Does Carbon Dating Disprove the Shroud's Authenticity?

Robert A. Rucker, September 18, 2020, revised October 28, 2023

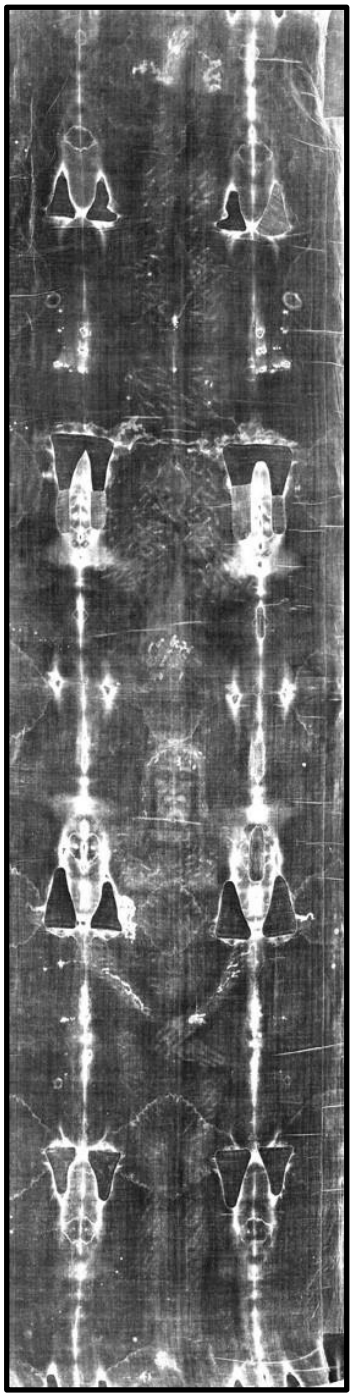


Figure 1. Shroud of Turin. © Barrie M. Schwortz Collection. STERA. Inc.

An ancient piece of linen cloth (Figure 1) called the Shroud of Turin contains front and back full-size images of a crucified man, with the images not due to pigment, liquid, scorch, or photography. Tradition has long maintained this cloth is the authentic burial cloth of Jesus. The main objection to the Shroud being authentic is its carbon dating in 1988.

Carbon dating is performed by measuring the ratio of carbon-14 to carbon-12, i.e. C^{14}/C^{12}, in the samples removed from the item to be dated. C^{14} is radioactive, decaying with a half-life of 5730 years, which means half of it will decay to Nitrogen-14 (N^{14}) every 5730 years. C^{12} does not undergo radioactive decay. This allows a "clock" to be established based on how the C^{14}/C^{12} ratio would normally decrease with time. After the C^{14}/C^{12} ratio is measured in the samples, a date can be calculated assuming the C^{14} has only changed due to the natural decay of C^{14}, as in Figure 2. Normally, this calculation assumes no C^{14} has been added or removed from the samples by any other process.

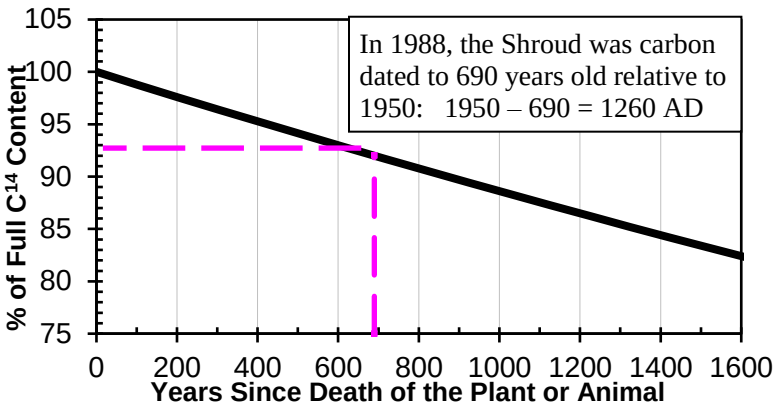
In 1988, scientists cut samples from the bottom corner of the Shroud and sent them to three laboratories for carbon dating. The average date obtained was 1260 AD ± 31. When this value was corrected for the changing concentration of C^{14} in the atmosphere, a range of 1260 to 1390 AD was obtained[1]. If this is the correct date for the Shroud, then it cannot be the authentic burial cloth of Jesus since Jesus died about 30 or 33 AD. However, based on scientific evidence from the cloth, most Shroud researchers believe the carbon dating of the Shroud to 1260-1390 was flawed. Four recent papers[2] in peer-reviewed journals have proven the 1260-1390 date should be rejected based on the statistical analysis of the 1988 experimental results.

