The 1988 Radiocarbon Dating of the Shroud of Turin and STURP

Presented by

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The 1988 Radiocarbon Dating

In October of 1981, the STURP team's original agreement expired and we reached the end of our formal existence. A number of scientific papers were still in progress at the time, and these were all ultimately completed and published in credible refereed scientific journals.

Some members of the team were interested in continuing their Shroud research and in the mid-1980's, an effort was made to create STURP 2. One of the prime experiments STURP 2 would suggest was radiocarbon dating of the cloth. However, due to a number of different reasons, this was not to be. STURP 2 was never formed and the eventual radiocarbon dating of the Shroud would be left to other researchers.

The 1988 Radiocarbon Dating

September 29 to October 1, 1986: Representatives of several radiocarbon dating laboratories at last meet in Turin, under Professor Chagas' chairmanship, to discuss the best 'protocol' for radiocarbon dating the Shroud. A protocol is drawn up for seven laboratories (five AMS, two small-counter) to take part, the AMS facility at Gif-sur-Yvette, France, having been added to the list. This is then submitted to both the Pope and the Cardinal of Turin.

October 6, 1986: News of the meeting is released to the world's press.

April 27, 1987: The Turin paper La Stampa publicly quotes Professor Gonella as saying that only two or three laboratories would be involved in the testing.

July 1, 1987: Representatives of the seven laboratories write a letter to Cardinal Ballestrero advising: 'As participants in the workshop who devoted considerable effort to achieve our goal we would be irresponsible if we were not to advise you that this fundamental modification in the proposed procedures may lead to failure'.

Source: Shroud of Turin Website Shroud History Page
http://www.shroud.com/history.htm#1900

The 1988 Radiocarbon Dating

October 10, 1987: Cardinal Ballestrero of Turin writes to the seven radiocarbon laboratories informing them that on the advice of his scientific advisor Professor Gonella, it is only three of their number, the Oxford, Arizona and Zurich laboratories, who have been chosen to perform the testing. Ballestrero's letter states that ' experience in the field of archaeological radiocarbon dating' was a criterion. The cardinal also advises that certain other details of the 1986 protocol have been scrapped, including any further involvement of the Pontifical Academy of Sciences in the exercise. Also eliminated is the participation of Swiss textile expert Mme. Flury-Lemberg who, it had been intended, would actually physically remove the samples from the Shroud. Dr. Tite is named as the appointed supervisor for certification of the samples.

November 1987: The directors of the three chosen laboratories warn Cardinal Ballestrero: 'As you are aware, there are many critics in the world who will scrutinize these measurements in great detail. The abandonment of the original protocol and the decision to proceed with only three laboratories will certainly enhance the skepticism of these critics'. The chosen three declare themselves 'hesitant to proceed', and request the matter be given 'further consideration'.

Source: Shroud of Turin Website Shroud History Page
http://www.shroud.com/history.htm#1900

The 1988 Radiocarbon Dating

January 13, 1988: The Turin newspaper La Stampa discloses that Professor Gove and Dr. Harbottle have written an open letter to the Pope, also to Nature and the director of the British Museum, deploring the rejection of the seven-laboratory protocol. They claim that the Pope has been 'badly advised' and 'that he is making a mistake if he approves a limited or reduced version of the research whose outcome will be, to say the least, questionable'.

January 15, 1988: In a press release Gove and Dr. Harbottle conclude, 'The Archbishop's plan, disregarding the protocol, does not seem capable of producing a result that will meet the test of credibility and scientific rigor' and that 'it is probably better to do nothing than to proceed with a scaled-down experiment'.

Professor Gonella declines to explain the reasons for his choice of laboratories, terming it a private matter.

January 22, 1988: Professor Gonella and leading representatives of the Oxford, Arizona and Zurich laboratories meet in the Board Room of the British Museum, London, to discuss the best procedures to be adopted. News of this meeting is released the same evening.

March 25, 1988: Professor Gove writes to the Pope outlining all that has transpired and appealing to him to persuade Cardinal Ballestrero to revert to the original protocol. His letter is ignored.

Source: Shroud of Turin Website Shroud History Page
http://www.shroud.com/history.htm#1900

The 1988 Radiocarbon Dating

April 21, 1988: At 5 a.m. the Shroud is secretly taken out of its casket. At 6.30 a.m. Dr. Tite and the representatives of the three laboratories assemble at the cathedral. In the cathedral sacristy the Shroud is unrolled and shown to assembled representatives of the three chosen radiocarbon dating laboratories. Professor Testore of Turin Polytechnic, Gonella's choice as textile expert in place of Mme. Flury-Lemburg, reportedly asks 'What's that brown patch?' of the wound in the side. Professor Riggi and Professor Gonella reportedly spend two hours arguing about the exact location on the Shroud from which the sample should be taken. During the event, it is Riggi who seems in charge of the operation.

At 9.45 a.m., with a video-camera recording his every move (he will later sell copies to international media and others), he cuts a sliver from one edge and divides this into two, then divides one of these halves into three. In a separate room (the Sala Capitolare), and now unrecorded by any camera, the Cardinal and Dr. Tite place these three latter samples in sealed canisters, for the respective laboratories to take away with them. At 1 p.m. the sample taking for carbon-dating purposes is formally completed, and the laboratory representatives depart.

Source: Shroud of Turin Website Shroud History Page
http://www.shroud.com/history.htm#1900

The 1988 Radiocarbon Dating

April 21, 1988: During the afternoon, and in the presence of some twenty witnesses, Riggi takes blood samples from the lower part of the crown-of-thorns bloodstains on the Shroud's dorsal image. According to Riggi's own subsequent account, he received the cardinal's permission to take for himself both these 'blood' samples and the portion of the Shroud he cut away but which was superfluous to the needs of the carbon-dating laboratories. These samples he will deposit in a bank vault. At 8.30 p.m. the Shroud is returned to its casket.

April 22, 1988:(Friday) The news of the taking of the samples is released to the world's press.

August 26, 1988: The London Evening Standard carries banner headlines declaring the Shroud to be a fake made in 1350. The source, Cambridge librarian Dr. Stephen Luckett, has no known previous connection with the Shroud, or with the carbon dating work, but in this article declares scientific laboratories 'leaky institutions'. The story is picked up around the world.

Source: Shroud of Turin Website Shroud History Page
http://www.shroud.com/history.htm#1900

The 1988 Radiocarbon Dating

September 18, 1988: Without quoting its source, The Sunday Times publishes a front-page story headlined: 'Official: The Turin Shroud is a Fake'. Professor Hall and Dr. Tite firmly deny any responsibility for this story.

October 13, 1988: (Thursday) At a press conference held in Turin, Cardinal Ballestrero, Archbishop of Turin, makes an official announcement that the results of the three laboratories performing the Carbon dating of the Shroud have determined an approximate 1325 date for the cloth. At a similar press conference held at the British Museum, London, it is announced that the Shroud dates between 1260 and 1390 AD. Newspaper headlines immediately brand the Shroud a fake and declare that the Catholic Church has accepted the results.

February 16, 1989: Publication, in the prestigious scientific journal Nature, of the official results of the Shroud radiocarbon dating. This has twenty-one signatories. It declares that the results 'provide conclusive evidence that the linen of the Shroud of Turin is medieval'.

Source: Shroud of Turin Website Shroud History Page
http://www.shroud.com/history.htm#1900

