

Forensic Science and the Shroud of Turin

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Opinion

The Shroud of Turin is a 14.3 by 3.6 foot linen cloth that has been in Turin, Italy, since 1578. Ancient tradition has long claimed this piece of cloth to be the authentic burial cloth of Jesus Christ. This is supported by full-size images on the Shroud of the front and back of a man who was crucified exactly as the New Testament says Jesus was crucified. So far, historical research has been unable to prove or disprove whether the Shroud is the authentic burial cloth of Jesus. Scientific research regarding its authenticity must be accomplished by following the scientific evidence where it leads, without bias or preconceptions. This process of following the evidence where it leads is the essence of forensic science. It can be described as reverse engineering from the evidence back to the cause. Scientific research on the Shroud can be divided into four periods:

1898 to 1977: Scientific testing of the Shroud began in 1898 when an Italian amateur photographer named Secondo Pia took the first photograph of the cloth. He would have expected his photographic plate to show a poor resolution negative image of the face, but instead it contained a good resolution positive image. This meant the image on the Shroud was a good resolution negative image, with light and dark areas reversed. Therefore, the image could not be a painting because an artist prior to 1898, or 1578, could not have painted a good resolution image of what he had never seen, i.e., a negative image of a face. Research continued over the next eight decades by very qualified people in the United States and other countries. In general, they concluded that the dead body of a crucified man was wrapped in the Shroud and in some unknown way had encoded front and back images of itself onto the burial cloth in which he was wrapped. This belief was largely based on the pristine unbroken appearance of the edges of the blood clots, with their indented center and raised edges, and the clear blood serum extending beyond the blood clots due to capillarity.

1978 to 1987: The discovery in 1975 by Dr. John Jackson, professor of physics at the Air Force Academy, that the images contained 3D information led to formation of the Shroud of Turin Research Project (STURP). In 1978, the Vatican allowed STURP, led by John Jackson, to send 26 American scientists to Turin to perform nondestructive experiments on the Shroud for a total of 120-hours. They worked in three shifts over a period of five days. The members of STURP made extensive preparations for testing and obtained donations of about 2.5 million dollars' worth of scientific equipment. STURP's experiments on the Shroud included microscopy, absorption radiography, X-ray fluorescence and absorption radiography, Laser-microprobe Raman spectroscopy, etc. The main objective of STURP was to determine how the images were formed. They concluded the images could not be the product of paint, dye,

or stain because there was: 1) No pigment on the fibers, 2) No evidence of a binder to hold pigment, 3) No brush strokes, 4) No clumping of fibers or threads, 5) No stiffening of the cloth, and 6) No cracking of the images along fold lines. They found that UV did not cause the image to fluoresce so the image could not be a scorch. STURP also found no capillarity (soaking up of liquid) in the fibers or threads, so the images could not be due to a liquid such as an acid or an organic or inorganic chemical in a liquid form. The images on the Shroud could also not be the result of a photographic process because the images contain 3D information. Photographs and paintings do not contain 3D information. Multiple tests also indicated the presence of real blood on the Shroud.

1988 to 2016: Small samples were cut from the lower corner of the Shroud in 1988 and sent to three laboratories for carbon dating. The mean date obtained from the three laboratories was 1260 ± 31 . When this was corrected for the changing concentration of C-14 in the atmosphere, a range of 1260 to 1390 AD (two sigma) was obtained. This allegedly proved the Shroud could not be authentic, and thus significantly reduced research on the Shroud.

2017 to 2021: The 1988 measurement data was finally released for review in 2017. Statistical analysis of the data proved the samples from the lower corner were not homogeneous, i.e., representative of the rest of the Shroud. This non-homogeneity of the samples has been confirmed by four recent papers in peer-reviewed journals and is consistent with previous statistical analysis of the measurement data. This indicates the presence of a systematic error in the measured (C14/C12) ratios of the samples evidently because this ratio in the samples was altered by something other than decay of the C14. This means the carbon date of 1260- 1390 AD for the Shroud should be rejected. This leaves us with three main questions: 1) How were the front and back images of the crucified man formed on the cloth? 2) How were the (C14/C12) ratios of the samples altered? 3) Why is the blood that

would have dried on the body now on the cloth, since cloth does not absorb dried blood? Multiple answers have been attempted to answer these separate questions, but a recent hypothesis proposes a concept that could explain all three questions.

The images on the Shroud are made by the top one or two layers of fibers in a thread being discolored to a sepia or straw-yellow color. This discoloration of the fibers penetrates to less than 2% of the radius of a fiber. It is the pattern of these discolored fibers that form the images of the crucified man. Three things are needed to produce this pattern of discolored fibers: 1) a mechanism to discolor the fibers, 2) energy to drive the discoloration mechanism, and 3) information to control which fibers are to be discolored. Since the images are that of a crucified man, the information must be that which defines the form of a crucified man and could only have come from the body that was wrapped in the cloth. The only mechanism that could communicate this information from the body to the cloth and produce the good resolution image that can be seen, appears to be radiation. Thus, many if not most Shroud researchers now believe the images were formed by radiation. Research indicates this radiation was evidently low- energy, perhaps charged particles and/or electromagnetic radiation, and released in an extremely brief intense burst of energy from the body. If this burst of radiation included neutrons, a small fraction of the neutrons would have been absorbed in the trace amount of nitrogen in the cloth to form new C-14 atoms in the fibers. This new C-14 could have shifted the carbon date forward by thousands of years, depending on the location on the Shroud. To shift the carbon date forward from the time of Jesus' death, about 33 AD, to the midpoint of 1260-1390 AD requires the C-14 concentration at the 1988 sample location be increased by only 16.9%. If the radiation burst from the body were sufficiently brief and intense, it would have thrust the dried blood off the body onto the cloth by a natural process called radiation pressure.

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