

THE ASSIST NEWSLETTER

The Association of Scientists and Scholars International for the Shroud of Turin, Ltd. June 1990 Vol. 2, No. 1

The Current Status of Pollen Research and Prospects for the Future Paul C. Maloney

I think a foreword is appropriate here: This paper presents material relating to botany and palynology. But I am a specialist in neither field — I am a research archaeologist.

I present the following paper in my role as General Projects Director of the Association of Scientists and Scholars International for the Shroud of Turin with a responsibility to present a detailed report on the nature of the Max Frei Collection to the ASSIST Board of Directors. The work on the material for that report is still in progress.

Early in 1986, responding to a request for information on the nature of the tapes in Dr. Frei's collection, Mrs. Frei kindly made five sticky tapes available to ASSIST. The study of those tapes produced an unpublished report, FIVE STICKY TAPES IN THE MAX FREI COLLECTION. A copy of this report was sent to Mrs. Frei. In July of 1987 she decided to make the entire collection available to the ASSIST Organization. The transfer took place on July 15, 1988 at the Hotel Thalwiler Hof in Thalwil, Switzerland. ¹

We recognized the need for scientific verification of the 27 tapes. Therefore, on July 23, 1988, two scientists who had done extensive work with the STURP tapes and were thus well qualified to inspect them were invited to make the verification. They were Dr. Alan D. Adler of Western Connecticut State University, Danbury, Connecticut and Dr. Walter C. McCrone of McCrone Research Institute, Chicago and London. The exam was held before some 23 witnesses who were able to observe the micro-proceedings on two video monitors. This examination was conducted without removal of the sticky tapes from the slides on which they had been placed on the night of October 8, 1978 when they were taken from the Shroud. The entire proceedings were videotaped by Dr. and Mrs. Alan D. Whanger of Duke University. Both Drs. Adler and McCrone attested not only to the fact that the tapes had touched the Shroud but contained a wealth of material valuable for further scientific testing. ²

These tapes were but a part of the larger collection which Dr. Frei had assembled over the years during his study of the material he took in 1973 and 1978 from the Shroud. ASSIST acquired a large collection of literature, SEM slides, SEM photographs, SEM transparencies of pollen, the botanical collection, a bloom-mount and small sample collection, the microscope slides containing the original pollen which Dr. Frei had removed from the Shroud, control slides made up of pollen from samples collected on seven

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Symposium Scientifique International De Paris Sur Le Linceul De Turin, Part II Daniel C. Scavone, Ph.D. Professor of History, University of Southern Indiana

Marie-Claire van Oosterwyck-Gastuche; "Is C-14 a Method of Absolute Dating?"

In an overly long presentation not sufficiently appreciated by the audience, the speaker, though admittedly not a C-14 specialist, critiqued that process. The results have been taken as conclusive. This ought not to be the case, since hundreds of other tests have been done which support the Shroud's genuineness. She cited numerous cases in Egyptology in which C-14 was wrong, too early or too late. She asked why all archaeologists are so suspicious of C-14. She said Evin's own work includes many discrepancies.

Robert DINEGAR and Larry SCHWALBE: "Isotopic Measurements and Studies on the Origin of the Shroud."

Dinegar reviewed the immense work done by STURP, including its giving the initial impetus leading up to the C-14 testing. In a proposal for follow-on research submitted in 1984, STURP recommended 26 experiments, including C-14 dating and the measurement of the stable hydrogen and oxygen isotopic concentrations in the Shroud's cellulose. The latter would help to locate the geographical origin of the Shroud. The first part (i.e. C-14) was addressed by Dinegar, who noted that quite large amounts (15 percent) of modern contamination would be necessary to alter a first century date to the C-14 date obtained. Thus he believes the Shroud is medieval.

Dr. Larry SCHWALBE: "Scientific Issues and Shroud Research in the 1990s."

Schwalbe presented his (and indirectly STURP's) recommendations for future Shroud research, especially relating to the isotopic measurements. Heavy oxygen and heavy hydrogen exist in specific ratios to ordinary oxygen and hydrogen, more so in warm, arid climates. A mere 100 mg of material would be required. These data could be coordinated with other data to determine where and when the Shroud originated, what pollens might be expected, etc. Beyond this, he listed in detail a set of test proposals for the immediate future.

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"Promoting the Scientific Study of the Turin Shroud"

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"The ASSIST Newsletter," a publication of the Association of Scientists and Scholars International for the Shroud of Turin, Ltd., seeks to disseminate news, scholarly articles, and reviews representing varied viewpoints regarding recent scientific study of the Shroud of Turin.

ASSIST, as an organization, currently takes the position that no conclusions can be drawn regarding the authenticity or non-authenticity of the Shroud and its related issues without further scientifically controlled data obtained directly from the Shroud.

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No individual view published in "The ASSIST Newsletter" should be taken as representing the officially sanctioned view of the ASSIST Organization.

ASSIST actively encourages the airing of multiple, divergent views about the Shroud.

ASSIST actively seeks peer review of all published and pre-publication materials.

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Address Letter to the Editor to:
Mr. Thomas J. Flaherty
"The ASSIST Newsletter"
Box 91 James Way
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different trips to Cyprus, Israel, and Turkey, and areas in France, a box of slides on which Dr. Frei was conducting research at the time of his death, three flat slide trays which contained various experiments with iron oxide and explorations and resources of other pertinent topics including pollen from the cloth of Oviedo, six sticky tape samples from the crown of thorns, and six sticky tape samples from the Tunic of Arguenteuil. Additionally we obtained the manuscript which Dr. Frei was on the verge of publishing along with the large photo file for the manuscript and the 4" X 6" card file of geographic notes pertaining to that publication.

His Shroud pollen and the controls which matched them were kept in a grey box marked "S. Sindone". There were two series of slides. One series was coded "MS" and the other "MV". Although Frei wrote many of his notes in German he did not use the German word "Grabtuch" to represent the Shroud. He preferred the Italian word "Sindone". Hence the "MS" code probably represented "Mikroskopie Sindone". The "V" in "MV" probably represented "Mikroskopie Vergleich" for "comparison microscopy". The latter were his pollen controls.