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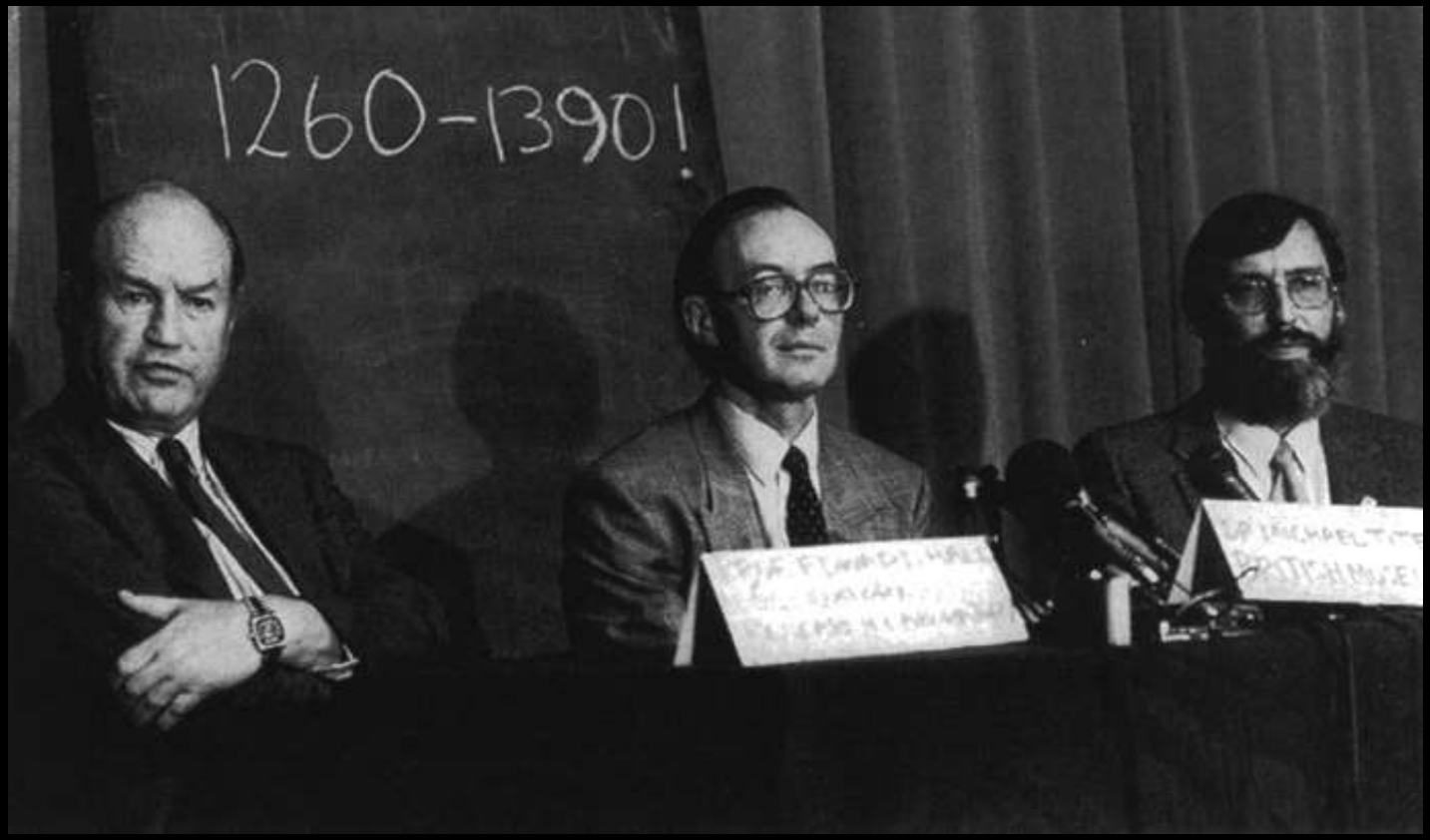
Many questions about the radiocarbon dating remain unanswered and are too numerous to mention here. However, it was reported in the British press that after the dating results were published, the Oxford Laboratory received a one million British Pound Sterling "anonymous" contribution for "debunking" the Shroud. In fact, Dr. Michael Tite of the British Museum, who supervised the dating process, left the museum and moved over to Oxford, where they built him a new laboratory.

The biggest question this raises is: When did the labs find out they were to receive this funding? If they had any inkling in advance, what influence might that have had on their results and what impact does that have on the credibility of their conclusions?

The 1988 Radiocarbon Dating

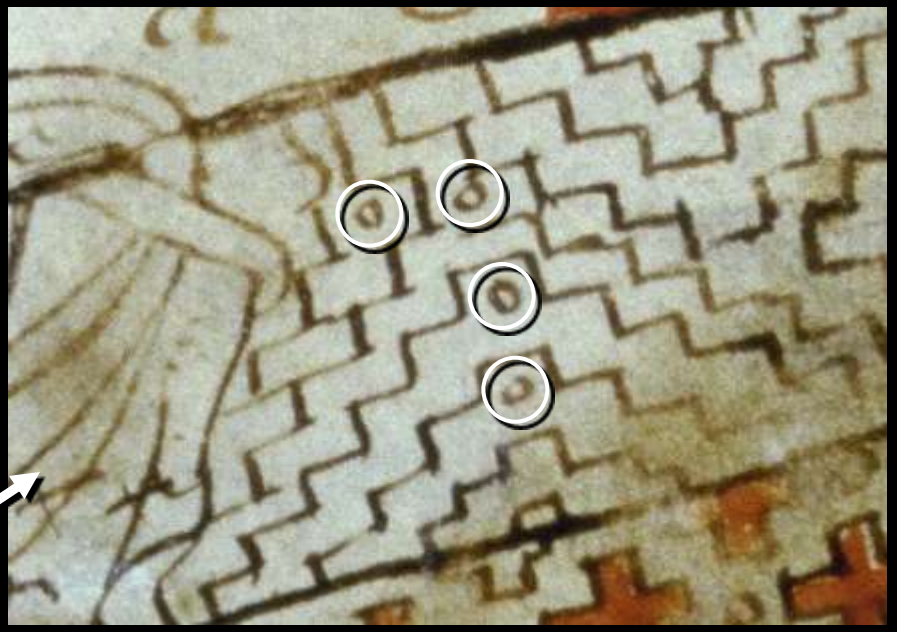


Of course, prior to the radiocarbon dating of 1988, there was a substantial amount of credible historical evidence that indicated the Shroud was considerably older than the earliest C-14 date of 1260 AD.

The Shroud MUST be older

(c) National Szechenyi Library
Budapest, Hungary

The Pray Codex, is an illuminated Hungarian manuscript documented from 1191 A.D. and known to many Shroud scholars by 1988.



It shows a herringbone woven cloth, the nude image of Jesus with hands folded over his torso, no thumbs visible, blood over the eye and most importantly, a set of four "L" shaped burn holes.

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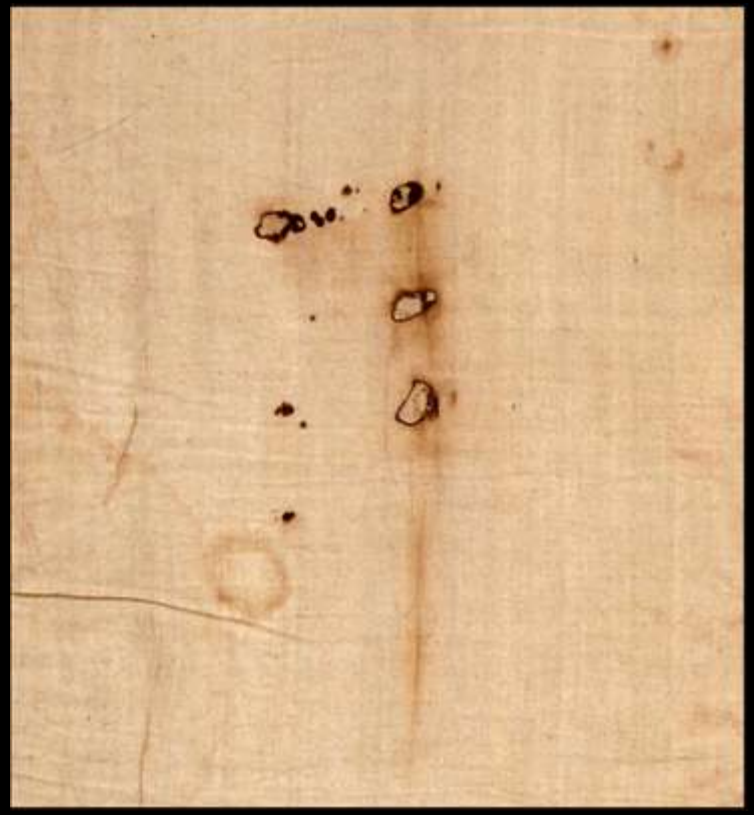
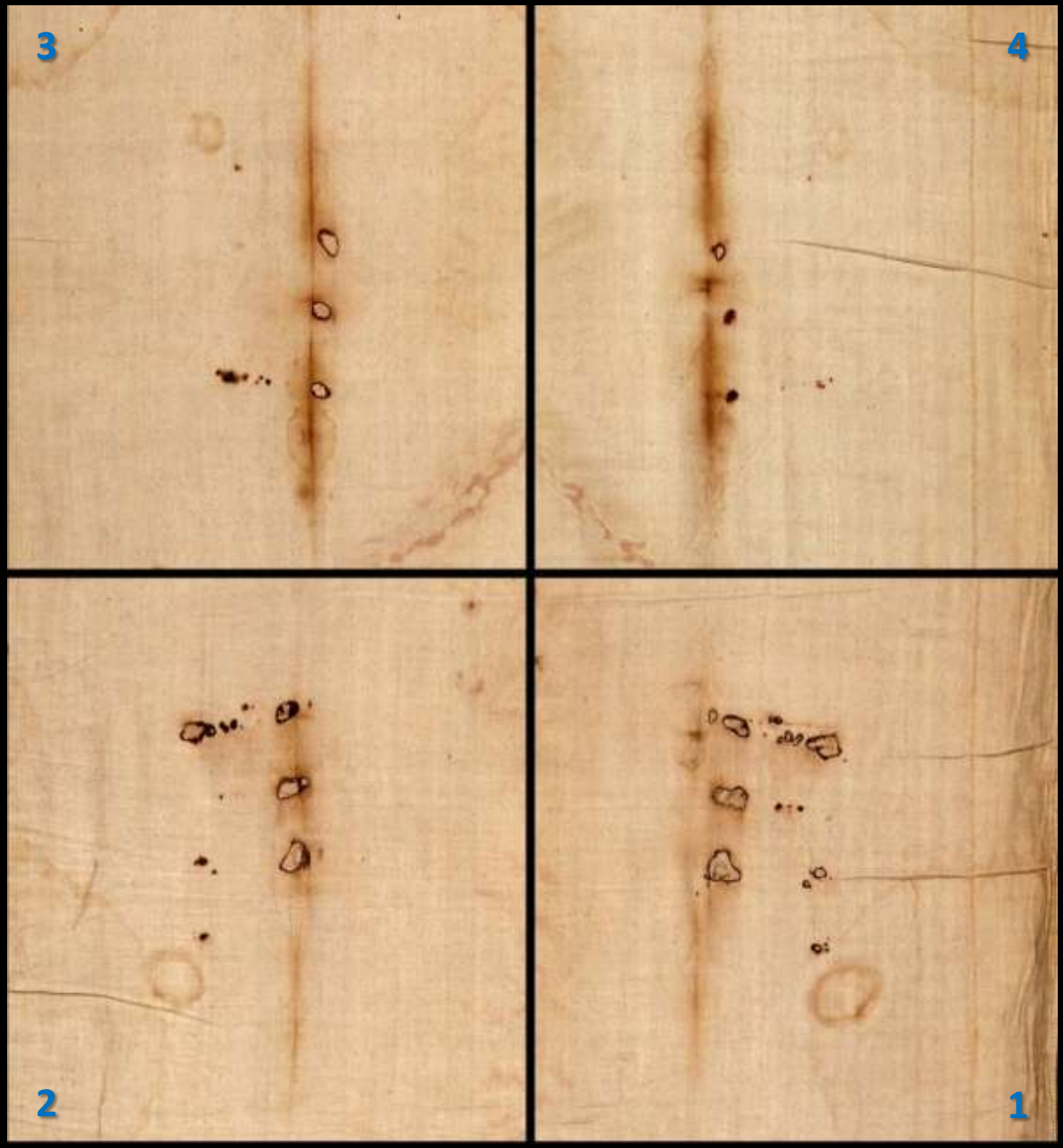


