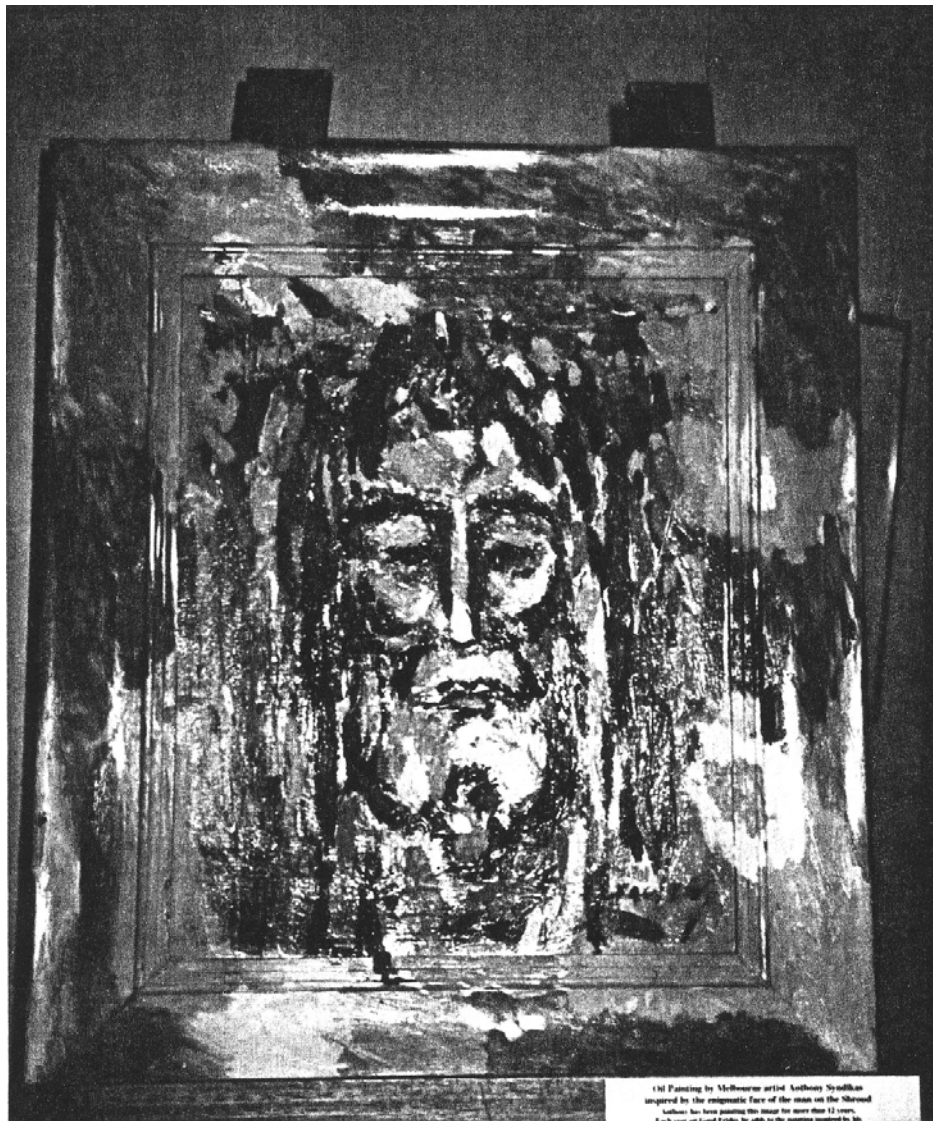


A NEWSLETTER ABOUT THE HOLY SHROUD OF TURIN
A NEWSLETTER ABOUT RESEARCH ON THE HOLY SHROUD OF TURIN
published in Australia for Worldwide circulation
edited by REX MORGAN, Author of several books on the Shroud
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Painting of the face of Christ after the Man in the Shroud
by a Melbourne artist

EDITORIAL

There is a small item in this issue telling us about an exhibition of Shroud photographic material in America which caused a great deal of interest. It is remarkable how many exhibits of this kind exist all over the world and continue to be shown despite the media-led lack of interest in the subject since 1988. It was equally encouraging to read (albeit in an Italian journal rather than any Southern Hemisphere source) of the success of a recent conference on the Shroud held in Jakarta, Indonesia. It was inspired by Father Gabriele Antonelli and commanded an attendance of more than 500 in a country which has only a small adherence to the Christian faith.

We also report the good news of yet another language edition (Polish this time) of the important book by Petrosillo and Marinelli of Rome.

In recent months a good deal of publicity has been gained by two American researchers who have produced yet another version of the theory for a manmade image on the Shroud. Supported by arch-skeptics Nickell and McCrone their paper contains a good deal of baffling scientific formulae but at least their conclusion is scientific enough to suggest that what they say is only a possibility. The American press took them up with gusto and we reprint their paper this month. One *Shroud News* reader summed it up with the words, "Others got a crayon set for Christmas". Noted expert on the Shroud, on art technique and art history and, hardly incidentally, nuclear physicist Isabel Piczek has written a well argued rebuttal of the newly advanced variation on this tiresome theme which is also published herein.

The indefatigable Alan and Mary Whanger of the USA have published more of their findings as a result of their close studies of the images on the Shroud. Now that Alan has retired from active medical practice he is able to devote even more time to his fascinating discoveries. And we await news of his work on the original Max Frei collection of Shroud pollens now in his possession.

In the next issue I hope to review another new book from the pen of English author Rodney Hoare, *The Turin Shroud is Genuine: the Irrefutable Evidence*. His previous books were *The Testimony of the Shroud* (1978) and *A Piece of Cloth* (1984).

So the work on this remarkable subject continues relentlessly world-wide.

REX MORGAN

THE SHROUD OF TURIN - NEW EVIDENCE

- Dr Alan Whanger and Mary Whanger, USA

New evidence on the nature of the formation of the image
and on the identification of the individual whose image is on the Shroud

New evidence showing that the image on the Shroud of Turin was produced by two types of radiation is presented by Dr. Alan Whanger, Professor Emeritus of the Duke University Medical Center in Durham, North Carolina, and his wife and co-researcher Mary, both of whom have been major researchers on the Shroud since 1979.

During the last decade, the Whangers have shown that there are images of many objects on the Shroud in addition to that of the body of a crucified man, and that these images have many of the appearances and characteristics of images made by coronal discharge. This is a high voltage high frequency electrical discharge which comes off the irregular surfaces and high points of all objects in its field.

More recently, they produced a three-dimensional enhancement of the Shroud images by superimposing the positive and negative photographs and moving them slightly out of vertical alignment. This enhancement shows much more detail than can be seen on a single photograph. Upon examining a 3-D enhancement of the hands, they saw clearly the images of the bones in the hands and wrist. This led them to look closely at a 3-D enhancement of the face, which shows the exacting image of the skull. Using their Polarized Overlay Technique to compare the 3-D enhancements with X-rays of hands and a skull, they found clear evidence of autoradiation. Even the individual wrist bones can be identified and it is plain where the nail went through the wrist. The eye sockets, the nasal bones, the sinuses, and about 20 teeth accurate in detail including the roots can be rather clearly seen. These findings have been reviewed by a number of physicians, including three professors of radiology, who all immediately agreed that this shows an autoradiograph, which means that the X-rays came out from every part of the body to form the image of that part of the underlying skeletal system which was fairly close to the surface. These new detailed images show clearly that the reason for the appearance of the very long fingers and of the wide eyes is the underlying skeletal image.

Others have also noted some of this evidence of X-radiation. Over 10 years ago Dr. Giles Carter found some of this, but he did not pursue it because he was told his observations were not correct. More recently, Dr. John Jackson spotted the bone images of the hand and left thumb.

