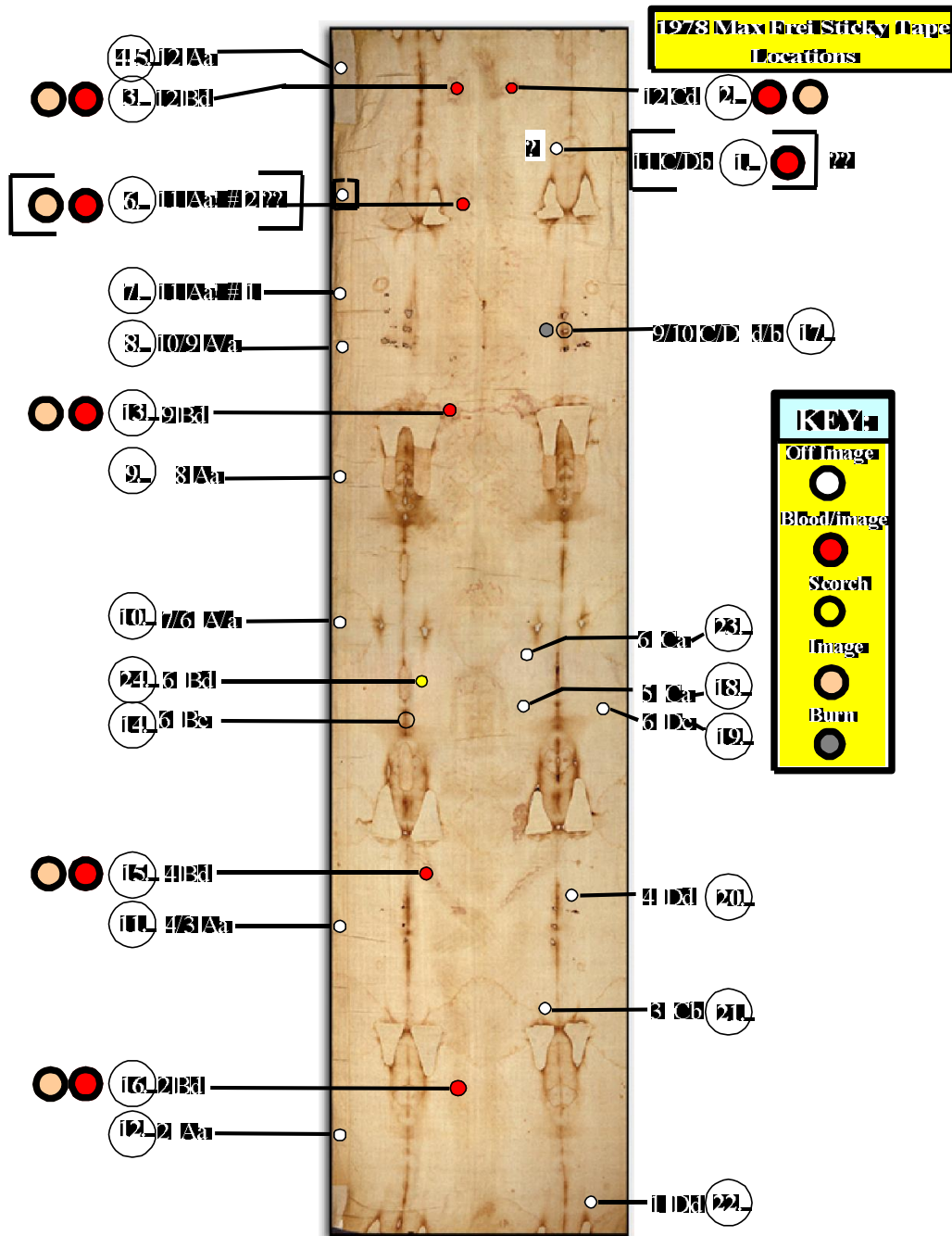


The Max Frei 1978 Sticky Tape Locations, Data Foundation and Accompanying Critical-Analytical Commentary

A Forward to this listing: I wish to make a number of comments about this listing and the 1978 sticky tapes this represents.



Underlying Scratch Image copy @ 1968/1/28 in CIVL Strickland Collection, Sydney, Australia.
 Underlying Blood Image copy @ 1968/1/28 in CIVL Strickland Collection

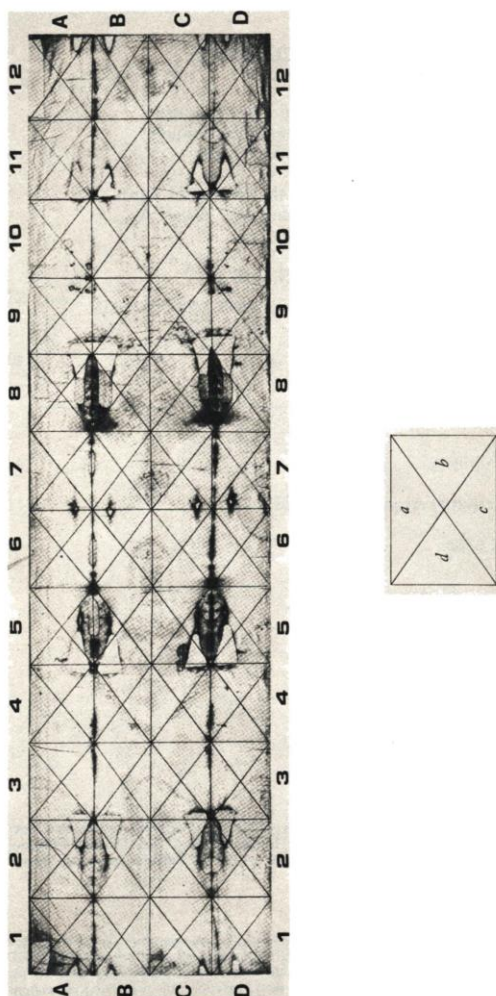
A. Dr. Frei's goal (on the one hand) and the goal of modern research (on the other): Dr. Frei's goal was clearly to get a much wider sampling of pollen grains from the Shroud. He was limited only to 12 samples from the extreme frontal end of the Shroud in 1973. It was on that sampling that he based his entire botanical case for the itinerary of the Shroud. However, although Dr. Frei actually doubled his sampling in two different ways in 1978 (he took 24 samples from the image side of the Shroud, and took them on sample sites from one end of the Shroud to the other, and from one side of the Shroud to the other) he did not actually find new pollen types on the 1978 tapes to expand his botanical base. He circled many places on these tapes but most of those circled sites, he eventually discovered, contained only blemishes in the plastic, not new pollen types.

Our *modern goal* has been to use these tapes to expand on the botanical findings—i.e. floral debris—which were not the goal of Dr. Frei. Although he found one floral type (*Pteranthus dichotomus*) from the frontal end of the Shroud, a single sample of this floral debris does not a pattern make. Our survey has been to document the presence of such floral debris types from one end of the Shroud to the other, and from one side to the other.

B. The Nature of this listing: This listing represents Barrie Schwartz' coded transparencies of Dr. Max Frei taking sticky tape samples in 1978: [This is the full selection of all Schwartz transparencies that I have in my collection and in his wider collection of what was happening when and while Dr. Frei was taking his samples (therefore, it does not include those by Mark Evans' macrographs of the weave)].

C. The Drs. PierLuigi Baima Bollone and Aurelio Ghio“map” of the Shroud:

Note: The 1978 Frei tapes were labeled by Dr. Aurelio Ghio according to the map which he and Dr. PierLuigi Baima Bollone designed. For this map see immediately below.



For the above map designed by Drs. PierLuigi Baima Bollone and Aurelio Ghio, please see *Shroud Spectrum International*, No. 6, March 1983, p. 2.

Comment: The best evidence for a sample site and the orientation of the tape sample removal comes, not from the label given by Dr. Ghio, but from a constellation of evidences that includes the label information, but, more importantly, also the Schwartz photographs, and the STURP magnetic markers. But caution must prevail for the earlier samples (# 1 through # 6)

since Dr. Frei began taking samples immediately (he was the first to enter the room when it was opened to investigators). Please see my book (in progress) for the map of all of the sample sites showing the actual orientation of the tapes themselves.

We can deduce the actual sequence of events for the Max Frei sample removal from the sequence number of Barrie Schwartz' photograph numbers. That is, with the exception of the first 6 samples, all other samples can be reconstructed from the Kodak numbers. Barrie established these in groups of 10—for example, 5-A-1 through 5-A-10, followed by 5-B-1 through 5-B-10, etc. Therefore, in order to show this “tour around the table” I have opted to organized this 1978 tape listing on the basis of Barrie Schwartz' Kodak transparency number. In each listing, where there is such a number, that number appears first.

