PART 6 ▸ Science and academia

The Shroud of Turin and Carbon 14 dating

By Arif Khan

Ever since the carbon dating results were announced the Shroud of Turin world has been divided about the cloth. For the scientists carrying out the tests this was certainly clear evidence that the Shroud was in fact a fake. Ever since the dates were released there has been intense debate.

For Ahmadi Muslims the Shroud of Turin is potentially a key piece of evidence to show that Jesus Christ survived the Crucifixion. There have been several scholars and scientists (Holger Kersten, Kurt Berna, Dr Theodor Hirt, and Dr Trevor Davies) who have come to the conclusion that the man wrapped in the Shroud of Turin had survived a Crucifixion. The anatomical accuracy of the blood flows and injuries have astounded researchers and made it even harder for people to believe it a work of a forger.

C14 sample not of the Shroud

On January 20th 2005, Raymond N Rogers had an article published in the chemistry journal "Thermochimica Acta", Volume 425, Issues 1–2, pages 189–194. The paper was titled "Studies on the radiocarbon sample from the shroud of Turin". This was the last paper Rogers was able to publish as, having suffered a long illness, he passed away a few months after this paper was published. The paper he published was nothing short of sensational for the Shroud world, and from his abstract it was clear this was a major piece of research:

> *"The radiocarbon sampling area was uniquely covered with a yellow-brown plant gum containing dye lakes. Prolysis-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 age of the shroud."*

This statement is made very boldly and categorically and may seem exaggerated, but on examination of the detailed evidence of Rogers' paper it becomes clear that he has the required results and observations to support this statement.

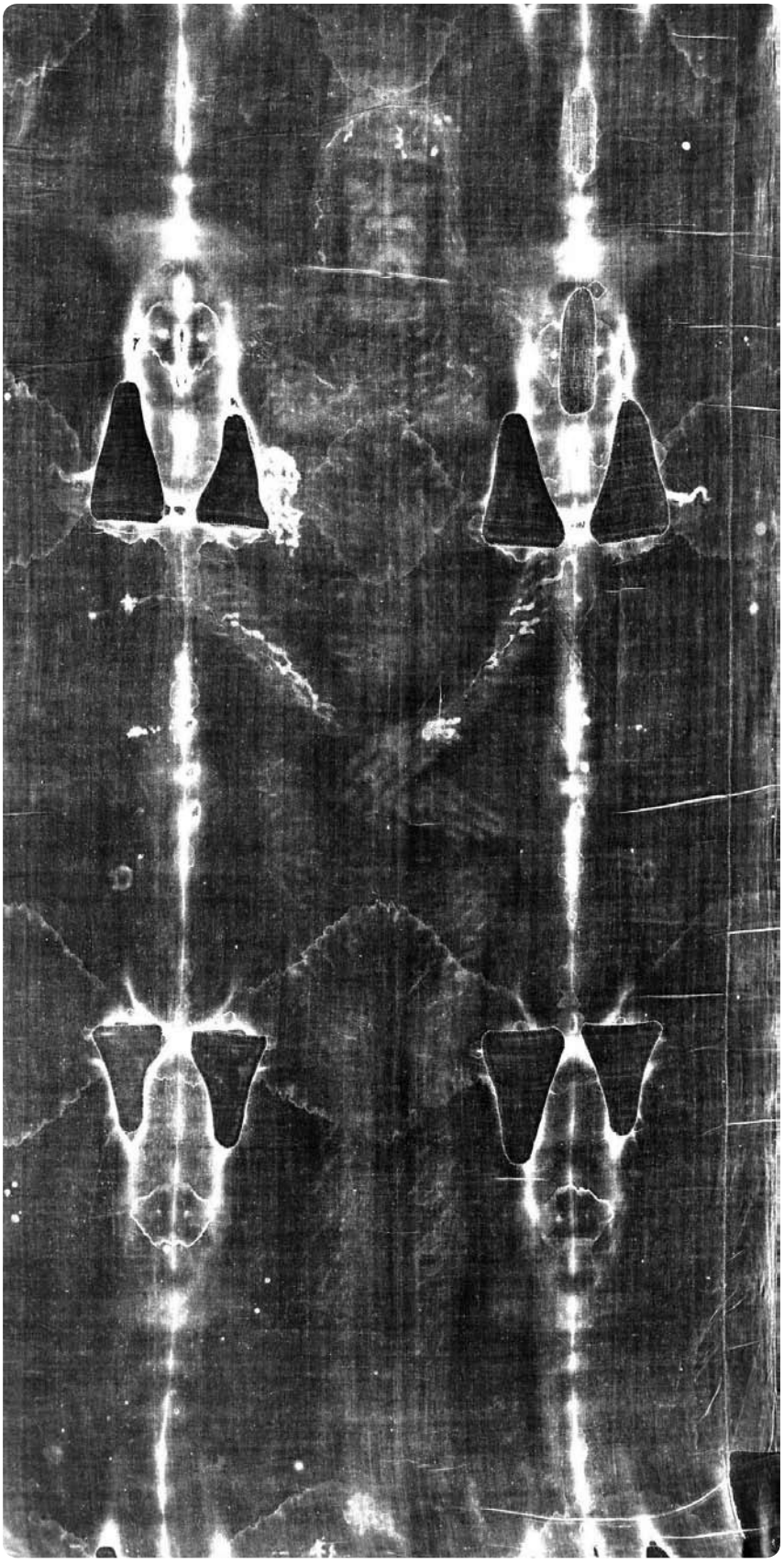
The implications for this are huge. The single biggest obstacle for the scientific community in taking the Shroud of Turin seriously was the Carbon-14 dating result of 1988. This result has now been declared null and void and scientific evidence for the Shroud's authenticity is now overwhelming.