Previously released findings by the Whangers include the identification of images on the Shroud of a crucifixion nail, a Roman spear, a sponge on a stick, and a crown of thorns all placed beside the body in the Shroud, a piece of fine linen 14 feet long by 3 feet 7 inches wide on which the body was laid and which was then simply folded over the body lengthwise. Other findings already released include the images of hundreds of flowers which had been banked around the body inside the Shroud. Of these, they were able to identify 28 species, 20 of which grow in Jerusalem and the other 8 within 12 miles of Jerusalem. Their common blooming time is March or April. By careful examination, the Whangers determined that these flower images were made between 24 and 36 hours after picking. The earlier work of Dr. Max Frei, a Swiss criminologist and botanist who in 1973 and 1978 took sticky tape specimens from the Shroud, on the identification of pollens found on the Shroud, provided verification for the observations on the flower images, as he had identified pollens of 25 of the 28 species.

NEW EVIDENCE - Whanger (cont'd)

Other earlier findings of the Whangers dated and localized the origin of the Shroud to Israel in about A.D. 30. These include the detailed images of two different coins (leptons, or "widow's mites") of Pontius Pilate, one placed over each eye, both dated A.D. 29; and statuary based on the Shroud face image dated 31 A.D.

In their thousands of hours of detailed examination of high grade life sized photographs of the Shroud images, both positive and negative, the Whangers found many other objects, including two scourges, a large hammer, a pair of tongs for pulling the nails out, and two desecrated Jewish phylacteries or prayer boxes, all of which are consistent with first century Roman crucifixions of Jews as well as with the Biblical account of the crucifixion of Jesus.

Another finding which strongly reinforces the identity of the victim is the image on the Shroud of the title or *titulus*, which by Roman custom was the sign fastened on the cross giving the victim's name and crime. Helena, mother of Constantine the Great, went to Jerusalem in the early A.D. 300's to search for the holy places. She reportedly found the tomb with objects in it, including the title with the words "Jesus of Nazareth King of the Jews" in three languages, Hebrew, Greek, and Latin. She divided the title into three pieces, leaving one in Jerusalem, sending one to Constantinople, and taking one to Rome. Visible on the Shroud and consistent with the copy of the section of the Title taken to Rome are images of the mostly intact letters Z, A, and E from the Greek inscription, and of several fragments of letters from the Latin.

All of these findings refute the widely held notion that the Shroud is a medieval artistic production or fake. The result of the carbon 14 testing of the single specimen taken from the Shroud in 1988 showed the carbon 14 content to be consistent with a date of A.D. 1260 - 1390. For whatever reason, the original scientific protocol for the sample taking and testing drawn up in 1986 by a group of 24 carbon dating experts was completely bypassed. Photographs of the taking of the sample show it be from a section of the Shroud which had been repaired and rewoven, probably late in the 17th century. Subsequent testing of threads from the Shroud has shown that there are living fungi and bacteria growing within the tiny linen fibers. The conditions of the fire of 1532 which superheated and scorched the Shroud resulted in the deposit of carbon 14 from medieval fabrics which wrapped the Shroud into the inside of the linen fibers.

All of the above would introduce late origin carbon 14 into the sample which could not be removed by the usual cleaning methods, and would thus make the tested specimen appear significantly younger than it really is.

The findings that the images were formed by mixed radiation at the time that the body was abruptly disappearing from within the Shroud without being unwrapped defies any natural or scientific explanation. Most of the physicists who have seen the evidence for this have said that they have no explanation for it, but Dr. Thaddeus Trenn of the University of Toronto, Canada, theorized that enough energy was put into the atoms of the body to overcome the force that holds the nuclei together, producing what he calls "weak dematerialization." This would release the protons and neutrons in the nuclei and the displacement of the electrons from their orbits. The results of this would be the release of soft X-rays, the production of coronal discharge by free electrons, and the bombardment by neutrons of the ordinary carbon 12 and the nitrogen in the Shroud fabric which would produce new carbon 14. This means that the carbon 14 dating is interesting, but of no value in determining the actual age of the linen which is the Shroud.

NEW EVIDENCE - Whanger (cont'd)

A number of notions and theories trying to explain how some medieval artist may have produced the Shroud keep surfacing from time to time, but none of them have been able to produce anything resembling the anatomic perfection, the extensive details accurate to a fraction of a millimeter, the physiologic accuracy and exacting details of such things as the Pontius Pilate coins, an amulet of Tiberias Caesar which hangs around the neck of the Man of the Shroud, first century Roman spear and crucifixion nails, or twenty-eight two-day-old flowers from Israel, many complete with their pollen. Proponents of these theories ignore the fact that there were many ancient artists and iconographers who had access to the Shroud face image and, presuming it to be authentic, copied it with extraordinary skill in a wide variety of media. Existing portraits of Jesus from the 3rd and 4th centuries are based on the Shroud, and from the 6th century on the Shroud face image was well known and formed the basis for almost all depictions of Jesus. There are Byzantine coins from the 7th century bearing the face of Jesus less than 3/8 inch (9 mm) in height which have 150 to 180 points of congruence with the Shroud. In a court of law it takes only 45 to 60 points of congruence to establish the identity of two faces as being the same.

To continue to assume that the Shroud of Turin is a medieval production requires that one ignore a mass of information and observations gathered by hundreds of experts in many fields over many years indicating otherwise. The recent confirmation by the Whangers of the impression held by a number of investigators that the image on the Shroud was caused by radiation energy puts the Shroud totally out of the possibility of its being any kind of artistic production. This, plus the self-dating of the Shroud image by the presence of two Jewish coins dated A.D. 29 over the eyes, the graphic evidence of a terrible scourging and crucifixion of a Jewish male in his 30s, the images of many objects on the Shroud associated with the crucifixion and burial, the evidence of the disappearance of the body from the Shroud about 36 hours after burial, and the presence of letters on the title indicating that this is Jesus of Nazareth leads to the conclusion that the Shroud of Turin is indeed the burial cloth of Jesus of Nazareth with a unique image produced by X-radiation and electron coronal discharge, presumably by whatever occurs at a resurrection.



Dr. Alan Whanger

IMAGE FORMATION AND THE SHROUD OF TURIN

- Emily A. Craig and Randall R. Bresee, USA

This article is taken from the *Journal of Imaging Science and Technology* Jan/Feb 1994. It received wide publicity in American popular press.

Both the first written historical record and modern radiocarbon analysis date the cloth known as the shroud of Turin to the 13th or 14th century. Interestingly, many people have remained convinced that the cloth was used as the burial shroud of Jesus and thus must be approximately 2,000 years old. The primary reason usually cited for this belief is the inability of scientists to explain how a 13th or 14th century artist could have created the image on the cloth that is continuous tone, exhibits fine detail without brush strokes, is a negative image, and accurately represents an abundance of three-dimensional information. In this paper, we will show how the carbon dust drawing technique used by medical illustrators can be modified to produce images exhibiting numerous features of the Turin cloth. We compared images formed using the technique with image attributes reported for the Turin cloth and showed that the dust transfer technique is able to form images more similar to the Turin cloth than any previously described technique. Because tools, materials, and concepts required to use the drawing technique have been available for centuries, we concluded that a 13th or 14th century artist could have created the image on the cloth known as the Shroud of Turin.