Moreover, it is important to keep in mind that other things were going on at the opposite side of the table in preparation for Giovanni Riggi di Numana's insertion of his “scope” into the backside of the cloth, between the Holland support cloth, and the other side of the image. Barrie was photographing these events as well as Dr. Frei was removing tape samples.

Also, the sample removal was interrupted between sample # 16 and # 17 when it appeared that Dr. Frei might wish to take a sample from the face. So Dr. John Jackson, Dr. Frei and Prof. Luigi Gonella, went into a temporary conference and it was decided that no samples should be taken from the face.

D. The length of each of the tapes taken by Dr. Frei in 1978: I have set forth here the entire listing of the length of those tapes as I found them on the 1978 glass slides and have provided them in terms of the actual sequence Dr. Frei took them from the Shroud. This sequence was reconstructed based upon the actual Kodak coding number Barrie gave to each photographic frame. The sequence number is followed by the actual label given to each sample by Dr. Ghio during the sample removal in 1978. The user of this listing will find some puzzles—for example, the two samples labeled 12 Aa and the two labeled 11 Aa. Surely, these do not represent two exact samples from the very same sample site! I will present evidence below that demonstrates, in fact, that they do not! For another example, sometimes the label does not truly match the actual sample site we have discerned from Barrie's photographs of Dr. Frei taking the original sample.


Although Dr. Frei took 27 sticky tape samples, three are from other sample sites and are not included here.


In this summary list of 24 samples taken from the image side of the Shroud that follows here immediately, I have taken the metric measurement and have rounded it off (up or down by about 1/16th of an inch) simply for convenience in my conversions.


1. 11 C/Db, length = 6.6 cm/2 $\frac{3}{4}$ inches.
2. 12 Cd, length = 7.6 cm/3 $\frac{1}{8}$ inches.
3. 12 Bd, length = 10.1 cm/4 inches.
4. 12 Aa # 1, length = 8.6 cm/3 $\frac{1}{2}$ inches.
5. 12 A/a # 2, length = 9.7 cm/3 $\frac{7}{8}$ th inches.
6. 11 Aa, # 1, length = 12.5 cm/5 $\frac{1}{8}$ th inches.
7. 11 Aa # 2, length = 14.1 cm/5 $\frac{1}{2}$ inches.
8. 10/9 A/a, length = 9.8 cm/4 inches.
9. 8 A/a, length = 9.8 cm/4 inches.
10. 7/6 A/a, length = 9.0 cm/3 $\frac{5}{8}$ inches.
11. 4/3 Aa, length = 5.0 cm/ 2 inches.
12. 2 Aa, length = 5.7 cm/2 $\frac{1}{4}$ inches.
13. 9 Bd, length = 7.1 cm/ 2 $\frac{7}{8}$ inches.
14. 6 Bc, length = 6.6 cm/2 $\frac{5}{8}$ inches.
15. 4 Bd, length = 8.0 cm/3 $\frac{1}{4}$ inches.
16. 2 Bd, length = 8.7 cm/3 $\frac{1}{2}$ inches.
17. 9/10 C/D d/b, length = 6.7 cm/2 $\frac{3}{4}$ inches.
18. 5 Ca, length = 7.7 cm/3 $\frac{1}{8}$ inches.
19. 6 Dc, length = 7.3 cm/3 inches.
20. 4 Dd, length = 5.2 cm/2 $\frac{1}{8}$ inches.
21. 3 Cb, length = 7.7 cm/ 3 $\frac{1}{8}$ inches.
22. 1 Dd, length = 8.0/3 $\frac{1}{4}$ inches.
23. 6 Ca, length = 7.1 cm/2 $\frac{7}{8}$ inches.
24. 6 Bd, length = 6.9 cm/2 $\frac{3}{4}$ inches.


Comment: From the above list one can see that the shortest tape sample Dr. Frei took in 1978 was no. 11 at 5.0 cm (2 inches) and the longest one was no. 7 at 14.1 cm (5 ½ inches). It will immediately be apparent that the magnetic markers were never designed to achieve any sort of precision, nor should we expect it because we now know that the greatest concentration of particulates was on the lead of the tape rather than the body. The magnetic markers, designed by STURP, only provide a very general idea of the sample site from which Dr. Frei took his samples. A map of all of these 1978 sample tapes will be included in my book (in progress) showing the positioning of the tapes including designating how the lead end is oriented during the sample removal.


E. Tapes taken from various areas on the Shroud are color coded according to the type of area they came from:


Tapes taken from a blood area are marked with a red circle: 

Tapes taken from an off-image area are marked with an empty (white) circle: 

Tapes taken from an image area are marked, in addition to the red circle, a "flesh-colored circle: 

Tapes taken from a scorched area are marked with a yellow circle: 

Tapes taken from a burned area are marked with a grey colored circle: 

Tapes that came from a blood/image area are given two coded circles: 

F. Certifying the contents of the tapes as representative of the original site from which it came:

1. The blood areas:

This concerns largely blood area sites because, since the Shroud is woven of flax, the presence of an unmodified flax fiber proves nothing. I have listed the evidences from blood areas in terms of the strongest (# 1) support for the original source to the weakest (# 4) argument.

a. Pseudo-morphs: Where the material presents a highly delineated outline of the original fiber. The flax fiber to which the material was attached stayed on the Shroud while the material originally adhering to that fiber has come away onto the sticky tape. (For example, see 9 Bd)

- b. Particle trails: where material that was once adhering to the original flax, came away onto the tape but the original flax fiber stayed on the Shroud. However, the particle trail did not necessarily leave a well defined outline of the original flax. (For example, see 11 Aa, # 2 as well as 4 Bd).
- c. Two parallel flax fibers near to each other bearing a coating. It is quite unlikely that two such fibers with a coating would still be side-by-side in the same micrograph (hence, in the same locale on the Shroud) unless they had originated from the sample site instead of being transported across the Shroud due to the rolling and unrolling and the folding and unfolding. (For example, see 12 Bd).
- d. Multiple evidences: several flax fibers on a sticky tape that exhibit a coating. For example, where required, I have provided numerous evidences in the form of micrographs here in this document to illustrate the presence of many different flax fibers where the coating suggests the tape's sample site.

2. 3 certifiably documented (through Barrie Schwartz' photographs) tapes came from blood/image areas.

- a. Sample 13, 9 Bd from the small of the back rivulet.
- b. Sample 15, 4 Bd from across the rivulet down the left anatomical arm.
- c. Sample 16, 2 Bd from the frontal shin of the left anatomical leg.

3. 4 samples came from blood areas, two of which are uncertifiable as to their original locations; these are where there are no photographs and/or where the STURP magnetic marker locations may be questioned.

- [a. Sample # 1: 11 C/Db. The actual site is unknown, but due to the presence on this tape of evidences for blood through pseudo-morphs and coated flax, the conclusion that it came from a blood site seems confirmed.]
- b. Sample # 2, 12 Cd. The placement of a magnetic marker here along with the extensive presence of coated flax and the fact that it is consistent with Dr. Ghio's label, supports the accuracy of this location as the source from which the tape was drawn. There is no Schwartz photo for this site.
- c. Sample # 3, 12 Bd. The label given by Dr. Ghio, and the placement of a magnetic marker here along with the extensive presence of coated flax all are consistent with the area designated by Dr. Ghio as the source of the tape.

[. d. Sample # 6: 11 Aa # 2 came from an unknown blood/image site and is certified so only by the contents of the tape which has coated fibers and pseudo-morphs on it. The STURP magnetic marker is incorrect but the confusion of the nature of this tape is partially due to the fact that there are two tapes labeled 11 Aa. 11 Aa # 2 clearly comes from a blood area but 11 Aa # 1 must have originated on the side-strip.]

Note: Theoretically, there should be image fibers on these four tapes. However, I was never able to develop a scientifically objective method of distinguishing between light scorch fibers that transported from elsewhere, fibers that might have aged serum, and actual image fibers that STURP has designated as “straw yellow.” Therefore, in many cases in my index I have simply used the general umbrella term “yellowish” to describe the color. Moreover, since I often used blue filters to cut down on the very bright sub-stage light, it has made it more difficult to discern what fibers are truly “straw yellow.”

