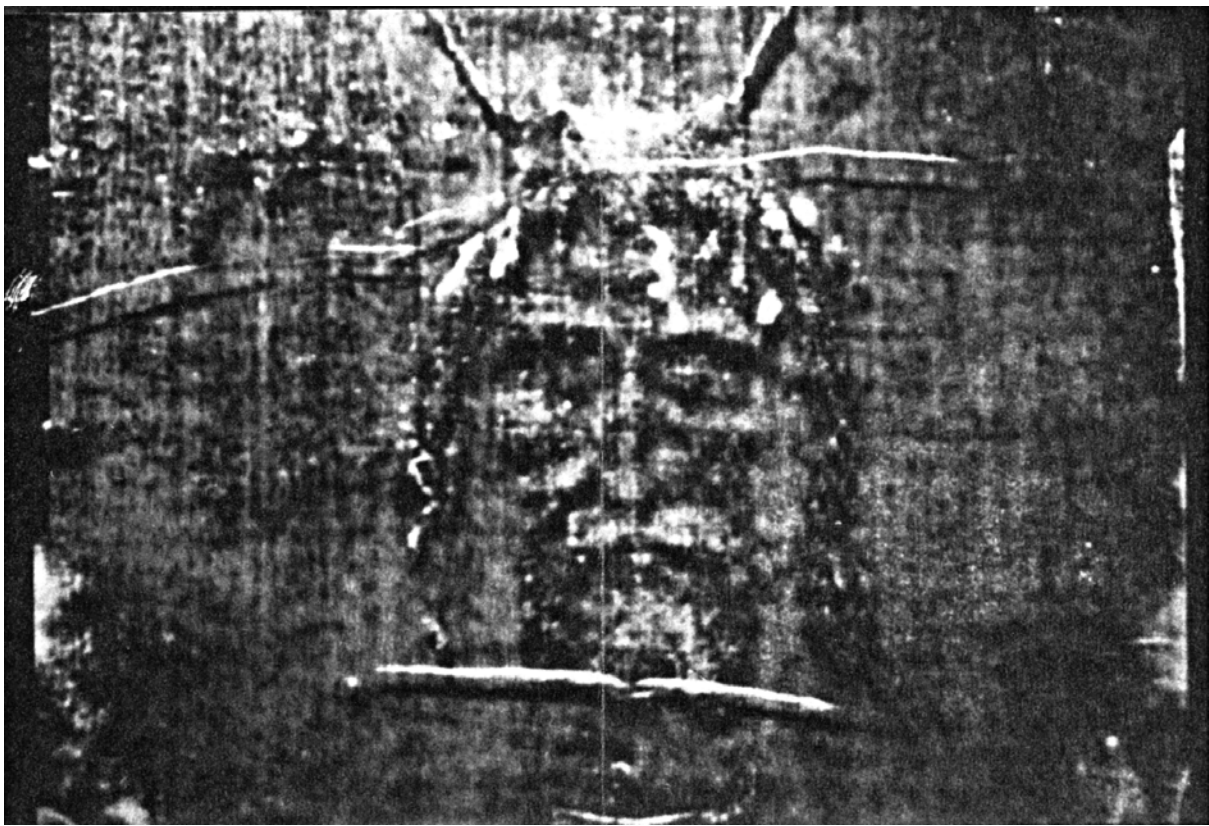


A NEWSLETTER ABOUT THE HOLY SHROUD OF TURIN
edited by REX MORGAN, Author of several books on the Shroud
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A remarkable newly created representation of the Shroud face image. This is a superimposition of positive and negative images of the Enrie (1931) photographs slightly displaced vertically giving an apparently enhanced or 3D effect. The latest work of Professor Alan D. Whanger of Duke University, USA

EDITORIAL

Since our last issue a large amount of Shroud mail has arrived from various parts of the world indicating the continuing and growing intensity of research in all disciplines connected with sindonology. In this issue you will find an important riposte to Nickell from distinguished Professor of History, Daniel Scavone as well as an update on the work of Professor Alan Whanger. Whanger's article is based on a paper he gave at the New York conference in March and covers his latest directions of research which are always stimulating. Not the least of his surprises is the remarkable photo on the front cover of this issue which looks for all the world like an enhanced or 3D photograph (of which there are two or three in the Brooks Exhibition as some of you will remember) and yet this is simply an overlay of the positive and negative photographs of Enrie (1931) slightly displaced vertically. When one considers the detailed and intricate work done by Jackson and Jumper and by Tamburelli on three-dimensional representations of the Shroud photographs it is quite amazing that this simple technique discovered by Whanger produces a similar result showing features in extraordinary detail. Whanger has sent me no commentary or possible explanation for his phenomenon, just the picture. I hope to catch up on his comments later this month when we both lecture at the St Louis, Missouri, Shroud Conference.

I have for comment in forthcoming issues the latest newsletter from ASSIST which describes some of the new discoveries made by Paul Maloney as he examines in great detail, on a continuing basis, the Max Frei pollen collection. Interestingly Whanger's work on flower images on the Shroud seems to be corroborated by some of the new pollens Maloney is identifying on the Frei Shroud samples.

An entire issue of the Italian *Pro Deo et Fratribus* is devoted to the Shroud and a whole issue of the Portuguese *Linteum* is devoted to the Oviedo Cloth. The latest *British Society for the Turin Shroud Newsletter* is a bumper issue and I have also received Ian Wilson's new book *Holy Faces, Secret Places* my review of which should be ready for the next issue.

An interesting and ambitious programme has been published for the St Louis Shroud of Turin Symposium to be held at St Louis University, Missouri, on 22 and 23 June 1991. In two intensive days no less than 18 papers are to be delivered by well-known sindonologists, indeed most of them have written Shroud books and all of them are published Shroud writers. The scheduled speakers include Dr John Jackson, Revd Kenneth Stevenson, Dr Robert Dinagar, Dr David Mayschak, Bro Bruno Bonnet-Eymard, Miss Isabel Piczek, Mrs Barbara Sullivan, Prof Daniel Scavone, Prof Alan Whanger, Dr Mario Moroni, Rex Morgan, Revd Albert Dreisbach, Dr W.S.A. Dale, Dr Phillip Callahan, Mr Frank Tribbe and Mr Paul Maloney.

REX MORGAN

UNSHROUDING JOE NICKELL

Daniel C. Scavone, PhD, Professor of History, University of Southern Indiana

Joe Nickell, amateur everything, has had a large forum in magazines such as *The Skeptical Enquirer* whose major project is the refutation of superstition.