Although his final manuscript would have formally published 57 different pollen from the Shroud, much of which had been published elsewhere in articles, Dr. Frei had continued his work on pollen grains which were in various

stages of research. In a separate box he kept the slides which were not ready for publication. There are some 19 different items here which, when added to the 57 he intended to publish, would have brought the total to 76. One of these is *Hypococum acgyptiacum* A & S which Frei had noted grows in Western Asia, North Africa, and the Mediterranean.

The photodocumentation of this collection is currently in progress. Approximately 50% of the work is complete. When finished it will become a tool for continuing with the research which Dr. Frei had begun. But what is emerging is a picture — a window to the mind of a man in pursuit of knowledge. From the collection, the notes, the microscope slides, and the few unpublished papers which were extant, we learn about his philosophy of the project, and clues to his methodology.

There are two facets of Dr. Frei's philosophy of the pollen project that we would like to mention. First, he has already published his view that the mechanism of deposition of the pollen on the Shroud was the wind. But in his unpublished manuscript and various notes he defends himself against his critics who have suggested that the wind can transport pollen for long distances and would therefore explain the presence of such pollen on the Shroud: "...a detailed examination of these events and a statistical approach to the problem shows the dominating plants in a pollen spectrum

grow in zones surrounding the place of deposition up to a range of a few miles."³ (his emphasis)

I submitted Dr. Frei's work to Dr. Aharon Horowitz, Israel's leading palynologist, and he agreed with Dr. Frei, stating that he had studied the pollen spectrum of wind from North Africa as well as of Israel. He noted that the spectrum on the Shroud as represented in Dr. Frei's work matches that of Israel not North Africa.⁴

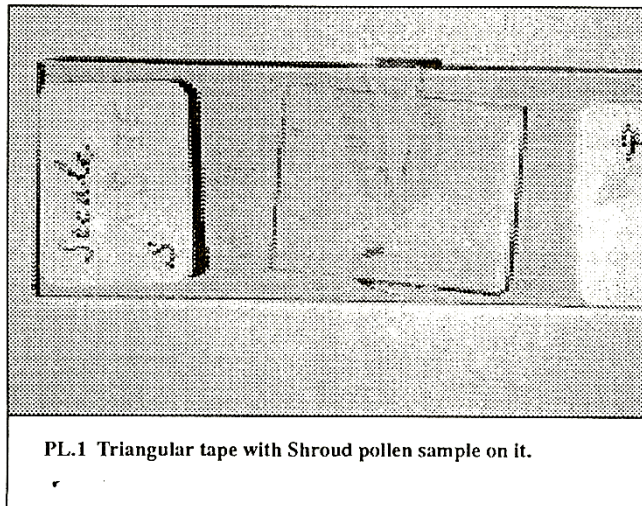
Also, Dr. Avinoam Danin, leading specialist in the desert flora of Israel at the Dept. of Botany of the Hebrew University, agrees and adds that it is possible to demonstrate from the pollen on the Shroud an itinerary through the Negev of Israel up through the highlands of Lebanon.⁵

A second facet to Dr. Frei's philosophy is the importance he placed on discovering pollen types which could provide convincing clues to where the Shroud had been. He was well aware that certain plants which grew all along the Mediterranean would not prove the Shroud's presence in a specific country. Last year, Dr. Uri Baruch, a botanist at the Hebrew University, expressed surprise on the British Q.E.D. program that no olive pollen had been found. But since olive is insect pollinated perhaps we should not really expect to find it on the Shroud. Nevertheless, despite the fact that olive grows in many of the countries where the Shroud is known to have been, Dr. Frei himself also considered the possibility that olive might be found on the Shroud. He collected a sample of olive in Israel and had specifically listed it on a penciled note, presumably for further investigation. But Dr. Frei was unable to complete his work. No bloom mount or microscope slide of olive was found in his collection. Of the more than 300 plants Dr. Frei had collected, he had only made mounts of approximately 1/3rd of those before he died. But he would have emphasized that olive would have to be classified with his group C, "Mediterranean Plants" which grow not only in Israel, but also in Italy and elsewhere.

We turn now to Dr. Frei's methodology. Frei wanted to investigate the known as well as the unknown. His

discussions with Don Coero Borga had given him clues as to where he should travel to collect samples to elucidate the known history of the Shroud. From a slide marked "Kirch St. Hippolyte" and from an envelope containing a small botanical sample which was marked "umbilifore", "St. Hippolyte-sur-Doubs" we know he made some botanical explorations along the River Doubs. I noticed a rather high number of a type of umbilifore pollen on several of the sticky tapes. Dr. Frei must also have noticed these. The only umbilifore which Dr. Frei listed as being on the Shroud is *Ridolfia segetum*. But there have been many others. Did these umbilifores come from Hippolyte-sur-Doubs? Dorothy Crispino notes: "...Marguerite de Charny was living at Hippolyte-sur-Doubs...and was exposing the Shroud quite openly, on a meadow on the banks of the Doubs..."⁶

From the slides and from an interesting unpublished manuscript, written by Dr. Frei in Italian, we learn about the way he handled the pollen themselves.⁷ He states that he made his survey of the tapes and circled the pollen he found. Then when he was ready to make a mount of each pollen he cut a "T" shaped incision into the tape, dissolved the adhesive with toluol, and very carefully lifted the grain of pollen out with a small wire loop. But this must have seemed to have been a very unsatisfactory method