The Twenty-Four Sticky Tape Samples Taken in 1978

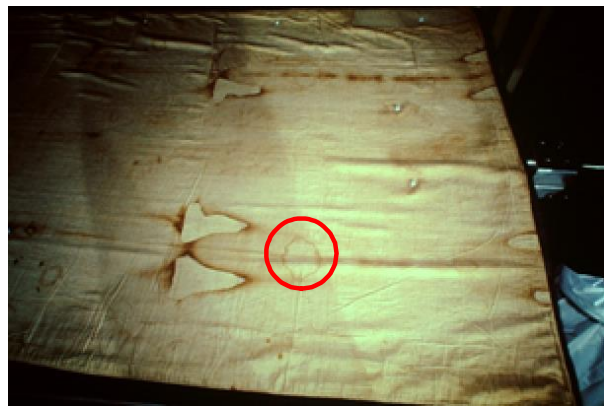
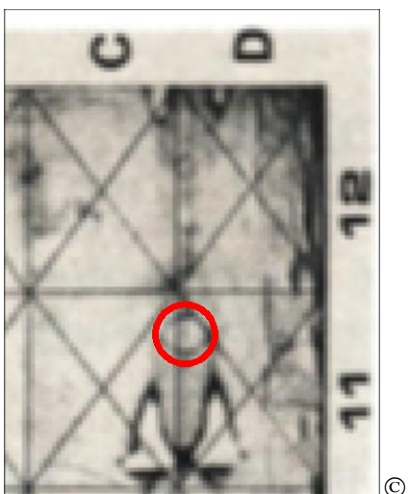
[●] **Sample # 1, tape 11 C/Db**, according to the label given by Dr. Ghio this is from a off-image area on the non-side-strip side of Shroud, small water stain margin.



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Comment: The exact location of this sample site is unknown. I have excerpted a portion of the Baima Bollone/Ghio map of the Shroud here below to show approximately where, on that map the above labeled tape sample (Sample # 1) would be located. There is no Schwartz photograph and no magnetic marker because, since this was the very first sample removed by Dr. Frei, other researchers, such as STURP had not had a chance to swing into action with Dr. Frei’s speedy sample removal effort. Barrie would not get the first photograph until sample # 7

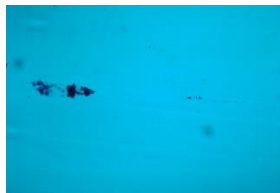
and Dr. D'Muhala would not begin placing magnetic markers down until sample no. 3 (from the center rivulet of the left foot blood flow).



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Adaptation on right, © 2018, Paul C. Maloney.

Comment (continued): However, to get some idea of where this sample was actually taken, we must have recourse to the contents of the tape itself:



3/8/90: # 7



3/8/90: # 17



3/8/90: # 22

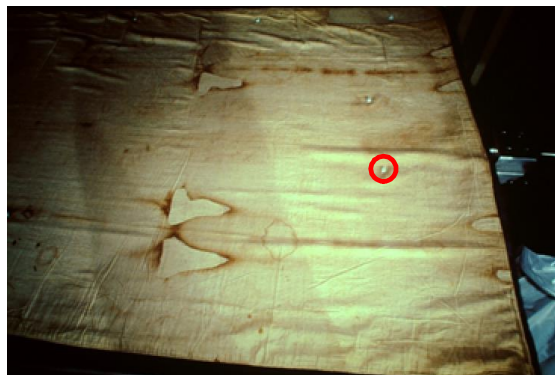
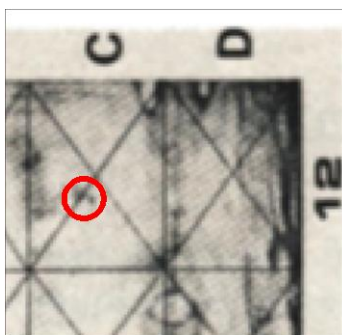
All three photomicrographs © 1990, Paul C. Maloney, ANER PhotoArchives.

The single most certifiable way of verifying the original source of a tape taken in a blood area would be to find pseudo-morphs from the original flax fibers. I would propose, not only on the basis of coated flax fibers, but also on finding pseudo-morphs (or particle trails) on this tape that the tape probably was taken from the area of the right foot on the dorsal end of the Shroud.

● **Sample # 2, tape 12 C d**, probably from the blood pool off of the right foot heel



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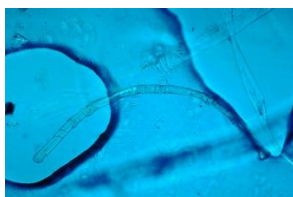
Dr. D'Muhala placed the magnetic marker down on the blood pool off of the heel of the right foot. This, essentially, agrees with the label on the Frei tape.



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Schwartz Kodak number **5-A-5**, Dr. T. D'Muhala placing magnetic marker down. (Notice that there is not yet a magnetic marker on sample site # 2 from the blood pool off the right heel).

Comments: Since we have neither an explicit magnetic marker at sample site # 2 prior to the placement of one at site # 3, and no Schwartz photograph we need to examine the photomicrography of this tape to see if the contents of the tape are consistent with the label "12 Cd." Here following are some sample micrographs of 1 uncoated flax, and multiple samples of coated flax, all taken at 100X or 50X. All are copyright by Paul C. Maloney 1989, 1990, ANER PhotoArchives. I conclude from the following that the contents of the tape is consistent with the label designating the sample site on the split blood pool that emanates from the right heel.



a. Frei 12 Cd, 8/13/89: # 29, 94.0/42.9 probably from the gap between the two halves of the blood pool. © 1989, Paul C. Maloney, ANER PhotoArchives.



b. Frei 12 Cd, 8/13/89: # 32; c. same, # 33; d. same, # 35, © 1989, Paul C. Maloney, ANER PhotoArchives.



e. Frei 12 Cd, same, # 36; f. 8/23/89: 9-7; g. 3/23/90-II: # 29, © 1989, 1990, Paul C. Maloney, ANER PhotoArchives.



h. same, 3/23/90-II: 31, i. same, 3/23/90-II: # 32, © 1990, Paul C. Maloney, ANER PhotoArchives.

Comments (continued): Essentially the only analysis done on this sample has been a particle spectrum study and the fiber evidence was drawn from that spectrum analysis. No dedicated extensive fiber analysis was done on this sample. Nevertheless, our findings are consistent with the label given by Dr. Aurelio Ghio.

● **Sample # 3**, 12 Bd, on center rivulet of left foot blood stain.



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Comment: I have provided four photo-micrographs here as a sampling of the contents of this tape:



8/23/89: # 13.

4/23/90-1: # 3.

4/23/90-1: # 6.

4/23/90-1: # 8.

© 1989 & 1990, Paul C. Maloney, ANER PhotoArchives.

The contents of this tape are consistent with having been taken from a blood area.

○ **Sample # 4/5** on dorsal end corner of Shroud (tape samples labeled 12 Aa and 12 A/a).

B. Schwartz transparencies of M. Frei sampling



Sample # 1 received from Frau Gertrud Frei-Sulzer, Jan. 1986. © 1986, Paul C. Maloney, ANER PhotoArchives.

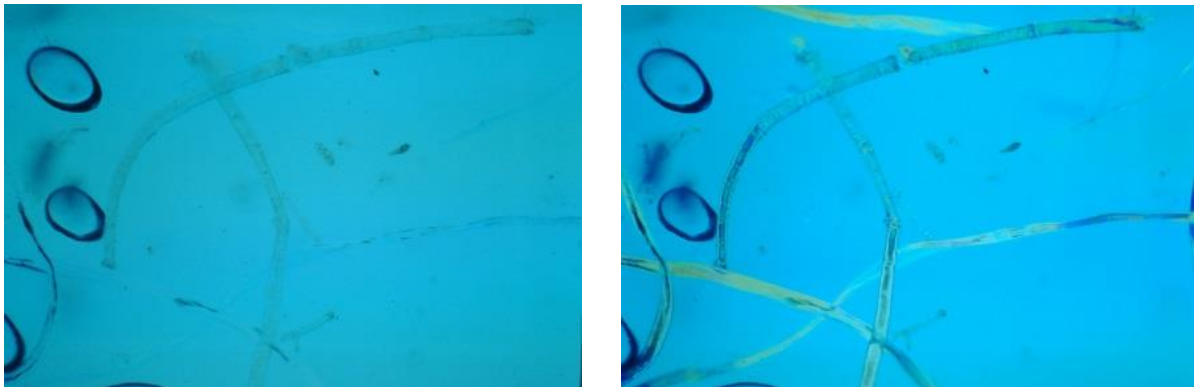


Sample # 2 acquired from Frau Gertrud Frei-Sulzer, July, 1988. The label on this glass slide has a slash between the A/a. © 1988, Paul C. Maloney, ANER PhotoArchives.