(c) National Szechenyi Library, Budapest, Hungary

Obviously, the artist who illustrated the Pray Manuscript saw the actual Shroud at some point prior to 1191.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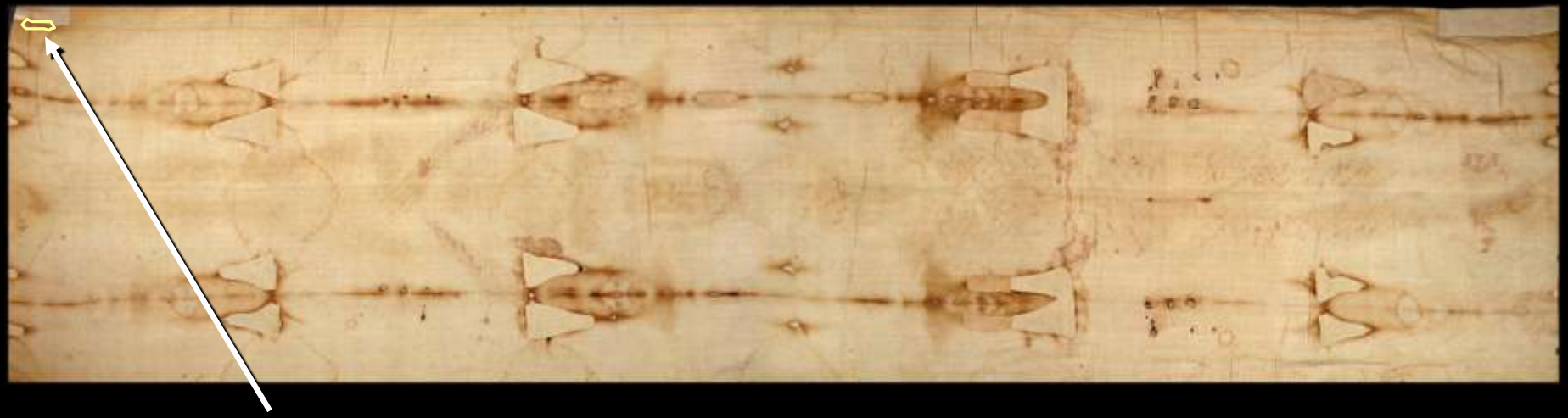
The 1988 Radiocarbon Dating



A single strip of only 1.2 cm x 8 cm (.47 in x 3.15 in) was removed from the Shroud for Radiocarbon Dating in 1988.

Only half of that sample was used and it was divided into three equal sections by weight. One section was given to each of the laboratories. The other half of the sample was held in reserve.

No chemical analysis of the removed samples was ever performed, even though it was specifically called for in the original C-14 dating protocol.

The C-14 dating results were based on a single small sample. Was it truly representative of the entire cloth or its age? That was the question in the minds of most Shroud scholars, but more than a dozen years would go by before a viable answer would emerge.

The 1988 Radiocarbon Dating

Edward Hall (left), Michael Tite (centre) and Robert Hedges at the British Museum after revealing their findings on the shroud.

Turin Shroud shown to be a fake

By Michael Sheridan in Rome and Phil Reeves in London

CARDINAL Anastasio Ballestrero of Turin yesterday confirmed what newspaper readers around the world have known for weeks: that tests on the Turin Shroud have shown it to be of medieval origin.

The shroud, believed by many to carry the imprint of Christ's face and body when laid in the tomb, has attracted devout pilgrims to Turin for centuries. Leaks of the results of modern carbon-dating tests had infuriated the archdiocese of Turin and the shroud's Italian custodians who spoke darkly of foreign plots against Italy, anti-Catholic prejudice and the like.

Yesterday it was at last official: the tests had established a 95 per cent likelihood that the 14-foot linen was made between 1260 and 1390 AD. There is no chance that it dates back to the time of Christ.

Cardinal Ballestrero pointed out that the church had never claimed that the shroud represented Jesus but had honoured a tradition of piety rooted in centuries past.

"Considering the results of the scientific tests, the church reiterates her respect and her veneration for the shroud," he said.

The tests were carried out in laboratories at Oxford University and in Arizona and Zurich. They were based on counting the number of radioactive carbon 14 atoms in a fragment of the shroud about the size of a postage stamp.

However, they did not resolve the icon's origin, or the mystery which surrounds the blood-stained image on the shroud, resembling a photographic negative, of an apparently crucified man.

The Shroud of Turin: exposed as a fake.

Professor Edward Hall, the director of the Oxford research laboratory involved, gave his theory: "There was a multi-million pound business in making forgeries during the fourteenth century. Someone just got a bit of linen, faked it up, and flogged it."

Professor Hall, 64, who said he had a file full of mostly "cranky" letters from believers in the shroud's authenticity, added that some people would probably continue to regard it as genuine, "just as there is a Flat Earth Society". But he was utterly convinced his findings were right.

Modern Catholic teaching holds that relics are an aid to devotion. They divide into three classes: a first-class relic is either an instrument of the Passion, such as the Turin Shroud, or bones of the saints.

A second-class relic is an object which has touched one of these, and a third-class relic is an object which has touched a second-class relic.

The disappointment to believers in the shroud is unlikely to deter enthusiasts for the tens of thousands of relics, many of them the products of medieval tricksters, which repose in gilded cases and cushioned jewel-boxes in churches throughout Italy.

In Rome, one may view a feather from the Archangel Gabriel at the church of Santa Croce in Gerusalemme.

Other examples include vials containing the last breath of Saint Joseph, several heads of Saint John the Baptist, innumerable splinters from the True Cross, and two thorns from the crown.

In Naples, a vial containing the blood of Saint Januarius miraculously liquefies each year. In 1980, when it failed to to do, the city was struck by an earthquake.

In the meantime, from 1988 to 2005, the world simply accepted that the Shroud of Turin was a medieval fake. Even though a wealth of other scientific evidence supported authenticity, it was all mainly ignored in favor of the 1988 C-14 dating results.

During this time, multiple theories from a variety of sources were proposed, examined and ultimately discarded, all attempting to explain the C-14 dating results. It was truly a mystery.

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Modern Catholic teaching holds that relics

For those of us familiar with the science and history of the cloth, the C-14 dating result seemed unexplainable and contrary to all the other evidence. Many of us continued our work, but we did not have an explanation either.

In the eyes of the world however, we were simply "flat earthers."

The 1988 Radiocarbon Dating

Over the years, many theories were put forth about "what went wrong" with the C-14 dating results of the Shroud. Some were scientific and others, less so. In fact, there is not even agreement amongst pro-authenticity researchers on this question. Some very heated debates have ensued over the years and a number of possible answers have been proposed by some very credible researchers.

Since this presentation is about the radiocarbon dating and the STURP team, I will limit it to the only proposed theory to date that carries the weight and credibility of two peer reviewed scientific papers and the involvement of one of STURP's most prominent scientists, Ray Rogers. In fact, these are the ONLY peer reviewed papers to appear in the scientific literature that have ever challenged the results of the original Nature paper that declared the Shroud a medieval fake.

This part of the story begins in 2000.

