

The Shroud, the real problem is the image

In addition to dating, the question is training and conservation, Emanuela Marinelli explains it

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After the recent revelations on the wrong dating and on how some studies have been distorted, today the most serious question for the Turin Shroud is how it should be preserved. Emanuela Marinelli explains the future prospects and other ongoing studies to ACI Stampa.

How is the Shroud kept today?

In 2000 Alenia Spazio, now Thales Alenia Space Italia, created a case for the conservation of the precious linen; it was made from a single block of aluminum, suitably constructed to avoid welding. The sheet - which is kept stretched out in the dark, in the absence of air and in the presence of an inert gas, the argon - is protected by watertight bullet-proof glass and is maintained in constant weather conditions through various monitoring systems.

Why is the radiocarbon test not essential? There are many other tests that deny it...

Three new analyzes, conducted in 2013 by the engineer Giulio Fanti, associate professor of mechanical and thermal measurements at the Department of Industrial Engineering of the University of Padua, date the Shroud to the age of Christ. Some relic fibers have undergone two chemical dating, based on vibrational spectroscopy. Fanti explains in this regard: «The basic idea is that time degrades the polymers of the fibers, modifying their chemical structure, so that the concentrations of certain groups of atoms, typical of cellulose, vary with the aging of the sample, groups that vibrational spectroscopy is able to recognize and count.

After the correction of a systematic effect of 452 years, due to the Chambéry fire, the dating of the Shroud by FT-IR vibrational spectroscopic analysis - from English Fourier Transform to Infrared - was found in 300 BC. \pm 400 years at the 95% confidence level.

The Raman vibrational analysis has provided the value of the Relic of 200 BC \pm 500 years, always at the 95% confidence level. Both vibrational datings are compatible with the date of the 1st century AD in which Jesus of Nazareth lived in Palestine ».

The third dating method is mechanical, the result of the work done by the engineer Pierandrea Malfi for the achievement of the master's degree in Mechanical Engineering, under the supervision of Fanti. To conduct the experimental mechanical tests on linen fibers, a traction machine for vegetable textile fibers was specially designed and built. Fanti explains: «The basic idea in this case is that the degradation of the polymer chains of the fibers promoted by time, by breaking them and changing the order in which they mutually arrange themselves in space, is able to modify their mechanical properties to the point of exploiting the property for dating purposes. Indeed, it turned out that five mechanical properties vary uniquely with time.

The multiparametric mechanical dating obtained on these five significant parameters, combined together, led to an age of the Relic of 400 AD \pm 400 years at the 95% confidence level ». He then concludes: "The average of the values resulting from the two chemical and mechanical datings gives the most probable date of the Shroud of 33 BC. \pm 250 years at the 95% confidence level ".

In addition to these new tests, there are other details that testify in favor of the antiquity of the Shroud. For example, the Swiss textile expert Mechthild Flury-Lemberg pointed out that the side strip joined to the Shroud, made of the same fabric, has a particular seam structure, for which there are comparisons with fragments of fabric from the archaeological finds of Masada. The excavations conducted in this area have brought to light a large quantity of fabric fragments, which in the 1990s were examined in detail. The research therefore provides valuable information

on fabric structures and their processing for garments during the period between 40 BC and the fall of Masada, which occurred in 74 AD.

In the findings of fabrics in Masada there is also the special typology of the structure of the selvedge that exists on the Shroud on the long external sides. Since on the short sides of the cloth there are instead the edges, the Shroud must have been cut by a longer cloth roll. The fabric and workmanship of the funeral sheet leaves no doubt about its professional production. This cloth was neither woven in a domestic frame, nor sewn by an unqualified hand: it is a linen of great value. It could be an expensive import commodity.

The Shroud therefore has characteristics similar to those of Jewish fabrics from the time of Christ.

Another important topic that testifies to the existence of the relic already in the first centuries is the striking resemblance to the ancient depictions of the Face of Jesus, which certainly appear to have been copied from the Shroud Face.

The most important study today is about image and its conservation... Is it disappearing?

The image on the Shroud is still a mystery. It is inexplicable how a corpse could have left the photographic image of itself on the sheet. In the area of the impression only the superficial film of the outer fibrils is yellowed, therefore the image can only be seen from the side of the sheet that was towards the body; on the wrong side of the fabric is not present. On the back you can see blood stains, which have passed from side to side.

The translucent yellow color of the image area is not due to any substance placed on the wires: the wires themselves have darkened.

The yellowing is caused by a degradation of the external surface of the fibrils, which is oxidized and dehydrated. It is a yellowing identical to that which light causes on the cellulose of wood, paper and fabrics over the years; except that in this case the phenomenon at the origin of the impression has darkened the fibrils to the maximum, while the rest of the sheet has the normal ivory color due to the passage of time.

The only explanation consistent with all the characteristics of the Shroud image would be to admit that the imprint was formed due to the exposure of the sheet to a brief but intense source of energy, coming from the inside of the human body covered by the Shroud. But it is a solution to the problem that goes beyond science. Only those who believe in the resurrection of Christ can admit that at that time a unique and unrepeatable phenomenon occurred, an emission of energy that left its mark on the fabric.

The experiment that has most succeeded in approaching the characteristics of the Shroud image has been realized in recent years in Frascati (Rome) by a group of physicists from ENEA, the National Agency for New Technologies, Energy and the sustainable economic development.

Some linen fabrics have been irradiated with an excimer laser, which emits high intensity ultraviolet radiation. The results, compared with the Shroud image, show interesting analogies: the coloring is similar and is limited to the superficial part of the fabric. The possibility is confirmed that the Shroud image was caused by directional ultraviolet radiation.

In the future the yellowing of the sheet will increase and reach the maximum degree of darkening, which has already been reached by the fibrils of the impression; at that point there will be no difference with the background and therefore the image will no longer be visible. For this reason the Shroud is preserved in the dark and is exposed as little as possible.

What the scientific community should do today

The scientific community should promote a new multidisciplinary plan of studies that includes the problem of conservation, that of dating and that of the origin of the image along with advanced studies on DNA and micro-traces on the cloth. The Shroud is a fascinating mystery for all, believers and non-believers; we cannot stop studying it and admire it.