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Frei 12 A/a, (3/18/90: # 11 & 12), sample # 2 (left: normal view; right, polarized view). © 1990, Paul C. Maloney, ANER PhotoArchives.

Comment: There is some confusion here as to which sample (“12 A a” or “12 A/a”) is the sample removed from the corner (circled in red in the above Schwartz photograph). It does not seem likely that there would be two samples from the same sample site. However, current study of the flax fiber content of the tapes has not solved the problem. Perhaps, after all, there were two tape samples taken from the side corner and only one of them was indicated by STURP’s magnetic markers. Dr. Frei was taking samples so fast it was difficult for Dr. Ghio and others to keep up!!

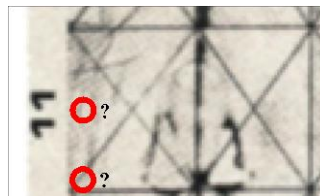
[● ○] Sample # 6, tape 11 Aa (# 2)



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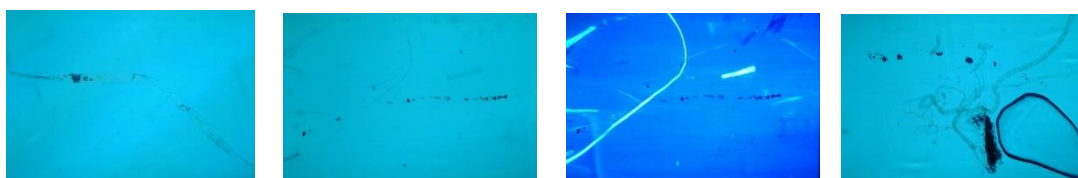
© 1978 Barrie M. Schwartz Collection, STERA Inc., Adaptation © 2018, Paul C. Maloney.



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Comment: There are two tape samples labeled “11 Aa” and I have shown this on the Bollone/Ghio map above. I am assuming that the above label is to be read “11 Aa.” However, since Dr. Ghio was writing fast to keep up with Dr. Frei’s pace, it may be plausible that the above label should be read “11 Ad.” Actually, this would make little difference in the location of the sampling since it would move it toward the frontal end of the Shroud by only a few inches. But there is no magnetic marker to offer us a clue to the answer to our question.

The contents of the sticky tape, designated 11 Aa # 2, however, argue that this tape sample most assuredly came from a blood area. But, again, there is no actual magnetic marker showing the exact location for having originated from a blood/image area.



1. 3/4/90-II: # 2

2. 3/4/90-II: # 34

3. 3/4/90-II: # 35

4. 3/4/90-II: 39



5. 3/6/90: # 32

Comment (continued): micrograph 1 = coated flax ; 2 and 3 pseudo-morph with attendant polarized view; 4. (far right) pseudo-morph. 5. Particle trail (pseudo-morphic) from same sample region. All are from a blood area (possibly from the dorsal left foot region or from the calf of the right anatomical leg) and all micrographs are from this tape sample designated as 11 Aa # 2. All five are © 1990, Paul C. Maloney, ANER PhotoArchives.

I have placed this sample in brackets because the exact location is far from certain and the calves of the legs are not generally considered a blood area. Without further documentation it can only be said that the contents of the tape argue for a blood source. Did this sample come from one of the flagrum wounds?

○ **Sample # 7: 4-M-2**, Left to right, A. Ghio, M. Frei, and PierLuigi Baima Bollone. Dr. Frei laying Sample # 7, **11 Aa** down.



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(Above: 5-D-7 cropped and circled in red to show sample # 7). © 1978, Barrie M. Schwartz Collection, STERA, Inc. Adaptation © 2018, Paul C. Maloney.



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- **4-M-6, Sample # 8, 10/9 A/a**, placing tape down

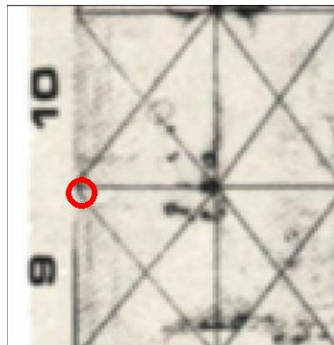


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- **4-M-7, Sample # 8, 10/9 A/a**, removing tape from side-strip

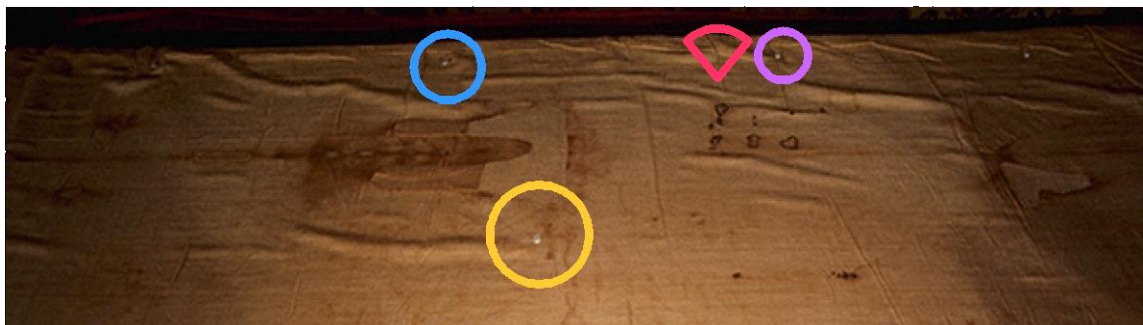


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Comment: When one examines the spot where STURP laid the magnetic marker, it appears adjacent to the dorsal oriented “end” of the pre-1516 burn holes of quadrant one. However, by examining Barrie Schwartz’ photographs of Frei laying the 10/9 A/a tape down and pulling it away, one is convinced that this tape actually came from a spot near the “frontal oriented” end adjacent to the pre-1516 burn holes of quadrant one. I therefore strongly suspect that the magnetic marker was laid down in the wrong spot. It is perhaps for this reason that Dr. Ghio gave it the “split” label “10/9 A/a.”

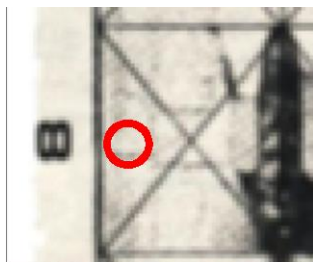


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However, there are TWO 11 Aa, the one nearer the frontal end of the Shroud we have designated # 1. There is no apparent STURP magnetic marker for the upper (frontal direction) placement of this sample (See the reddish colored triangle in photo above). The magnetic marker that one sees in Schwartz photo code **5-E-9** is actually 11 Aa # 1! After Dr. Frei took tape sample 10/9 A/a (which is sample sequence # 8), the magnetic markers placement actually skips over to sample # 9, 8 Aa.

Since this sample came from the side-strip it is a good sample to use as a control for extraneous materials to test John Jackson’s suggestion that many things from different sites on the Shroud became transported elsewhere during the folding and unfolding, rolling and unrolling. So, for example, the “damaged” pollen grain found on this tape may well have been transported from tape 6 B/d where 20 other “damaged” pollen grains were found (but nowhere else except the one on 10/9 A/a!

○ **Sample # 9, tape 8 A/a.** (no Schwartz photo)



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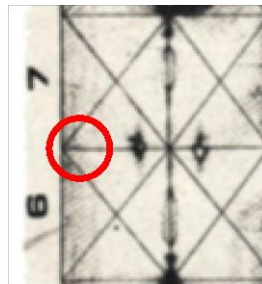
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Comment: This label appears to be a straight forward reference to a location on the side-strip adjacent to the frontal end oriented patch from the fire of 1532. However, I examined all the magnetic marker photos I have in my possession and was unable to find one to absolutely and positively confirm this position. However, since Dr. Frei was taking many samples alongside the side-strip side of the Shroud, it seems plausible that this sample also came from the side-strip. I believe that the magnetic marker I have selected (above) is the best one for the tape labeled "8 A a."

○ 4-M-8, Sample # 10, 7/6 A/a, removing tape



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Comment: This label accurately reflects the other evidences of the location of this sample taken from the side-strip of the Shroud. Note that it is directly adjacent to the small burn marks that demarcate the division between the dorsal and frontal ends of the Shroud.