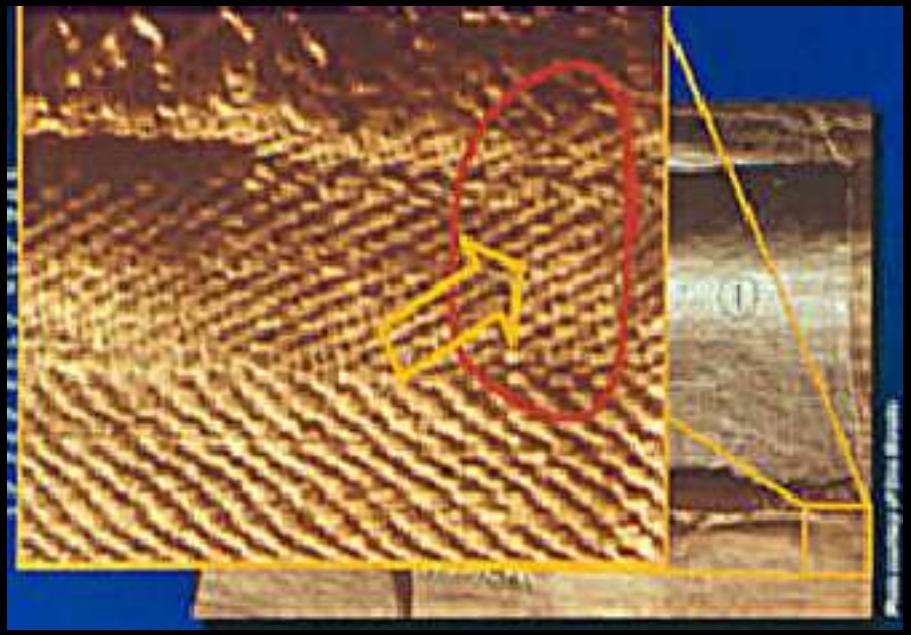
The 1988 Radiocarbon Dating

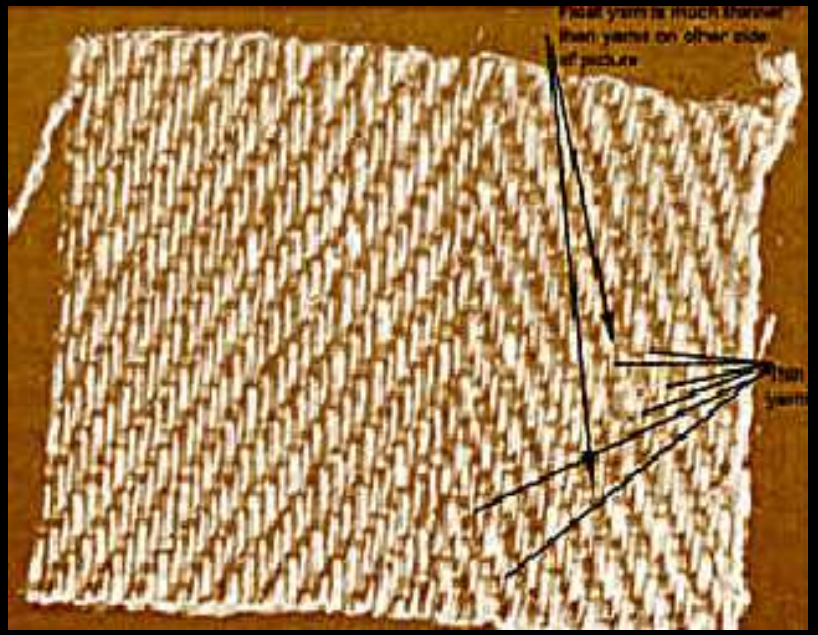
At the Sindone 2000 Worldwide Congress held in Orvieto, Italy, in 2000, independent Shroud researchers Joseph Marino and Sue Benford presented a paper that dealt with the C-14 issue from a new perspective. Titled Evidence for the Skewing of the C-14 Dating of the Shroud of Turin Due to Repairs, it suggested that the corner where the sample had been taken had undergone an earlier, undocumented repair, did not represent the rest of the cloth and was thus, invalid.

They had consulted a number of independent textile experts and showed them close up photographs of the Shroud C-14 samples (without revealing they were from the Shroud). Surprisingly, all the experts reported evidence of skillful "reweaving" in the samples.

So they deepened their research, which ultimately led to the above paper. I felt it reflected a new point of view and was important enough to ask the authors' permission to reprint the article on www.shroud.com.

COULD THE C-14 SAMPLES HAVE COME FROM A REWOVEN PORTION OF THE SHROUD?





Photographs courtesy Benford/Marino

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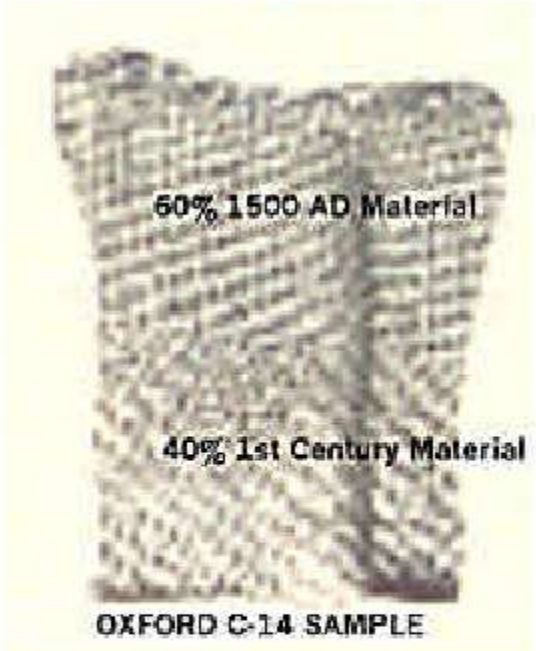

Oxford summary of mean radiocarbon dates
750 +/-30 = 1200 A.D. (from Nature, 1989)

Beta Analytic calculations based on 60/40 ratio (by mass) of 450 BP (1500 A.D.) threads/ 1875 BP (75 A.D.) threads = 1210 A.D.

Photographs courtesy Benford/Marino

COULD THE C-14 SAMPLES HAVE COME FROM A REWOVEN PORTION OF THE SHROUD?

Shortly after reprinting the article on Shroud.com, I received a rare phone call from STURP chemist Ray Rogers, who chastised me for publishing the paper. He was upset that I was willing to include it on the site since it had been written by non-scientists that he typically referred to as the "lunatic fringe."

I explained why I felt it was valid (it had followed proper scientific method and provided a novel but viable explanation for the dating results) and I thought the public should have access to it. He then said he still had some of his 1978 Shroud samples in his safe and he was going to examine them again and prove Marino and Benford were wrong. As he put it, "I'll prove them wrong in five minutes!"

Several hours later, he called back. He was much quieter this time and simply said, "I can't believe it, but I think they are right!" He had found evidence in his own samples that corroborated their results. He also reviewed the STURP data and found additional corroboration.

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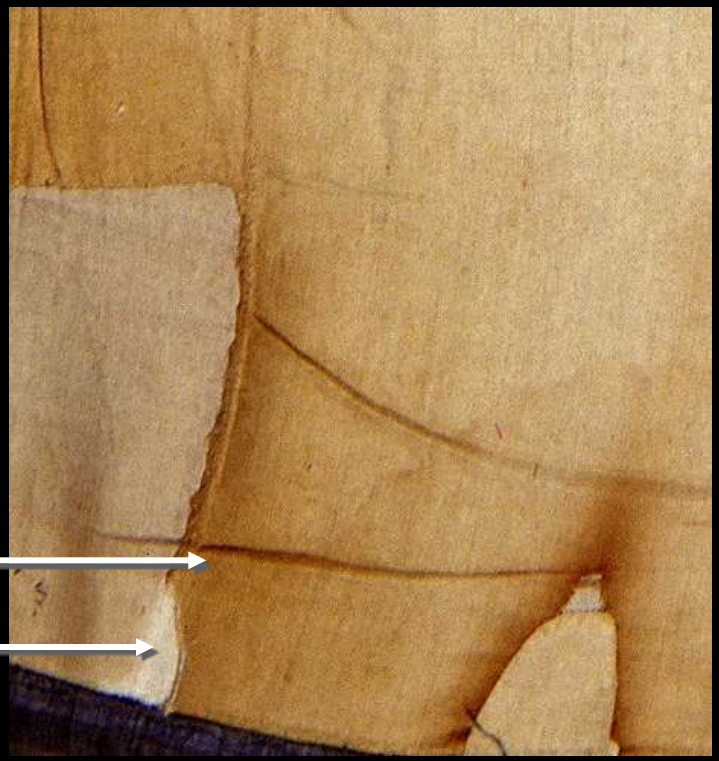

