

Proposals for further Study of the Shroud's Image and
Surface Debris in the Light of Insights from the Max
Frei Collection

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New Insights from the Frei Collection

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Abstract

The author will describe the sticky tape portion of the Max Frei Collection which ASSIST acquired in July of 1988. He will discuss the nature of his work in preparation for a general report still in progress for the ASSIST Board of Directors. New information gleaned from studies of these tapes in early 1990 will be presented and a new hypothesis will be offered to explain the "missing blood" which has troubled some forensic pathologists who have studied the Shroud. Based upon this study further proposals for future defining research will be offered.

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On July 15-18, 1988 the ASSIST Organization acquired the Max Frei Collection for Shroud Research (Maloney, 1989). Within that collection were 27 sticky tapes, 26 of which have been verified as having been taken from the Turin Shroud by Dr. Max Frei on the night of Oct. 8, 1978. (Flaherty, June 1989).

Let me say at the outset here that I present this material strictly in my role as General Projects Director for ASSIST with a responsibility to present a final report to the ASSIST Board of Directors on the nature of the Max Frei Collection and its potential for future Shroud research. I am neither a microscopist, nor a pathologist or chemist, thus, I will not presume to draw conclusions here that I am not competent to draw. However, during my work in the use of the microscope to develop the reports for ASSIST, certain interesting finds have been made and these have suggested hypotheses for future testing by those who are the real experts in the field.

Already early in 1986, ASSIST had had a preview of the 1978 Max Frei tapes when Mrs. Gertrud Frei-Sulzer kindly made available on loan to us five of the tapes in the collection. Microscopic study of these may be said to have begun, even if briefly, at the Elizabethtown College Conference on the Shroud of Turin held Feb. 15-16, 1986 when various members of STURP, Dr. McCrone, and others viewed some of the particles and fibers on them. However, it can be said that my own work on the tapes began in earnest early in March of that year. It was clear then that pollen and such adjunct material as other botanical debris were among the most common classes of particles on the tapes. (Maloney, 1986, 1988, 1989, 1990).

Dr. Frei's singular goal for taking his samples in 1978 was to obtain fresh material from a larger area of the Shroud to continue his pollen studies begun when he took 12 samples from the extreme frontal end of the cloth in 1973. All other material which came up on the tapes were, for him, mostly incidental to his prime purpose.

His method was simple: he used a hand held dimestore sticky tape dispenser, pulled out about 3 inches length and applied one end of it to the Shroud all the while pressing down on the cloth with his cotton gloved finger and then tore the tape from the dispenser and ran his finger laterally along the tape with somewhat less pressure. Hence, the greatest concentrations of particles and fibers is at what I have termed the "lead" end of the tape where his finger created the greatest weight on the cloth (Maloney, 1990).

Despite Frei's main concentration on the study of the pollen of the Shroud, the manner in which he took some of his samples during the 1978 session provides a window to his mind. It is quite clear from such tapes as those taken from across the upper right arm, from the blood flow across the small of the back, and from the shin that he was also somewhat curious about the nature of the blood markings and the image itself. Hence, the Frei tapes have important value, totally aside from the study of the pollen and botanical materials, for the study of the blood flows and the image.

The immediate concern for future testing of the Shroud in the aftermath of the carbon date has been for the conservation of the cloth and the image. We wish to share two insights for future study of Shroud materials which have been gleaned from the Max Frei samples which should be considered in future testing of the tapes and of the Shroud itself.

The first insight deals with the study of the Frei tapes themselves. Many may wonder why we might not successfully pursue the study of these tapes immediately and aggressively with chemical and other destructive analyses. The impetus to do so might be easier were it not for one basic problem inherent in all tape samples taken from the Shroud. Neither Dr. Frei nor STURP micromanipulated tiny individual reference fibers from any of the areas represented by their tapes..

The vacuum samples also do not provide a resolution of the image controversy because they may be described as "macro" samples and therefore even less

precise than the tape method of sampling. Some specific threads were actually removed by an Italian group headed by Dr. Pierluigi Baima Bollone but these were limited to blood studies (Bollone & Gaglio, 1984).

During the private examination session of the Frei tapes on July 23, 1988, Dr. Stuart Fleming, director of the Museum Applied Science Center for Archaeology of the University of Pennsylvania, pointed out that without individual control samples from the image on the cloth, one could never really be quite sure what was an image fiber and what was a loose stray from somewhere else.

Joseph Kohlbeck, a chemist with Hercules Aerospace in Salt Lake City, and one who himself has also spent countless hours examining and testing the materials from the tapes has confirmed that he, too, was not always clear about what was actually an image fiber and what was not.