Rogers' findings extend further than simply declaring the sample taken for the C14 tests to not be from the actual cloth. In the process of carrying out his chemical analysis, in particular the analysis of the amount of Vanillin lost from the Lignin on the Shroud, he was able to estimate that the Shroud of Turin was most likely between 1,300 and 3,000 years old, much older than the C14 tests suggested.

This view that the area sampled for the C14 tests was not part of the original cloth is not a new one. Holger Kersten has offered a similar opinion in his books and Barrie Schwortz, the lead photographer for the Shroud of Turin Research Team (STUPR) setup in 1978, said the following about the C14 sample in a recent TV documentary:

> *"Amazingly when we look at the UV florescence photography of that area; the area where the samples were taken is dramatically different to the rest of the Shroud of Turin."*

Raymond N. Rogers, whos recent findings have renewed the debate on the authenticity of the shroud, photographed at his petrographic microscope in May 2004. Ray passed away on March 8, 2005 at the age of 77 after a long illness.



The ventral image on the Shroud of Turin, an approximately 14 by 3 foot cloth, as it appears on a photographic negative. It is bloodstained and imprinted with a faint image of a tortured man's face, hands, and body.

Schwortz goes on to say:

"Now, remember that in 1978 that particular area of the cloth was irrelevant. It was 10 years before the carbon dating so we didn't focus our attention there. Going back and looking at those UV florescence images today we can see now that there is a dramatic difference in the colour of the Shroud in the area where the Carbon 14 samples were taken, and that indicates a difference in physical makeup or content. So it's quite obvious just from the UV florescence photography, that there is something anomalous about the area where the Carbon 14 samples were taken from."

Despite this evidence, as well as evidence from a variety of fields including botany and history suggesting a pre-medieval date for the Shroud, no repeat Carbon dating experiment has ever been carried out on the Shroud.

Extended details of Raymond Rogers' experiments

Rogers was able to carry out his pioneering research due to having access to the following sources of shroud cloth:

1. Sample threads from the piece of cloth cut for the C14 tests.

2. Fourteen yarn segments from a sample of the cloth cut from an adjacent position to the C14 sample, cut by Professor Gilbert Raes (referred to as "Raes" samples).

3. Thirty two samples from the Shroud taken using a special adhesive tape.

Access to these three complimentary samples was pivotal in allowing Rogers' conclusions to be as authoritative as they are. Rogers was part of the initial STURP team and had carried out extensive chemical tests on samples of the shroud between 1979 and 1982.