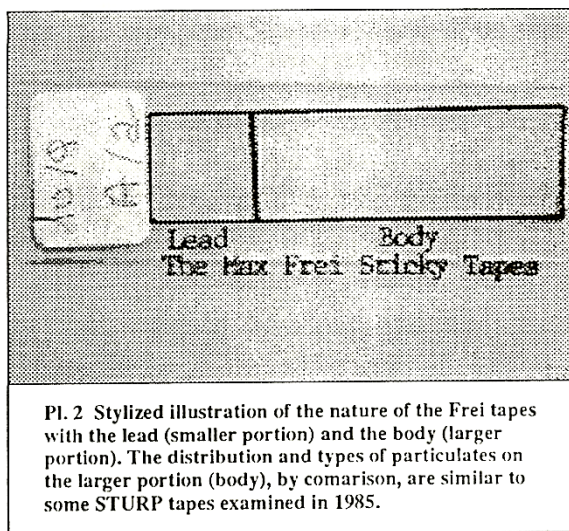
of manipulating the grains and ensuring that they were not lost during transport from the tape to the slide. Hence, Dr. Frei invented a very special technique using triangles of sticky tape (Pl. 1). He would dip the point of the triangle into the incision and retrieve the pollen grain on the tip or edge of the triangle and then lay this down on a microscopic slide. He would then put a drop of mounting medium on the slide and place control pollen with this and finish off the mount with a cover slip. This way he could compare the pollen on the triangular tape with the controls.

Before we proceed further it may be useful to state the nature of the Frei sticky tapes which he took from the Shroud in 1978.⁸ The greatest concentration of particulates is located on the lead of the tape. When Frei removed the sticky tape from the Shroud after each application he would place pressure on the end of the tape while removing the body of it from the cloth. In this way a large amount of

material stuck to the lead of the tapes. I therefore speak of the lead as being that place on the tape which carried the most pressure and thus the concentration point of the material that was down in the valleys between the crowns of the threads. An examination of the tape labeled "6 Bd" will suffice to illustrate my point. The phenomenon is best seen with back lighting where the concentration of cotton from Dr. Frei's gloves and the flax from the Shroud show up in stark contrast. I have stylized the pattern to distinguish the difference between the lead, where nearly all the pollen are to be found, and the body which is not as heavily laden with particulates (Pl. 2).

It will also be useful here to make a brief comparison of the three methods of sample removal: Dr. Frei's, STURP's, and the vacuum method used by Dr. Riggi (Pl. 3). We have already noted above that Dr. Frei pressed on the tape with finger or thumb before removing the sample. The plasticity of the tape allowed it to pick up the pollen from the valleys between the crowns of the threads. Early on it was a puzzle that STURP was only able to obtain one single pollen grain in 34 tape samples and Frei was finding a lot of pollen. The STURP method limited the pounds per square inch to about 60 and thus only removed material from the crowns of the threads. There clearly was stratification of debris on the Shroud. STURP's single pollen has been identified as ragweed which grows in profusion around Turin.⁹ A comparison of the contents of the STURP tape with the body of Frei's tapes show they are quite similar.¹⁰

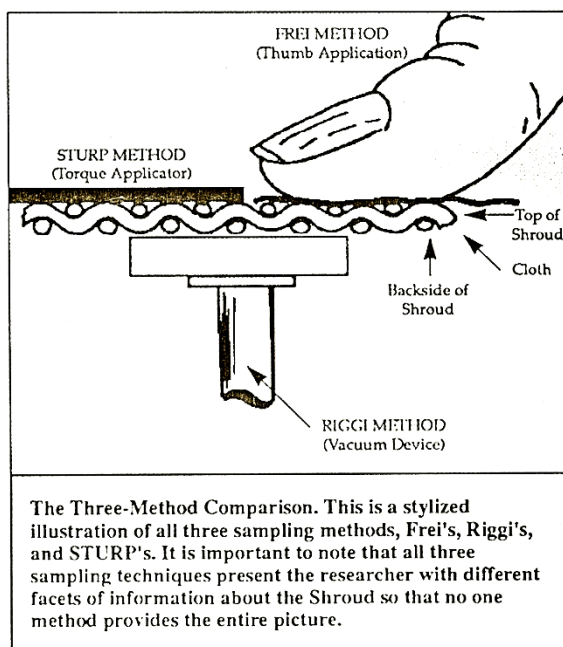
But more puzzling still are the findings of Dr. Riggi who vacuumed his samples from the backside of the Shroud — i.e. the side which does not bear the image. He has noted that he found pollen grains with a mineral coating. During my discussion with Dr. Riggi he looked at the photo-inventory of the pollen on tape "4 Bd" and noted that possibly only one of the more than 160 grains on that tape



Pl. 2 Stylized illustration of the nature of the Frei tapes with the lead (smaller portion) and the body (larger portion). The distribution and types of particulates on the larger portion (body), by comparison, are similar to some STURP tapes examined in 1985.

was actually mineral coated. He informed me that fully 50% of all his pollen samples were mineral coated! Hence we must resolve the question: "Why are nearly all of the mineral coated grains on the backside of the Shroud with few if any on the front?"

So far as Dr. Frei's surveys of the tapes are concerned, the evidence indicates that he made a kind of random analysis of the contents of each tape, circling items of interest which came to light at low power (probably 10X). Those

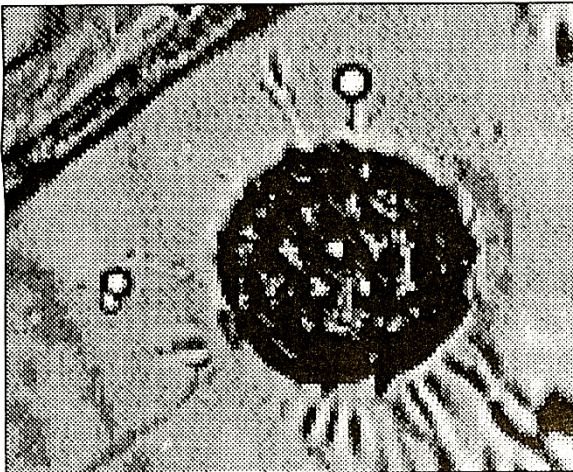


The Three-Method Comparison. This is a stylized illustration of all three sampling methods, Frei's, Riggi's, and STURP's. It is important to note that all three sampling techniques present the researcher with different facets of information about the Shroud so that no one method provides the entire picture.

experienced in microscopy know that the higher power the more time consuming it is to do survey work. Dr. Frei once told Dr. Walter McCrone that he (Frei) was finding approximately 1 to 2 pollen per square centimeter on the tapes.¹¹ Projecting this figure onto the Shroud it would imply that there are between 47,000 and 94,000 pollen grains on the cloth.