In presenting his case against the Turin Shroud, Nickell goes round in circles. His dry powder technique for duplicating the Shroud's image was refuted by his own idol, microscopist Walter McCrone, who claims he sees a liquid bonding agent for his "red pigment". The present writer happened to be present, in fact, when McCrone denounced Nickell's image-formation hypothesis at a Shroud Conference held at Elizabethtown, PA in 1987. Far from "successful," Nickell's efforts are being laughed at. Certainly Nickell (dry application) and McCrone (tempera paint) cannot both be correct. Yet, when Nickell needs credibility, the McCrone name is the one he drops.

The Nickell method, in fact, fails to replicate the Shroud image in certain details which are critical, if unseen. It results in fine jeweller's rouge particles working their way through his cloth, leaving particulate residue deep in the weave, and thoroughly dousing the table beneath with rouge dust. The actual Shroud, on the other hand, has nothing but absolutely clean fibers below its image, which exists only on the caps of the outer fibers no more than twenty microns in thickness. Scientists who studied the Shroud "hands on" have concluded that the image is a natural deterioration of the linen cellulose, the process by which cellulose in cloth and paper yellows with age.

Against both Nickell and McCrone, the Shroud science team which made direct studies of the cloth found iron oxide scattered in uniform amounts over the entire cloth, both in image areas and in non-image areas. If that amount of iron oxide cannot be seen in non-image areas, it certainly cannot be what the eye sees as the image. It is there, but not intimately related to the image.

Deprived of his simplistic rubbed-on image, Nickell is left with little but abusive and unflattering name-calling. If Nickell is wrong and McCrone is refuted, then the mystery of the image-forming process remains and all the complaining in the world does not of itself negate the Shroud's possible authenticity.

Against both Nickell and McCrone, the bloodstains on the Shroud have tested positive for blood by every juridicially acceptable test for blood. McCrone claims it is simply a thicker daubing of red paint; Nickell agrees. But the Shroud blood was attacked by animal antibodies in the test-tube. Animal antibodies do not attack

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red paint. The opinion of Dr John Fischer, Nickell's certified anti-Shroud forensic analyst, that tempera paint would yield similar results from the same blood tests, is tantamount to the ludicrous charge that pathology cannot tell blood from paint!

Nickell gets great pleasure denouncing the group of scientists who support the Shroud's possible authenticity as fanatical Christians. What, then, is Nickell, the non-scientist, who sees *a priori* nothing but a fake -- and this in the face of mountains of scientific evidence published in respected journals -- if not a "true believer" who will be right whether he is right or wrong. His only recourse is to accuse the scientists of misusing evidence because of their religious bias. It is a preposterous charge, made against professional people from the best labs in the U.S., with reputations at stake. It is made by one whose repeated vituperations against the Shroud and its advocates marks him clearly as almost insanely anti-Shroud.

What may we add regarding Nickell's own "Shroud science team", consisting of people unanimously, not to say fanatically, anti-Shroud, not one of whom ever saw the Shroud nor handled it in the course of a scientific test? This includes "a Smithsonian botanist who was skeptical" about the Dead Sea halophyte pollens found on the cloth. This group begins with the premise that the Shroud is a fake and then echoes everything McCrone says. When one gets past the nonsense of Nickell's "team" who look at PICTURES of the Shroud and say "this doesn't LOOK real," or "the arms LOOK too long," or "that doesn't LOOK LIKE real blood," or "the hair falls as for a standing rather than recumbent figure" (Uh, Joe, it COULD have been arranged that way), then, it is McCrone alone, of all the scientists who have studied the Shroud material, -- even though he never laid hands on the Shroud -- who matters when he denies its possible authenticity. And Joe Nickell not at all.

Correct logical and scientific protocol would seem to demand that if a single scientific conclusion disagrees with the overwhelming preponderance of scientific evidence, it is the one outlier which is suspect, and not the mass of peer-reviewed and cross-checked findings.

Nickell boasts about the canny research skills of skeptical investigators. He has cleverly discovered that the Gospels do not, in fact, say that Jesus's burial garments were preserved. Bravo, Joe. No one ever noticed that before. There are, however, Joe, second century apocryphal documents whose writers did know of the survival of the burial cloths. Concerning Nickell's research "coup" that there were multiple cloths in Jesus's tomb, how is that contradicted by the existence of one of them? The Shroud itself does not seem to bear evidence of an additional cloth, a napkin not over the face but *around* the face to hold the mouth

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closed.

Nickell, concerned that the blood on the Shroud APPEARS too red to be real, should know what Alan Adler, a heme specialist and what coroners such as Dr Frederick Zugibe, Chief Medical Examiner of Rockland County, New York, know: that the blood on the Shroud is clotted blood which is rich in red bilirubin and that it has continued to seep moisture long after death because it is the blood of a victim of violence.

Nickell enjoys repeating that the late Max Frei, pollen expert on the Shroud and originator of palynology as a tool of criminology, pronounced the forged "Hitler Diaries" as genuine. He does not say that Frei's reputation was so great that he was called in as an expert to ascertain the cause of death of Dag Hammarskjold, U.N. Secretary-General and Nobel Peace Prize recipient. Nickell does not reveal that McCrone's claim to fame, the exposing of the "Vinland Map" as a modern forgery has been refuted. His "over two decades of experience" did not make HIM perfect either.

Nickell notes the "bizarre hot-corpse theory advanced by a Utah chemist and a nun" as an outrageous hypothesis of image formation. It turns out not to be so incredible after all. Albert Ponsold, (*Lehrbruch der gerichtlichen Medizin*, Berlin, 1957) writes that the post-mortem activities of internal bacteria and gas formation actually generate heat. Nickell's skepticism has indeed made him a wondrous scholar, right on the money each and every time. The nun, by the way, happens to be a Ph.D. archaeologist, Eugenia Nitowski, highly respected by the Israeli intellectual community for her studies of ancient Jewish burials. Her thesis is that the peculiar limestone (aragonite) of Jerusalem tombs can interact with warm corpses so as to produce Shroud-like images on cloth. By her suggestion this aragonite has been searched and found on the Turin Shroud, especially in the spoiled area of the sole of the foot. Her hypothesis may not stand up, but it is not that of a fanatical Shroudologist. Of course, Joe knows better.