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Introduction

The cloth known as the shroud of Turin is an ivory-colored linen cloth measuring 4.3 m by 1.1 m and is believed by many people to have covered the body of Jesus of Nazareth when he was placed in a tomb nearly 2,000 years ago. The cloth contains a yellow-colored, life-sized image of a man (Fig. 1) that faithfully reproduces the Gospel accounts of the appearance of Jesus. The first recorded exhibit of the Turin cloth occurred in the early 1350s, and it has been enshrined in the Royal Chapel of Turin in Italy since 1578. The Shroud of Turin Research Project spent five days and nights analyzing the cloth in 1978. Although not unanimous, this group presented compelling evidence that the Turin cloth was in fact the burial shroud of Jesus. However, radiocarbon dating performed in 1988 concluded that the cloth originated between 1260 and 1390 A.D.¹ These dates agreed with the first recorded appearance of the cloth and cast serious doubt that the cloth existed nearly 2,000 years ago. Interestingly, many people have remained convinced that the Turin cloth was the burial shroud of Jesus. The primary reason usually cited for this belief is the inability of scientists to explain how a 13th or 14th century artist could have created the image on the cloth.

When the cloth was photographed in 1898, the glass plate negative revealed a continuous-tone image of a man

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that was positive instead of the usual negative. This meant that the image on the cloth was negative rather than positive. When modern image analysis began in 1974, the negative image was found to contain an impressive amount of accurate three-dimensional spatial information. That is, body locations were represented substantially more accurately on the cloth than on typical paintings and photographs.² Other attributes reported for the image on the cloth are that it is barely discernible, it exhibits no apparent brush strokes, and it exhibits no evidence of layering (i.e., the image was applied all at once).

An important question that still remains to be answered is, "Did someone have the knowledge and capability in the 13th or 14th century to produce the image on the Turin cloth?" Scientists have offered numerous hypotheses about image formation on the cloth. An excellent summary of these hypotheses has been provided by Schwalbe and Rogers³, so only a few details will be reiterated here.

Written evidence that the image on the cloth was painted by an artist dates to the 1300s.⁴ Modern scientific analysis identified several types of colored particles on adhesive tapes used to remove substances from the surface of the cloth. In particular, iron oxide particles were found on all tapes from "blood" areas, two thirds of the tapes from "body" areas, and none of the tapes from nonimage areas of the cloth.⁵ Tempera (made from collagen, egg albumen, or milk casein) accompanying the iron pigment also was identified and may have contributed to image formation by causing fiber discoloration.⁶ This and other evidence led McCrone to conclude that the image on the Turin cloth could have been formed by an artist using an iron tempera paint applied as a dilute liquid suspension.

Several arguments opposing this hypothesis have been presented.⁷ No evidence of capillary flow between fibers of the cloth have been reported. X-ray fluorescence did not detect substantial differences in iron concentration between image and nonimage areas of the cloth bulk. The yellow color of fibers was not extractable by solvents, as might be expected for collagen. Mass spectrometry, histological staining, and ultraviolet fluorescence failed to detect the presence of collagen in important image areas. Most importantly, experimental images formed with dilute tempera paint contained little accurate three-dimensional information.

McCrone's technique was modified by Nickell, who applied solid iron oxide to linen by rubbing over a bas relief.⁸ However, the amount of three-dimensional information produced by this method was substantially limited by the inherent qualities of bas relief sculpture. In addition, image distortion was introduced as a fabric draped over a three-dimensional sculpture was removed and flattened to two dimensions.

IMAGE FORMATION - Craig and Bresee (cont'd)

Several hypotheses that have been proposed attempt to explain image formation as involving oxidation and dehydration of cellulose to produce yellow-colored fibers. Of the many ways to achieve this change, the most likely mechanism has been proposed to involve transfer of a substance that either produces the image directly by oxidation/dehydration or acts as a catalyst that sensitizes the cloth to image development later through another process such as heating.⁹ Pellicori used this latent image process and replicated the color and chemical properties of the Turin image better than had other workers. He applied various uncolored substances to linen and heated the fabric. The substances catalyzed cellulose oxidation/dehydration, which produced colored fibers to form an image. Several problems with this process remain, however.³ No sensitizing substance has been detected on the Turin cloth, although it has been recognized that a sensitizing substance may have been lost by washing, evaporation, or decomposition.⁷ In addition, Pellicori's experiments failed to control the depth of penetration suitably. Most importantly, his process failed to produce accurate three-dimensional information, which is one of the most important attributes of the Turin cloth.

After much hard work, no hypothesis has been provided to identify a suitable mechanism of image formation on the Turin cloth. We will show in this report that the image on the cloth could have been formed by a simple drawing technique that uses technology available to 13th century artists. The technique may be implemented many ways to satisfy various image attributes reported for the Turin cloth. That is, the drawing medium may be iron oxide, iron oxide and collagen, or an uncolored sensitizing substance. Of particular importance is that images produced by this method are rich in three-dimensional detail.

The Dust Transfer Technique

The technique of carbon dust drawing has long been used by medical illustrators to render images that reveal few brush strokes, contain fine detail, and exhibit photograph-like continuous transitions between light and dark. For this technique, dry powder (finely ground carbon or charcoal) is gently brushed onto a surface, using a soft artist's paintbrush. We modified this drawing technique several ways to obtain various image attributes.

We found that many substances besides carbon could be used for drawing. Nearly any material (colored or colorless) that can be ground into a fine powder is suitable. For example, increased image permanence on linen fabric may be obtained by applying a mixture of a colored pigment and collagen and then dissolving the collagen with steam to bind pigment to the fibers.

To duplicate the characteristics of the image on the Turin cloth, a faint negative image had to be created in a way that revealed no brush strokes and accurately represented detailed three-dimensional structure. We dipped the tip of a clean, dry, soft artist's watercolor paint brush into dry dust, gently tapped the brush to remove excess dust, and then drew the brush across a drawing surface in short, delicate strokes. The amount of dust applied with individual brush strokes was nearly indiscernible to the naked eye, but the brush strokes were repeated again and again from slightly different angles to build up dust in areas corresponding to the greatest numbers of brush strokes.

It is well known that the texture of a drawing surface affects the way pigment transfers from a brush. For example, brushing across the surface of a woven fabric



Figure 1. The shroud of Turin. (Published with permission from Vernon Miller).

deposits much pigment perpendicular to yarns in a way that has been referred to as "snow-fencing." Another problem arises when pigment is applied as a liquid, because capillary action causes movement through the fabric unless the liquid is very viscous. We found that snow-fencing and pigment movement can be reduced by first applying dry pigment to a relatively smooth drawing surface and then mechanically transferring the pigment

IMAGE FORMATION - Craig and Bresee (cont'd)

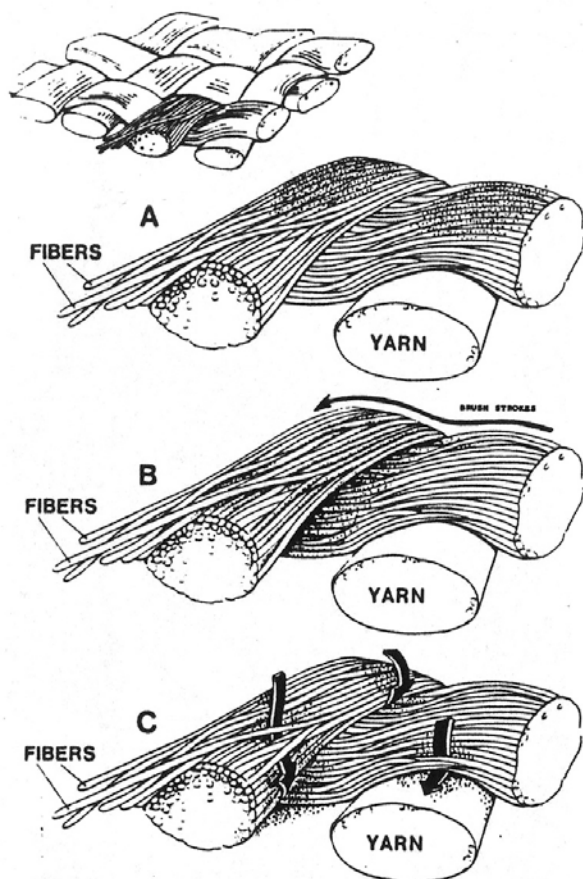


Figure 2. Illustration of colored woven fabric. (A) Dry pigment transferred from a drawing by using dust transfer technique. (B) Dry pigment brushed directly onto the fabric. (C) Wet pigment brushed directly onto the fabric.

to the final textured material with gentle rubbing. Figure 2 illustrates pigment transferred to a woven fabric in this manner with dry and liquid pigment transferred directly from a brush.

