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Review

Turin Shroud: A Medieval Technique

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A B S T R A C T

Summary

Two recent papers in the Medical & Clinical Case Reports Journal1,2 have included reviews of some experiments by this author suggesting possible mechanisms by which the image on the Turin Shroud may have been created in the Middle Ages. Unfortunately he finds that excessive zeal for an alternative, 1st Century, explanation has clouded these reviews and hopes that by contributing an article himself, he may help readers clarify their understanding of his work.

Keywords: Middle Ages; Turin shroud

Introduction

The Turin Shroud is a 4.4m long cloth preserved in the Cathedral of Saint John the Baptist, Turin, Italy, because it has long been regarded as the cloth in which Christ was wrapped, according the gospels, for his burial. Its most remarkable feature is the double image of man, front and back and head to head, apparently representing the figure of Christ as he lay in his tomb. It has a well-known history as far back as the mid-14th century, but its identity as a genuine relic, rather than as a representation, dates from a hundred years later. Although it was reliably radiocarbon dated to the 14th century in 1988,[3] many Christian scholars have tried to find possible references to this cloth between the death of Christ and the 14th century and to discredit the radiocarbon date and thus to establish that the Shroud is, indeed, what it purports to be, a genuine relic. A major argument for this case is that the image has not been precisely reproduced to the satisfaction of those who hold the "authenticist" view, adding credence, in their opinion, to the possibility of a miraculous origin. However, a number of possible artistic methods have been explored, which, within the rather vague constraints enforced by such knowledge of the cloth and its image as has been established, have provided a satisfactory proof-of-concept, if not a definitive answer to the question, "How was it done?"

The papers criticizing the experiments carried out by this author are predicated on the assumption that that the Shroud is authentic, effectively removing the need to evaluate them. After all, goes the argument, if the Shroud image was formed in the tomb of Christ, then it could not have been created in the middle ages, however precise an attempt to match it may be. The irrefutable logic of this argument, baseless though its premise is, has persuaded the author of the criticism that abuse and mockery are appropriate adjuncts to his review, which this present author deplores.

Agreed characteristics of the Turin shroud image

In 1978, a team of scientists from the USA examined the Shroud to try to discover how the image was made. It was

photographed by visible, ultra-violet and infra-red light, examined using a portable microscope and fibres relieved from the surface using sticky tape. It was clear that the marks representing blood flows were of a different nature from the marks representing the body itself, but the observations of the scientists who studied the fibres were seriously conflicting, especially regarding the role of iron oxide, which was found in trace amounts, non-uniformly, all over the Shroud. Heller and Adler[4] considered it of no relevance to image formation, while McCrone[5] thought it made a substantial contribution. After detailed study, both Heller and Adler and McCrone and later Rogers[6], all decided that a yellowish layer over the fibres was the primary chromophore, but all disagreed as to the nature of the layer and how it became coloured.

This sort of disagreement among scientists who were able to study the Shroud fibres in person and microscopically is not conducive to anybody being able to duplicate a method of manufacture to everyone's satisfaction, so this author, who has himself studied all the relevant literature, compiled a target list of his own and attempted to meet them all as best he can. The author of the reviews, in turn, compiled a separate list and decided that because I had failed to meet some of his criteria, my endeavours were a total failure. I think this is misguided and driven more by conviction that I must be wrong rather than objective assessment. The review author even finds it appropriate to quote a comment from a YouTube video to the effect that I am "a snake in the grass," a moment of egregious abuse which, in my opinion, reflects more the character of the review author quoting than it does of the present author it allegedly describes.

By studying photographs taken in 1988 at various scales, it is obvious that the Shroud is not a painting in a conventional sense. There are no brushstrokes, no big flakes of paint, no outlining or underdrawings and no "snow-fencing," a term to describe the buildup of pigment on one side only of a succession of threads as the brush swept it across them. Also, the intensity of the colour is greatest on the more protuberant parts of the body, such as the nose and beard, deltoid muscles and knees, rather than the more recessive parts, which, if observed on a living person, are most likely to be in shadow and thus darker than the more protuberant parts. A side-effect of this is that, when the colours of the image are 'inverted,' the resultant image, with its light protuberant and dark recessive parts, looks more 'realistic' than the original. This phenomenon has been likened to that of looking at a positive print of a negative photograph and led some people to think the phenomenon is actually photographic, which is untrue. Real photographic negativity would also represent genuinely darker parts of the anatomy, such as the moustache and the extensive 'bruising' on the face and shoulders, as light on the cloth and dark on the inverted image, but this is not the case. Being protuberant, they appear dark on the cloth and light on the image. Subjecting the image on the Shroud to "3D" image enhancement software produces an apparent three dimensional model, which in some respects mimics the contours of a real face.

Every one of the characteristics described above is easy to emulate using a technique involving the dabbing of a damp, coloured, pad onto cloth fastened over a bas relief, a fact not questioned by the author of the critical reviews[1,2]. His claim to "comprehensive impossibility" rests on his individual resolution of the uncertainty regarding the primary chromophore, described above and on some personal observations of his own, which are not accepted as valid by this author.