In 1978 STURP performed exhaustive tests on the Shroud itself. These scientists could not refute the Shroud's authenticity; nor could they prove that it is authentic. These are sober statements, not those of a fanatic fringe. When Nickell asserts that the Shroud failed a battery of tests done in 1973 he is correct; more detailed and thorough tests were called for, subsequently performed, and the Shroud passed. This happens every day in science. He gleefully harps on 1973 and makes sneery noises at the moderate pronouncements made by Shroud science after the far better tests done in 1978. Nickell's preoccupation with the 1973 results says more about Nickell's credibility than about Shroud science.

Nickell, now medieval art expert, says the Shroud image is nothing if not

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Gothic. But art historians cannot point to a single example of Gothic art which is similar to the Shroud. The Shroud fits no genre or technique known in the 13th or 14th c. Giotto, the first master of the Italian Renaissance around 1300, did capture three-dimensionality by giving his figures bulk and placing them in realistic landscapes. But his knowledge of human anatomy is hidden beneath lumps of heavy clothing. Yet Giotto is renowned. He would pale next to the artist who contrived the Shroud image. Where in any history book of art is any rival to Giotto proposed? Where are the other masterpieces to which the Shroud bears similarities? Nickell is exposed again. In 1985 I asked him in person in Evansville what happened to the realistic statue used by his rouge-dauber. He responded casually that it had been pitched once its usefulness was over. I commented that the wrong masterpiece was pitched. It would have been priceless today as the first realistic nude of the Renaissance.

What about C-14? Three labs agreed that the Shroud dates back only to 1260-1390 and thus could not be Jesus's burial cloth. No one doubts that this is the date which their method retrieved from the sample of the Shroud which they tested. But a strong case can be made to question their conclusion. Normally, in the process of dating historical objects, a number of datable (i.e. organic) objects is taken from a single stratum of an archaeological dig. These objects have usually not been touched since they were buried. They are carefully packaged for delivery to the lab so as to prevent contamination from cigarette smoke or unnecessary handling. In the lab they are pre-treated and cleansed before being dated by the usual C-14 methods. If one or other objects differs too greatly in its date from the others, it is excluded. An average date for the other objects is arrived at. This is the approximate date of the stratum, in which they were found and of the objects themselves. (Bettancourt, et al. *Archaeometry* 20. 2, pp. 200f.)

This luxury was not possible with the Shroud, a single object. Besides it is one which has been much handled for over 600 years (at least). Moreover, the Shroud's known "thermal history" makes it probably unique in the entire experience of C-14 dating. In 1532 it was nearly destroyed by fire as the church in Chambery, France burnt down around it. Its silver box began to melt as the fire reached temperatures of about 900 degrees (the melting point of silver).

By now enough has been said in Shroud-related organs about the many flaws in the C-14 testing of the Shroud. The method is not infallible and Wölfli of Zurich and the others involved in the Shroud testing well know it. Nickell does too. (Barnard, "Radiocarbon Dates and their Significance in the Chinese Archaeological Scene," 1980. Bettancourt, et al. *Archaeometry* 20. 2, pp. 200f.) Wölfli, in a paper read at an International Radiocarbon Conference at Trondheim,

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Norway, 1985, complained of the error levels of C-14 testing. Wölfli, again, *Nuclear Instruments and Methods in Physics Research*, 1987.

This criticism of C-14 testing on the Shroud is not a repudiation of C-14 dating science. Nor am I arguing that the Shroud is certainly that of Jesus. I am modestly asserting that the verdict is not yet in. It may not be a real Jesus relic; but private investigator Joe Nickell has not proved this by any means. I am tempted to say he does not have a clue, but I won't. In suppressing the plausibility and intellectual honesty of the pro-Shroud position he is foisting upon his readers a culpable deceit.

Finally and significantly, Dr Alan Whanger has shown that the icon of Jesus from St Catherine's Monastery in Mt Sinai, indisputably known to have been painted in the sixth century, seems certainly to have been copied from the Shroud. If so, it would be strong evidence that the Shroud originated much earlier than C-14 supposes. By superimposing the icon face over the Shroud face, congruence between them can be seen at more than 170 points. Most convincing of all is the congruence of wrinkle lines on the Shroud cloth, which the icon artist copied. This is not offered as proof that it is Jesus's shroud, but it would refute a 14th century date.



Shroud book authors: Professor Daniel Scavone of University of Southern Indiana (on right) with Dr Fred Zugibe, Medical Examiner, New York

EVIDENCE OF EARLY ORIGIN AND NATURE OF THE SHROUD OF TURIN BY IMAGE ANALYSIS AND OPTICAL COMPARISON

Prof ALAN D. WHANGER and MARY WHANGER, Duke University, USA

I. Introduction

Since first seeing a photograph of the Shroud of Turin in 1977, I have been intrigued by this image. Photography has been an almost lifelong serious hobby, and I have had considerable experience in radiology. Having this background, I was impressed that there was something highly unusual about this image on this ancient piece of fine linen. With information that came out as a consequence of the 1978 studies on the Shroud of Turin, my wife Mary, who is my co-researcher, and I began intensive study of the Shroud. The observations and speculations of such researchers as Wuenschel Vignon, Riggi, Bulst, Wilson, and others that the face of Christ in art and the image on the Shroud have many similarities stimulated us to look closely at large numbers of these early depictions. It was out assumption that some important questions might be answered if there were some way to accurately compare and quantify the similarities of these images.

Our interest in finding means for accurate comparison was greatly bolstered in 1979 which a colleague returned from an expedition to St. Catherine's Monastery at Mt. Sinai with many photographs of their large collection of early icons. One of these photographs was of Christ the Pantocrator, which is a splendidly detailed and preserved encaustic icon from the mid 6th century which, by their tradition, had been painted in Edessa. It was almost certainly a gift from the Byzantine emperor Justinian I, who built the monastery. Noting many similarities between this icon and the Shroud face image, we intensified our search for image comparison techniques, and examined thousands of photographs of other works of early art.

II. Polarized Image Overlay Technique

Searching the literature did not reveal any useful technique for comparing artistic images quantitatively. We finally had a breakthrough in December, 1981, while working with a photograph of a Byzantine coin of Justinian II, a gold solidus minted between A.D. 692 and 695. These particular coins were the first to bear the face image of Jesus Christ. The fine detail of this coin as well as the appearance of the eyes being off center interested us greatly, since the eyes have this appearance on the Shroud image. The thought came to mask off the eye region on the coin and then project this image directly onto an image of the Shroud face projected on the same screen. As the two images were adjusted to the same size and alignment, the similarities -- the blood stains, the eyes, the hair patterns—became clearly apparent.

