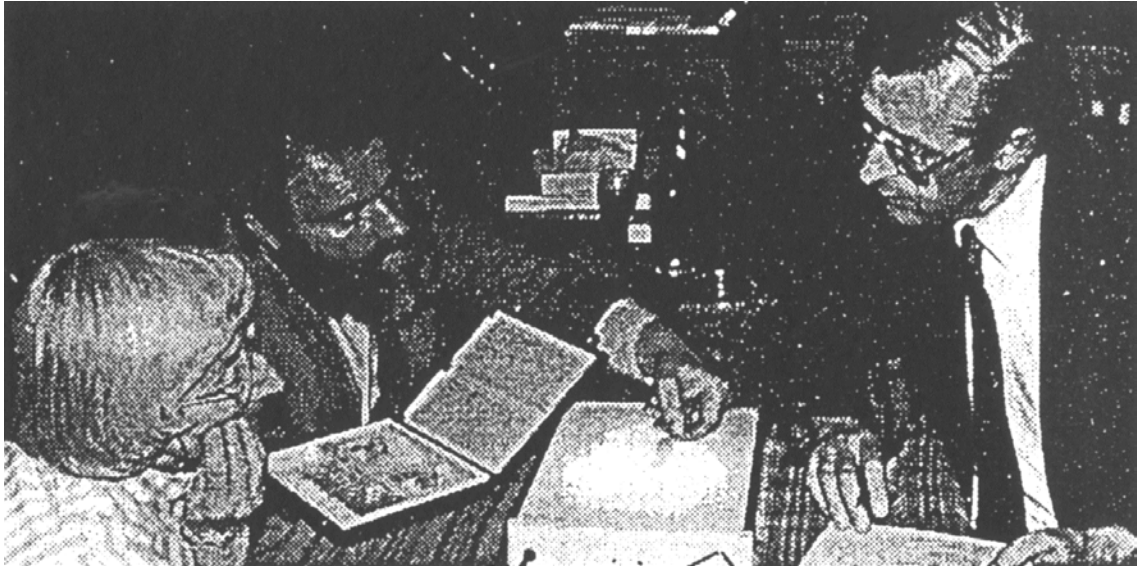


## OBSERVATIONS ON THE FREI POLLEN SAMPLES

**Paul C Maloney, General Project Director, ASSIST, USA**



**Mrs. Gertrud Frei-Sulzer and her son Ulrich examining the Max Frei Collection of Tapes from the Shroud, along with Mr. Paul C. Maloney (r.) of ASSIST. Photo courtesy of Dr. Alan D. Whanger.**

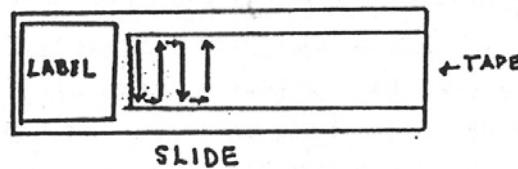
In the latest issue of *Shroud News* (No. 97, Sept. 1996, pp. 11-18) I read with lively interest Dr. Alan Whanger's well written rebuttal to Dr. Joe Nickell's article "The pollens on the Shroud: A study in deception." I deplore Nickell's use of innuendo, hearsay, and irrelevant matters to besmirch the reputation of Dr. Max Frei, a man of integrity, to suggest that some kind of dishonesty and fraudulence might be involved. If one is to critique pollen research, it should be done on objective and scientific grounds. Thus, Dr. Whanger has done the late Dr. Frei and the Shroud community a wonderful service with his studied remarks.

However, I should like to add a number of my own observations specifically designed to supplement the discussion at a number of points and clarify the picture regarding contamination on the tapes. On p. 12 of his article Dr. Whanger briefly describes two separate techniques by Dr. Frei and by STURP. Readers interested in further information on this topic may consult my Paris Symposium [1989] paper published in the *ASSIST Newsletter* (Vol. 2(1), June 1990, pp. 1-7) entitled "The Current Status of Pollen Research and Prospects for the Future."