○ 4-M-9, Sample # 11, 4/3 Aa, placing tape down



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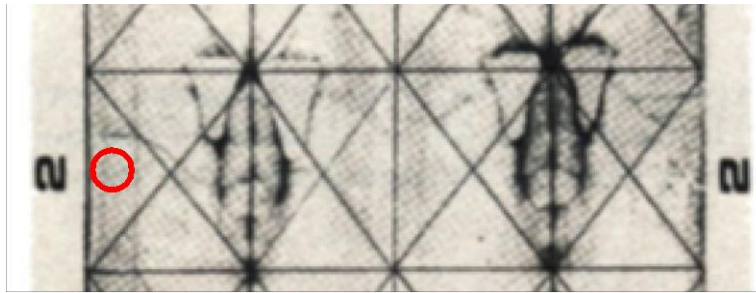
© 1988, Paul C. Maloney, ANER PhotoArchives.

Comment: I don't have a Schwartz photograph showing the location of this magnetic marker.

○ 5-A-1, Sample # 12, 2 Aa, placing tape down



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Comment: I don't have a Schwartz photograph showing the location of this magnetic marker.

5-A-5, T. D'Muhala placing magnetic markers down on sample site # 3 from the center rivulet of the left foot.. Notice that there is not yet a magnetic marker on the right foot sample site area (Sample # 2).

Comment: The speed with which Dr. Frei was removing samples can be demonstrated by noticing that Dr. D'Muhala was putting a magnetic marker down on sample site number 3 while Dr. Frei was already placing and removing the sample from site number 13!!



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● ○ 5-A-6, Sample # 13, 9 Bd, placing tape down.



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● ○ 5-A-7, Sample # 13, 9 Bd, removing tape.



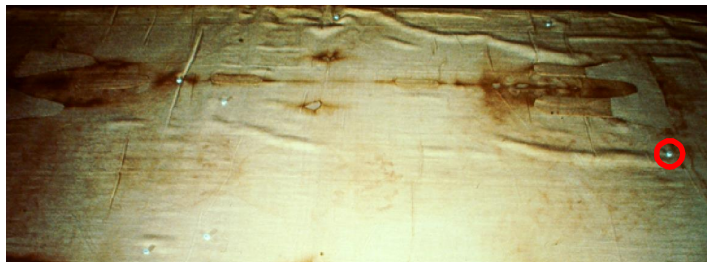
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Shroud map by PierLuigi Baima Bollone and A. Ghio; adaptation by Paul C. Maloney, © 2018.



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© 1988, Paul C. Maloney, ANER PhotoArchives, 9/15/88-I: # 6.



© 1990, Paul C. Maloney, ANER PhotoArchives, left = 3/4/90-I: # 19, and right = polar view) 3/4/90-II: # 8. Note the pseudomorph on the left of each photo-micrograph.

Comment: Everything appears to match this sample site quite well. This tape preserves the best representation of what I have elsewhere called pseudo-morphs. Alan Adler told me he also found similar pseudo-morphs on the STURP tape blood areas. Numerous such blood area samples (particularly 4 Bd and 9 Bd) have evidence of them. But this particular pseudo-morph appears to me to be a kind of finely divided “wash” of components in the fluid that settled out and attached themselves to the threads. When the tape was laid down and then peeled off by Dr. Frei this “near-perfect” reflection of the original fiber came away onto the tape but left the original fiber still on the Shroud! The photomicrograph above (taken with turned polarizer) is an illustration of that pseudo-morph. Please note the birefringence of the flax fiber on the right but no evidence of birefringence of the original fiber on the left.

- **5-A-8, Sample # 14, 6 Bc, placing tape down at an angle**

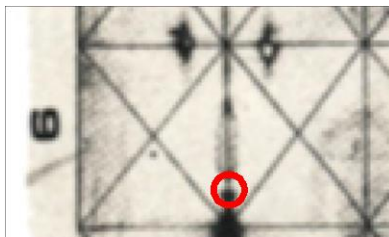


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- 5-A-9, Sample # 14, 6 Bc, removing tape**



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● ○ 5-A-10, Sample # 15, 4 Bd, placing tape down



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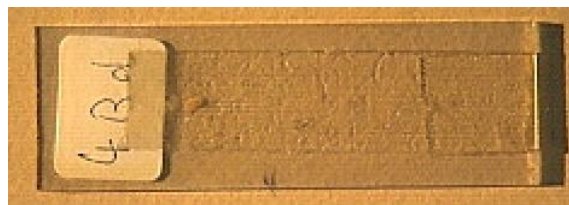
Shroud map by PierLuigi Baima Bollone and A. Ghio; adaptation by Paul C. Maloney, © 2018.



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Comment: The Schwartz photograph and the ensuing photograph showing the location of the magnetic markers, indicate that the label on this tape should actually read "4 B a/b" The contents of the tape are also consistent with having been removed from 4 Bd across the rivulet down the left anatomical arm.

5-B-1, Sample # 15, 4 Bd, Rogers placing magnetic marker down after removal of tape 4 Bd



● ○ **5-B-2, Sample # 16, tape 2 Bd** being placed on upper shin, © 1978, Barrie M. Schwartz Collection, STERA, Inc.



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● ○ **5-B-3, Sample # 16, tape 2 Bd** being removed from upper shin



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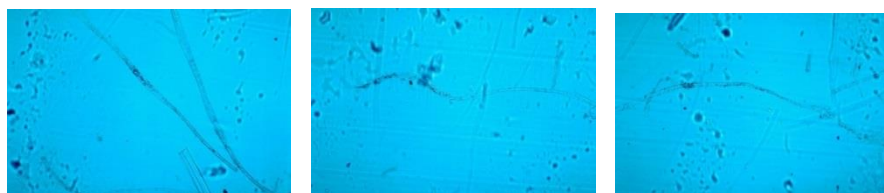
© 1978, Barrie M. Schwartz Collection, STERA, Inc.; adaptation © 2018, Paul C. Maloney.



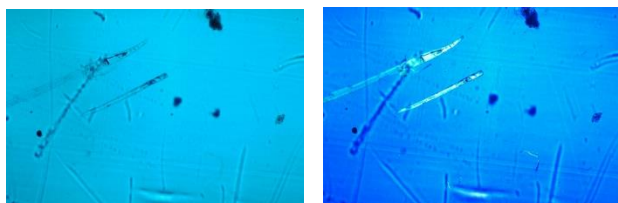
© 1988, Paul C. Maloney, ANER PhotoArchives.



2/17/90-III: # 13. © 1990, Paul C. Maloney, ANER PhotoArchives. Pseudo-morph of material on the flax.
(But the flax fiber stayed on the Shroud).



2/17/90-III: # 28, 34 & 35



2/17/90-IV: # 13 & 15. (# 15 is a polarized view), All photos © 1990, Paul C. Maloney, ANER PhotoArchives.

Comment: The photos, magnetic marker, and the contents of this tape are all consistent with the label on this sticky tape glass slide. The flax fibers on this sampling show that the area of 2 Bd was some sort of abrasion/wound area on the left anatomical shin area—consistent with the interpretation that the Man of the Shroud had fallen and injured this area of his leg.

[5-B-4???

5-B-5, Frei in conference with Luigi Gonella and John Jackson; stopped from sampling the face.



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● **5-B-6, Sample # 17, 9/10 C/D d/b**, sample taken from center hole of 2nd quadrant of the pre-1516 burn mark.



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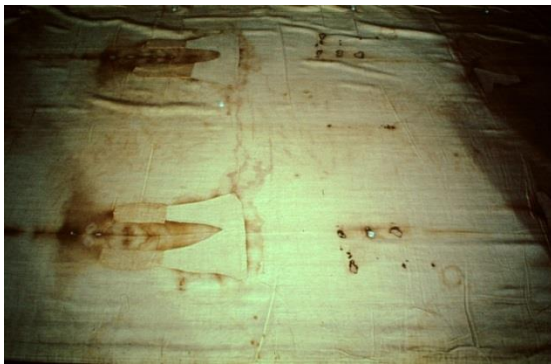
● **5-B-7, Sample # 17, 9/10 C/D d/b**, sample being removed from center hole in the 2nd quadrant of the pre-1516 burn mark.