I have used a different approach. Beginning at the upper right hand corner of the tape I surveyed down, moved over one tenth of a millimeter and continued upward. Following that pattern I have nearly completed my survey of pollen on at least 3 of the 27 sticky tapes. But quick preliminary analysis of the remainder of the tapes have proven that on every single tape taken directly from the Shroud, there are apparently many times the figure given by Frei. For example, on the tape which Frei took from the blood flow from the heel I have made a quick count of at least seven pollen. And seven were found in a quick count of the tape from the blood flow across the back. But such quick counts do not really tell the story. My nearly complete photo-

inventory of a tape from the dorsal "side-strip" shows a count of more than 80, and the one from the blood flow down the anatomical left arm holds more than 160, while the one from beside the face of the man of the Shroud exhibits more than 275 pollen, all of these concentrated in the approximate two square centimeters of the lead end of the tape! ¹² These findings imply that there are incredible amounts of pollen on the Shroud. One need only find 21.1 pollen per square centimeter to project a million on the cloth.



Pl. 4 Echinate pollen grain found on tape "4 Bd" from the anatomical left arm. Pollen grains with such spines are common among floral groups which are insect pollinated.

The question, therefore, is not "Are there pollen on the Shroud?" nor even how many. I am convinced that although wind certainly did play a role in the deposition of pollen on the cloth as Dr. Frei believed, we must look for another explanation for the bulk of the pollen found there.

In May of 1986 Dr. A. Orville Dahl, professor emeritus of palynology at the University of Pennsylvania, and visiting professor of palynology at the University of Stockholm, examined Dr. Frei's unpublished manuscript and noted the rather high number of floral pollen types on the Shroud (Pl. 4). That is, these are insect pollinated plants. He counted some 32 different plants which fell into this category out of the 57 in the manuscripts ¹³ and noted that during 20 years of changing slides in his study of airborne pollen at the University of Minnesota, floral pollen were almost non-existent on his slides. He proposed the hypothesis that human activity must be involved and that perhaps flowers had been laid down on the Shroud in a liturgical context.

More than a month later I was doing microscopy on one of the tapes from near the forehead on the frontal end of the

Shroud, "6 Bd," and found what appeared to be an anther. Dr. Dahl confirmed my finding by pointing out that the pollen grains could still be seen inside it. My survey conducted since then has uncovered numerous evidences of botanical debris from many areas on the Shroud. On "4 Bd" from the anatomical left arm there is a bract. A similar one was found also on "2 Bd" on the anatomical left shin on the front end of the Shroud. Other evidences of botanical debris are testimony to the fact that flowers were physically laid down on the cloth (Pl. 5).

Some time ago Dr. Alan D. Whanger of Duke University, while studying Zohary's FLORA PALESTINA, made the observation that 27 of 28 flowers which he had identified in a special project (more of which later) on the Shroud, actually flourished in the Spring of the Year.

If we look for a liturgical context in the Spring of the year it seems to me that the most likely option is a ceremony held at Easter time. It is well known that today in the Eastern Rite (Greek and Russian Orthodox as well as Coptic rites), flowers play a very important role in the commemoration of the death and burial of Jesus. Actual flowers are laid down on an epitaphios. But this suggestion would imply that the Shroud was once used as an altar cloth.

With regard to an earlier time, witness the following note:

It is well known that (the) liturgical aspect of the mystery of the passion, death and resurrection, ... is connected with a liturgical prescription concerning the altar-cloth for every celebration of the divine worship. This has been so from the very earliest days of liturgical worship. At the local council held in 325 at the Baths of Trajan in Rome, in the presence of 267 Bishops and the Emperor Constantine, Pope Silvester established "the Holy sacrifice of the Mass be celebrated on a cloth of linen consecrated by the Bishop as if it were the clean Shroud of Christ." ¹⁴

Fr. A. M. Dubarle has already suggested that the pre-1516



Pl. 5 Piece of botanical debris also from bloom.

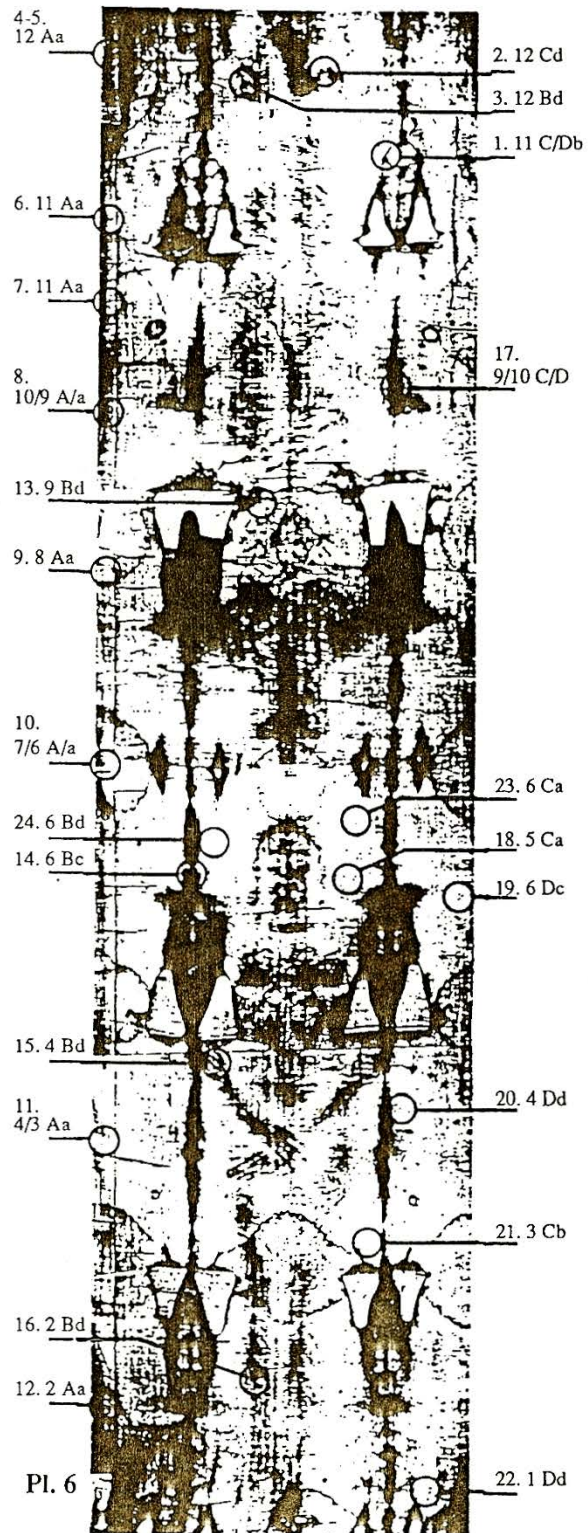
burn holes may actually have been caused by hot coals dropped from a censor swung over the center of the Shroud as it was folded in quarters and laid on an altar. I believe the presence of the very large abundance of pollen and botanical debris may hark back to exactly this kind of context. If so, it becomes a powerful physical argument for the presence of the Shroud in an Eastern Rite.