The projecting of two different images, one on top of the other, on the same screen results in a confusing blur. A way to distinguish one image from the other in order to compare them point by point was needed. This can be accomplished by the use of polarizing filters which separate ordinary mixed light rays through their crystalline structure and pass the light through in a single plane. When two polarizing filters are used together with their axes in the same direction, much of the light passes through. However, when the two axes of the filters are at right angles, about 99% of the light is blocked out. In the technique we developed, two projectors are used, each with a polarizing filter so placed that the filters are at right angles to each other. The beams from the two projectors are passed through the filters onto a lenticular screen. It is necessary to use a lenticular screen to avoid depolarizing the light again. The resulting superimposed images are viewed through a third polarizing filter which is rotated through a 90° arc which permits the images to fade in and out and thus be discerned one from the

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other. To describe and tabulate the observations of similarities between the two images, we use the system of "points of congruence," by which we mean features or points which are identical or markedly similar between two images. Points of congruence may be either large features such as the swelling of the cheek or the configuration of the beard, or fine points such as blood stains or all spots. These observed points of congruence are then diagrammed on a transparent plastic sheet covering large photographs so that these findings may be tabulated and demonstrated so that others may evaluate our findings.

By comparing the Pantocrator icon with the Shroud, we found that indeed the icon is an incredibly accurate image derived from the Shroud image because of the presence of over 200 points of congruence between the two. While the analogy may not be strictly correct, in forensics, 45 to 60 points of congruence is sufficient to establish identity or same origin of facial features. Such features as what appears to be a tear running down from the left eye, squall irregular areas on the lips, and configurations of lines in the halo or nimbus are all highly congruent with the Shroud image. The remarkable fidelity between the Pantocrator icon and the Shroud would indicate that the artist had direct access to the Shroud image when the icon was produced, and that the artist considered the Shroud to be authentic, since in the Orthodox church icons have the same status as Scripture and the iconographer attempts to reproduce the original as accurately as possible.

III. Coin Images Over the Eyes

While studying the face area of the Shroud on the VP-8 Image Analyzer which produces a three-dimensional image, Jackson and his group noted in 1977 that there are button-like objects over the eyes. They speculated that these might be coins, and an attempt was made to identify them. In 1979, Filas thought he identified the letters UCAI and a design that looked like a shepherd's crook over the coin area of the right eye. This design and these letters would fit a lepton, a coin of Pontius Pilate (the Biblical widow's mite) struck in Israel during the reign of Tiberius Caesar. Many doubted this observation of Filas's in spite of his having secured a lepton coin which fairly well matched the design over the right eye, including an aberrant misspelling. Having developed the polarized image overlay technique which allows for exacting comparisons, we contacted Filas to obtain photographs of both his coins and of computer enhancements of the coin areas over both the right and left eyes. These enhancements were made from the 1931 Enrie photographs. Filas also speculated, on rather minimal evidence, that there was a lepton over the left eye as well.

Using the polarized image overlay technique, we found that there was a nearly perfect match between the image over the right eye of the Shroud and the photograph of Filas's coin, showing at least 74 points of congruence, including all of the letters UCAI. We were also able to identify most of the remainder of the eroded letters, TIOU/CAICAROC, and with a reasonable degree of certainty found congruence between the coin and the Shroud image on seven of these letters. It is observed that almost all of these congruencies are on elevated points or irregularities on the coin's surface, following the pattern that one would expect from a corona type of discharge, a phenomenon first noted in 1982 by Dr. Alan D. Adler on observing the overlay of these two images. The superimposition of the unenhanced photograph of the eye area over the photograph of the coin is even more impressive, but it is so cluttered that it is difficult to count all the congruencies. Our conclusion is that indeed there is an identifiable coin image over the right eye of the man of

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the Shroud of Turin, and that it is so similar to a known coin that the two coins must have been struck from the same die. Using overlays from books on numismatics, we were able to identify the pattern and date on the back of Filas's coin and found it to have been struck in the 16th year of the reign of Tiberius Caesar, or A.D. 29.

The coin image over the left eye is less distinct than that over the right eye, but by using the comparison technique with various coins we were able to identify that one as well. It coincides with another Pontius Pilate lepton, the so-called Julia lepton, which was struck only in A.D. 29, we tabulated 73 points of congruence between the left eye image and that of a Julia lepton, Thus we have the incredible situation in which the images are dated to the time around A.D. 30 by the presence of identifiable coin images over the eyes. This finding localizes the origin to Israel since these were crude coins struck locally only in Israel. In addition, the coin over the right eye is unique, as far as is known, since the coin given to Filas is the only known one of its striking.

IV. Nature of the Image -- Evidence for Coronal Discharge Phenomena

The nature of the process forming the image on the Shroud has continued to defy adequate explanation, although a number of theories have been advanced. The predominant idea at this time is that it was some type of radiant energy. At least three investigators have hypothesized a corona discharge type of phenomenon for mechanism of the image production. These are Dr. Alan A. Mills of the Department of Astronomy at the University of Leicester, Oswald Scheuermann in West Germany, and Dr. Igor Benson, a research engineer who has specialized in high voltage phenomena.

Simply, corona phenomena are produced by the discharge of high energy Charged particles which, through a process of ionization, produce a variety of visible streamers which give a crown-like or coronal appearance. These phenomena occur in nature, in such phenomena as St. Elmo's fire. It has been used in types of biological studies called Kirlian photography as well as in commercial duplicating machines. The importance of this to Shroud studies is that coronal discharge can occur off the surface of any object of any material in a high energy field. The high energy particles flow over the surface and are discharged from high points or irregular surfaces of the various materials. The streamers are attenuated in air so that they have a limited range, and they can be collimated under appropriate circumstances and can produce ionization both of gases and of materials in their path. These would all have relevance for image formation on cloth.