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Dr. Whanger also refers (p. 16) to the meeting (hosted by the late Dr. Benjamin Stone, then chairman of the Dept. of Botany, on July 23, 1988, at the Philadelphia Academy of Natural Science) at which Dr. McCrone verified that the 1978 Frei tapes actually came from the Turin Shroud. Whanger notes that McCrone viewed the slides in "an irregular fashion" to quickly examine their contents. I might add that low power (10x) on the microscope was used and then the power was raised periodically to examine an item here and there. During my extensive study of Dr. Frei's 1978 tapes I found items circled with a pen. When I raised the objective lens from 10x to 100x I discovered that these items were often "pollen-shaped" air defects caught in the manufacturing process of the tape. At other points they were items of disinterest to Dr. Frei. During a convention in Chicago Dr. Frei told Dr. McCrone that he was finding about 1 or 2 pollen per square centimeter (McCrone, personal communication). As I watched Dr. McCrone examine the tapes at our meeting I realized that this same low power (10x) "zig-zag" technique must have been the same method used by Frei to examine the tapes after he had removed them from the Shroud.

My own approach to examining the tapes was to employ a side to side "scanning" pattern beginning with one corner of the lead end of the tape moving over one millimeter as the edge of the tape was reached and returning slowly to the opposite side of the tape.



In this manner, over a period of more than 500 hours of time, I was able to examine the area of the tapes in a much more detailed fashion than did Dr. Frei or Dr. McCrone. Although the technique is much more time consuming it has enabled me to photograph at 10x, 50x, 100x and 400x thousands of features--from Shroud fibers, both plain and coated, extraneous cotton fibers (some of them coated with paint), insects and insect parts, plant hairs, cells, spore and pollen grains, as well as globules of paint and other materials. My Kodak transparency collection numbers more than 7000 items.

Now I wish to discuss the topic of contamination. I believe that a small amount of pollen contamination is possible and that there are two sources of this, both attributable to human error.

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ASSIST received these tapes in two batches. The first was the series of five tapes placed on loan to us in January of 1986; the second batch was acquired during ASSIST's visit with Frau Gertrud Frei Sulzer in Thawil, Switzerland in the Summer of 1988. The five tapes were as follows: an unlabeled tape, 6 Bd, 4 Bd, 10/9 Aa, & 12 Aa. Of these five the macro-photographs taken soon after receipt show that 6 Bd had one corner crinkled and that the lead. of 10/9 Aa was in a somewhat lifted position. In fact, many of the tapes displayed evidence of having been placed on the original microscope slides in some haste.

A study of the invaluable Kodak transparencies kindly made available to me by Barrie Schwartz, and subsequent discussion of their contents with him, showed that Dr. Frei was the first to begin taking samples on the night of October 8, 1978. Mr. Schwartz' photographs are so sharp that one can actually see the time on the face of Dr. Frei's watch. It would appear that Frei succeeded in taking the entire 27 tapes in the space of approximately one hour's time and that his assistant, Prof. A. Ghio, who did the labeling, may have been pressed to keep up. Aside from the sometimes crinkled and wrinkled edges of the deposited tape samples this haste is also evident in the duplicated labeling on a number of the early samples. (Frei began his sample removal at the dorsal end of the Shroud. There are 2 samples of 12 Aa and 2 samples of 11 Aa--labels that would argue they are allegedly all from the "side-strip"--but my microscopy disclosing possible "coated fibers" suggests that at least two of these may have come from the dorsal feet. But this is a matter for further research). Therefore, one possible source of later contamination might have been the sometimes slightly lifted serrated edges and corners of the leads of some of the tapes. In other words, human error due to the haste of the moment. But one would have to posit that air, carrying pollen, would have forced the large numbers of such grains just under the edge of the leads. To my mind that is hardly possible.