White Light Photo of the Raes Corner

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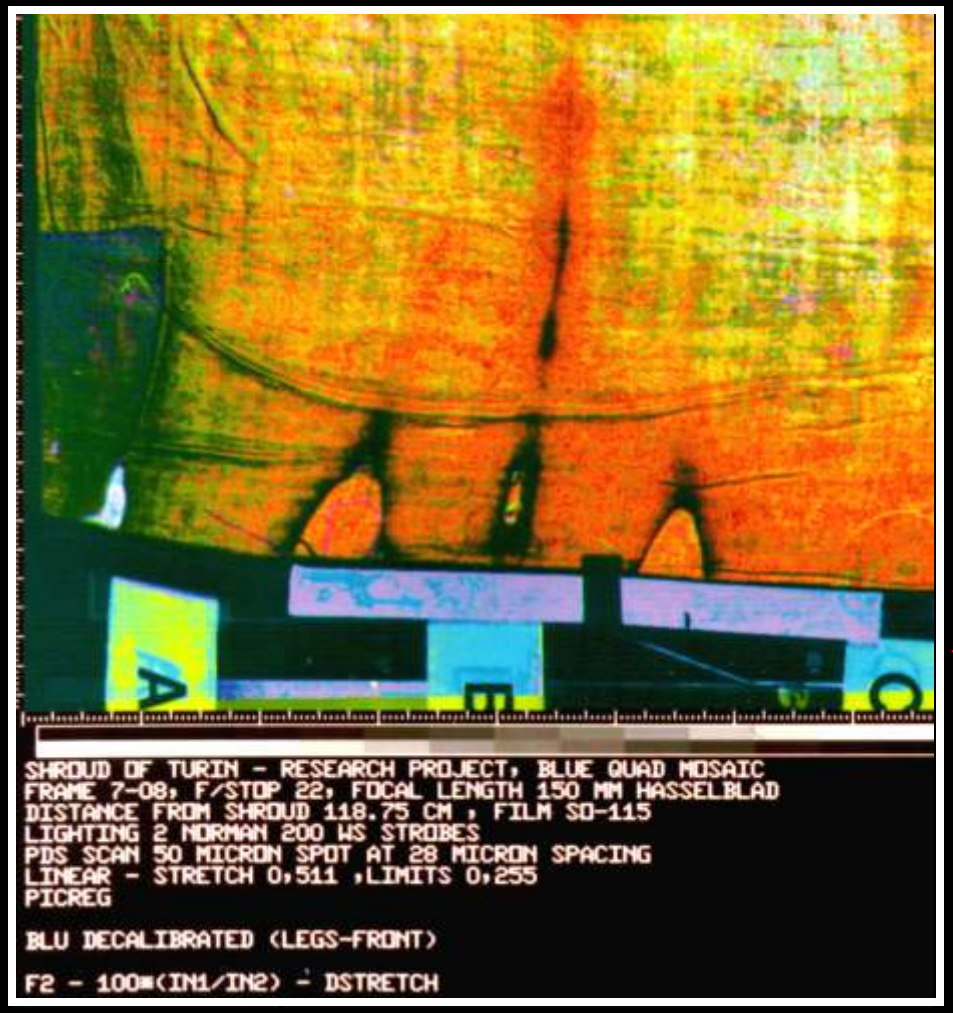
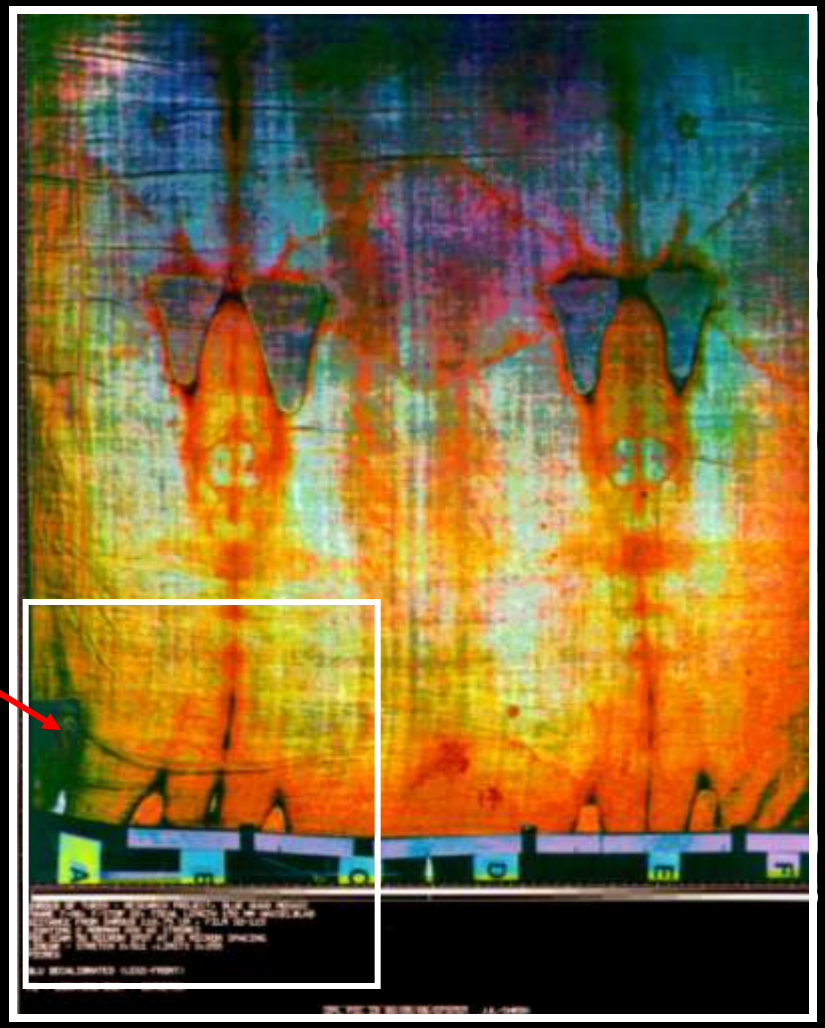
UV Fluorescence Photo ©1978 Vernon D. Miller





“Quad mosaic” view of Raes’ Corner, the area from which the radiocarbon sample was removed. The image was processed at JPL and resulted in this chemical “map.” Notice the green discoloration in the C-14 sample region, which indicates a different chemical composition in that area.

COULD THE C-14 SAMPLES HAVE COME FROM A REWOVEN PORTION OF THE SHROUD?

Rogers reexamined the 1973 Raes samples which he still had in his possession. They had not been used for any other research so they were still basically intact. He knew that some threads from the Raes sample inevitably ran through the adjacent C-14 sample area as well.

His microscopic and chemical examination revealed cotton interwoven with the linen and an end to end splice in one of the samples. He also found evidence of a gum and dye that had been intentionally applied to the surface of the fibers in an apparent attempt to match the color of the rewoven area to the rest of the cloth. Rogers realized that these observations were very controversial and enlisted the aid of another, independent scientist, John Brown, to review his work.

Brown, a materials scientist and expert microscopist, made a detailed examination of Rogers' samples and corroborated all of his findings. He documented everything photographically and compiled his results into an article titled "Microscopical Investigation of Selected Raes Threads from the Shroud of Turin," which I ultimately published on Shroud.com in January 2005.

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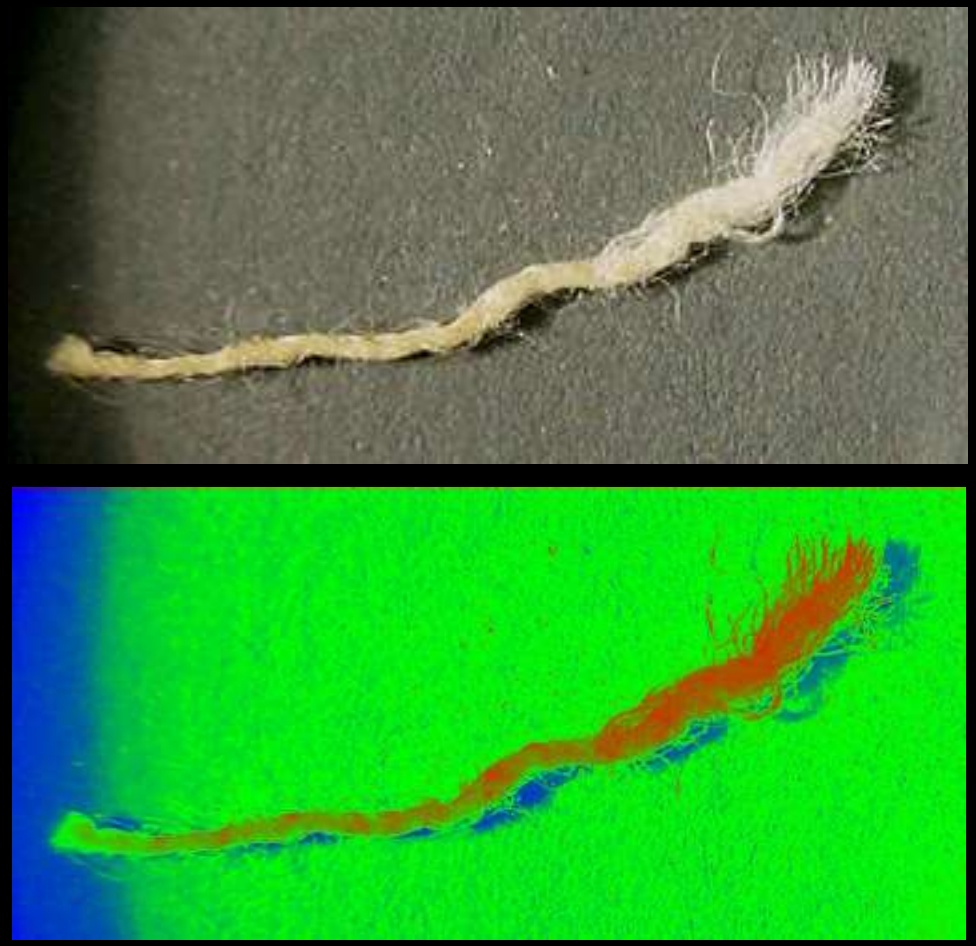


Original photo ©2004 Ray Rogers Collection, STERA, Inc.
Bottom enhancement courtesy Benford/Marino

COULD THE C-14 SAMPLES HAVE COME FROM A REWOVEN PORTION OF THE SHROUD?

