

muse@nature.com: To know a veil

Philip Ball

Attempts to date the Turin Shroud are a great game, says Philip Ball, but don't imagine that they will convince anyone.

The most recent scientific study of the Turin shroud will not surprise anyone with even a passing interest in this mysterious bit of cloth.

Retired chemist Raymond Rogers claims that the sample used for radiocarbon-dating studies in 1988 - which suggested that the shroud was a medieval forgery - is quite different from the rest of the relic.

Rogers, who worked on explosives at the US Los Alamos National Laboratory, presents chemical arguments for the shroud being much older than those datings implied. It is, he says, between 1,300 and 3,000 years old. Let's call it somewhere around the middle of that range, which puts the age at about 2,000 years. Which can mean only one thing...

But it would be unfair to imply that Rogers has steered his study towards a preconceived conclusion. He has a history of respectable work on the shroud dating back to 1978, when he became director of chemical research for the international *Shroud of Turin Research Project*.

At the time, he says, he suspected that taking the job was "a good way to destroy my scientific credibility". And when he found that some of his findings did not fit with what some wished to hear, he was reproached: "Ray, you are not a soldier for Christ."

"That," he says, "is the kind of goal-directed approach I had feared."

Cloth of old

Rogers has spoken of "the pseudoscience surrounding the shroud". Future studies, he says, "must be carefully planned and executed, and they cannot involve management by dilettantes". He has complained about the uncooperativeness of the shroud's guardians in Turin, saying that because of this, "competent scientific efforts to understand the shroud have a bleak future".

This should not, perhaps, make anyone terribly distraught. The scientific study of the Turin shroud is like a microcosm of the scientific search for God: it does more to inflame any debate than settle it.

Believers' ability to construct ingenious arguments is more than a match for the most exhaustive efforts of science. The shroud literature leaves no stone unturned in casting doubt on 'evidence' that



Shrouded in mystery: no one knows how this image was imprinted on the Turin shroud.

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the relic was faked, while embracing with blind rapture every argument for its authenticity. So why study it at all?

And yet, the shroud is a remarkable artefact, one of the few religious relics to have a justifiably mythical status. It is simply not known how the ghostly image of a serene, bearded man was made. It does not seem to have been painted, at least with any known historical pigments.

And the relic is surrounded with legend and linked to Cathar sects, shady secret societies and papal conspiracies. If all this sounds like a popular current novel about hidden codes and religious mysteries, that may be no coincidence: among the flaky theories about the shroud's origin is one that it was created by Leonardo da Vinci, using a primitive photographic technique to record his own image. You couldn't make it up (although people do).

The photographic hypothesis has been developed (so to speak) in some detail, notably by South African art historian Nicholas Allen. He has even used medieval materials to create faint photographic images on linen cloth saturated with silver nitrate. But Allen failed to convince other shroud scholars, who reasonably asked how an invention as marvellous as photography could have remained otherwise unknown until the nineteenth century.

Besides, this is a crowded field. Among the wilder entrants is the idea that Christ's image was burned into the cloth by some kind of release of nuclear energy from his body.

Winding sheet

The international team of scientists who convened in 1987 to put a date on the shroud probably did not expect to banish such fantasies. But by applying radiocarbon dating to the fabric, they were at least employing the most definitive of archaeological tools. Or so they thought.

The textile sample was cut from the shroud in Turin Cathedral in April 1988, under the supervision of textile experts, representatives of the laboratories in Arizona, Oxford and Zurich selected to perform the analyses, a conservation scientist from the British Museum, and the Archbishop of Turin.

The three measurements indicated with 95% confidence that the shroud's linen dated from between AD1260 and 1390. This, the researchers said, was "conclusive evidence that the linen of the shroud of Turin is medieval"¹.

Needless to say, the ink was barely dry before others started to quibble. Professor of history Daniel Scavone collected examples of erroneous radiocarbon dates and problems with the method that were "well known to the 14C community". And microbiologists Leoncio Garza-Valdes and Stephen Mattingly proposed in 1996 that bacteria and fungi on the fibres had skewed the dates, by a thousand years or so.

Patch work

Rogers has pursued another objection. Originating as it did from a couple who research 'pyramid energies' and 'the existence of the soul', the suggestion that the carbon-dated fragment was taken from a patch repaired in the sixteenth century did not look promising.

“Competent scientific efforts to understand the shroud have a bleak future”

The shroud was indeed damaged by fire and patched up in 1532, but those patches, called the Holland cloth, are obvious. Rogers thought that he would be able to "disprove [the] theory in five minutes".

Raymond Rogers

But he now says that there is something in it. Luigi Gonella, the Archbishop of Turin's scientific adviser, provided Rogers with a few threads from the piece cut for dating, which he compared with the samples he collected during the *Shroud of Turin Research Project*.

The radiocarbon sample, but not other parts of the shroud, seems to have been dyed with madder, a colorant not widely used in Europe until after the Crusades, Rogers writes in *Thermochimica Acta*². This suggested that the fabric could have been inserted during repair, after being dyed to match the original, older cloth.

Well, maybe. Perhaps more compelling is that most of the shroud lacks vanillin, a breakdown product of the lignin in cotton fibres. There is vanillin in the Holland cloth, and in other medieval linen. Because it decomposes over time, this suggests that the main body of the cloth is considerably older than these patches. By calculating the rate of decay, Rogers arrives at his revised estimate of the shroud's age.

Facing faith

There is no explanation, however, of how the 'repaired' threads used in radiocarbon dating were woven into the old cloth so cunningly that the textile experts who selected the area for analysis failed to notice the substitution. This is by no means the end of the story.

Will scientists ever accept that trying to establish the true status of the Turin shroud is a vain quest? The object itself is too inaccessible, and its history is too poorly documented and understood, to permit irrefutable conclusions.

And of course 'authenticity' is not really a scientific issue at all here: even if there were compelling evidence that the shroud was made in first-century Palestine, that would not even come close to establishing that the cloth bears the imprint of Christ.

References

1. Damon P. E. *et al.* *Nature* **337**, 611-615 (1989).
2. Rogers R. N. *Thermochimica Acta* **425**, 189-194 (2005).
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