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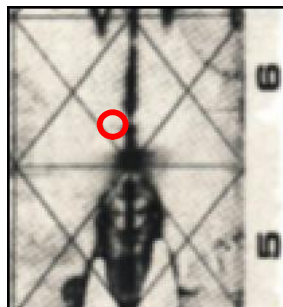


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○ 5-B-8, Sample # 18, 5 Ca tape being placed down



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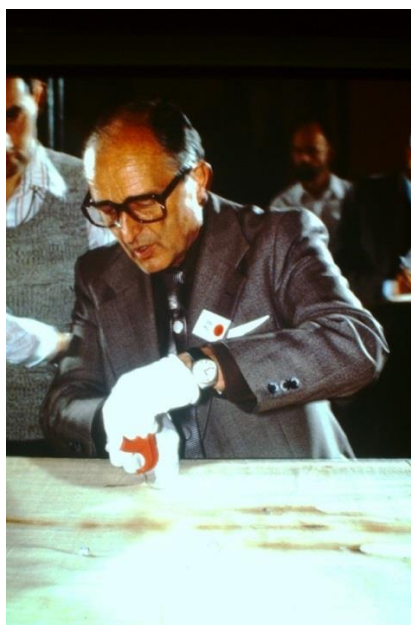
© 1978, Barrie M. Schwartz Collection, STERA, Inc., adaptation © 2018, Paul C. Maloney.



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Comment: There appears to be a serious discrepancy between the Schwartz photographic evidence/STURP magnetic marker, and the label on the tape! The area designated “5 Ca” would place the sample removal site on the upper chest of the Man of the Shroud. However, both the photograph of Max Frei placing the tape down, and the follow-up magnetic marker indicate that actually this sample came from a site adjacent to the nose but in the “blank” spot between the face and the 1532 burn line adjacent to the nose. The label, according to the evidence available, should actually have been “6 C c.”

- **5-B-9, Sample # 19, 6 Dc** tape being removed and magnetic marker at the site of sample # 19.



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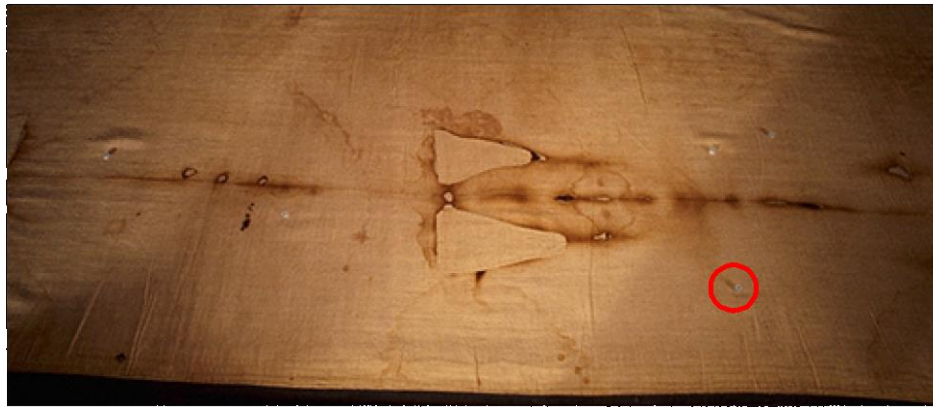


Shroud map by PierLuigi Baima Bollone and A. Ghio; adaptation by Paul C. Maloney, © 2018.

B. Schwartz transparencies of M. Frei sampling



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- 5-B-10, Sample # 20, 4 Dd tape being placed down.



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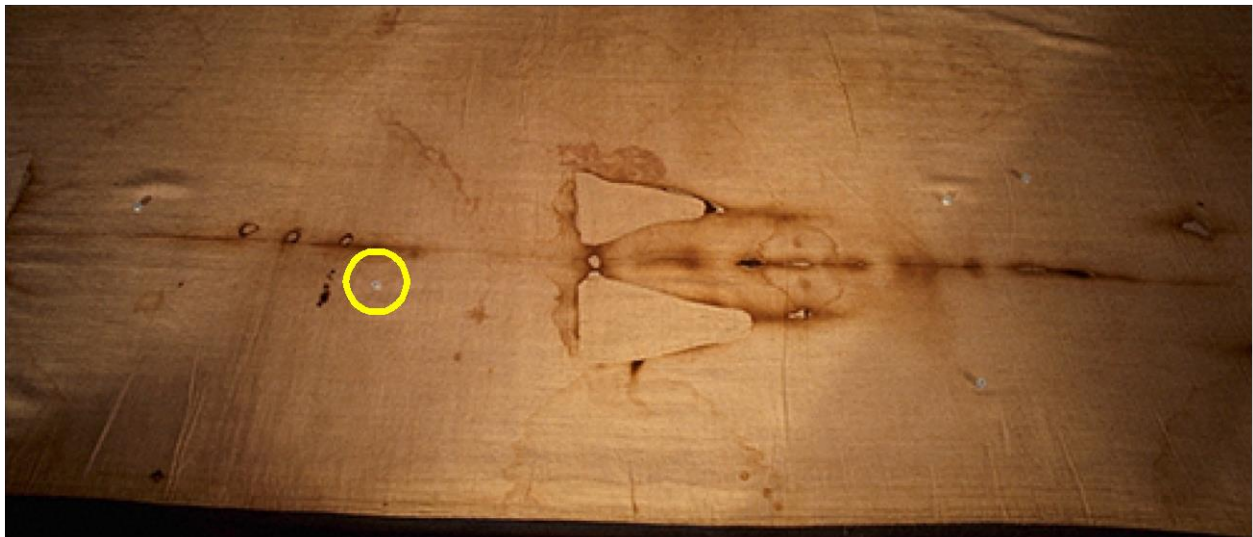


Shroud map by PierLuigi Baima Bollone and A. Ghio; adaptation by Paul C. Maloney, © 2018.

B. Schwartz transparencies of M. Frei sampling



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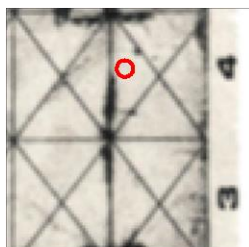
© 1988, Paul C. Maloney, ANER PhotoArchives.

Comment: The Schwartz photograph showing where Max Frei placed the tape down and the ensuing placement of the magnetic marker indicates that Dr. Ghio's label (4 Dd) is not precise. It should actually be "4 D a". But there is no "hook" on the lower case "d" to interpret it as a lower case "a". Dr. Ghio's lower case "a's" always are made with a "hook" at the top of the downstroke.

○ 5-C-3, Sample # 21, 3 Cb being placed down.



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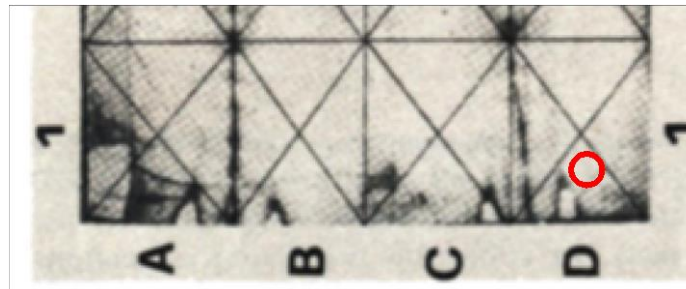
© 1988, Paul C. Maloney, ANER PhotoArchives.

Comment: The Schwartz photo, and the magnetic marker, both indicate that the label on this slide means that it lacks precision. Technically, the label should read “4 D a”.

○ 5-C-4, Sample # 22, 1 Dd being placed down.



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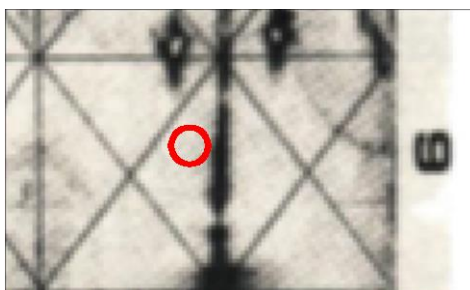
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○ 5-C-5, Sample # 23, 6 Ca being removed.

Comment: The magnetic marker for sample # 18 (5 Ca) is in view while Dr. Frei is taking sample # 23 (6 Ca).



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Shroud map by PierLuigi Baima Bollone and A. Ghio; adaptation by Paul C. Maloney, © 2018.