Successful artists, illustrators, and photographers translate the three-dimensional world into two-dimensional pictures by using shading and perspective. Although two-dimensional pictures often seem to represent the three-dimensional world accurately, the effects are achieved by light and dark areas that mimic highlights and shadows. Pictures created in this way generally do not duplicate the actual three-dimensional surfaces of the subject matter. This property can be observed when a photograph or other conventional picture is viewed as a three-dimensional surface and spatial relationships are seen to be confused and distorted.

We found that three-dimensional information could be accurately represented in a dust transfer drawing if the highs and lows of subject topography were simply correlated with dust buildup. Subject areas that are higher in relief are rendered with less dust buildup, and areas that are lower are rendered with more dust. A negative image can be produced simply by reversing this procedure to obtain a reverse topographical image. When this regimen

is followed, an image can be easily drawn that accurately represents three-dimensional spatial information in either the traditional positive or negative view. A negative image produced by this process does not require complicated technology or knowledge of photography but simply involves conventional drawing along with artistic reversals of high and low. If an artist wanted to produce an image on cloth that looked as if it covered a human corpse, the reverse-topography drawing could be created easily to mimic cloth-to-body distance.

If the dust transfer technique described in this paper was used to create the image on the Turin cloth, a surface for creating the initial drawing must be identified. Almost any smooth, slightly porous surface available to 13th or 14th century artists might have been used. For example, the original drawing could have been rendered on vellum, a writing material prepared by soaking the skins of calves in pits.¹⁰ It has been pointed out that residue from the soaking solution would be expected to remain on the skins and might have been transferred to the linen fibers of the Turin cloth, thus accounting for the traces of other chemicals documented in the Shroud of Turin Research Project study. Paper also could have been used as the original drawing surface, because it was readily available in long lengths. We used newsprint for our reproduction technique, because this coarse paper made from wood pulp has properties similar to, though not identical to, those of 13th or 14th century paper.

If the image on the Turin cloth were created using the dust transfer technique, the only tools required for transfer of dust from the original drawing surface to linen cloth were a flat working surface and a flat piece of wood for rubbing. The images we created for this report were transferred by laying the initial newsprint drawing on a table, placing a piece of linen over the newsprint, and then pressing the linen against the newsprint by firm rubbing with the flat side of a wooden spoon.

Experimental Results

We compared attributes of images created using the dust drawing technique described herein to image attributes reported for the Turin cloth. We used various powdered substances to produce images. An example of an initial image drawn on newsprint using a mixture of iron oxide and collagen dust is shown in Fig. 3(a), and the corresponding image on linen fabric after transfer is shown in Fig. 3(b). As reported for the Turin image, the overall hue of the image was faint reddish-brown and was a negative view. This was more easily seen after the linen was photographed and the negative film was viewed, as shown in Fig. 3(c). The film revealed a life-like positive likeness of a person.

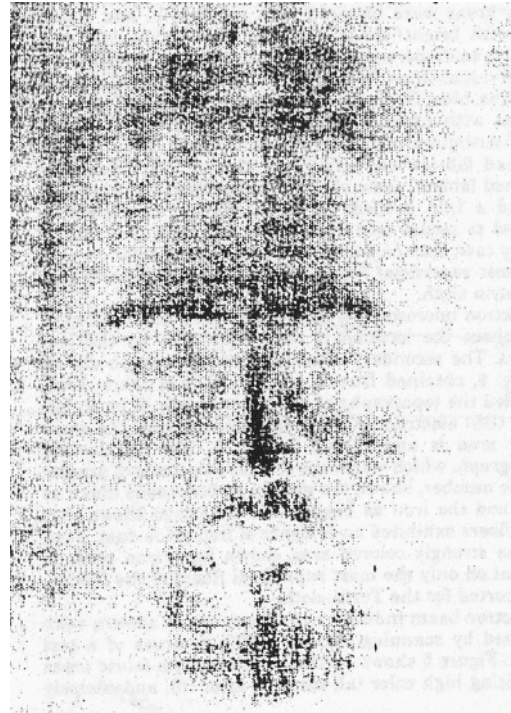
Because collagen was reported⁶ to be present as a thin coating on fibers of the Turin cloth, we held the linen fabric shown in Fig. 3(b) over a pan of boiling water to dissolve the collagen. It is possible that a similar steam process was part of the original image-formation process for the Turin cloth. It also is possible that steaming occurred accidentally at a later date. That is, the well-known fire of 1532 was doused with water, which could have created steam to dissolve the collagen. It is also possible that collagen was not involved in image formation on the Turin cloth in any way but was present only as a contaminant. At any rate, we successfully created images, using iron oxide dust or iron oxide and collagen dust, either with or without steaming.

Visible light microscopy was used to locate iron oxide and collagen dust on experimental fabrics. Fibers from

IMAGE FORMATION - Craig and Bresee (cont'd)



a



b



c

Figure 3. Image created with iron oxide/collagen dust. (a) Initial image drawn on newsprint. (b) Image on linen fabric after transfer from newsprint. (c) Photographic negative of the image on linen fabric.

IMAGE FORMATION - Craig and Bresee (cont'd)

image areas were removed from test fabrics and examined with brightfield illumination. Iron oxide dust was found to be dispersed relatively uniformly on the surfaces of individual linen fibers. Fibers also were stained with toluidine blue 0, a stain that produces a blue color on contact with proteins. Stained specimens revealed that the distribution of collagen dust on most fibers of unsteamed fabrics was similar to that of iron oxide. For steamed fabrics, some of the collagen dust dissolved and formed a thin coating on the surface of fibers, which seemed to secure iron oxide dust onto individual fibers. In any case, iron oxide and collagen were present only on the most superficial fibers of the fabrics, as reported for the Turin cloth.

Electron microscopy was used to obtain more information about the location of iron oxide dust on the test fabrics. The secondary electron photomicrograph shown in Fig. 4, obtained from a strongly colored fabric area, revealed the topography of the woven fabric. A backscattered (BS) electron micrograph obtained from the same fabric area is also shown in Fig. 4. The BS electron micrograph, which was more sensitive to atoms of greater atomic number, shows the mainly carbonaceous fibers as dark and the iron as bright. The BS image shows that most fibers exhibited no evidence of iron oxide dust. Even for the strongly colored area shown here, iron oxide is present on only the most superficial fibers of the fabrics, as reported for the Turin cloth.

Electron beam induced x-ray fluorescence spectra were obtained by scanning $300\mu\text{m} \times 300\mu\text{m}$ areas of a test fabric. Figure 5 shows spectra obtained from fabric areas exhibiting high color (a),

medium color (b), and scarcely discernible color (c). Spectrum (a) shows that the dominant peak from a highly colored fabric area is the iron line, although silicon (Si), sulphur (S), and calcium (Ca) lines also are present. Spectra from fabric areas exhibiting less color displayed a reduced iron peak intensity, as seen in Spectrum (b), wherein the iron peak intensity is reduced by a factor of ten or more, and Spectrum (c), wherein the iron peak is undetectable above spectral noise. This series shows that a correlation exists between image color density and the amount of iron detected by x-ray analysis. In addition, these data show that color is detectable by the eye when the iron x-ray signal is too small to be detected by x-ray analysis over a $300\mu\text{m} \times 300\mu\text{m}$ fabric area (Spectrum (c)).