We have worked rather extensively with Oswald Scheuermann who has done extensive work in producing photographic images off a wide variety of materials which has given us important clues in better understanding what the appearance of various objects on the Shroud might be like. He has also produced a number of images on cloth which have many of the characteristics of the image on the Shroud. Among the important observations of relevance are that images resulting from coronal discharge are fragmentary since the streamers come off only the irregular surfaces and high points, thus producing a partial and non-contiguous image. Objects which are in direct contact with the photographic plate or a cloth tend to produce a dense dark image, those which are in partial contact or are very close to the cloth or the photographic plate often produce a partial outline of dark image with a light center, and those which appear to be at a little distance away may produce

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either a dark image or a negative image in which there is a central light area with diffuse darker halo around that area. Images produced by coronal discharge can show exquisite detail. It is also observed that an image produced by coronal discharge can penetrate several layers of cloth or leather, although the image can be blocked by moist secretions such as sweat or blood but often not by dried secretions. Images on cloth are variable, depending on the moisture, the fabric, the chemical composition, the presence of oils or other contaminants, and other factors. Objects are often outlined in various ways, although they may show fine surface features sometimes to a fraction of a millimeter. Scheuermann produced images of dozens of types of objects such as coins, model phylacteries, flowers, pieces of flesh, and models of faces. This has helped enormously in finding, understanding, and identifying various images on the Shroud.

Dr. Benson did some fascinating work in estimating the potential amount of energy required to produce images on linen, and hypothesized that the Shroud image has a number of characteristics of so-called electron corona which is produced by a burst of extremely high energy. He speculated from some rather simple experiments that it takes approximately 50 watt-seconds of energy per square centimeter in approximately 1/10 second either by thermal energy or coronal energy to produce a detailed clear-cut image on linen. Extrapolating from this, he estimated that to produce an image similar to that on the Shroud would probably take 11,000 kilowatts (i.e., 15,000 horsepower) of energy at 100,000,000 to 200,000,000 volts in 1/10 second or less. There is no practical way to test this hypothesis at this time, but it gives an idea that there was clearly an extraordinary and complicated process that went on to produce the image on the Shroud.

Dr. Benson also observed that objects in an extremely high energy field would produce secondary corona discharge as well. This characteristic may help explain the presence of detailed images of objects on the Shroud separate from the body image.

V. Phylactery -- Forehead

A curious finding on the Shroud, which has also been noted on many early icons, is a three-sided box shape which has been noted between the eyebrows with a V-shaped object extending down on the bridge of the nose. Detailed studies have enabled us to identify this object as a head phylactery, a small leather box or pouch containing four small parchments on which were written certain scriptures and which is worn by orthodox Jewish males during times of prayer. By the polarized image overlay technique we were able to determine that the central part of the capsule of the phylactery (Hebrew, tefillah) is very similar to the earliest known intact head phylactery which was discovered in the Qumran caves and reported by Dr. Yigael Yadin in 1969 and which dates from the first half of the first century A.D. We feel that the phylactery on the Shroud has been desecrated so that the front part of the leather box or capsule was torn open so that two or three of the four scripture packets have fallen out of their tiny compartments. The V over the bridge of the nose is caused by the front flap of the phylactery which was cut open and is hanging down.

This area was studied in great detail in computer image analysis by Dr. Robert M. Haralick, Professor of Electrical Engineering and Computer Science while he was Director of the Spatial Data Analysis laboratory at Virginia Polytechnic Institute. Haralick found a band extending around the head with a rectangular object on the

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forehead with a smaller square on it, and showed that the square and the V have three-dimensional qualities, indicating that there was an object there separate from the body itself.

We feel that this desecrated phylactery would be consistent with the history of Jesus having been mocked as a Jew.

VI. Phylactery -- Arm

Having identified the head phylactery, we looked for the arm phylactery since these are always worn in pairs, one on the head and one on the non-dominant arm, ordinarily the left arm. The blood flow patterns on the two arms are markedly different, with the blood flow on the left arm showing a number of transverse linear separations.

An arm phylactery is a box containing a single parchment with scripture written on it. It is attached to a noose with a ritual knot and is secured around the arm just above the elbow, and the ten foot long strap is wrapped seven times around the forearm and then around the wrist and the fingers in a ritualized way.

We feel that there are seven identifiable transverse areas on the left forearm, which probably represent where the strap had been wrapped. Finally, after long searching, we noticed a linear pattern extending away from the area of the anatomic left elbow with the appearance of hanging down beside the left arm, apparently disappearing behind the thigh and then coming back up and possibly being tucked under the left forearm. This strap measured about 7 mm in width and 2 mm in thickness. Then we spotted the image of the box of the phylactery in the area of the left elbow. The base of the phylactery measures 23 mm and the sides measure 30 mm. We were not able to clearly identify the central structure of the phylactery, but it appears to have been torn and is hanging down. In addition, the phylactery is put on upside down.

By using the polarized image overlay technique with the picture of the earliest arm phylactery we could find, which came from the 16th century, we found that the image on the Shroud is highly congruent with the drawing of that arm phylactery, even to the stitches and the ritualistic knot. There are apparently small blood clots on the Shroud which correspond to the interstices of that knot.

Thus we have, as far as we know, a unique finding of evidence of a pair of phylacteries on a crucified individual, and they both have been desecrated.

VII. Amulet on Chest

In his studies, Scheuermann noticed the image of an object in the midline of the breast bone which he speculated might be an amulet. This prompted us to examine this area more closely. At the level of the upper portion of the spear wound stains is a somewhat irregular image approximately 30 mm in diameter. Apparently hanging down from this about 10 cm in length are two images that appear stringy.

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small circular object between the two heads. We then examined photographs and drawings of hundreds of Roman and Jewish amulets. Interestingly, there was one Roman Emperor who had a penchant for depicting himself in various carvings seated and holding a spear and with a female figure, presumably that of the goddess Roma. In addition, there was on at least occasion a circular object between the two figures on the carving which represented the sign of Capricorn. This particular Emperor was none other than Tiberius Caesar, who was quite well known for his interest in astrology.

By using the polarized image overlay technique with photographs of the amulets of Tiberius Caesar superimposed on the image on the Shroud, we found the male figure to be highly congruent. On the back of the denarius of Tiberius Caesar, who ruled from 14 to 37 A.D., there is a figure sitting holding a spear which is very similar to that on the image of the amulet on the chest. Pondering what the two stringy objects which appear to be attached to the lower edge of the amulet could be, it finally occurred to us that these might be tassels tied on to the amulet. The tassels may have come from the traditional decoration on the robe of Jews. Thus we feel that there is the image of a Roman amulet of Tiberias Caesar hanging around the neck of the individual of the Shroud from which are hanging two tassels suggestive of those worn on the robes of Jewish males.