But there is another option we should make note of. It is also possible that the very burial which such Easter celebrations commemorated also left its traces on the Shroud. In fact, if flowers were banked about the corpse before the cloth was drawn up over the body it might explain why there is so little distortion in the image and why there is no distorted evidence of the sides of the face and the body: the flowers would have supported the cloth and prevented draping.

With the huge numbers of pollen on the Shroud there will be no quick resolution of the pollen questions. We do not know the distribution patterns of the various pollen types across the Shroud. The high number of pollen found on tape "6 Bd" near the forehead (more than 275) may imply longer exposure to the air as well as to a liturgical setting. This might support Ian Wilson's suggestion that the face was exposed for a long period of time and the remainder of the cloth was protected. The possibility is a most intriguing one. In order to sort out and reconstruct the botanical history of the Shroud we shall have to make careful note of the exact distribution of all the pollen types on the cloth and develop some idea of their statistical representation. The data is available on the tapes. I predict a new chapter in Shroud research in which a field we may call "Sindonic Botany" will be established. The challenge will be for a wide number of specialists in palynology and historical and geographical botany to bring their expertise to the study of the Shroud. The urgent immediate need is for us to develop a complete photo-inventory of all pollen on the tapes so that this can become a tool for advancing our understanding of the many pollen types and their statistical data.

The matter is of interest from another point of view: I referred above to a special project by Dr. Alan Whanger. On a suggestion from Oswald Scheuermann, Dr. Whanger applied his polaroid overlay technique to the possibilities that perhaps there might be floral images on the cloth. This can be illustrated by one which he tentatively identified as *Chrysanthemum coronarium*. He believes he has identified as many as 28 which appear in Zohary's FLORA PALESTINA. This entire subject needs to be carefully investigated in conjunction with the pollen studies.

Are there coated pollen on the Shroud? Dr. Frei indicated he never saw any.¹⁵ However, can it be determined that there are coated pollen in the blood areas? Certain pollen there do look suspiciously as though they have a closely associated



bit of extraneous matter, opaque to light, adhering to them.

Were the pollen which Dr. Frei believed came from the Near East laid down by wind or deposited by human activity? The pollen by themselves do not suggest a date for the cloth — only that the cloth was once in the Middle East. But one may argue that a medieval artist purchased a Middle Eastern cloth for his work. It is therefore of paramount and singular importance to resolve this question.

Beyond study of the pollen, the tapes have a wealth of other materials which might be used to elucidate other aspects of the Shroud. For example, the tapes from the right foot blood flow, the left foot blood markings, the blood flow down the anatomical left arm, and the blood flow across the back all preserve flax fibers coated with material for those areas. Fifteen tapes come from the off-image areas while only one comes from a non-blood/image area. Included also are materials from patches, from burns, from the Holland cloth and one from an area on the backside of the Shroud at the dorsal end. Please see the map of the shroud sample locations (Pl. 6) on page six.

Since the formal release of the carbon date there have been many questions raised about the chemical and physical nature of the Shroud. It is the unanimous decision of the ASSIST executive council that the Frei sticky tapes should be made available to science to help unlock some of the mysteries of the Shroud. I am therefore pleased to announce that ASSIST will be willing to accept scientific proposals for the use of the tapes. We do not yet have a protocol for the control of the tapes as a resource. But we wish to use the proposals as a means for the intelligent development of such a protocol.

It is my conviction that the Shroud has yet to yield up all of its secrets but that intelligent and careful application of what science has to offer will bring rewarding results.

FOOTNOTES

1. For further details please see my article "ASSIST Announces the Acquiring of the Max Frei Collection for Shroud Research." in the premier issue of the ASSIST Newsletter, Vol. 1, no. 1 June 1989, p.1-3.

2. For further details please see Mr. T. Flaherty's article "Verification of the Max Frei Collection." in the premier issue of the ASSIST Newsletter, Vol. 1., no. 1, June 1989, p. 4f.

3. Max Frei-Sulzer, THE POLLEN FROM THE SHROUD OF TURIN. Unpublished manuscript, p. 15.

4. Private communication.

5. Private communication.

6. D. Crispino. "Doubts along the Doubs.", SHROUD SPECTRUM INTERNATIONAL, year IV, no. 14, March 1985, p. 19.

7. I am using the English version of this manuscript translated for ASSIST by Dr. Anna M. Ottolenghi of Durham, North Carolina: "A Contribution to the Study of the Problem of the Authenticity of the Shroud Based on Microscopic Traces", p. 10f. We owe her our thanks.

8. We do not have access to the twelve sticky tapes Dr. Frei removed from the frontal end of the Shroud in 1973. They may have been lost in Vercelli.