Dr. McCrone's answer to this problem was to use a statistical approach. In his studies he discovered a high correlation between sub-micron particles of iron oxide and the image area tapes of the Shroud (McCrone, 1980, 1981). The problem with using the STURP tapes on which to base a conclusion that the iron oxide found there actually represents the image material is complicated by the Shroud's interesting history. Since the late 15th century some 52 different, life-size paintings of the Shroud known today as "True Copies" (Fossati, 1984), were laid down cloth for cloth and image for image onto the Shroud. This means that we should expect to find a high correlation of iron oxide materials, the presumed common pigment, with the image area of the Shroud. Dr. Fleming's observation, then, is quite apropos to the question: What was loose and what was adhering to the Shroud before the tape samples were taken?

Whereas the STURP tapes cannot easily address this question because they were taken with a very light amount of pressure and represent material only from the crowns of the threads, the Frei tapes are somewhat different in this regard. For the most part we may say that the spectrum of particles found on the body of the Frei tapes are quite similar to the STURP tapes. But there are rare occasions where there is clear and

indisputable evidence that specific material on these tapes clearly came from the Shroud. During the microscopy session of March 4, 1990 I discovered one such truly striking example. On the sticky tape labeled 9 B/d, which came from the blood flow across the back, pseudomorphs of several flax fibers were preserved in the form of tiny particulates which once heavily coated those fibers and the configuration preserved is of the exact shape of the fibers to which they were once attached. The only way we can explain this is to assume that this particulate material which is now on the tapes came away from the Shroud when fibers stayed attached to the cloth as the tape was pulled.

This sample, then, becomes an important but highly limited resource for the microscopical and chemical study of material from the blood flow across the back. Unfortunately, due to lack of controls, it cannot address the questions surrounding the image. Dr. Frank Glassy, a blood pathologist in Sacramento, California, who has studied the Shroud for years and who has examined some of the data related to sample removal noted to me in a recent letter:

Judging from the way the various cloth fibers and the vacuum minisamples were obtained it appears that some unintentional errors or some misinformation may result because of the lack of precision or purity and appropriate controls. Here and elsewhere good controls are essential.

Therefore, the first insight from these studies is to strongly reinforce the suggestions already made by others such as Dr. Glassy, Dr. Alan Adler and Dr. Stuart Fleming: in any future serious attempt to resolve the question about what we are conserving on the Shroud, microfibers must be teased away from as many randomly selected images areas as possible to determine the nature of the image. Such control samples should be removed by experienced textile specialists and the results would be completely invisible to the naked eye and present no evidence of damage to the cloth or its image.

The second insight relates to the image of the body and its interrelationship with the blood. A tape sample labeled 2 B/d has raised some intriguing

questions about the distribution of blood on the Shroud. Originally I had considered the possibility that the findings on this tape favored Dr. McCrone's hypothesis. In my micro-notes dated Feb. 17, 1990 I wrote:

I have found something very disturbing to the STURP image thesis: --At the end of the previous film--moments ago--I documented what appeared to be tiny particulates adhering to flax. Then I found another. They were close together. I wondered why these "coated" fibers were on this tape. I looked at my notes (the micro-summary sheet for 2 bd) and found that this was the single image area Frei sampled--all others being a mixture of blood and/or blood image, [or off-image].

The very valuable documentation photographs taken by Barrie Schwartz of STURP during the 1978 session shows Dr. Frei removing this particular sample from the left anatomical shin on the frontal end of the Shroud parallel to the warp of the cloth. Ostensibly, this is a "strictly" image area. Unfortunately, since we lack any documentation showing the sample close up in situ we cannot define the exact coordinates any further than we have. This problem illustrates the need for precise documentation of all sample removal in any future testing.

Examination by microscope at 50x had shown that there were significant amounts of flax fibers along the entire 8.7 cm length of this tape which are coated, some of them fairly heavily, with particulates.

For a long time Dr. McCrone has been saying he has found, at high microscopic powers, fibers with iron oxide particulates adhering to them. In any scientific project it is important to maintain objectivity and an open mind. My first recommendation for future testing in this regard would be to specifically re-examine the area from which 2 Bd was taken. What is the precise nature of the area from which this sample came?

Now, permit me to digress for a moment. When researchers use published photographs to study the Shroud they essentially rely upon light reflectance photos. These are the photographs of the Shroud where

the light is bounced off the front of the cloth. But there is another type of photograph which is not as well known. I refer now to light transmission photographs which are taken with the light in back shining through the cloth. These were taken quite literally during the waning moments of the 1978 work on the Shroud. Both the frontal and the dorsal light transmission views have been published in many different places. One may turn, for example, to Ian Wilson's The Mysterious Shroud (1986, plates 11, 12) to find excellent color photographs of these.