Therefore, we have a triply remarkable finding: an amulet which would almost certainly be that of Tiberius Caesar, thus dating the time of the crucifixion of this individual to the reign of Tiberius; a further demonstration of the image having the characteristics of a coronal discharge; and the unparalleled appearance of a Roman amulet with possibly Jewish tassels attached hanging around the neck of a crucified individual. This outrageous object would certainly have been put there as an act of mockery, and would have been left there, we speculate, only because by Jewish custom anything that was in touch with the body at the time of death was buried with the individual.

The amulet and the two coins over the eyes make three objects dating from the reign of Tiberius Caesar whose images are on the body.

VIII. Flower Images

During his studies in 1983, Scheuermann made the observation that there seemed to be flower-like patterns around the face. We examined what he was referring to, but could not clearly distinguish these patterns as being flowers. However, two years later while examining the Shroud photographs closely, I suddenly saw the image of a large chrysanthemum-like flower about 15 cm lateral to the anatomic left side of the head and 6 mm above the midline top of the head. On looking at off-body areas of the photographs from some little distance, it became apparent that many of them have definite patternings which looked much like coronal discharge images.

Scheuermann then quickly produced large numbers of coronal discharge images using a variety of flowers, plants, and bouquets, including several allowed to wilt after picking. In order to identify these, we secured the definitive six volume set of *Flora Palaestina* by Michael Zohary and studied the drawings of the some 1900 plants depicted therein. We then attempted to match these as well as possible with the clear plant images on the Shroud. Then, using drawings of those plants whose pollens Dr. Max Frei had identified and which grow in Israel, we systematically searched the photographs of the Shroud to see if we could find images which are

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compatible with those in the text..

We feel that on the Shroud we are looking at coronal -like images of partially wilted flowers often massed together. While some of the plants have only a flower image, with some there is much more, including flowers, buds, stems, leaves, and fruits which are reasonably clear. While identification of many plants, especially when there are many species of a particular genus, is rather difficult, we did side-by-side comparisons and polarized images overlays of images found on the Shroud with plant drawings in Flora Palaestina to show reasonable compatibility.

While there are vague or partial images of hundreds of flowers on the Shroud, we feel we have tentatively identified 28 plants whose images are sufficiently clear to make identification reasonably certain. Tabulation of these plants shows that all 28 grow in Israel, 20 grow in Jerusalem itself, and the other 8 grow either in the Judean desert or the Dead Sea area, both of which are within about 12 miles of Jerusalem. 27 of the 28 bloom during March and April, which corresponds to the time of the Passover and the crucifixion.

We recorded the appearance of the wilting process of flowers after picking by photographing a variety of flowers every 12 hours. In addition, Scheuermann made coronal images off several flowers at the time of picking and every 24 hours thereafter. Both the gross and the coronal image appearances changed quite markedly with the changes in time. We feel that the appearance of the flower images on the Shroud most closely resembles those photographs and coronal images of flowers between 24 and 36 hours after having been picked. In a number of cases, images of clusters of the same flower are found together. In addition, there are images of at least seven small bouquets of flowers bound together.

Some comparisons are quite striking, such as the berries on the *Pistacia lentiscus* plant whose image is found near the head. The *Rudolphia segetum* image is quite clear in showing in great detail the multiple tiny florets on the Shroud which are little more than 1 mm in diameter. It also shows that the plant is partially wilted and has been compressed. There is only a single species of this plant, so it is difficult to confuse it with anything else. On the chest is an interesting appearance of a clump of *Hyoscyamus reticulatus*, a plant that grows in the Judean desert and not at all in Europe. Several of these are clumped together, and the reticular or netlike pattern of the plant can be seen plainly on the Shroud, and with the polarized image overlay the exact image of the stamen of the plant can be seen.

IX. Correlations with Pollens

When Dr. Max Frei took his sticky tape samples from the Shroud in 1973 and 1978, he had no idea that there are flower images on the Shroud, so his specimens were taken at random as far as the flowers were concerned. We do have two good correlations already. On the Shroud map of the sticky tape samples prepared by Paul Maloney, I noted that tape 6B/d, which was taken from the area lateral to the forehead anteriorly on the anatomic right side, had been taken squarely in the middle of two of a cluster of *Cistus creticus* plants. I informed Mr. Maloney, who was examining these slides, that he ought to find the pollens of *Cistus creticus* on this particular slide: He said that he had been going over this very slide with a pollen expert only two or three days before, and the pollen expert had noted that there seemed to be a number of pollens of *Cistus creticus* on the slide.

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In addition, there was a retrospective correlation when Mr. Maloney called me to say that he had spotted apparently *Artemisia* pollens on sticky tape slide 4 B/d. Knowing that this tape had been taken from the fold of the anatomic left elbow, I went to this area and searched carefully to see what I might be able to find. Indeed, in the area where the tape was taken from, there turned out to be images of apparently the flowers and stems of *Artemisia judaica*. Dr. Max Frei had already identified the pollens of *Artemisia berta alba*, but this particular image on the Shroud certainly is not that plant. Apparently a number of the pollens of closely related plants are rather similar, although pollens are generally so individualistic as to be very helpful in identifying the particular plants.

Another interesting observation is that near the scorch areas the flower images are much more prominent and dense. This may correlate with Scheuermann's observation that images produced by coronal discharge on linen showed up much more vividly if the fabric was pressed with a hot iron.

X. Images and Icons

In comparing the photographs of hundreds of early images and icons with the face image on the Shroud, we were able to determine that the Shroud face image was very well known to early artists who produced exacting images on icons based on the Shroud face image. The remarkable detail of some of these icons would indicate that the prototype, which was the Shroud face, was available and was presumed to be an authentic image, as otherwise these painstaking and accurate reproductions would not have been made. We feel that through image comparisons we can show that accurate productions from the Shroud face circulated in certain areas and were frequently utilized as the basis for the depiction of Jesus in the paintings and carvings in the Roman catacombs as early as the third century. The polarized image overlay technique permits comparison of similar points, although there are of course wide variations in artistic style and skill of the artist.