To understand how 1260-1390 may not be the true date for the Shroud, carbon dating will be compared to the operation of an hourglass. An hourglass consists of an upper region and a lower region, both being fully enclosed in glass but with a small diameter tube connecting the two regions so that sand in the hourglass can flow down from the upper region to the lower region. Assume that all the sand is initially in the lower region. When the hourglass is turned over, all the sand is then initially in the upper region and starts to flow from the upper region to the lower region through the connecting tube. The amount of time that has passed since the hourglass was turned over can be measured by the amount of sand in either region,

1. P.E. Damon, et al. (20 others), "Radiocarbon Dating of the Shroud of Turin", *Nature*, February 16, 1989.
2. T. Casabianca, et al., "Radiocarbon Dating of the Turin Shroud: New Evidence from Raw Data", 2019, *Archaeometry*, B. Walsh and L. Schwalbe, "An Instructive Inter-Laboratory Comparison: The 1988 Radiocarbon Dating of the Shroud of Turin", *JASREP*, Feb. 2020, and "On Cleaning Methods and the Raw Radiocarbon Data from the Shroud of Turin", P. Di Lazzaro, et al., "Statistical and Proactive Analysis of an Inter-Laboratory Comparison: Dating of the Shroud of Turin", *Entropy* Aug. 2020

with the amount of sand in the upper region decreasing and the amount of sand in the lower region increasing. Consider the upper region. The volume of sand in the upper region decreases as time increases, so the height of the sand in the upper region can be marked off on the glass in minutes, thus making a "clock" that gives the time after the hourglass was turned over. At least this is the normal expectation based on the assumption that the amount of sand in the hourglass remains constant. But what if the upper region is not fully enclosed so more sand can be added to the upper region. If at some point after the hourglass is turned over, additional sand is added to the upper region, which the observer is not aware of, this additional sand would change the time read on this "clock". This means the time indicated on the hourglass, since it was turned over, would be shorter than the true time.

Figure 2. Amount C^{14} Decreases Due to Decay



This is also true for the carbon dating of the Shroud. If C^{14} due to an unexpected mechanism is added to the fabric, then the calculated date will be more recent than the true date. If the Shroud of Turin is the burial cloth of Jesus, and if Jesus' resurrection is an historical event, then the cloth could have experienced unique phenomena, such as radiation, at the instant of Jesus' resurrection. Experiments on the image indicate it was probably formed by an extremely brief intense burst of radiation from within the body[3]. This radiation burst can account for the characteristics of the image and blood on the cloth. The atoms in a normal human body are composed of neutrons, protons, and electrons. If neutrons were also emitted in this burst of radiation from the body as it was wrapped in the cloth, a small fraction of these neutrons would have been absorbed into the trace amount of N^{14} that naturally would exist in the linen fabric. This neutron absorption would form new C^{14} by the [N^{14} + neutron produces C^{14} + proton] reaction. This new C^{14} would shift the calculated date forward[4]. Only a 16% increase in C^{14} in the samples will shift the calculated carbon date from 33 to 1260 AD. The possibility of this additional source of C^{14} was not seriously considered in the 1988 carbon dating of the Shroud.

Nuclear analysis computer calculations[5] in 2014 using the MCNP software have determined that neutrons absorbed into the Shroud would shift the carbon dates forward by up to thousands of years depending on the location's distance from the center of the body. This explanation for the 1988 carbon dating to 1260-1390 can be tested[6] by carbon dating the charred material removed from under the patches on the cloth in 2002. This charred material was placed into 42 sample jars, which were placed into a vault in Turin, Italy, where it remains to this day. Thus, carbon dating this charred material would not affect the Shroud in any way.

3. Robert A. Rucker, "Image Formation on the Shroud of Turin", October 28, 2023.
4. Robert A. Rucker, "Solving the Carbon Dating Problem for the Shroud of Turin", October 28, 2023.
5. Robert A. Rucker, "The Carbon Dating Problem for the Shroud of Turin, Part 3: The Neutron Absorption Hypothesis", July 7, 2018.
6. Robert A. Rucker, "Proposal for C^{14} Dating of Charred Material Removed from the Shroud", Oct. 15, 2018. Rucker's papers are available on the research page of his website www.shroudresearch.net . Send questions or comments to robertarucker@yahoo.com.