order to help pilgrims who had been unable to reach Turin during the floods which had struck the area a few days earlier). The pilgrims were almost one million and a half with the presence of more than 115,000 foreigners.

At the end of the Exposition the Shroud was transferred from the huge exposition case to a new case (fig. n. 25), which was lighter and handier, for its ordinary conservation. This case had been built by the Italian aerospace company Alenia Spazio, which placed its high level technical know how (acquired in the field of space technologies) at the disposal of the Shroud. The new case (fig. n. 26) is similar in size to the previous one and it is built in a light, aeronautical alloy, apart from the upper surface which is made of bullet-proof, laminated glass, and it weighs about 1,000 kg. Once again the Shroud was sewn onto an untreated, Molton cotton backing and placed on a light aluminium support sliding on runners. Inside the airtight case there is a mixture of argon (99,5%) and oxygen (0,5%) in order to guarantee the perfect conservation of the Shroud and its protection from any form of aerobic and anaerobic bacteria.

The new case is provided with a pressure control system composed of a battery of moving bellows (placed underneath, as we can see in the photo) that allow the adjustment between the inner and outer pressure of the case. This control system is necessary in order to avoid dangerous stresses on the case surfaces, in particular on the glass. The upper part of fig.

n. 27 shows a graph produced by the monitoring system of the case: the blue curve shows the trend of the atmospheric pressure in Turin in the month of February 2005 measured in the chapel where the Shroud is kept and the red curve represents the difference between the outer and inner pressure of the case; as clearly visible, it is practically constant. Therefore the graph underlines the excellent efficacy of the adjustment system. In the lower graph the red curve shows the trend of temperature inside the case, which is almost constant in time. The temperature is constantly monitored.

Before inserting the Shroud into the new case for its ordinary conservation, it was officially photographed by Gian Carlo Durante (fig. n. 28) using both traditional and digital color and black and white photos.

Moreover the reverse side of the Shroud was partially examined using a scanner. The Shroud was unstitched along its perimeter (fig. n. 29), but for the considerable limitations due to the presence of the patches which were stitched not only onto the Shroud but also right through onto the Holland cloth (fig. n. 30), it was necessary to gently insert the scanner into the few free spaces (fig. n. 31). The scanner images thus obtained regarded almost exclusively the central longitudinal strip, but they were clear enough to confirm the hypotheses made in 1978 by the STURP scientists about the perfect visibility on the reverse side of the blood spots and at the same time the lack of the body image (the details of the scanning operations will be provided in the talk by Prof. Nello Balossino).

During the above operations the partial unstitching of a peripheral patch (fig. n. 32) revealed the already suspected presence of polluting material underneath which was above all composed of residues of cloth that had been carbonized during the Chambéry fire and reduced to a fine powder with time. This material was probably present under every patch and was obviously a very high risk for the preservation of the Shroud. The Commission for the Conservation of the Shroud drew up a thorough detailed technical report on the above problems and this was sent to the Pope who is the owner of the Shroud. Some months later the Holy See gave its authorization to proceed to the substitution of the old Holland cloth and the removal of the patches and of the polluting material.

At the end of long and delicate preparations the work (fig. n. 33) began on June 20<sup>th</sup>, 2002 and ended on the following July 23<sup>rd</sup>. Under the guidance of Dr. Mechthild Flury Lemberg (fig. n. 34), an expert of world-wide renown in the field of the restoration of ancient fabrics, the Shroud was unstitched from the old Holland cloth and afterwards all the patches were unstitched as well (fig. n. 35). The polluting carbonized material (figs. n. 36-37-38) found under all the patches was painstakingly vacuumed up (figs. n. 39-40), placed in small,

sealed bottles (fig. n. 41), catalogued, and given to Card. Severino Poletto, Archbishop of Turin and Papal Custodian of the Holy Shroud. The technical details of the whole operation will be explained by Dr. Flury Lemberg in her talk.

Before stitching the Shroud onto a new support cloth, a series of data were collected. The reverse side of the Shroud (fig. n. 42) was completely photographed and scannerized. Photographs were taken using ultraviolet light. In some particular sites with different characteristics (under sites without the image, with only image, with only blood, with both image and blood, etc.) reflectance and fluorescence UV-VIS spectra were recorded. RAMAN spectra were also recorded in the same sites (fig. n. 43). The spectra were taken by supporting the sensors of the instruments over the Shroud's sites using a mobile bridge (fig. n. 44). In order to take the measurements in the best way possible, before using the spectroscopy on the reverse of the Shroud preliminary tests on a modern linen cloth which had identical textile characteristics were conducted; these results are shown in fig. n. 45.

Moreover a microscopic analysis was done on some Shroud sites using a videomicroscope with enlargements between 80x and 450x. The sensor of the optical microscope was put on the site under examination using the usual mobile bridge and the images were recorded using a digital videocassette recorder. For example, and with the permission of the Papal Custodian of the Shroud, in these figures we can see images of a site (fig. n. 46) with blood and of a site with a fragment of carbonized material (fig. n. 47).

Finally, always on the reverse side of the Shroud, some microscopic samples were taken using the aspiration and the adhesive tape methods (fig. n. 48).

All the recorded data and material collected was given to the Papal Custodian of the Holy Shroud and if and when the Holy See decides to do so, it will be placed at scientists' disposal for study and research.

At the end of these operations the Shroud was stitched to a new backing cloth which had previously been analysed in order to be certain about its chemical and physical characteristics. In the end the edges of the holes caused by the Chambéry fire were stitched to the new backing cloth because the Commission decided that it was no longer necessary to cover them with new patches, both for the fact that the Shroud is now kept flat and in a horizontal position - and hence without mechanical stresses - and in order to render the image and the blood stains totally visible (see figs. n. 49-50-51, where it is possible to see one of the fabric sites that was damaged by the Chambéry fire before and after the restoration work and the removed patch).

At the end of the work the Shroud was returned to its case (fig. n. 52) in the left transept of Turin Cathedral (under the Royal gallery) where it is protected and monitored by modern systems (fig. n. 53).

The operation of improvement of the conditions of conservation of the Shroud that was planned and realized in the ten-year period 1992-2002 is without doubt a milestone in the Shroud's history because it guarantees the best possible modern conditions of conservation. This operation will permit new generations to continue to admire this unique and fascinating image which still today, at the beginning of the third millennium, can be rightly considered an "inexplicable image".