To effect a compromise between the conflicting descriptions of the role played by iron oxide and a yellowish coating, I used a medium composed of yellow ochre, egg-yolk and vinegar, all mixed with water, a fairly common medieval 'recipe' for tempera paint[6]. Having obtained an image of a bas relief by dabbing this 'paint' on a cloth fastened over it, the cloth was then thoroughly washed and scrubbed to remove as much of the ochre as possible and concomitantly most of the egg-yolk and residual vinegar, leaving only a faint stain on the cloth, composed of residual medium and, it was hoped, some yellowing of the cloth itself brought about by the chemical action of the organic acids in the vinegar. To a certain extent all this seems to have been realised, although the ratio of ochre to vinegar in my home-made tempera was probably too great, for, as the critical author pointed out, the pigment particles are still very evident and the yellow stain is very slight. Similarly, there was probably too much egg-yolk, as some of the fibres of my experiment were stuck together by it, which is not evident on the Shroud.

Nevertheless, I think this is as close as I can come to an accurate reproduction of the Shroud's image-making method without having the uncertainties explained above resolved.

Disputed characteristics of the Turin shroud image

To assist in his refutation of my experiments as "complete failures" and "demonstrations of the absurd," and to reinforce his suspicion - in a scientific journal! - that my "destiny" is to be "suffering in hell," the author of the reviews includes, in his list of characteristics which he thinks my experiment fails to conform to, some items which are contradictory (the idea that the image is both photographic and also not photographic), some which are disputed (the idea that there are images on both sides of the cloth but with no discoloration within its thickness) and some which are evidently wrong (the idea that the image is not found in the interstices where threads overlap).

I have already discussed the pseudo-photographic nature of the image, so will not re-iterate it now. However, in an interesting paper involving a fair amount of image enhancement, the review author has previously demonstrated the possibility that a very faint copy of the principal image is also visible on the reverse side of the cloth[7]. As it happens, parts of my experiment also seep through to the other side, but the review author insists that on the Shroud there is no apparent connection between the two images in terms of color transmitted through or between the threads. However this seems to be contradicted by his own observations in another paper, that the colored fibers of the main image in fact continue deep into the interstices between the threads[8].

All in all, I think I make a fair case for the Shroud image being derived from the dabbing of tempera onto a cloth stretched over a bas relief, which over time has lost most of its ochre pigment and probably gained in the yellowing of the surface of its threads. This view may be contrasted with the review author's first conclusion[1], that I have "completely failed to reproduce the TS [Turin Shroud] body image," and his second conclusion[2], that I am among those "individuals who lack scientific credibility and continue to make unfounded assertions, equivalent in value to declaring that the Earth is flat."

It is regrettable that the review author's opinion of my work is based less on a dispassionate assessment of its quality and

more on religious fervor, claiming that "the TS provides us with such powerful proof - beyond any reasonable doubt - of the existence of God, that believers can transform their faith in God into certain knowledge of God, which is infinitely better!"

The radiocarbon date - medieval

A significant factor in the review author's rejection of the experimental findings discussed in this paper is his unshakeable conviction that the Turin Shroud is the actual burial cloth of Christ. Naturally this flies in the face of the date of manufacture derived from radiocarbon dating, in the face of successive papers either finding it medieval or, after challenging the finding, not refuting the medieval date. This is irrational. In 1988 three teams of scientists, from Tucson, USA, Zurich, Switzerland and Oxford, UK, submitted small samples of the Shroud to radiocarbon dating and found that "The results provide conclusive evidence that the linen of the Shroud of Turin is mediaeval[3]." However, a remark in the paper observing that "The spread of the measurements for sample 1 [The Turin Shroud] is somewhat greater than would be expected from the errors quoted," encouraged some statisticians to request more comprehensive data from the tests, with a view to understanding this anomalous 'spread of measurements.' Papers by Riani, et al.[9], Casabianca, et al.[10] and Schwalbe and Walsh[11,12], established that the samples tested originally cut in a line from one corner of the Shroud, had produced results implying a chronological gradient along the line, the Oxford sample appearing the oldest and the Tucson sample the youngest. It had thus been inappropriate to treat the three samples as if they were, in fact, exactly contemporaneous. However, none of these papers concluded that the Shroud was not medieval. The first two did not attempt to account for the chronological gradient, but Schwalbe and Walsh suggested that a small amount of residual contamination could account for it, making the Oxford sample appear twenty years too old or the Tucson and Zurich samples twenty years too young.

Encouraged by this, Benford and Marino[13] and Rucker[14] suggested that the radiocarbon content of the sample area had been so altered that a cloth actually dating to the 1st century now appeared to date to the 14th. The first proposed that the sample was in fact mostly composed of interpolated threads from the 16th century, invisibly incorporated among shreds of the original cloth and the second that sub-atomic particles emitted from the body of Christ during his resurrection had created just the right amount of new radiocarbon to date the Shroud to the 14th century, when tested 2000 years later. There is currently insufficient evidence for either of these to be considered serious challenges to the medieval date.

Conclusion

The experiments discussed above represent a serious and worthwhile attempt to discover and understand a possible method by which the image on the Turin Shroud could have been created in the late middle ages. The author is aware that his results are not perfect, but considers that they successfully replicate most of the undisputed characteristics of the Shroud image and, in approaching the more disputed aspects, offer a sensible foundation on which to base further research. The wholesale rejection of this research based on unfounded or disputed assumptions and misplaced religious conviction, is unworthy of serious consideration in a scientific journal.

Ethical Statement

The author is a committed and practicing Roman Catholic. He does not consider that the Shroud of Turin has any relevance to his faith.

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