And such an interpretation is not even possible for tape 4 Bd--taken from the blood flow down the anatomically left arm--where the adhesion is good over the critical area of tape where I made individual photomicrographs (at 200x) of each of 163 grains. On the evening of Nov. 21, 1987 at the Ryetown Hilton Hotel, Ryetown,

New York, in the presence of Prof. Luigi Gonella and myself, Prof. Riggi personally examined the 163 Kodak transparencies and declared that all of them were pollen. Although the serrated end of the tape is loose where it overlaps the label absolutely none of the count came from that edge due to the opacity of the label preventing microscopy in that area.

A second source of contamination may be traced to another human error: mine. Using a medical examiner's microscope I began the examination of the 5 tapes

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on loan to ASSIST. During that early period, beginning in March, 1986, I began the systematic count of all the candidates on each of the tapes that might be large enough to be pollen. I have, with one exception, followed a rigid policy not to tamper with the tapes. However, any microscopist will tell you that you cannot adequately examine tapes that have wrinkles in them.

Therefore, it was during the process of this examination of these tapes that this second source of possible contamination developed. This one is limited solely to 6 Bd. Because the corner of 6 Bd was wrinkled, I lifted it with a



tweezer and taped it down for microscopy. My action, however, was limited only to that slide and only to that corner. Because I was desirous of obtaining the highest possible resolution with the tape I used the oil immersion technique. All went well until I got close to the edge of the taped down corner. I cannot say for sure but it is possible that some of the immersion oil seeped under the edge there. In Paris in 1989 I announced that I had counted "more than 275 pollen,..." on this particular tape. (ASSIST Newsletter, 2(1)p. 5). However, that is not quite the whole story. My count actually went to over 300 just on the lead end of that tape alone. But because of the loose corner and the possibility of oil immersion contamination, perhaps carrying American pollen grains into that area, I decided it was preferable to give a more conservative count--hence the 275 figure. It is unfortunate that I did not think to take a control sample of the oil on a separate clean slide. That would have provided me with information on whether or not the oil itself might have been contaminated and I could have ruled that out as a source. Needless to say, human error prevents me from doing so. Yet, since the oil was capped except for those moments when a sample was removed for the immersion technique, contamination via this oil would never explain the high numbers of pollen found in that loose corner. Moreover, since the count of pollen in that loose corner reflects a similar distribution in the areas where the tape was definitely not lifted my guess is that if there is contamination at that corner, it is minimal.

A review of my microscopy notes where I made it a point to annotate the adhesive condition of the tapes indicates that 'crinkled or slightly lifted areas on the following tapes may suggest candidates for slight contamination, but only in those areas. All come from the image side of the Shroud: 1 Dd (1 millimeter of the lead

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edge), 2 Bd (one corner crinkled and lifted completely from slide), 3 Cb (1 slightly lifted corner on lead), 4 Dd (serrated edge slightly lifted, otherwise good adhesion except for hermetically sealed air pockets), 6 Bd (taped down corner where contamination might have occurred--already discussed above), 6 Dc (lifted only at one serration corner and along a portion of serration), 6 Ca (slightly lifted at serrations), 6 Bc (some portions of serrations slightly lifted), 7/6 A/a (lifted very slightly at serrations and one corner adhering against itself), 8 A/a (lifted edges and poor adhesion at serrations near lead), 9 Bd (slightly lifted edge near serrations, one corner slightly lifted on front), 12 A/a (heavily crinkled on lead end with one lifted corner but good adhesion elsewhere), 12 Bd (very slightly lifted edge at serration, back of tape adhering against itself), 12 Cd (edge lifted on front, but front is probably not the lead of tape; back, where lead is probably located, is not lifted but a crease mark at one corner shows that at one time it may have been folded back but before it was acquired by ASSIST).

