

# Concerning the Side Strip on the Shroud of Turin

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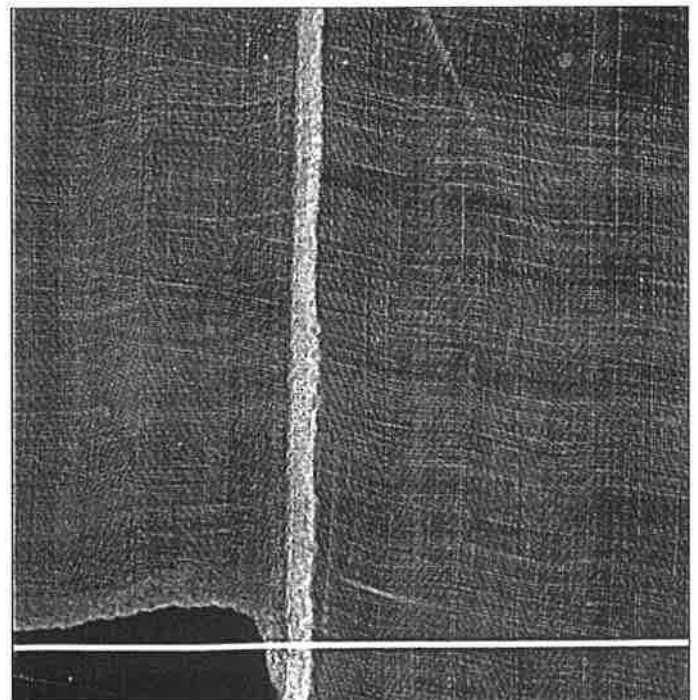
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**T**he side strip on the Shroud of Turin, the apparent seam separating it from the rest of the cloth, and the two missing panels of cloth at the top and bottom of this strip that reveal the underlying backing cloth have long been a subject of interest and speculation to sindonologists. Why is this strip there? What purpose could it serve? What is the nature of the seam? At what time in the cloth's history was this strip and seam created? Why are there two missing panels of cloth? When and why were they removed?

There are three possibilities as to the nature of the side strip: 1) it is a completely different piece of linen cloth which has been joined to one edge of the Shroud for some unknown purpose; 2) it is a piece of the original cloth of the Shroud which for some unknown reason became detached from the original and was then reattached by the seam; 3) it is cloth that is continuous with the rest of the Shroud and the seam is really a tuck or a tuck that has been sewn into the cloth for some unknown purpose.

Crispino<sup>1</sup> has reported a chronological survey and summary of various observations on the Shroud as a textile. Many of these reports also include comments on the side strip. More recently Vial<sup>2</sup> has also summarized some technical details on weaving faults observed on the Shroud and possible weaving techniques employed in the production of the original cloth.