In our research on early images and art work, we came across repeated observations by a number of experts in ancient art history referring to the abrupt appearance of the artistic style called frontality, first in depicting various gods, and then rulers, and finally common folk. The archaeologist and geographic historian Michael Avi-Yonah traced this development of frontality in multi-figured scenes in paintings, mosaics, and carvings in which the main figure directly faces the spectator with no regard to the rest of the scene. Such frontality was infrequent, quite the exception, in both Eastern and Western art until the first century A.D. Until then, gods were generally depicted in profile. Avi-Yonah traced the abrupt onset of frontality to a carved relief of Zeus Kyrios at Dura-Europos and dated by its own inscription to 31 A.D. The oversize head of the clothed god is turned toward the spectator at whom it stares fixedly. The next example of similar frontality was found in the relief carving in the temple of Bel at Palmyra dated 32 A.D. Both Dura-Europos and Palmyra were small trade cities in northern Mesopotamia, which had a close cultural interchange with Edessa, where historically the Mandylion (the folded Shroud) was taken in 30 A.D. This type of depiction spread rapidly in the Middle and Far East.

With the appearance and spread of frontality came a rather abrupt change in the character of the gods, with most of them becoming savior gods who listened and responded to and identified with common worshippers rather than being detached from

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human affairs. There is a sense of intense spirituality and interaction with the worshipper or onlooker. On examining a number of these, we noted that they have a strikingly similar appearance. Two of these images that are particularly well preserved are that of Zeus Kyrios in 31 A.D. and that of the god Aphlad in 54 A.D. By doing polarized image overlay comparisons of these faces with the Shroud face, we found that they have a number of striking features and similarities. This includes long flowing hair, beard, mustache, wide staring eyes, and lines across the neck. In each there is a gap in the beard which closely corresponds with that on the Shroud. We feel that this is evidence that the Shroud face was well known in the first century and had a profound effect on the depiction of other divinities in the area. The power of the divinities was thought to be in the face, and particularly in the eyes.

XI. Sequence of Byzantine Coins

Our attention was drawn early to the appearance of faces of Jesus on the Byzantine coins which were first produced by Justinian II between 692 and 695 A.D. We noticed the considerable detail on these and the eccentric eyes that are a rather common feature. By using the polarized image overlay technique, we found that these coins are incredibly accurate derivative images from the Shroud face. While the images of the face on the coins are from eight to nine mm in height from the crown of the head to the point of the beard, they have large numbers of congruencies with the Shroud face. On the first coin that we examined, we found about 145 points of congruence between the two, including remarkable similarity of blood stains, small marks, and even the wrinkles of the Shroud that were reproduced on the coin. There was an extremely highly skilled die cutter in the Byzantine Empire at this time who produced these incredible tiny images in the negative. The images are so small that the detail cannot be seen by the unaided eye, so there would be no apparent way one die could be copied from another.

More recently, Mt. Bill Yarbrough, a numismatist working with Shroud researchers, spotted a Byzantine tremissis, a coin of Justinian II that had an image that looks remarkably like that on the Shroud. Comparison of this tremissis coin face, which has a rather crude appearance, with the Shroud face shows, incredibly, that this coin image is a direct copy from the Shroud face rather than a derivative image as most of the icons are. The artists producing derivative images endeavored to be true to the Shroud image and yet to present the face in an attractive and traditional form. There are approximately 188 points of congruence between the image on the tremissis and that of the Shroud face. This is an extraordinarily rare coin, and we feel that this coin was probably a prototypic one which was not widely circulated because of its somewhat strange appearance.

Interestingly, the appearance of the Christ face on the Byzantine coins, we feel, gives backing to the history and availability of the Shroud. Accurate depictions of the Shroud face are found only on the coins which were struck between 692 and 695. Justinian II was deposed in 695, but returned to power 705-711. At that time, he again produced solidus coins with a depiction of Christ, but these depictions were radically different in appearance. The images on the solidus coins of the second reign, we feel, are based on the so-called Camuliana image, which was one of the other images of Christ not made with hands which appeared in the Middle East. This image was in Constantinople from the end of the 6th century, but was destroyed during the iconoclastic movement. We feel that after 700 A.D. the Mandyliion image was no longer available to the die cutters who were not able to get

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to Edessa, and so one of the other supposedly divine images was used as the basis for the depictions. The Christ faces disappeared during the iconoclastic movement. The next appearance of a Christ face on a solidus was in 843 during the reign of Michael III, but this depiction was rather crude. We feel that the crudeness indicates that the artist attempted to copy the earlier coins (692-685) and probably did not have access to the Shroud. Historically, the Mandylion was brought from Edessa to Constantinople in 944. The coins of Constantine VII beginning in 945 again accurately reproduce the Shroud face. Thus we feel that the Byzantine coins accurately depict the Shroud face when the Shroud itself in the Mandylion form was available to the die cutters.

XII. Flower Images on Byzantine Coins

On examining the large photographs of the Byzantine coins of Justinian II's first reign, we found regular and recurring patterns in the periphery around the head which amazingly have high correlation with the flower images that are apparent on the Shroud itself. On careful examination of the magnified images, we found that there are actually dozens of flowers reproduced on the coins, with remarkable fidelity to those found on the Shroud. These are abundantly clear on the solidii from the era of 692-695, but on the 705-711 solidii by Justinian II there is no evidence of these flowers. They do not appear again until the coins of Constantine VII after 945 when the Shroud image was again available in Constantinople to the die cutters. These flower images can easily fit on the head of a pin, and are too small to be copied from one coin to another in the detail which magnification reveals is present, which would indicate that the die cutter was looking directly at the Shroud and reproducing what he saw as accurately as he possibly could on the coins.

XIII. Image as That of a Human Body

To those of us who are trained in anatomy and surgery, the body of the figure on the Shroud is the image of a real body. The presumed discrepancies in the anatomic features have been shown by more detailed study to be due to reasons other than anatomic deficiency or artistic whim. The absence of the umbilicus we have shown to be due to the presence of bouquets over the abdominal area. The presumed lack of genitalia or their being covered by the hands is incorrect, as shown by Dr. Robert Haralick, who identified a six by nine inch folded cloth over the lower abdomen and genital area which he appropriately called a "modesty cloth."

More recently, in an article on the vertical alignment of the frontal image, a researcher commented on the breast and nipple images not being visible on the Shroud. He further speculated that the skin in that region apparently did not have enough relief structure to generate discernible contrast to be seen. Elaborating on that, he felt that this called the patterns of the coins over the eyes into question, because if the breasts failed to have sufficient relief to be visible, how could the coin inscriptions generate sufficient contrast to be seen. Stimulated by this, I went to the Shroud photographs to examine this area, and found clear evidence for both breast images in exactly the correct anatomic spots between the fourth and fifth intercostal space bilaterally. The breast and nipple images are anatomically correct and are shown in fine detail, even the areolar glands of Montgomery and the fine lactiferous duct openings. The anatomic left breast image is complete, as shown by the polarized image overlay comparison. The

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anatomic right breast is approximately one third obscured by the encroaching images of overlying flowers of the *Hyoscyamus reticulatus* plant. We feel the reason the breast shadows are not immediately visible is that the presence of multiple flower images in the area tends to obscure the anatomic landmarks and clarity. It is rather difficult to image any medieval artist being able to incorporate this anatomically correct detail in such a remarkable way.