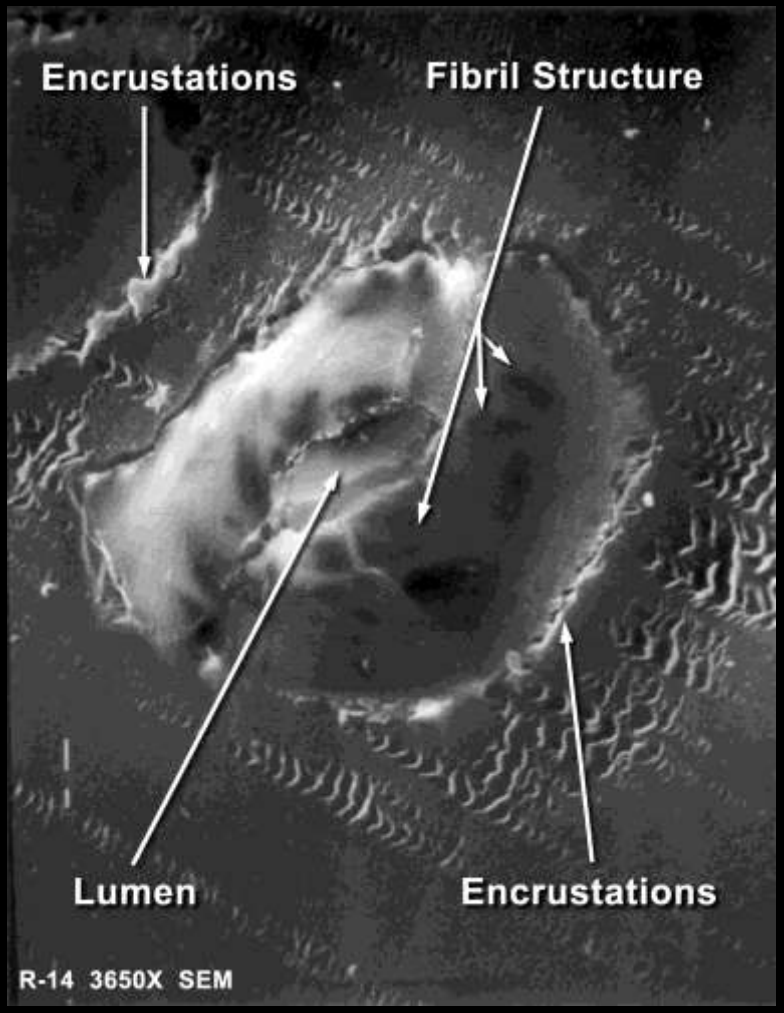
The dye apparently was applied after the cloth was rewoven in an attempt to match its color to the Shroud.

When the warp threads are removed from the weft threads, undyed areas are revealed.

Undyed areas do not fluoresce like dyed areas, as shown in this UV photomicrograph.

Cotton fibers were found interwoven with the linen in the Raes and C-14 samples. No cotton was observed anywhere else on the Shroud (except for some surface cotton fibers that came from STURP's white cotton gloves).

The outer surface of many fibers showed the characteristic encrustation of gum and dye particles.



Scanning Electron Microscope image

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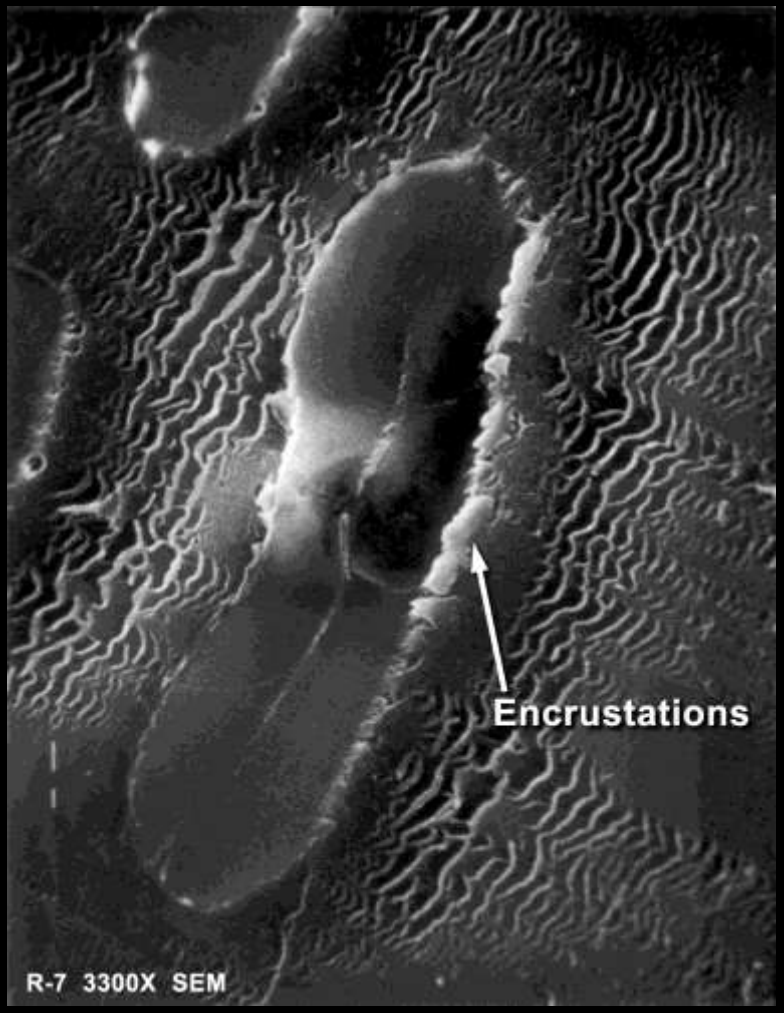

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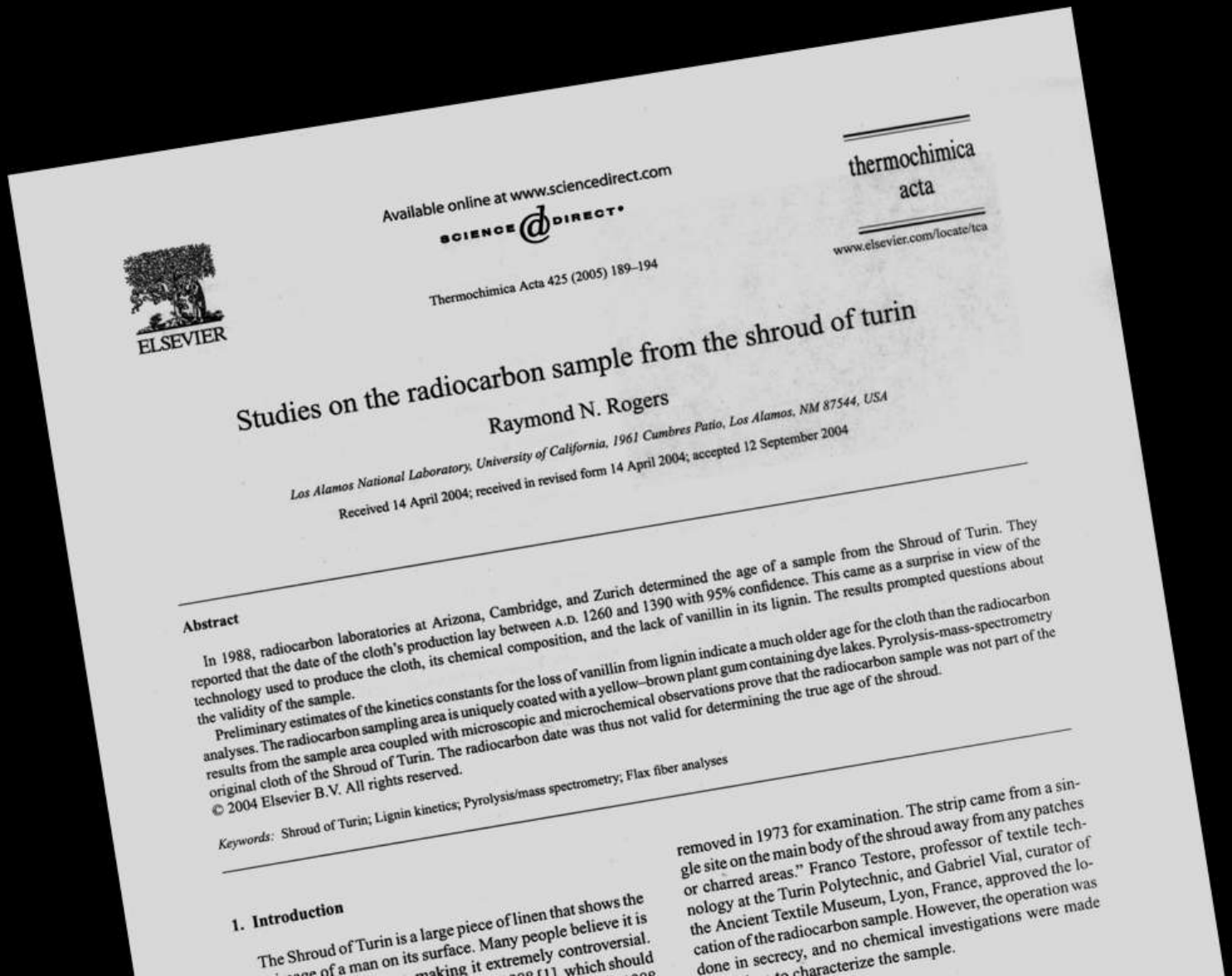
Rogers wanted to formalize his results but realized he would first have to obtain a portion of the actual C-14 Reserve Sample for analysis.