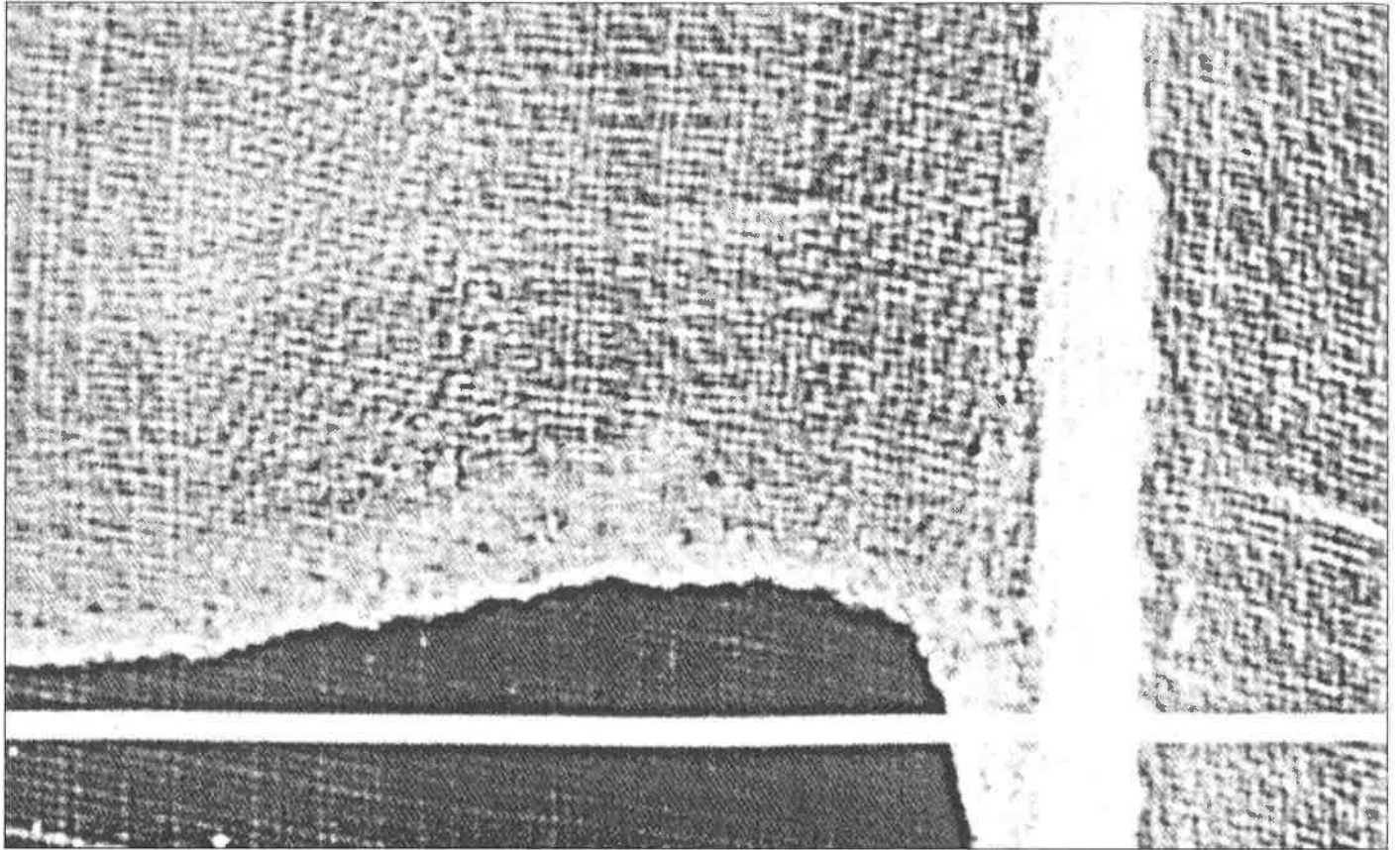
Schwalbe and Rogers<sup>3</sup>, mainly on the continuity of various macroscopically observable patterns seen in the weave in the radiograph images<sup>4</sup> taken during the STURP investigations, rejected the possibility of an adventitious piece of cloth for the side strip and concluded that the two pieces of cloth were actually continuous through the seam. In accepting this conclusion one must be certain that the pattern of the underlying backing cloth does not confuse the issue, as the radiographs were made through both pieces of cloth. Fortunately, this can readily be done as the backing cloth is an over and under tabby weave while the Shroud and side strip are both a twill herringbone weave. There is also a readily distinguishable difference in the image intensity of the threads of the two weave patterns. This is due to the fact that at the x-ray source wavelength employed in this study the major element present producing most of the intensity of



*Fig. 1 : Portion of X-radiograph of the section of the Shroud's frontal image showing the end edge of the side strip, the missing panel with the exposed backing cloth, and seam between the strip and the rest of the Shroud.*

the image is calcium. The STURP x-ray fluorescence<sup>5</sup> and chemical<sup>6</sup> investigations evidenced a substantial difference in the calcium content of the backing cloth and the Shroud cloth.

Figure 1 shows a portion of the x-radiograph of the section of the Shroud's frontal image displaying the end edge of the side strip, the missing panel with the exposed backing cloth, and the seam between the strip and the rest of the Shroud. The radiocarbon sampling area is only a few inches below this section. Figure 2 shows a contrast enhanced and magnified section of figure 1 demonstrating that the backing cloth weave image is readily distinguishable both by pattern and image intensity from the images of the side strip and Shroud cloths. Figure 3 shows another magnified section of figure 1 demonstrating that every thread in the weave of the Shroud



*Fig. 2 : Contrast enhanced and magnified section of figure 1 showing that the underlying backing cloth's over and under tabby weave pattern is clearly distinguishable from the twill herringbone pattern of the side strip and the Shroud both by pattern and intensity of image.*

is continuous through the seam and matches its corresponding side strip thread in position, thickness, and intensity. Viewed at low angles the continuity of the chevrons of the herringbone weave pattern through the seam are also clearly evident. In other radiographs fault patterns in the weave can also be seen to go continuously through the seam. This continuity can be seen for the entire length of the seam, except for the very ends where the situation can not be cleanly resolved.