Pellicori determined that iron oxide (Fe_2O_3) could not be responsible for the image on the Turin cloth, because it would not be detectable by the human eye when present in concentrations $< 5\mu\text{g}/\text{cm}^2$ (9). To compare our results to Pellicori's conclusion, we deposited $5\mu\text{g}/\text{cm}^2$ chromium over a fabric area exhibiting medium color, using a precision coater equipped with a calibrated quartz-crystal thickness monitor. Chromium was chosen because it was located near iron in the Periodic Table and was resolved from it by the x-ray system. Spectrum (d) reproduces Spectrum (b) along with a spectrum from the same fabric area after chromium had been deposited. The replotted iron peak can be seen to be only 5-10% as high as the chromium peak when chromium existed at a concentration of $5\mu\text{g}/\text{cm}^2$ on the same fabric area. Because color on this fabric area was detected by the human eye, we can conclude that iron oxide contributes significant visual color density to the fabric at a coverage level well



(a)



(b)

Figure 4. Scanning electron micrographs of strongly colored image area on linen fabric created with iron oxide. (a) Secondary electron image. (b) Backscattered electron image.

IMAGE FORMATION - Craig and Bresee (cont'd)

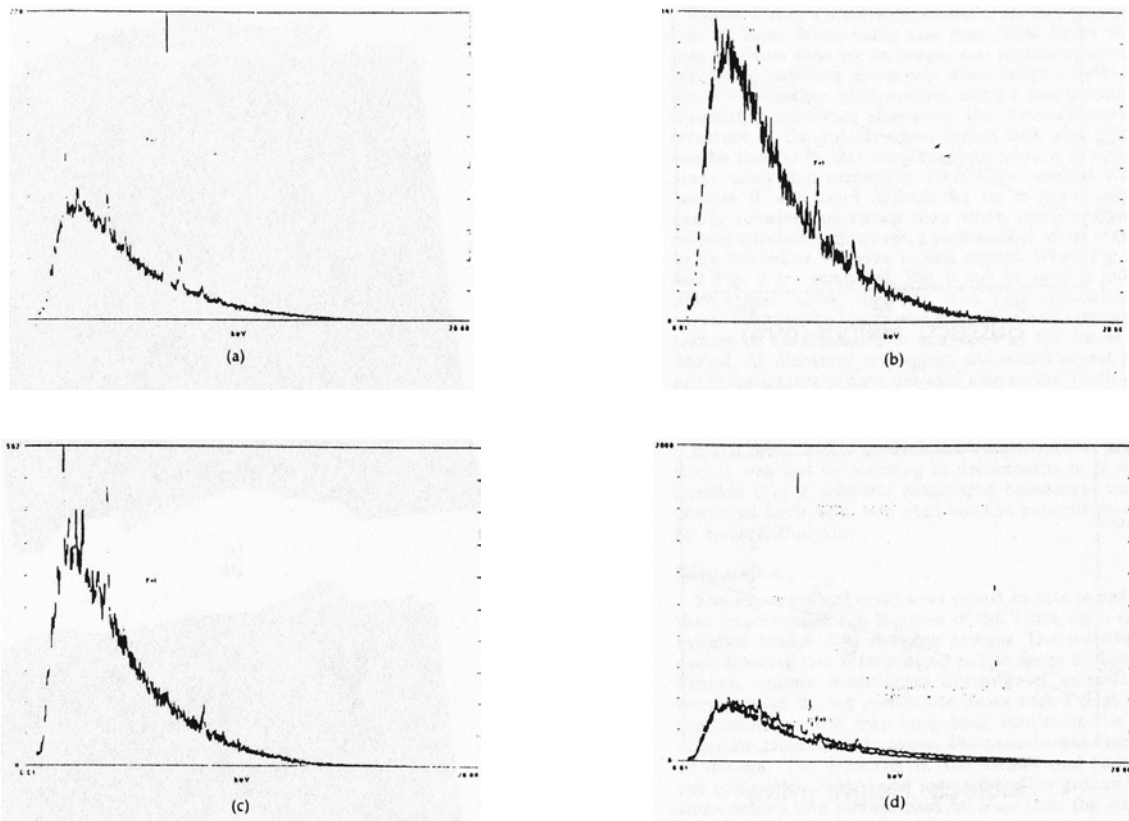


Figure 5. Electron beam induced x-ray fluorescence spectra from image areas created with iron oxide/collagen on a linen fabric. (a) Area exhibiting high color. (b) Area exhibiting medium color. (c) Area exhibiting barely discernible color. (d) Spectrum from medium color area replotted along with a spectrum from the same area after chromium deposition.

below $5 \mu\text{g}/\text{cm}^2$, and probably as low as $0.5 \mu\text{g}/\text{cm}^2$. Because the coverage of iron oxide is very localized on a microscopic scale, one might expect that the sensitivity of the optical reflectance technique used by Pellicori was reduced compared with the case of uniform iron coverage, because his technique sampled a substantial fabric area.

Next, the accuracy of the three-dimensional information in experimental drawings was assessed. The head and face of a life-sized manikin were drawn on newsprint as a negative image with iron oxide/collagen, using the technique described above. The manikin was also photographed. Both images (drawing and photograph) were illuminated with diffuse light and then imaged with a video camera, which in turn was interfaced with a personal computer. Computer images of the photograph and drawing were acquired as positive images (to facilitate interpretation later) and stored on the frame grabber with 512×512 spatial resolution (262,144 pixels) and 8-bit gray level resolution (256 gray levels). The accuracy of three-dimensional information in each image was assessed both qualitatively and quantitatively.

An attempt was made to assess the accuracy of three-dimensional information in the photograph and drawing quantitatively as follows: Thirty-three facial features (e.g., tip of nose) were located on each of the original digitized images, and the pixel gray level

was recorded at each (d) location. Then, each of the same 33 features was located on the manikin and the height of each feature was measured from a plane behind the manikin. If structural information were accurately represented in an image of the manikin, a plot of feature gray level (in the image) versus feature height (on the manikin) would be expected to correlate in some way. Figure 6 shows these plots for the photograph and for the dust drawing, along with the best fit linear regression, line for each data set. Little correlation between the photograph's gray levels and feature height measurements was observed ($R^2 = 0.19$). This result indicated that feature height was not represented accurately by gray level in the photograph of the manikin. A stronger correlation was observed for the drawing ($R^2 = 0.591$, indicating that feature height was more accurately represented by gray level in the drawing of the manikin).