He contacted Thomas D'Muhala, former STURP President, who had previously received a small part of the Reserve Sample from Prof. Luigi Gonella (the Scientific Advisor to Archbishop Ballestrero during the 1978 STURP examination and the 1988 C-14 dating). D'Muhula had already allowed Dr. Alan Adler, STURP blood chemist, to examine it.

D'Muhala promptly provided Rogers with this same Reserve Sample for his analysis and direct examination.

Based on his analysis of this sample, Rogers compiled all his data into an article that he submitted to the prestigious, peer reviewed journal *Thermochimica Acta*. After a seven month review process in which many corrections and revisions were made, the paper was finally accepted for publication and appeared in the January 20, 2005 issue.

Full paper available at:
http://www.metalog.org/files/shroud/C14.pdf



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Studies on the radiocarbon sample from the shroud of turin

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Abstract

In 1988, radiocarbon laboratories at Arizona, Cambridge, and Zurich determined the age of a sample from the Shroud of Turin. They reported that the date of the cloth's production lay between A.D. 1260 and 1390 with 95% confidence. This came as a surprise in view of the technology used to produce the cloth, its chemical composition, and the lack of vanillin in its lignin. The results prompted questions about the validity of the sample.

Preliminary estimates of the kinetics constants for the loss of vanillin from lignin indicate a much older age for the cloth than the radiocarbon analyses. The radiocarbon sampling area is uniquely coated with a yellow–brown plant gum containing dye lakes. Pyrolysis-mass-spectrometry results from the sample area coupled with microscopic and microchemical observations prove that the radiocarbon sample was not part of the original cloth of the Shroud of Turin. The radiocarbon date was thus not valid for determining the true age of the shroud.

Keywords: Shroud of Turin; Lignin kinetics; Pyrolysis/mass spectrometry; Flax fiber analyses

1. Introduction

The Shroud of Turin is a large piece of linen that shows the
age of a man on its surface. Many people believe it is
making it extremely controversial.
which should

removed in 1973 for examination. The strip came from a single site on the main body of the shroud away from any patches or charred areas." Franco Testore, professor of textile technology at the Turin Polytechnic, and Gabriel Vial, curator of the Ancient Textile Museum, Lyon, France, approved the location of the radiocarbon sample. However, the operation was done in secrecy, and no chemical investigations were made to characterize the sample.

Courtesy Thermochimica Acta and

An encrustation of plant gum was found on the outside of the C-14 Sample fibers. Chemical and microscopic analysis revealed Madder Root dye particles embedded in it.

ROGERS CONCLUSIONS

Preliminary estimates of the kinetics constants for the loss of vanillin from lignin indicate a much older age for the cloth than the radiocarbon analyses.

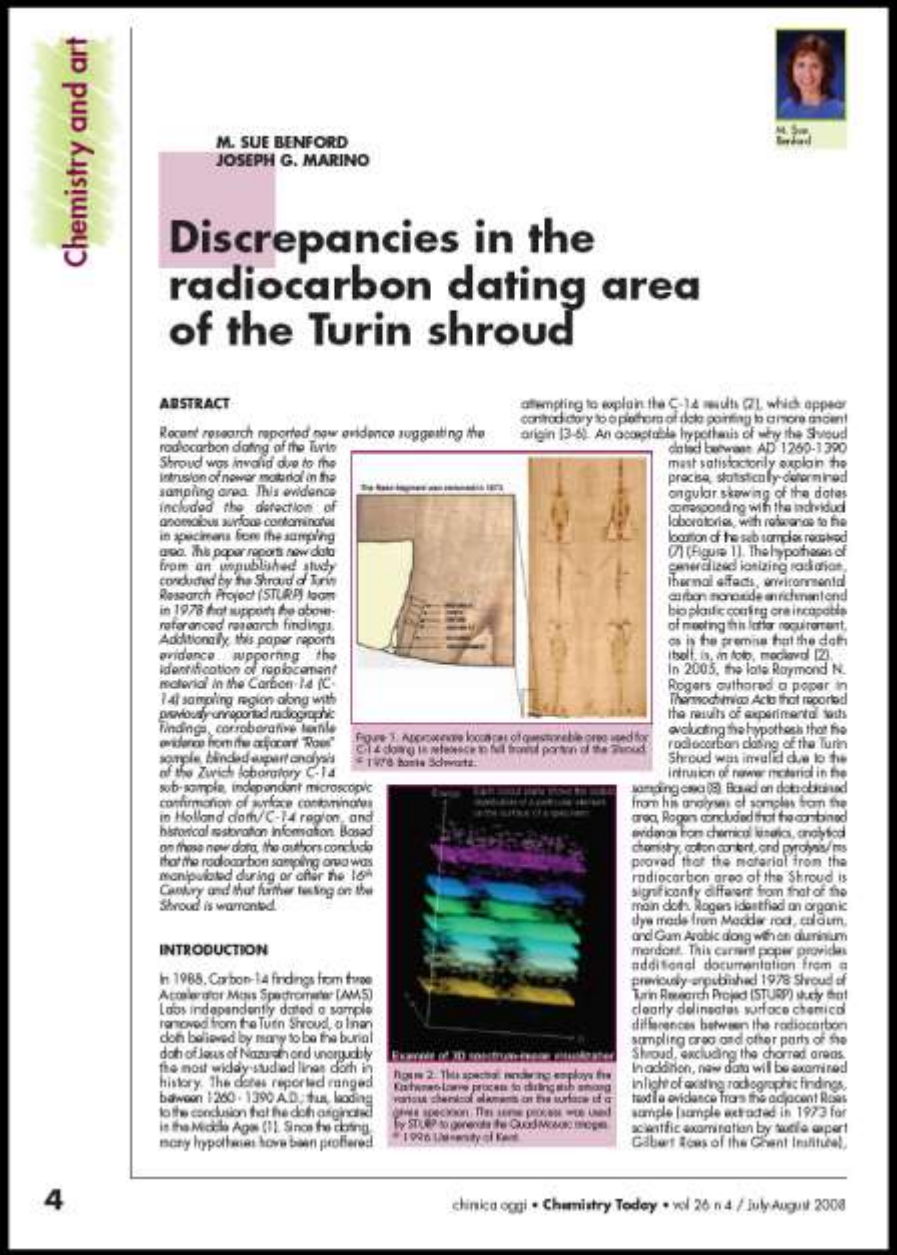
The radiocarbon sampling area is uniquely coated with a yellow-brown plant gum containing dye lakes.

Pyrolysis-mass-spectrometry results from the sample area coupled with microscopic and microchemical observations prove that the radiocarbon sample was not part of the original cloth of the Shroud of Turin.

The radiocarbon date was thus not valid for determining the true age of the Shroud.

Source: http://www.metalog.org/files/shroud/C14.pdf

Raymond N. Rogers
July 21, 1927 - March 8, 2005



Chemistry and art

M. SUE BENFORD
JOSEPH G. MARINO

Discrepancies in the radiocarbon dating area of the Turin shroud

ABSTRACT

Recent research reported new evidence suggesting the radiocarbon dating of the Turin Shroud was invalid due to the intrusion of newer material in the sampling area. This evidence included the detection of anomalous surface contaminates in specimens from the sampling area. This paper reports new data from an unpublished study conducted by the Shroud of Turin Research Project (STURP) team in 1978 that supports the above-referenced research findings. Additionally, this paper reports evidence supporting the identification of replacement material in the Carbon-14 (C-14) sampling region along with previously-unreported radiographic findings, corroborative textile evidence from the adjacent "Raes" sample, blinded-expert analysis of the Zurich laboratory C-14 sub-sample, independent microscopic confirmation of surface contaminates in Holland cloth/C-14 region, and historical restoration information. Based on these new data, the authors conclude that the radiocarbon sampling area was manipulated during or after the 16th Century and that further testing on the Shroud is warranted.