9. My thanks to Prof. Luigi Gonella who kindly supplied this information to me during a meeting on Nov. 21, 1987.

10. In 1985 ASSIST was able to examine three of the tapes taken from the Shroud by Ray N. Rogers.

11. Using the same random method of examination last July 23, Dr. McCrone tended to agree with Dr. Frei regarding this figure.

12. The tape coordinates are 10/9 Aa from the "side-strip", 4 Bd from the anatomical left arm, and 6 Bd from an off-image area at the point of a scorch plume adjacent to the forehead of the Man of the Shroud on the "side-strip" side of the frontal cloth.

13. Labbe, Scr. Conc., p. 1542. My thanks to the Revd. Albert R. Dreisbach, Jr., Director of the Atlanta Center for the Continuing Study of the Shroud of Turin, to whom I owe this reference.

14. Max Frei, THE POLLEN FROM THE SHROUD OF TURIN, p. 15.

Paris Two continued from Page 1.

The first day concluded with questions addressed to the specific speakers.

Evin answered most of those relating to C-14. He agreed that more samples from different parts of the Shroud should be dated. For now he is satisfied, but urged that charred areas should be tested and the conventional C-14 technique should be used as well.

WILSON next fielded some questions, explaining in response to one his view that stigmatists seem to bleed in imitation of the particular crucifix inspiring them, and not in any relation to the Shroud. He also noted that modern artists can in fact reproduce the Shroud quite well tone by tone.

This is far different from the task of an "original" artist, who would have no model. It remains an enigma that the Shroud was the basis of so much art prior to the C-14 date.

RIGGI responded to a question, that actually four Shroud samples were made from the cutting: the three sent to the labs and another for future testing. Some pieces were eliminated because they were contaminated with alien threads.

DAY II - September 8, 1989

Two papers on pollens began the program of Day II.

J-L. de Beaulieu: "critique of the Work of Max Frei-Sulzer."

Beaulieu adversely criticized Frei's work by arguing that Frei was self-taught, not properly trained, in palynology. His reference collection was too small (to develop an adequate reference collection would take a team and more than one generation) and he claimed an impossible level of accuracy and precision in identifying minute differences in species within genera. He consulted no other palynologist. Since we know, too, that merely leaving pollen grains in a cloth results in damage to them and that fire seriously aggravates the case, the Shroud pollens should have been in a pitiful state.

As we read his identification of pollens, some may point to a North African origin and not (as Frei) a Middle Eastern origin for the Shroud. However, 13 of his 58 pollens have a probable Middle Eastern provenance, and this does refute a hypothesis that the Shroud was produced in France. We await publication of Frei's photos and procedures before making a final critique of his work.

Paul MALONEY: "The Current Status of Pollen Research and Prospects for the Future."

Maloney announced that ASSIST had acquired the Max Frei Collection for continued pollen research. The collection vindicates the soundness of Frei's procedures and the care he exercised throughout. Two of Israel's leading palynologists, Drs. Horowitz and Danin have tentatively verified Frei's determination that his pollens are Israeli and not North African and they accept his reconstructed Shroud-itinerary based on wind-carried pollens from the Negev to the Lebanon highlands.

Maloney next described Frei's, Riggi's, and STURP's pollen removal techniques. Maloney's own sector-by-sector counting approach promises to find millions of individual

pollens on the Shroud. Already he has found high concentrations on a sticky-tape from the head area. This tends to support Wilson's dandylicon theory.

A surprising development in pollen research is Maloney's confirmation of a high percentage of insect-pollinated floral plants represented on the Shroud. Whanger has noticed by his image-overlay technique 28 different flowers on the Shroud, of which 27 flourished in springtime. History teaches that the Mass be celebrated on a clean linen as if it were the Shroud of Christ. If the Shroud was ever used as an altar cloth, flowers would have been laid directly upon it.

A new field of Sindonic Botany, stimulated by the study of the Frei collection, will turn up more than pollens; it will permit better studies of Shroud blood. Maloney closed by inviting proposals from experts relating to future pollen work.

Gilbert Lavoie and Pierluigi Baima-Bollone presented papers under the rubric of Hematology.

LAVOIE: "The Making of the Blood Marks and the Creation of the Image Are Two Separate Events."

The study of the blood flow on the Shroud is evidence that the man died in a vertical position and the blood was transferred by contact with a body. Further, the downward hang of his hair and the fact that his calves and buttocks are rounded and not flat are evidence that the image occurred while the body was in a vertical position. The position of the feet show that the man was suspended and not standing.

Lavoie made much of the dark areas on the Shroud suggesting that they were shadows cast by light from above, and providing more evidence of a vertical body. He surmised that IF the Shroud image is a true photographic negative, then the man had blonde hair and beard.

Most effectively, Lavoie argued that the blood which seems to cake in the hair of the Shroud man is really on the sides of the face, transferred while the cloth was draped around the face. When the cloth was stretched out and the image had appeared, the cheek bloodstains appear in the hair area. Thus the title of this paper.

BAIMA-BOLLONE: "Proofs of the Presence of Human Bloodstains."

His sophisticated tests done in the Laboratory of Judiciary Hematology on several threads taken from the Shroud on October 8, 1978 have provided proof that the blood is human and gave a positive response for the antigens A, B,

M and S.

John JACKSON: "A Novel Mechanism of Image Formation on the Shroud Which is Consistent With All Observational Characteristics of the Image."

This research was published in 1984. Any successful theory of image formation process must explain all the known characteristics of the Shroud's image. They are: 1. Face image is sharp and clear; 2. Fibrils are individually colored, with no bonding; 3. The image produces a 3-D figure; 4. No side image is seen; 5. The yellow color is a molecular cellulose change.

Jackson assumes as proven that the Shroud covered a human body, not merely a human form such as a statue. Not only does the microdensitometer return a single set or graph of relationships exactly corresponding to those of a cloth covering a body, but the off-image blood echoes and the serum halos are evidence of an actual bleeding body. Jackson also accepts Lavoic's evidence that blood transfer and image formation were separate events.