XIV. Points for Future Studies

From our own studies and perspectives, we would suggest a number of areas of focus for forthcoming studies. Primarily, of course, is preservation and conservation of the Shroud. We feel that this not only means preservation of the object itself in a way which will provide for its safety and protection from deteriorating influences, but also the preservation of the image by a variety of improved techniques including various digital imaging photographs and advanced video studies of the Shroud so that the image might be permanently preserved and made widely available to researchers and scholars.

Second, we would encourage more detailed examination of the flower images. This would mean not only using image-recording techniques, since we now know the location of large numbers of the flowers, but also getting several sticky tape samples from the centers of several of these identified flower images using a technique similar to that of Max Frei. Preliminary studies by Paul Maloney indicated high concentrations of different pollens in different areas. Since the centers of a number of identifiable flowers can be accurately located, sticky tape samples off these areas should be examined for pollen and particulate matter. Such findings could give extremely high correlation between the images and the pollens, and this would be strong evidence in validating both the place of origin of the Shroud and its authenticity.

Certainly further detailed studies need to be done in the nature of the image formation. While we do not feel that coronal discharge alone is an adequate description or explanation of the image, certain features are compatible with coronal discharge. Certainly there are detailed ways of evaluating the image and the effect that the image-forming process has had on the Shroud itself.

In addition, we would strongly urge a detailed search for other images on the Shroud. Careful examination has shown there to be images of hundreds of objects on the Shroud itself in addition to the body. We feel that by further image analysis and optical comparisons more evidence of the early origin and the nature of the image on the Shroud of Turin can be determined.



EXTRACT FROM ARTICLE "FROM THE TURIN FRONT" IN THE MAY 1991 ISSUE
OF *THE HOLY SHROUD GUILD NEWSLETTER*, USA
Father PETER M. RINALDI, S.D.B., Turin and New York

I wish I could give you better news about the Shroud. The truth is that the Relic, which used to attract hundreds of visitors daily, now lies in total abandonment in the Cathedral's Royal Chapel. For the last ten months, the Chapel has been out of bounds for visitors, its massive bronze doors closed because of repairs now in progress on its great dome, one of Europe's architectural wonders.

I am not overly encouraged by what I found in Turin with regard to any progress on an early scientific investigation of the Shroud. We know, of course, that on August 19 last year, Pope John Paul II transferred all matters regarding the conservation and veneration of the Shroud to the direct responsibility of the new Archbishop of Turin, Giovanni Saldarini. Thus far, here in Turin, no direct, positive action has been taken to initiate a new investigation into the Shroud. This, in spite of the fact that the Archbishop has repeatedly stated that he will welcome any and all qualified proposals conducive to a serious research on the Shroud.

I was unable to speak to the Archbishop due to the fact that he was convalescing from a protracted illness. I did speak, however, with several Shroud experts close to him. The overall impression I was left with is that he does intend to move on the Shroud, but not at any time soon, whatever the reason.

One of my informers made the point that the Archbishop is in the process of setting up a data bank of all the results obtained in past research. "As to any decision on procedure," he added, "the Archbishop keeps his counsel to himself."

"What we do know," my informer went on, "is that the Archbishop is concerned with the conservation and preservation of the Shroud since he was told that it is deteriorating at a rather fast pace. On this he has no choice, and must take action soon. But how soon will that be?"

Clearly since any action he is likely to take will be dictated by his concern to stave off any further deterioration of the Shroud, it is essential that interested groups and individuals present to him definite proposals on the all important point of conservation.

More than anything else at this point, the need and the urgency to save the Shroud should induce the Church authorities to place it as soon as possible in the hands of qualified experts.

Shroud News began in 1980 when Rex Morgan, author of three books on the subject of the Holy Shroud (*Perpetual Miracle*, *Shroud Guide*, and *The Holy Shroud and the Earliest Paintings of Christ*) started putting together a few notes about current developments in Sindonology (the study of the Shroud of Turin) for a small circle of interested people in his home country of Australia. He didn't expect it to go beyond a few issues.

The bulletin now reaches subscribers all over the world and it is written and produced and the information disseminated more quickly than most news-sheets of a similar kind or the more prestigious Shroud publications. It contains information, news, articles and illustrations gathered from sources of Shroud study worldwide through Rex Morgan's extensive network of personal connections with what has been described as the "Shroud Crowd".

Rex Morgan is a frequent traveller overseas and this has given him the opportunity to keep abreast of latest developments in Shroud study and research at first hand. He was present at the world media preview of the Shroud itself in August 1978 in Turin, Italy and has met with numerous Shroud researchers in many countries. His quest for Shroud information became, as he described it, "a passionate hobby". He brought the world-famous Photographic Exhibition created by Brooks Institute, California, to Australia, New Zealand, Hong Kong, Macau and Canada and during those tours it attracted more than 600,000 visitors. The exhibition was subsequently donated by Brooks Institute to the non-profit making organisation, The South East Asia Research Centre for the Holy Shroud (SEARCH) of which Morgan is President. He is also a member of the Board of Directors of the USA based Association of Scientists and Scholars International for the Shroud of Turin (ASSIST) and was a member of the scientific team which conducted environmental experiments in a Jerusalem tomb in 1986 (The Environmental Study of the Shroud in Jerusalem). He has made several original contributions to the research of the Shroud, has presented papers at international conferences, has written many articles and given numerous broadcasts and telecasts on the subject in many countries.

The list of *Shroud News* subscribers continues to increase internationally and the publication has been described many times as one of the best available. Its production is obviously privately subsidised as we still request a subscription in Australia of only \$6 for six issues posted. *Shroud News* comes out six times per year. The USA subscription is \$US 6 (posted surface mail) or \$US 12 (posted airmail). Postage to other countries varies. ALL back issues are available at \$1 (US or Aust) each plus postage charges except the famous 50th issue which is \$3 plus post.

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