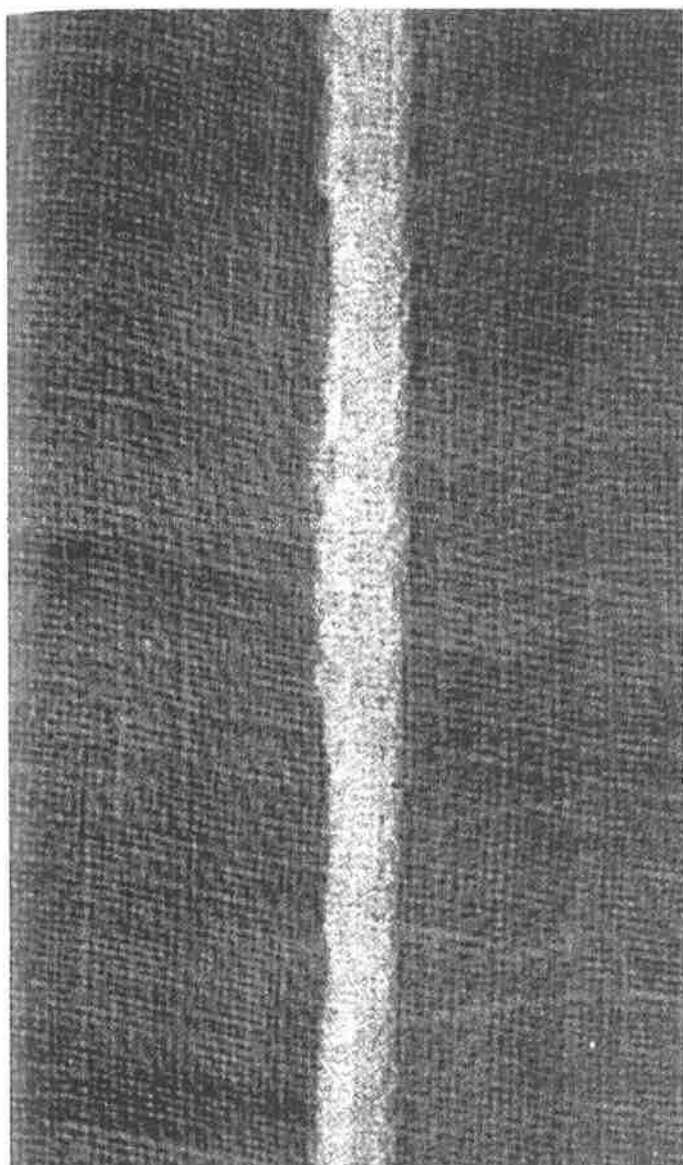
Of our three original possibilities, situation 1 is clearly rejected and situation 2 also seems highly unlikely in view of the detailed thread matching that would be required and the absence of any evidence of any frayed thread ends along either side of the seam image. Therefore we conclude that the side strip is actually continuous with the rest of the Shroud. The seam image in figure 3 also seems to show some sinusoidal pattern in the seam. However, the resolution is not good enough to determine whether this is a stitch forming the tube or represents an enclosed twisted cord in this seam as has been suggested by some authors.

A recent investigation<sup>7</sup> comparing STURP sticky tape sample fibers with those of the radiocarbon sample by Fourier Transform Infrared Microspectrophotometry and also Scanning Electron Microprobe Spectroscopy demonstrated a clear difference in the chemical composition of the radiocarbon fibers from those of the various

types of Shroud fibers. (Note that this calls into question the accuracy of the radiocarbon date.) In table 1, it can be seen that the radiocarbon fibers, although they are from a waterstain area, are «saltier» than the waterstain image fibers from the rest of the cloth. Since the edges of the waterstains on the body of the cloth are unbounded permitting free diffusion, this implies that missing panels were already missing at the time of the 1532 fire, as such a bounded edge would concentrate diffusing dissolved salts at such an edge. Therefore, we conclude that the creation of the side strip itself also predates the time of the repairs following the 1532 fire.