For his theory of image formation, he asks: What is the directionality of the image relative to the body when the Shroud was draped over the body? The evidence points to a body in horizontal position and a vertically upwards interpretation of the image which is gravity induced. His scenario, "unbelievable" even to himself: The Shroud collapsed by gravity through the area where the body had been. This explains the absence of image of the side of the body and between the frontal and dorsal head. The surface-only image further requires a process with a small attenuation rate, giving high resolution in instantaneous speed, as in short wave ultra-violet range. He concludes this was an electrostatic radiation. This might have produced a faint image on the reverse of the frontal image, and it could be checked.

Mario MORONI: "Hypothesis of a Slight "Accidental" Burning of the Shroud Image: Experimental Verification."

All attempts to duplicate the Shroud's image have resulted in the image appearing on the reverse of the cloth. Direct heat, from a heated statue, e.g., would carbonize the blood, and this is not the case on the Shroud.

His experiment was entirely successful in reproducing all essential Shroud characteristics. A plaster face covered by a thin buckskin, with real beard, with applied blood clots, was sprayed with blood-sweat and bilirubin. After 25 hours a Shroud-like result occurred: negative image on one side of cloth only, except for the blood, and 3-dimensionality. Next

the fire of 1532 was simulated by placing the folded cloth in an oven at 220 degrees Celsius. After 30 minutes, the cloth had characteristics identical to the Shroud's. It conformed to the tests of Heller and Adler.

Dr. Sebastiano RODANTE: "The Natural Formation of the Shroud Imprints from Blood-sweat and Aloes and Myrrh." Paper was read by Emanuella Marinelli.

A mold representing the face on the Shroud was sprinkled with blood-sweat. Blood clots were applied to the forehead. It was then covered with a linen dipped in an aqueous solution of aloes and myrrh. The experiment was conducted in the catacombs of Syracuse, Sicily in order to reproduce sepulchral conditions. The result was a somatic and hematic imprint similar to the Shroud's, of an intensity directly proportional to the contact duration. The author took photos at 12, 24 and 36 hours contact duration. The same experiment, but using oils of aloes and myrrh produced a result equally suggestive after 36 hours. The imprints are superficial, 3-D, and under formed, as on the Shroud.

Prof. Giovanni TAMBURELLI: "New 3-D Eidomatic Shroud Face and New Eidomatic Correspondence with the Gospels and Tradition."

The author has produced a new, more detailed 3-D image from the Shroud face. They show new wounds (e.g., two tiny holes on the side of the nose suggesting the dumbbell end of the flagrum) and new relationships between eidomatic images of the Shroud and typical early icons.

Arnaud UPINSKY: "A Synopsis of an Epistemological Synthesis Applied to the Study of the Shroud."

This paper was allotted one hour instead of the customary 20 minutes. The author asserted that he had only recently heard of the Shroud and had always been skeptical of relics.

Until now, the Shroud has reached an "epistemological crisis." Science has been opposed by C-14. Can science not distinguish a first century object from a 14th century forgery? Is this the image that 20th century science wishes to project? Epistemology must be a court of arbitration for the opposing position of science and C-14.

Let us first remove religion and ontological truth from the debate. We are dealing with logic and scientific truth alone. Let us further distinguish the levels of authenticity applicable to the Shroud. (He showed a number of charts.) Can it be proved to be an authentic burial cloth? The true

Shroud of Christ? The true Shroud of the Gospels?

Epistemology needs to base its decision on existing evidence, not wait indefinitely for new evidence which will only be quantitative and not affect the question of certainty. Up to 1988 science said the Shroud was authentic; now C-14 negates that. As long as we tabulate, we always have mere probabilities (e.g., the "95% certainty of C-14). Modern thinking confuses scientific truth with scientific probability. "Probability" is one of the accepted categories of thought today. We are at home with polls, etc.

Moreover, the Shroud's case should have proceeded from its physical authenticity to its meaning or ontological authenticity. But the former was never scientifically established. We have the coins (pro) and we have the artist (con), but neither is verified. In the case of the Shroud there has always been a presupposed non-authenticity. This is what has kept the question alive so long, though science has supported its authenticity. With other objects this pre-judgement does not exist. With the Shroud there is a paradox (which has led to a priori doubts of authenticity): scientifically and rationally it seems authentic, but its very authenticity is contrary to reason [possible proof of Resurrection]. (Applause.) It is a vicious circle. This why it is the medium, rational and observable, that science must study, and not the message. It is the message or significance of the Shroud's authenticity that is disturbing.

If we go on another 100 years, the conclusion would still be questioned for the above reason. The stakes are high: science itself is at stake for being incapable of debunking a 14th century object.

A forgery can be unmasked. But no forger's signature has been discovered for the Shroud. Au contraire, the 3-D, negative, biological, chemical, pigment-stable, thermal-stable, etc. qualities of the Shroud are "signatures" of authenticity. Also we have artistic uniqueness, and science has refuted the artist: no paint, anatomical perfection, etc. A 14th century artist did not need to go to these extremes of perfection. He has engaged in "overkill." All these accumulated elements fit together and confirm one another.

Upinsky went even further, adding the crown of thorns as evidence of the highest level of authenticity: it is the Shroud of the Gospels. He added that C-14 testing of the Shroud was flawed and the C-14 labs have not furnished their raw data.

Finally, he noted that C-14 here will have proved that all other 20th century science which supported the Shroud was wrong. Science has proved that science cannot be relied upon. Once in a while something happens in a field that calls into question the teachings of that field. C-14 claims to have done this with all fields of science.

Prof. Olivier POURRAT: "On the Absolute Necessity of a Rigorous Methodology for Scientific Study of the Shroud."

A review of scientific literature on the Shroud reveals that a rigorous methodology has been lacking. Shroud articles often lack details on the methods used, details on results, and bibliography. The fault is not a lack of competence of the authors but rather in a confusion between their observable and measurable scientific facts and their subjective interpretations. The international scientific community should establish protocols for future research and its publication.