To assess three-dimensional information qualitatively, we prepared three-dimensional surface plots from digitized images of both the photograph and the drawing. Commercially available software for technical graphing and data analysis (AXUM by Trimetrix, 444 NE Ravenna Blvd., Seattle, WA) was used for both data reduction and plotting. First, pixels were deleted to provide a square array of 480×180 pixels. Then successive pairs of pixel columns were averaged row-by-row, and successive pairs

IMAGE FORMATION - Craig and Bresee (cont'd)

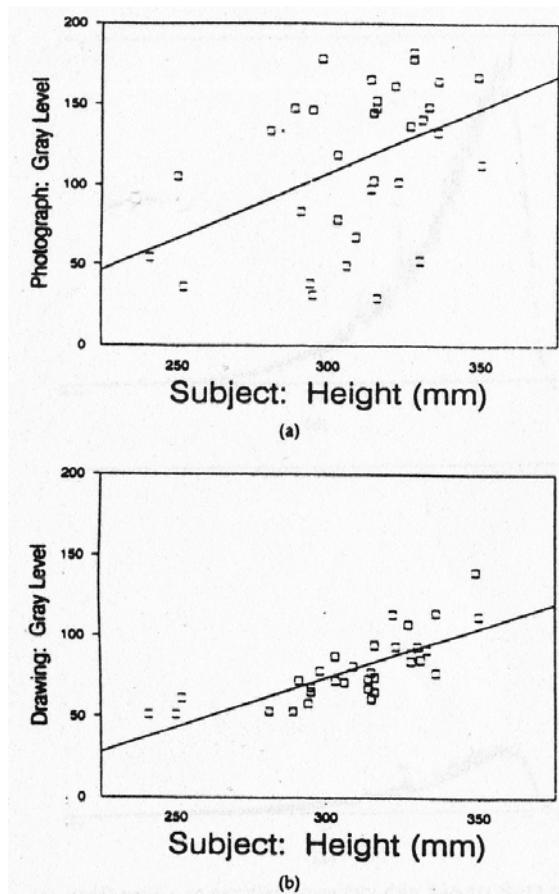


Figure 6. Feature gray level (in image) versus feature height (on manikin). (a) From photograph. (b) From dust drawing using iron oxide/collagen.

of pixel rows were averaged column-by-column. This operation smoothed the data and reduced the data set to a 240 x 240 array (57,600 pixels). Then even-numbered pixel columns and even-numbered pixel rows were deleted to reduce the data set again by a factor of four to achieve a 120 x 120 pixel array.

Using the reduced data set, three-dimensional surface plots were prepared by plotting image gray level at each pixel location. These plots allowed us to determine qualitatively if image gray level represented subject height. Plots are shown in Fig. 7 for the manikin's head. The gray level information of the photograph can be seen to have confused and distorted the three-dimensional spatial relationships of the manikin. The dust transfer drawing, on the other hand, represented the manikin's three-dimensional structure substantially more accurately.

When dust drawn images were transferred from newsprint to fabric, three-dimensional information on the fabric became slightly less clear. This result is shown in Fig. 8, where three-dimensional surface plots are provided for an image drawn on newsprint (Fig. 8(a)) and after transfer of this image to linen fabric (Fig. 8(b)). Image deterioration after transfer occurred because the image signal intensity decreased (not all pigment transferred

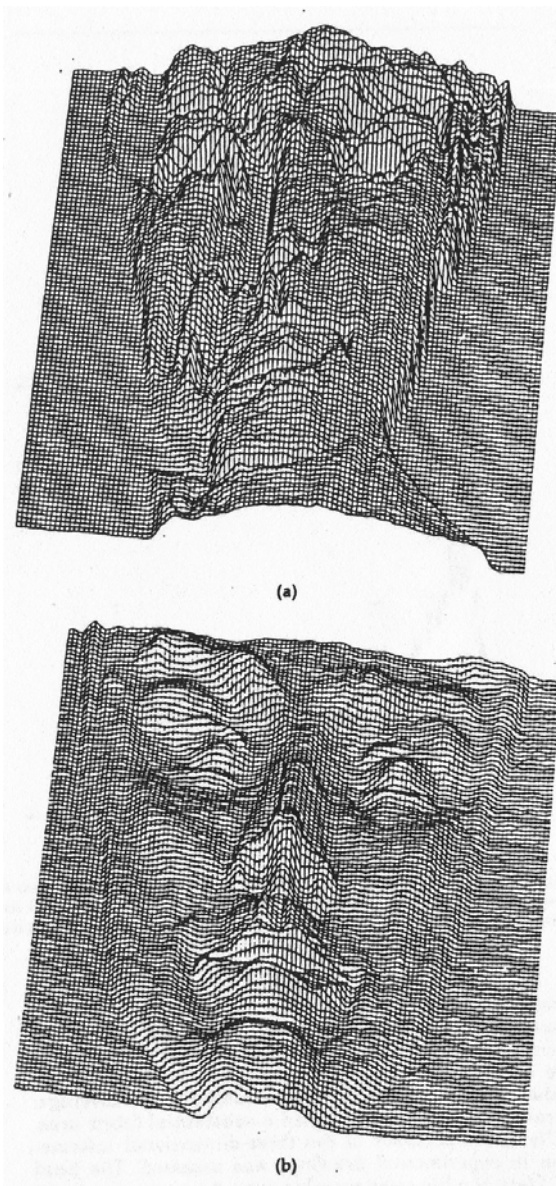


Figure 7. Surface plots. (a) From photograph. (b) From dust drawing using iron oxide/collagen.

to the fabric) and because the image noise increased (fabric structure contributed more visual noise than paper). Figure 8 shows that the final image on fabric still accurately represented a substantial amount of three-dimensional information, however. These results indicate that the dust drawing technique provides a simple way to accurately represent an impressive amount of three-dimensional information.

As discussed previously, several hypotheses have attempted to explain image formation on the Turin cloth by incorporating oxidation and dehydration of cellulose to produce yellow fibers. Pellicori replicated the color and

IMAGE FORMATION - Craig and Bresee (cont'd)

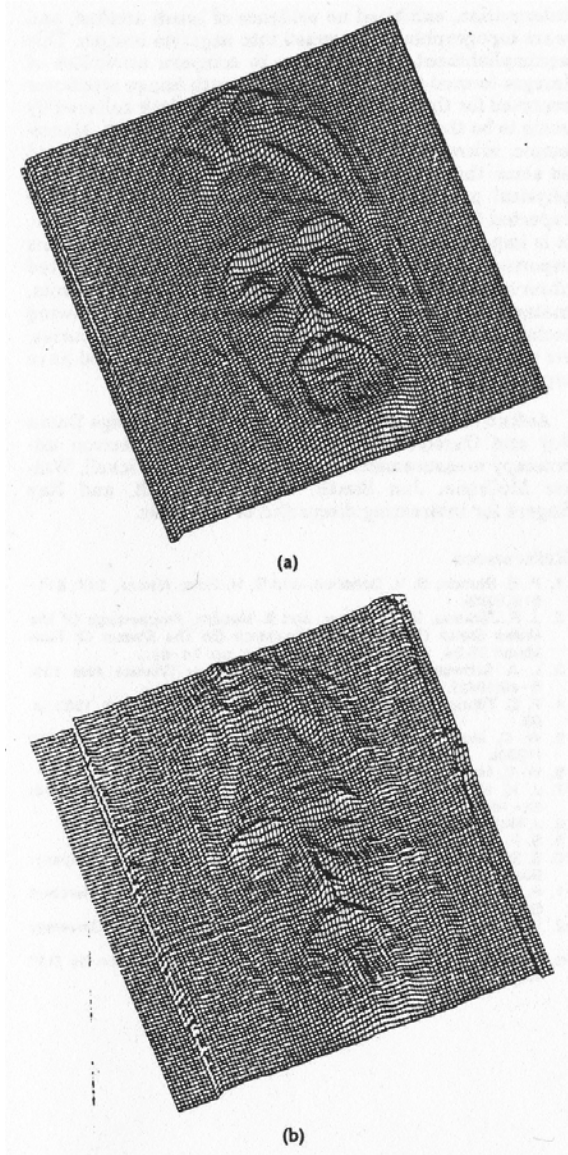


Figure 8. Surface plots of Figs. 3(a) and 3(b). (a) Plot of image on newsprint (Fig. 3(a)). (b) Plot of image on fabric after transfer from newsprint (Fig. 3(b)).

some properties of the Turin cloth by applying substances directly to fabric and then heating the fabric to induce oxidation/dehydration of the linen fibers. The applied substance catalyzed this process so that more intense yellow color appeared where the substance had been applied. We attempted to use the dust drawing technique for image formation, using nearly colorless aloe powder, which would be expected to form an image on linen by catalyzing oxidation/reduction rather than by direct coloration. The image of a human face was drawn on paper with the aloe powder, then transferred from paper to linen fabric, and the fabric was heated in an oven at 200°F for approximately 5 hr to induce oxidation/dehydration of the linen.