This same study<sup>8</sup> provided new evidence confirming previously reported conclusions (3, 6, 8) that the Shroud is not a painted image and that the blood images represent blood derived materials. It was also shown that the congruence of the dorsal head wound images on the Shroud with corresponding images on the Cloth of Oviedo provide strong evidence that the radiocarbon date is not just possibly inaccurate, as suggested by the chemical composition data, but is actually inaccurate in view of the known historical age of the Sudarion. Bollone<sup>9</sup> has also independently made this type of comparison between images on these two cloths.

Several authors have suggested that the purpose of a corded side seam might be to facilitate hanging the cloth for exhibition. Certainly many paintings of such medie-



val exhibitions show the Shroud being displayed in such a manner with the cloth shown along its length and held or suspended along what would appear to be the side seam. It should be noted that this mode of display places maximum stress at the end points of suspension and tearing of the fabric would be expected to proceed from the ends inward along the seam. Some historical accounts record that certain noteworthies were given pieces of the Shroud. It would be logical to assume that such samples would be taken from such torn end panels, thus providing a simple explanation for the missing panel portions of the side strip. Perhaps the De Charny family decided to repair such damages at the time of their display of the Shroud. Maybe the radiocarbon sample is simply rewoven material from the time of this repair. Had the recommended protocol for taking this sample been followed<sup>7</sup>, we would have an answer for these questions. ■

#### Acknowledgements

We are indebted to Dorothy Crispino for numerous consultations on historical and textile matters. Luke Adler of LA Engine Computer Services prepared the graphics.

#### Dedication

This paper is dedicated to the memory of John H. Heller, who passed away on December 13, 1995 and who was responsible for involving one of us (AA) in sindonology.

*Fig. 3 : Magnified section of figure 1 showing that every thread in the weave of the Shroud is continuous through the seam and matches its corresponding side strip thread in position, thickness, and intensity. Viewed at low angles the continuity of the chevrons of the herringbone weave pattern through the seam are also clearly seen.*

#### References

- 1) Crispino; *Shroud Spectrum International*, 38/39, 21 (1991)
- 2) Vial, *ibid.*, 7
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**Table 1. Contrast of Weight % Composition of «Salt»  
Elements as Seen in Typical Radiocarbon Sample and Shroud Waterstain Fibers**

Sample	Na	Mg	Al	Cl	K	Ca
Radiocarbon	8.3	0.9	2.0	3.1	4.3	8.5
Waterstain	0.6	0.0	0.0	0.5	0.1	0.1

## Etude de la bande latérale du Linceul de Turin

*La bande de tissu dite bande latérale du Linceul de Turin et le fait qu'il manque deux morceaux en haut et en bas de cette bande ont longtemps été un sujet d'intérêt et de spéculation pour les sindonologues. Une étude attentive des photographies prises aux rayons X au cours des investigations menées par le STURP en 1978 révèle que la bande est une partie intégrale du Linceul et non pas une pièce additionnelle de tissu comme on l'a souvent affirmé. A la suite des examens par microspectroscopie électronique, de récentes comparaisons ont été faites du contenu minéral des fibres en provenance du corps principal du tissu à l'emplacement des taches d'eau et en provenance des échantillons pour la datation radiocarbone. Ces comparaisons montrent que la surface échantillonnée pour la datation correspond à une bordure. C'est pourquoi l'événement qui a provoqué le retrait des deux morceaux doit s'être produit avant l'incendie de 1532. Les descriptions moyenâgeuses des ostensions du Linceul permettent de faire raisonnablement des hypothèses sur la nature de la couture apparente, sur l'amputation des deux morceaux de tissu et en outre sur les lisières qui ont été trouvées sur le corps principal du tissu au voisinage de la surface échantillonnée pour la datation radiocarbone, ce qui peut mettre en question l'exactitude de la date radiocarbone.*