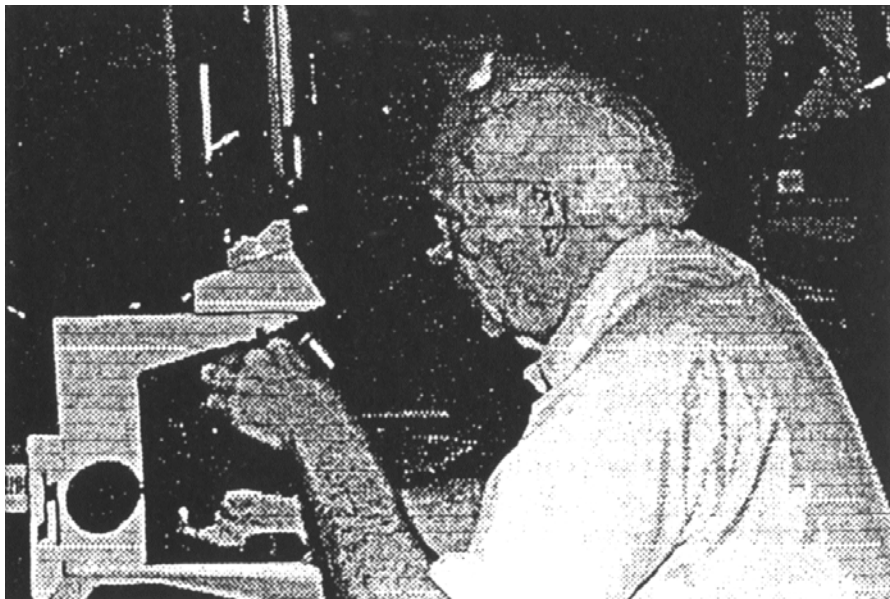
So, a bit more than one half of the 27 tapes from the 1978 exam might have tiny areas that could be candidates for contamination. But let me stress that these would only be limited to approximately 1-2 millimeter, at the serrated edge and the few that had loose corners. But the count of pollen candidates on the lead of each tape takes in the first centimeter to centimeter and one half from the serrated edge. In most of this area the adhesion was very good and I can see no evidence of the possibility for contamination there. Joe Nickell's case is without a sound foundation.

Of course, Nickell was right--new gloves shouldn't contain pollen--gloves, I might add which he borrowed from STURP, given to him by Dr. Robert Dinegar at Frei's own request. But whence the pollen? The palynologist to which Dr. Whanger refers on p. 17 of his article was none other than Dr. A. Orville Dahl of the Dept. of Botany of the University of Pennsylvania and senior palynologist with the Dept. of Botany of the University of Stockholm, Sweden, with whom I consulted in the Spring and Summer of 1986 regarding Dr. Frei's tapes. Dr. Dahl was emphatic in his interpretation of the pollen he saw on the Frei tapes: while many may be attributed to air deposition as Frei himself did, Dahl himself believed that the lion's share of pollen were due to flowers having been laid down physically on the surface of the cloth. From much handling, rolling, and folding over the years, these grains have become lodged deeply in the interstices of the weave of the cloth. Contributing to this action forcing pollen deep into the weave we may also point to the Poor Clares whom Fr. Peter Rinaldi witnessed using a brush on the Shroud to smooth it out during the 1931 exhibition. In the case of 6 Bd, a tape coming from a slightly scorched area near the face, those fibers had been weakened and the tape brought up copious amounts of deep pollen distributed rather evenly in with copious amounts of broken flax fibers--

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all preserved on this tape with no evidence whatsoever of tampering. We must also keep in mind, if Wilson's hypothesis that the Shroud is the Mandylion is correct, that this tape preserves samples from an area that was allegedly exposed to the air for many more years than was the remainder of the cloth. We should therefore not be surprised at the very high number of pollen found on this particular tape.

In sum, there is no evidence of fraudulence. While there are differences in the numbers of pollen on the individual tapes, overall each compares quite well with all other tapes. If contamination occurs it is limited to those tapes where the serrations are loose--1 to 2 millimeters of tape, and to loose corners--in all, only a very small percentage of the total surface area in which the pollen are largely found.



**Dr. Walter C. McCrone examines a slide from the Max Frei Collection.  
Photo courtesy of Dr. Alan D. Whanger.**