During repairs of the cloth in 1532, after the cloth was rescued from a fire, the Shroud was stitched on to another cloth known to researchers as the "Holland Cloth". This cloth now provided another source of reference for Rogers' tests.

Rogers' research paper was based on

3 main areas of experimentation, each of which will be explored below:

1. Kinetic-based Experimentation

Rogers observed that Lignin deposits are to be seen all over the Shroud, and that this Lignin can be tested for the presence of Vanillin. He noticed that the Holland Cloth and other medieval cloths gave a clear positive result for the presence of Vanillin, whereas the fibres from other areas of the Shroud did not give this result. Thus, he states:

> *"This suggested that the rate of loss of Vanillin from the Lignin could offer a method for estimating the age of the shroud."*

Raymond Rogers found the sample taken for the C14 tests is not from the actual cloth.

Building on research by Stanley Kosiewicz, Rogers was able to produce a mathematical model to act as a chemical dating process. Kosiewicz had analysed the rates of Vanillin loss from Lignin at a variety of temperatures for over 2 years, and shown that loss rates of Vanillin was very low. Based upon experimental data and this mathematical model Rogers was able to give the expected results shown in **figure 1**.

Rogers pointed out that the fire of 1532 would not have affected the results much as the cloth would not have absorbed much heat because it was in an iron casing and linen has a low thermal conductivity. Rogers also stated that if the Shroud was created in 1260 AD then 37% of the Vanillin would have remained in the cloth.

No samples from any part of the shroud itself gave a positive result for any trace of Vanillin.

2. Microscopic Examination and Surface Composition

Following this kinetic analysis of the fibres, Rogers then set about explaining the characteristics of the thread samples from the C14 sample and the Raes threads. All threads from this area gave positive tests for a dye or pigment coating. When the threads were cut open the inner fibres were a much lighter colour. From this Rogers states:

> *"Specifically, the colour and distortion of the coating implies repairs were made at an unknown time with foreign linen dyed to match the older original material"*

3. Mass spectrometer based analysis

During the original STURP investigation, mass spectrometry was used on samples of the Shroud from a variety of areas including the blood flows, scorched areas, heels and water stains as well as "pure" image areas.

The analysis had been done previously to test to see if the Shroud was a painting. The experimental results could now be used to compare the makeup of the Shroud areas and the C14 and Raes sample areas.

Again, the C14 and Raes sample areas were shown to be very different in composition from the rest of the Shroud. All areas tested of the Shroud showed the presence of cellulose, but the C14 and Raes samples showed instead the presence of a pentosan covering. Thus again a fundamental difference in composition between the C14 sample area and the other areas of the cloth was shown.

Conclusion

As the experiments were varied and very detailed, Rogers' conclusions are bold and he is very confident in his analysis. He states:

> *"The combined evidence from chemical kinetics, analytical chemistry, cotton content, and prolysis proves that the material from the radio-carbon area of the Shroud is significantly different from that of the main cloth."*

He goes on further to say:

> *"The radiocarbon sample was thus not part of the original cloth and is invalid for determining the age of the Shroud"*

Rogers's work is emphatic on the subject of the C14 tests. It is hoped that now this debate can be put to rest and further tests, in particular a further C14 test, can be carried out.

This recent research has again thrown open the question about the Shroud's authenticity, and it still may be critical in showing, without doubt, that Hazrat Isa عليه‌السلام was rescued from an accursed death on the cross. ■

Glossary of terms

Vanillin. Crystalline compound found in vanilla beans and some balsam resins; used in perfumes and flavourings.

Lignin. Complex polymer, chief non-carbohydrate product of wood. Binds cellulose fibres to harden and strengthen cell walls of plants.

Mass Spectrometry. Technique to work out the constituent parts that make up a substance. Using electromagnetic techniques a graph is produced of the varying amounts of different ions present within a compound. By analysing the different masses of the compounds present it is possible to determine the elements present in the compound.

Figure 1: Expected results based on Rogers' mathematical model and experimental data.

Average storage temperature	Years taken to lose 95% of Vanillin in Lignin
25°C	1319
23°C	1845
20°C	3095