INTRODUCTION

In 1988, Carbon-14 findings from three Accelerator Mass Spectrometer (AMS) Labs independently dated a sample removed from the Turin Shroud, a linen cloth believed by many to be the burial cloth of Jesus of Nazareth and unarguably the most widely-studied linen cloth in history. The dates reported ranged between 1260 - 1390 A.D.; thus, leading to the conclusion that the cloth originated in the Middle Ages (1). Since the dating, many hypotheses have been proffered attempting to explain the C-14 results (2), which appear contradictory to a plethora of data pointing to a more ancient origin (3-6). An acceptable hypothesis of why the Shroud dated between AD 1260-1390 must satisfactorily explain the precise, statistically-determined angular skewing of the dates corresponding with the individual laboratories, with reference to the location of the sub samples received (7) (Figure 1). The hypothesis of generalized ionizing radiation, thermal effects, environmental carbon monoxide enrichment and bio plastic coating are incapable of meeting this latter requirement, as is the premise that the cloth itself, is, *in toto*, medieval (2).

In 2005, the late Raymond N. Rogers authored a paper in *Thermochimica Acta* that reported the results of experimental tests evaluating the hypothesis that the radiocarbon dating of the Turin Shroud was invalid due to the intrusion of newer material in the sampling area (8). Based on data obtained from his analyses of samples from the area, Rogers concluded that the combined evidence from chemical kinetics, analytical chemistry, cotton content, and pyrolysis/ms proved that the material from the radiocarbon area of the Shroud is significantly different from that of the main cloth. Rogers identified an organic dye made from Madder root, calcium, and Gum Arabic along with an aluminium mordant. This current paper provides additional documentation from a previously-unpublished 1978 Shroud of Turin Research Project (STURP) study that clearly delineates surface chemical differences between the radiocarbon sampling area and other parts of the Shroud, excluding the charred areas. In addition, new data will be examined in light of existing radiographic findings, textile evidence from the adjacent Raes sample (sample extracted in 1973 for scientific examination by textile expert Gilbert Raes of the Ghent Institute),

Figure 1: Approximate location of questionable area used for C-14 dating in reference to full frontal portion of the Shroud. © 1978 Barrie Schwortz.

Figure 2: This spectral rendering employs the Kirchmer-Lorre process to display ash among various chemical elements on the surface of a given specimen. The same process was used by STURP to generate the Quad Mosaic images. © 1996 University of Kent.

Image courtesy Chemistry Today

In July 2008, a new paper by Benford and Marino was published in the respected, peer-reviewed scientific journal, Chemistry Today. Their new research further supported the earlier data and provided additional evidence for an anomalous sample.

Source: http://chemistry-today.teknoscienze.com/pdf/benford%20CO4-08.pdf

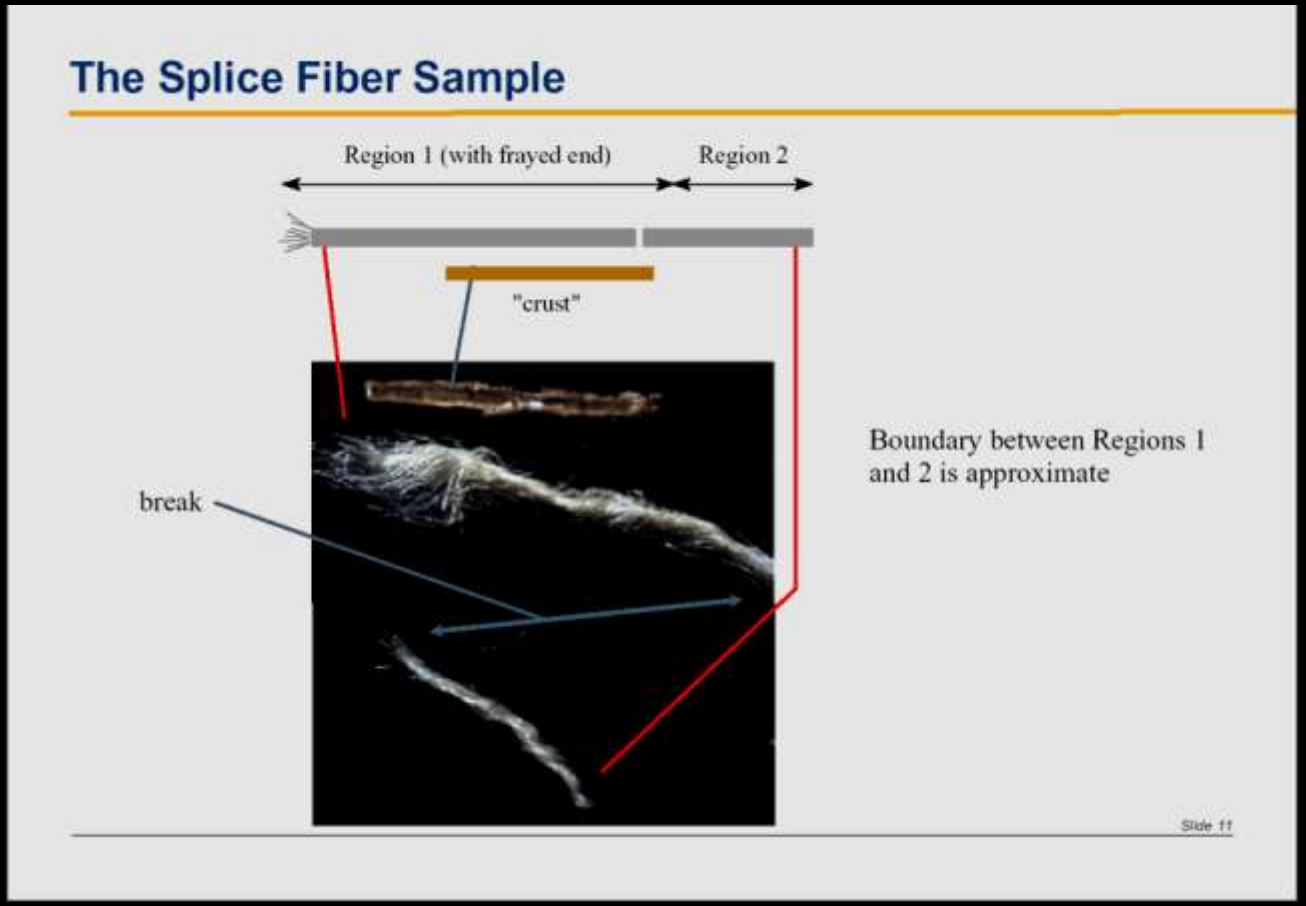


Image courtesy Robert Villarreal - Los Alamos National Laboratory

In August 2008, Robert Villarreal and a team of eight researchers from Los Alamos National Laboratory analyzed Rogers' samples and presented their results at the Columbus, Ohio, Shroud Conference. Their data further corroborated Rogers' conclusions.

Link to Online Abstract: http://www.ohioshroudconference.com/a17.htm
Link to WMV Video: http://www.shrouduniversity.com/videos/villareal.wmv

WERE THE C-14 SAMPLES ANOMALOUS OR WERE THEY TRULY REPRESENTATIVE OF THE SHROUD?

In November 2008 Joseph Marino, working with Ed Prior, retired NASA researcher and former Chief Scientist at NASA's Langley Research facility, compiled an article titled "Chronological History of the Evidence for the Anomalous Nature of the C-14 Sample Area of the Shroud of Turin."

In the 40 page article the authors compiled a detailed chronological history of all the documented evidence that supports the anomalous nature of the C-14 sample area.

In January 2009, the authors issued an Addendum to the above article titled "ADDENDUM to Chronological History of the Evidence for the Anomalous Nature of the C-14 Sample Area of the Shroud of Turin" **that expanded the data even further (to 59 pages).**

Another Useful Reference:

ROGERS, Raymond N. - **A Chemist's Perspective on the Shroud of Turin** – Publisher: Barrie M. Schwortz, Lulu.com, July 2008

ONE FINAL THEORY

One other theory exists that should be mentioned here, as it too involves the participation of one of STURP's most prominent scientists, STURP Co-Founder, John Jackson.

In May 2008, Jackson provided us with an overview of his new theory, which states that CO (carbon monoxide) had adsorbed into the Shroud material, enriched the carbon content and skewed the resulting C-14 tests. The article is titled "A New Radiocarbon Hypothesis," and can be found at this link: http://www.shroud.com/pdfs/jackson.pdf.

Jackson is working on this hypothesis directly with Christopher Ramsey, current director of the Oxford Radiocarbon Accelerator Unit in England, one of the three laboratories that performed the original 1988 C-14 dating of the Shroud. To date however, no results have been released or published.

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