Figure 9 shows a three-dimensional surface plot of the face on linen fabric using aloe dust. This figure shows that the dust drawing technique can represent three-dimensional structure accurately when image color is produced by oxidation/dehydration, using a nearly colorless sensitizing substance. However, the three-dimensional structure of the subject when drawn with aloe (Fig. 9) can be seen to be less accurate than when a drawing is made using iron oxide (Fig. 8(b)). This resulted simply because it was more difficult for us to draw using a nearly colorless substance than when using a strongly colored substance. However, a professional artist may not be as limited as we were in this regard. When Fig. 8(b) and Fig. 9 are compared, Fig. 9 can be seen to exhibit more visual "noise" than Fig. 8(b). This apparently occurred because the image was more faint and because the texture of the linen fabric increased as the fabric was heated. As discussed previously, one would expect modern investigators to have detected aloe on the Turin cloth if it had been used to produce the image, but it is possible that it was lost by washing or decomposition. It is also possible that a colorless sensitizing substance, such as powdered boric acid, was used but has escaped detection by modern analysis.

Discussion

The experimental results we report in this paper show that important image features of the Turin cloth can be satisfied with a dust drawing process. The technique of dust drawing has a long history. The caves at Lascaux, France, contain magnificent drawings of animals that were created during prehistoric times with a dust drawing technique that may have been similar to the technique we report in this paper. The process was described as follows: "For drawing, he (the artist) used chunks of red and yellow ochre, and for painting he ground these same others into powder that he blew onto the walls or mixed with some medium, perhaps animal fat, before applying."¹¹

Religious events have inspired artists as subject matter and are said to have influenced the actual artistic process. Many works produced during the Middle Ages were said to include direct divine intervention. "To Medieval

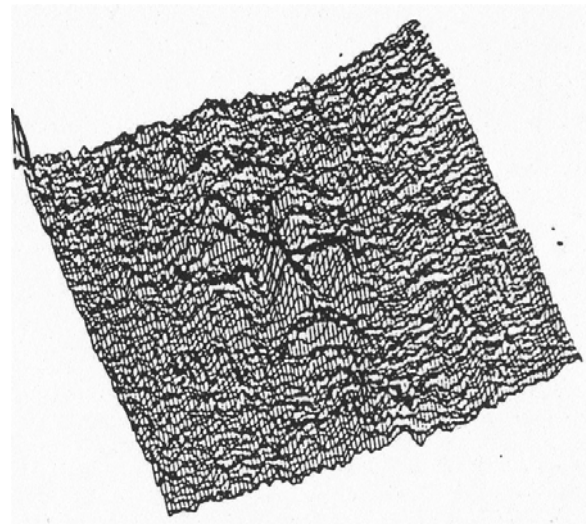


Figure 9. Surface plot of image on fabric created with aloe powder.

IMAGE FORMATION - Craig and Bresee (cont'd)

minds, imbued with the conception of God as the 'great artificer,' legends about art miraculously wrought were especially appealing."¹² Fanciful accounts of divine intervention during the creation of artistic works revealed a deep respect for art but provided little information about the actual artistic process. The production of art during the Middle Ages was vast, but little is known of its creation. However, the 12th century work of Theophilus, *De diversis artibus*, and the 14th or 15th century work of Cennino d'Andrea Cennini, *Il libro dell'arte*, revealed step-by-step procedures for artists of that period.¹² Cennini's handbook includes instruction for grinding pigment into powder, brushing charcoal with feathers, and burnishing an image onto cloth. His handbook contains chapters containing specific instruction on "how to paint a dead man" and "how to paint wounds."¹³

These considerations indicate that the inspiration, knowledge, and tools necessary for an artist to create the image on the Turin cloth were probably available during the 12th and 13th centuries, although the specific combinations of individual techniques we used in our dust drawing technique have not been described. It is clearly possible that an artist created the image on the Turin cloth. Of course, radiocarbon dating also supports this hypothesis, because this analytical technique determined that the Turin cloth originated between 1260 and 1390 A.D.

The hypothesis that an artist could have created the image on the Turin cloth also finds support in historical accounts of the burial shroud of Jesus. Historians have counted more than 40 copies of the shroud during the 14th-16th centuries and point to the likelihood that other copies were made earlier.⁴ It is fairly well established that the Turin cloth was brought from the Crusades to France by Geoffrey de Charny [sic] during the time copies were produced. Therefore, it is conceivable that the Turin cloth could be a copy of the original burial shroud of Jesus.

Conclusion

The conventional carbon-dust drawing technique was modified to produce faint continuous-tone images that contained an abundance of accurate three-dimensional information, exhibited no evidence of brush strokes, and were topographically reversed into negative images. This accomplishment motivated us to compare attributes of

images formed using our technique with image attributes reported for the shroud of Turin, a linen cloth believed by some to be the burial shroud of Jesus of Nazareth. Macroscopic, microscopic, and image analyses were performed to show that an image could be created on fabric with physical properties and image features similar to those reported for the body image on the Turin cloth. However, it is impossible to satisfy simultaneously all observations reported for the Turin image, because many reported observations conflict. Because the inspiration, concepts, materials, and tools necessary to implement the drawing technique we describe have been available for centuries, we conclude that a 13th or 14th century artist could have created the image on the Turin cloth.

Acknowledgments. We gratefully acknowledge David Joy and Carolyn Joy for their help with electron microscopy measurements. We also thank Joe Nickell, Walter McCrone, Jan Simek, Gerald Schroedl, and Ray Rogers for interesting discussion of this topic.

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A RESPONSE TO THE CRAIG-BRESEE THEORY

- Isabel Piczek, USA

Isabel Piczek, world renowned artist, art history expert, scientist and Shroud researcher, responds to the widely publicised paper on image formation by Craig and Bresee

Last June at an International Symposium on the Turin Shroud held in Rome I have presented a paper probing whether or not the Turin Shroud is a painting or an artifact created in the Middle Ages.

In the last couple of weeks articles appeared in papers around the country based on a new theory presented by Mrs. Emily A. Craig and Randell R. Bresee claiming a possible solution to the Shroud of Turin's mysterious image. As we know, the Shroud of Turin exhibits the double image (front and back) of a crucified male figure in the negative. The nature of the suggestion falls especially within the scope of my expertise in Shroud research.

I had the benefit of reading the original paper of the authors of the new theory. Their suggestions sound beguilingly scientific, but they are not sound regarding the practiced technology, paint chemistry and history of art as these relate to the Turin Shroud.

The focal point of any Shroud research has to be the realization, that the positive image of the Turin Shroud is an entirely personal, and lifelike portrait of a real man, not a composite, abstract or symbolic "representation". The success of the described method incorporated in the new image making theory of Craig and Bresee wholly depends on an initial drawing created by the use of carbon dust or iron oxide mixed with a binder and transferred from paper to canvas with a burnishing spoon (a simple depression method) and steam. This initial drawing, in order to have the above described qualities of the Shroud, would have had to introduce a degree of draftsmanship we cannot produce even today without the agency of modern photo methods underneath the drawing. In the Middle Ages that kind of draftsmanship was non-existent. The initial drawing would have had to include an anatomical and medical knowledge, which was barely touched upon even in the High Renaissance and a profound biblical scholarship regarding early Christian writings, first century Jewish burial rights, Roman crucifixion methods in the first century Judea and a premonition about the results of recent archeological excavations around Jerusalem. The first ever portrait painting in Western culture¹, that of Enrico Scrovegni in Padua at the Arena Chapel (1304) is at astronomical distance in quality from the Shroud, even though it is not the work of an unknown artist, but that of the great master, Giotto. The development of portrait painting in its own right had to wait till the coming of the artists of the High Renaissance, but a true realism in it was achieved only by the painters of the French Academy², from about the last half of the 17th century to the second half of the 19th century.