Dr. Eberhard LINDNER: "The Ambiguity of the Radiocarbon Results of the Shroud."

The high C-14 content, i.e., the late date, of the Shroud may have two causes: 1) the linen comes from the 14th century, and is thus a forgery; or 2) the Shroud was irradiated with neutrons during the events 2000 years ago.

Lindner's theory of 2) combines all results of scientific studies including C-14: the material which formed the dead corpse of Jesus disappeared into "nothingness"; initially, only the protons of a limited number of atoms on the surface of the corpse disappeared, leaving behind the electrons and neutrons. The remaining electrons caused the body image (by electron flux or radiation) and the coins on the eyes (by electrical spark). The remaining neutrons caused an isotope shift to C-14. This theory can be verified if the Vatican gives permission for new testing. Indeed, there already are slight indications that flux has occurred.

If confirmed, this theory would change the face of the Christian faith. Therefore, the tests must be done so that the results are incontestable.

As Lindner and Dr. Thomas Philips describe it, the event causing a neutron or electron flux would be a unique event, such as the "Big Bang," which many scientists accept.

Dr. Larry SCHWALBE: "Scientific Issues and Shroud Research in the 1990s." Here Schwalbe took up in more detail the ideal directions for Shroud science to follow in the next decade. His recommendations were 1) to develop a new repository for the conservation of the Shroud. 2) Learn how the image was produced, whether by scorch or chemistry, or what he personally has not ruled out, artistry. For this detailed study of the image density and distribution is required. 3) Learn the true history and itinerary of the Shroud. 4) More blood chemistry, physics, and medical

studies. 5) Confirmation of C-14 tests. 6) Pollen studies. He then suggested a timetable in the 90s for these phases. He urged cooperation of church and science leaders. He urged a church policy that transcends the will of one cardinal or individual. He urged a protocol for accepting or rejecting science proposals.

Rev. Adam OTTERBEIN: "The Necessity and Possibility of New Studies."

The 1988 Catholic Encyclopedia entry by Rev. Wild, S.J., denies authenticity on the grounds of C-14 as Rev. Thurston's entry did in 1912 on the grounds of the reputed artist. The artist has been refuted by science; will C-14 also be refuted? Otterbein urged that correct conservation of the Shroud depends on the nature of the image; this demands new studies. He called for creation of an international commission of Shroud scholars to draft a protocol to judge proposals and carry out properly controlled testing. This should be submitted to the Vatican. He urged a sincere effort be made to reconcile conflicting evidence, done without mutual recriminations.

This was the last scheduled presentation.

Gonella took the stage and made some closing remarks, one pointedly responding to Schwalbe: Remember the Shroud is private property and is not, he implied, in the public domain for everyone to dictate what is done to it.

A question and answer period followed. Most of the questions required Jackson, Evin, Tite, Legrand, and others to reiterate a particular point.

Dr. Whanger created a stir by insisting on showing two frames from the Riggi videotape which, he argued, shows clearly that the sample cut from the Shroud for the C-14 labs contained threads from the 16th or 17th century coming right out of the seam between the body of the cloth and the side strip. The sample thus was seriously flawed. Tite replied that they were subsequently cut out, and in any case it would take 60-80% of 16th-17th century material to skew the date 1300 years. One or two threads inadvertently left in would not be enough. Whanger said the burden was on Tite to count the actual number of threads, that "one or two" is not an adequate answer. Gonella interjected, "I was there; don't tell me what I did." Vial said that he and Testore observed weighing and noted the threads were all removed; the samples were all squarely cut. Whanger suggested that a master weaver could hide his work so that sutures would not be recognized.

Legrand, asked why he believed the 3-D effect on the Shroud could not have been achieved by a medieval artist, responded with an illustration: the bar codes used in the supermarket. Anyone in the middle ages can draw a series of straight lines, but would they be read by or be meaningful to the 20th century reading device?

A marvelously subtle conclusion to the symposium was spoken by Prof. Jerome LEJEUNE, a member of the Pontifical Academy of Sciences. He was intrigued by the phenomenon of cold science being excited about the Shroud and its "mysterious" image. But equally amazing was the casual setting aside of the carefully developed protocol for the double blind. Vial had remarked that he could find no other herringbone weave cloth "in the world." Therefore the identity of the Shroud sample was known to the labs. But then why remove the sample to another room — unvideotaped — for packaging? There was no longer a need for secrecy; they were merely going through the motions required if the double blind protocol had been strictly followed. This, he said, was "psychological science."

The C-14 test should be disqualified. They further told the labs the dates of the control samples, "to avoid any disqualifying errors." They thus lost the ideal means of retaining some degree of blind samples.

The significance of the Shroud prevented detached science and invited emotional "psychological science."

Moreover, there is a thing called courtesy among scientists: give your colleagues around the world the raw data for possible replication or verification of your experiments. Yes, the labs did publish in a major journal, but the best journals published reports on cold fusion. The ranking of the journal does not guarantee good science. C-14 is just one datum among many, which also should be incorporated in the curve.

Lejeune then moved to iconography. Byzantine icons can only be understood in terms of the Shroud. Why is it that later artists attempting to imitate the Shroud could not reproduce it? The copies are ugly. The Shroud's image is universally acclaimed as noble, beautiful. Therefore it is not a copy of anything. I know this esthetic argument does not hold much scientific weight, but science (except C-14) has given us better arguments.

NEWS & NOTES

The American Shroud of Turin Association (ASTA) has re-scheduled a conference on the Shroud for March 2-3 at Columbia University. There will be a banquet on March 2. There will be more details in the next issue of "The ASSIST Newsletter."

A conference on "Science, Theology, and the Shroud," will be held June 22-23, 1991 at St. Louis University in St. Louis MO. It will be concerned with the relationship between science and religion in scindonology. It is to be co-sponsored by the Man in the Shroud Committee of Amarillo, TX. and the Institute for the Theological Encounter of Science and Technology (of St. Louis).

Admission is open to the public and is free. Contact Brother Joe Marino for further information at (314) 878-0294.