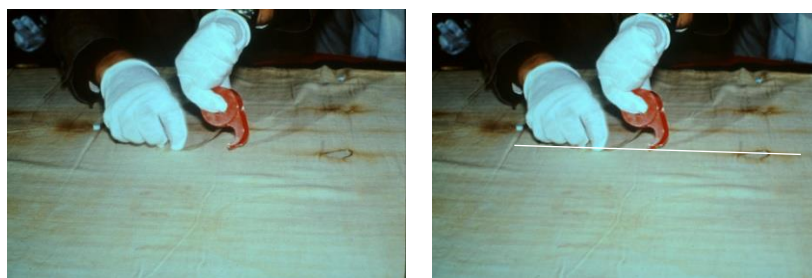


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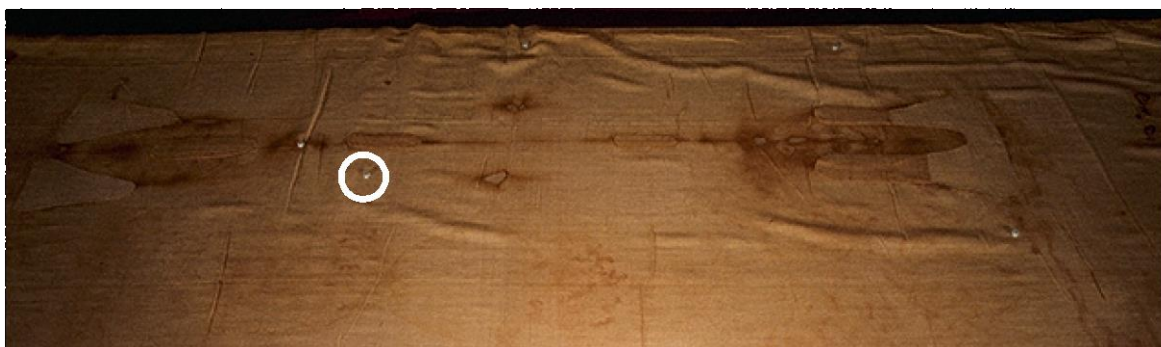


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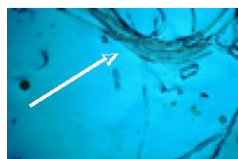
● **5-C-6, Sample # 24, 6 B/d** being placed down (Schwartz photo on left and my white-lined adapted photo on right).



Left and right © 1978, Barrie M. Schwartz Collection, STERA, Inc.; adaptation showing line of orientation with the heat plume © 2018, Paul C. Maloney.



Comment: The sample was removed from the very end of a heat plume. The evidence on this tape for the weakened crowns of the threads verifies it. For example, see my photomicrograph dated March 3, 1986-I: # 34 from tape 6 B/d as follows:



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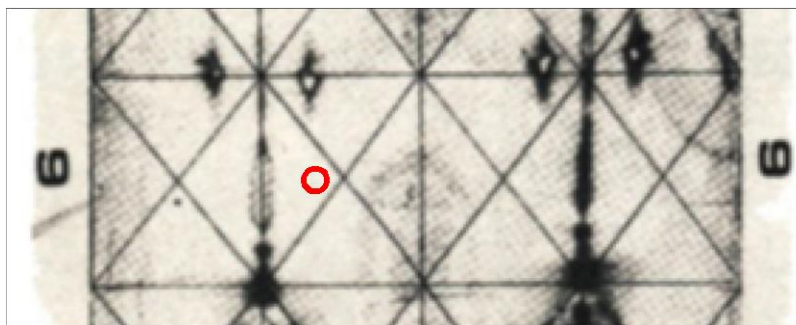
Although other tapes may exhibit single curved fibers, this is the only tape, of all the tape samples removed by Dr. Frei, that exhibits these bulk fibers in the crown of a thread. Hence, the fire of 1532 has weakened these particular threads

It is also the only tape (with but one exception) where “damaged” pollen can be found! For the full listing of these 20 pollen on 6 B/d, please see my paper (still in progress) entitled “Frei ‘cracked’ or ‘damaged’ pollen” Their presence suggests that the heat from the fire of 1532 has caused that “damage” and therefore hints that these damaged pollen were on the Shroud at least before Dec. 4, 1532, the date of the fire!

5-C-7, Sample # 24, 6 B/d being removed.



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Comment: This is the very last sample Dr. Frei removed from the image side of the Shroud. The entire process took slightly more than an hour as one can note by the time on Dr. Frei's watch!

5-D-7, magnetic markers for # 2, # 3, # 4/5, # 6, and # 7, and # 17.



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5-D-9, magnetic markers for # 7, # 8, # 9, # 13 & # 17.



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5-E-1, magnetic markers for # 14, # 18, # 19 and # 24.



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5-E-3, magnetic markers for # 11, # 12, # 16, # 20, # 21



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**5-E-4 showing magnetic markers for sample sequences# 16 (2 Bd) # 21
(3 Cb) # 22 (1 Dd)**

5-E-5, view of frontal end of Shroud:



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5-E-6, view two, magnetic markers on frontal end of Shroud showing seven sample sites for # 11, # 12, # 15, # 16, # 20, # 21, # 22.



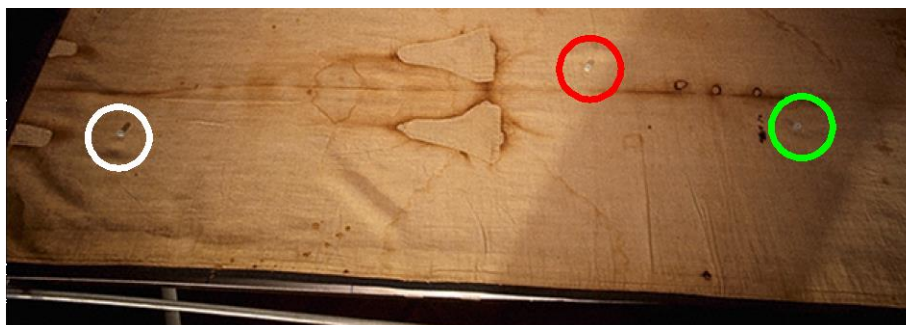
© 1978, Barrie M. Schwartz Collection, STERA, Inc.

5-E-6, upper portion:

© 1978 Barrie M. Schwartz Collection, STERA, Inc., circular adaptations © 2018, Paul C. Maloney

The following color coded circles (left to right, top to bottom):

1. Teal blue = sample sequence # 12 (2 Aa) on side strip.
2. Yellow = sample sequence # 11 (4/3 Aa on side strip.
3. White = sample sequence # 16 (2 Bd) frontal end, on abraded left anatomical leg shin.
4. Red = sample sequence # 15 (4 Bd) on rivulet down left anatomical arm.

5-E-6, lower portion:

Circular sample site from the Barrie M. Schwartz 1978 Collection, STERA, Inc., © 2018, Paul C. Maloney

The following color coded circles:

5. White = sample sequence # 22 (1 Dd) at lower corner end of frontal Shroud.
6. Red = sample sequence # 21 (3 Cb) just above 1532 burn patch on non-side strip side of the Shroud.
7. Green = sample sequence # 20 (4 Dd) just above fourth quadrant pre-1516 burns.

5-E-7, magnetic markers for # 15, # 18, # 19, # 20, # 23, # 24.



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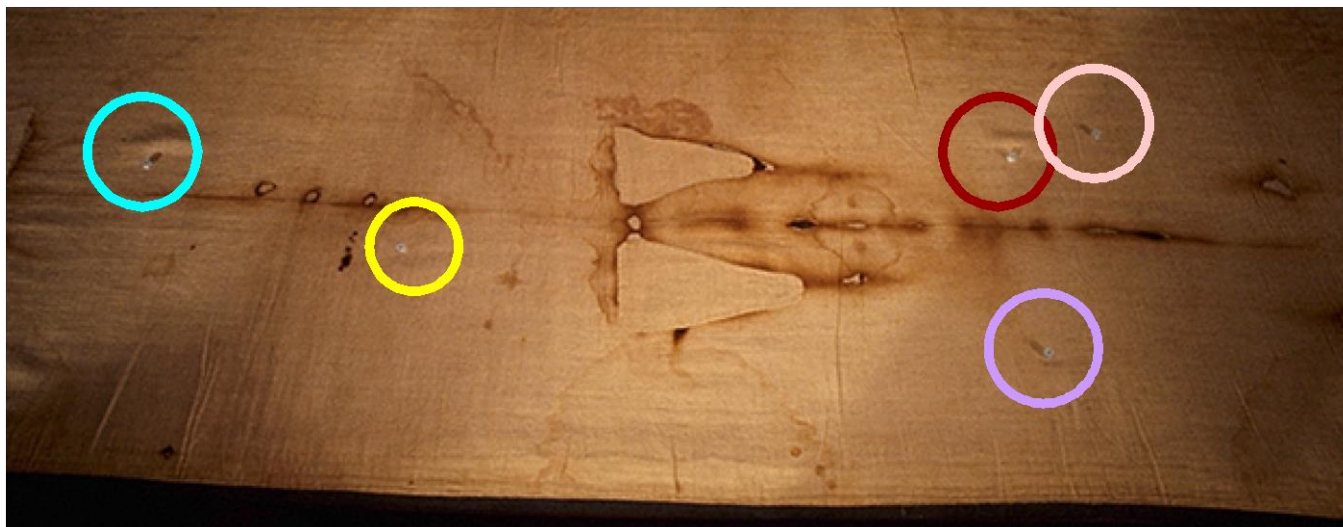
5-E-7: upper portion showing 4 Max Frei 1978 sample sites:



Circular sample site from the Barrie M. Schwartz 1978 Collection, STERA, Inc., © 2018, Paul C. Maloney

The following color coded circles, left to right, top to bottom:

- 1. Peach colored circle = sample sequence # 11 (4/3 Aa) on side strip.**
- 2. Red colored circle = sample sequence # 15 (4 Bd) across rivulet down left anatomical arm.**
- 3. White color coded circle = sample sequence # 14 (6 Bc) on burn area line of the 1532 fire.**
- 4. Green color coded circle = sample sequence # 24 (6 B/d) at end of heat plume from the 1532 fire.**

5-E-7 lower portion showing five 1978 Max Frei sample site:

Circular sample site from the Barrie M. Schwartz 1978 Collection, STERA, Inc., © 2018, Paul C. Maloney

The following color coded circles, left to right, top to bottom:

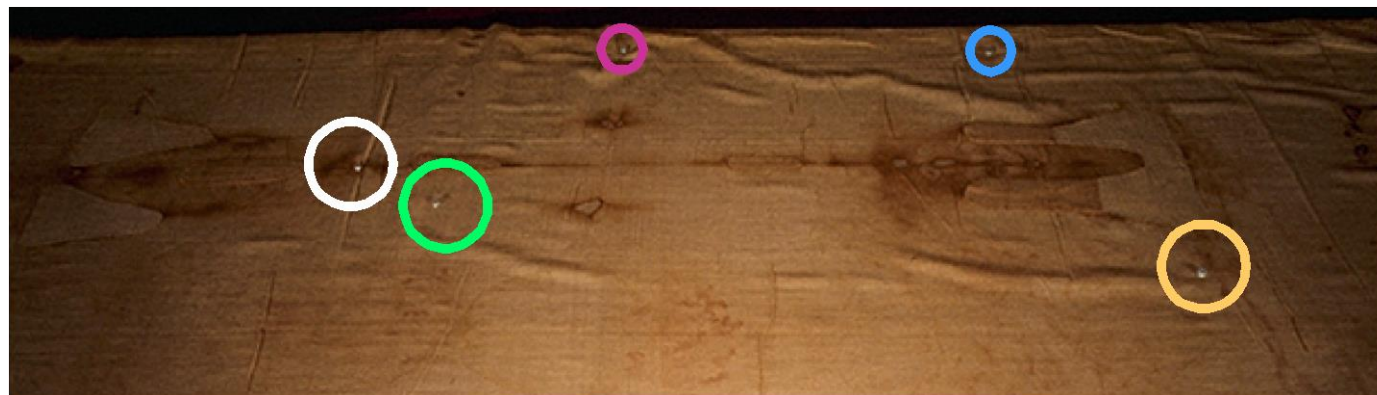
- 1. Teal colored circle, sample sequence # 21 (3 Cb) just above 1534 fire patch.**
- 2. Yellow colored circle, sample sequence # 20 (4 Dd) just above fourth quadrant burn marks from the pre-1516 burns.**
- 3. Dark red colored circle, sample sequence # 18 (5 Ca), adjacent to the nose on the non-sidestrip side of the Shroud.**
- 4. Pink colored circle, sample sequence # 23 (6 Ca), adjacent to the forehead on the non-sidestrip side of the Shroud.**
- 5. Lavender colored circle, sample sequence # 19 (6 Dc), adjacent to the upper nose on the non-sidestrip side of the Shroud.**

5-E-8, magnetic markers for # 10, # 9, # 14, # 24, # 18, # 19, # 23, # 24.



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5-E-8: upper portion showing 4 sample sites.

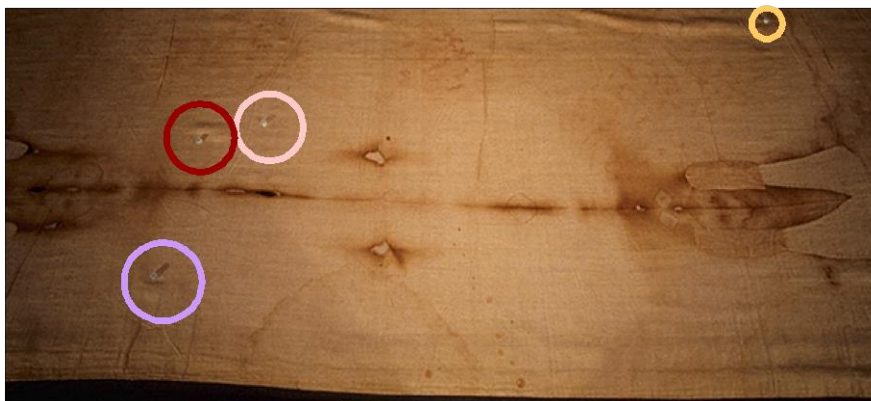


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The following color coded circles, left to right:

1. White colored circle, sample sequence # 14 (6 Bc) on 1532 burn line.
2. Green colored circle, sample sequence # 24 (6 B/d) at end of 1532 heat plume.
3. Magenta colored circle, sample sequence # 10 (7/6 A/a) on side strip adjacent the four center burns that divide the frontal and dorsal ends of the Shroud.
4. Blue colored circle, sample sequence # 9 (8 Aa) on side strip
5. Peach colored circle, sample sequence # 13, (9 Bd) on the blood rivulet across the small of back.

5-E-8 lower portion showing three sample sites.



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The following color coded circles, left to right, top to bottom:

1. Dark red color coded circle, sample sequence # 18 (5 Ca), adjacent to nose on non-sidestrip side of Shroud.
2. Pink colored coded circle, sample sequence # 23 (6 Ca), adjacent to the forehead on the non-sidestrip side of Shroud.
3. Peach colored coded circle, sample sequence # 13 (9 Bd) on blood rivulet across small of back.

4. Lavender colored coded circle, sample sequence # 19, adjacent to the nose on the non-sidestrip side of Shroud.

5-E-9, magnetic markers for # 7, # 8, # 13, # 17.



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The following color coded circles, left to right, top to bottom:

1. Blue color coded circle, sample sequence # 9 (8 Aa), on side strip adjacent to end of 1532 patch.
2. Peach color coded circle, sample sequence # 13 (9 Bd) on the blood rivulet across the small of the back.
3. Lavender color coded circle, sample sequence # 7 (11 Aa # 1) adjacent to the lower dorsal end of the pre-1516 fire.



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5-E-10, magnetic markers for Sample # 2, 12 C/d, right foot blood pool, Sample # 3, 12 Bd, center left foot blood rivulet, Sample # 4/5, dorsal side-strip corner, Sample # 6, 11 A/a, from

side-strip, Sample # 7, from side-strip. Sample # 13, 9 Bd, Sample # 17, 9/10 C/D d/b. STURP failed to place a magnetic marker down on Sample # 1 which is tape 11 C/D b.



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Left to right, top to bottom:

1. Peach coded circle, sample sequence # 13 (9 Bd) from blood rivulet across the back.
2. Lavender coded circle, sample sequence # 7 11 Aa # 1, from side strip.
- [3. Yellow coded circle, STURP has designated this as a sample site (it should be 11 Aa # 2] but the magnetic marker should actually be located somewhere on the calf of the left anatomical leg because of the blood evidence on the tape. See the map location and the commentary on this sample.]
4. White coded circle, sample sequence # 4-5, (12 Aa), on the corner of the Turin Shroud.
5. Green coded circle, sample sequence # 3 (12 B) , on the center rivulet of the left foot blood area.
6. Blue coded circle, sample sequence # 2, (12 Cd), on the blood rivulet/pool just off of the heel of the right foot.



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Left to right:

1. **Red coded circle, sample sequence # 17** (9/10 C/D d/b), center hole in the pre-1516 burn hole.
2. **Blue coded circle, sample sequence # 2** (12 Cd), on the blood rivulet and pool area just off of the right heel.

5-F-1, magnetic markers for Sample # 2, 12 C/d, right foot blood pool, Sample # 3, 12 Bd, center left foot blood rivulet, Sample # 4/5 dorsal side-strip corner, Sample # 6, 11 A/a, Sample # 7, 11 Aa, (sic) side-strip, Sample # 17, 9/10 C/D d/b.



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