Since the particulates under discussion are visible at a relatively low power and appear fairly concentrated in a small area they should therefore create some opacity or impedance to the light. Thus, I reasoned that they ought to show up in the light transmission photographs. But when one examines the published photos of these light transmission views one cannot determine whether or not there is evidence of opacity in the cloth except where the blood flows are clearly evident. This is because the lithographic dots which compose the photographs in the publication process lower the resolution and make them useless for research at the level required.

Now I must resume my discussion of the finds on Frei slide 2 Bd. At my request, Barrie Schwartz kindly made 8 x 10 prints from his master slides. By March 8, 1990 I had received these prints from Mr. Schwartz and I had appended the following note to my sheet dated Feb. 17, 1990:

Note (3/8/90): Barrie's 8 x 10s of the light transmission photos arrived. The details are incredible--nearly everywhere in the image area one can see a "whisp-of-an-image" whereas the blood flows themselves jump out at you. But clearly something is impeding the light in the image area ever so slightly. But the incredible details seen in the reflectance photos are missing. At a micro-level 2 Bd is the only tape that indicates what may be causing this "whisp-of-an-image."

So that there is no misunderstanding of my current interpretation of this data let me offer the following clarification: when the reflectance photographs are

on the cross and that therefore the body was never washed. More recently Dr. Gilbert R. Lavoie and others have addressed this matter concluding that in accordance with Jewish custom the body was not washed. (Lavoie et al., 1982).

However, this has created a problem for some forensic pathologists. If the man of the Shroud were beaten as severely as the evidence on the cloth would suggest, and if considerable blood exuded from the many wounds we see, then the body should literally have been covered with blood. But this is not readily apparent in the reflectance photos.

Dr. Michael Baden, formerly chief medical examiner of Suffolk County, New York, observed that the obvious blood flows on the Shroud were too neat and he concluded that such "blood" flows were more likely the creation of an artist (Rhein, 1980; Nickell, 1983).

On the other hand, Dr. Frederick T. Zugibe, Chief Medical Examiner for Rockland County, New York, a proponent of the authenticity of the Shroud, believes that the body was in fact washed (1988:138ff). In that view none of the blood flows we currently see would represent the stance of the body while it was still on the cross.

The new information I have presented here suggests that perhaps the formulation of the above conclusions may have been predicated upon our heretofore insufficient knowledge about the distribution of blood on the Shroud. The "missing blood", if I may term it that, may not be missing after all! The blood may not have been wet enough to create a "blood stain" as we see closer to the actual flows, but only sticky enough to adhere to the Shroud in tiny amounts sufficient to cause the "whisp-of-an-image" seen in the light transmission photographs.

This second insight suggests that it is a matter which definitely needs to be cleared up in any future examination of the cloth. The major concern I would voice here can be expressed with a series of questions: In our quest for the conservation of the Shroud, what, exactly, are we seeking to conserve? Are these particulates which Dr. Max Frei retrieved from the Shroud with his sticky tape from the shin, adhering

very lightly to the fibers? If so are they still there? We must remember that Dr. Frei took his tape samples before the Shroud was vacuumed. I would therefore recommend that any future testing session involve both forensic pathologists and pigment specialists who would study the Shroud to determine if other randomly selected areas retain these same particulates glued to the flax fibers. (This idea has already been suggested privately in a slightly different form by Dr. Walter C. McCrone). If individual flax fibers can be micromanipulated from a large random sampling of the image area on the Shroud and microscopically and chemically determined as to whether they are iron oxide or blood exudate, it would not only bid fair to resolve the McCrone/STURP controversy, but it would also provide us with some of the information about what we are seeking to conserve.

I conclude here with a summary of the points I believe are pertinent for future testing:

1. Dr. McCrone's suggestion for a dual team of forensic pathologists and art conservators to study the image problem is excellent and should be given serious consideration.
2. Reference control samples must be micro-manipulated from the Shroud to enable scientists to determine exactly what it is they are testing. Such controls will make future use of the STURP and Frei samples scientifically more rigorous and defined. The "whisp-of-an-image" hypothesis can be examined within the context of this proposal.
3. Development of a computer enhanced version of the light transmission photographs should provide scientists with a useful tool for the study of areas of concentration of particulates on the Shroud including the more tenuous aspects I have termed here the "whisp-of-an-image".
4. Future photo-documentation should include long range photos such as those taken by Barrie Schwartz in 1978 and close up photos of the exact context from which samples have been removed. There needs to be a visual manner in which coordinates can be recorded on film to provide an accurate setting for the sample site.

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