RESPONSE TO CRAIG-BRESEE - Piczek (cont'd)

The authors refer to Cennino Cennini's handbook on art³ (*Trattato della Pittura* by Cennino Cennini da Colle Valdelsa, 1437) and also to Theophilus Presbyter's book⁴ written most probably in the 12th century in Latin and translated in 1961 into English by Charles R. Dodwell, Oxford, under the title "The Various Arts". The reference is made to these books in an obscure manner as evidence for the existence of the authors' technique in the Middle Ages. I have read and studied both these books. Neither one of them reveals any "dust transfer techniques" in art in the Middle Ages. We also have to remark that Theophilus Presbyter writes on early Northern methods of art beyond the regions where something like the Turin Shroud could have been made, even if it would have been handcrafted as an art piece. Northern art did not develop nearly with the pace of the arts of the southern regions. If it isn't within the reach of the medieval Italian and French artists to have the draftsmanship to draw the image of the Shroud, it is even far less within the reach of the primitive northern artists of that period.

Regarding the history of the technology of art, there are similarly great difficulties with the Craig-Bresee theory. The hand-ground, coarse dry pigments of the Middle Ages would not lend themselves to achieve an image with the superb qualities of the Shroud image, especially when transferred to a coarse, unprepared linen with a herringbone weave, such as the Shroud. The image would greatly deteriorate and distort with the fine details absolutely lost. Also, the image of the Turin Shroud shows no light focus. Any artist-drawing does, always. Furthermore, it is one thing to create just a face, as these researchers did, but it is quite another to carry the technique through a 14 feet length with a double image of a six feet tall man. It also would be impossible to evenly steam that length with medieval instruments. Designs in the Middle Ages were woven into the fabrics and many of those survived. Stencilworks on fabric never claimed any great longevity. Besides, the Shroud image does not have the visual qualities of a secondary, depression image, but resembles more to a direct photo portrait, without being one.

The Craig-Bresee theory also shows a misunderstanding of the cave paintings of Lascaux, France, 20,000 B.C., Altamira, Spain, about 20,000 B.C., Font-de Gaume, France, also about 20,000 B.C. and others⁵. They were by no means depression images. They also were not negative images. The outlines of animals were first drawn by the use of a burnt stick from the fire, the forerunner of today's charcoal stick. Then, the forms were filled out with natural earth colors and chalk, mixed with animal blood and animal fat. The basic principles are amazingly identical with any paint made even today, namely a dry pigment and a binder. If some of these murals look like dusty pastels, let us not forget the more than 20,000 years which have passed. The binders mostly have disintegrated since. These paintings survived only because they were painted deep inside the caves, indeed not for public viewing as an exhibition, but for magical ceremonies.

Hence we also find on these cave murals prints of human hands next to the animal figures. Again, these are neither dust transfer images nor negatives. They simply are real human hands put on the wall and painted around with paints. They are primitive stencils for magic purposes. Today these caves are sealed to preserve their secret treasures, the oldest murals on earth. Between their time 20,000 years ago and just 200 years ago our time absolutely nothing happens on the field of pastel painting⁶, which the technique, described by the Craig-Bresee theory, would have to be classified to be as for art technology. There was neither portrait painting nor pastel painting of any sort in the

RESPONSE TO CRAIG-BRESEE - Piczek (cont'd)

Middle Ages. It was only 200 years ago that the great pastel portraits were started. This technique would not have satisfied the medieval mind at all, which aimed at permanence at all costs and meticulous preparation of the ground for painting. The Craig-Bresee paper states: "Since tools, materials and concepts required to use the drawing technique have been available for centuries, we concluded that a 13th or 14th century artist could have created the image on the cloth known as the Shroud of Turin." Unfortunately, this conclusion is not up to Craig and Bresee to make. Here their theory seriously gets into adversity with the history of art, with the history of the development of art technology and with the authority of the professional practiced arts. Finely ground pigments, drawing techniques of photographic accuracy, pastel portraits and the very thought of a negative image on a burial Shroud, do not fit the milieu of the Middle Ages. We can be sure, all the materials to make the spacecrafts of the future are around us - spacecrafts which probably will be able to leave our own galaxy and would have an intelligence of their own - as suggested by Dr. Freeman J. Dyson at a conference at Caltech. But can we make them today? I do not think so, even though the materials for them are there. They do not fit into the milieu of the 20th century, as the manipulations described by the Craig-Bresee paper do not fit into the milieu of the Middle Ages.

At the end, the Craig-Bresee paper refers to two paragraphs in Cennino Cennini's *Trattato della Pittura*⁷: "How to paint a dead Man", and "How to paint wounds". The authors of the paper see a proof in these chapters that the Shroud could have been painted by a medieval artist. These texts cannot be taken out of context. They are part of many detailed instructions Cennini gives to his pupils, how to paint faces, old young, male, female, how to paint fish, water, draperies of all sorts, etc. He speaks about panel painting and he makes some reference in these texts to walls also. Regarding painting a dead body, he recommends the use of verdaccio, which is a gentle green, light ochre, flesh colors, white lead, and outlines with dark sinoper and a little black, "tempered" and this will be called "sanguine" says the master. As for wounds, he recommends to take straight vermilion. He instructs his pupils to shade all over this vermilion with "a little fine lac, well tempered in the usual way". Again, this cannot be taken out of the whole series of instructions. Earlier, he warns us several times that vermilion, exposed to sun, air and other paints, turns black. He does not therefore recommend it for murals on walls. In this chapter he speaks only about paintings on well prepared panels, kept indoors and not undergoing rough handling. He certainly does not speak about wounds painted with vermilion on raw canvas, exposed to the elements and rough handling, such as the Shroud. In the Middle Ages they did not execute paintings on raw, unprepared, unstretched canvas. Vermilion is totally unstable in tempera, but fairs better suspended in oils. Even then this paint behaves erratically. Cennini warns his pupils about that several times in the book. I just fail to see what these two here mentioned chapters have to do with the Turin Shroud, which is a raw canvas, has no color other than a yellow without any pigments, no outlines, no style, no brushstrokes, very tiny amounts of submicron size vermilion particles without lac and not enough to count for the images of the wounds. Anyhow, vermilion would show up mostly black by now.

Also, it is known that the blood transferred itself to the Shroud before the image did and there is therefore no image underneath the blood. How would the dust transfer technique of Craig and Bresee reproduce that? We must admit, it would be impossible. Another

RESPONSE TO CRAIG-BRESEE - Piczek (cont'd)

warning! The translations of the book of Theophilus Presbyter and Cennino Cennini had to be adopted to the modern understanding of the technology of art materials and practices. Some of the ancient expressions are still under discussion and newer editions are undergoing multiple corrections. It is not that easy to know in some cases the true meaning of the words and which modern materials they correspond to, if any. These books are only for the understanding of professional artists and restorers of museum quality and not for lay people. Grave misunderstandings are bound to happen when non-professionals try to interpret and adopt materials and techniques based on these ancient formulas.

"It was so simple", Mrs. Craig said⁸ in one of the interviews she gave on her theory and its suggestions about the Shroud image. In truth, there is nothing more complex than the Turin Shroud and nothing more difficult than Shroud research.

There is no simple solution to the mystery of the Shroud.

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ITALIAN AUTHORS RECEIVED AGAIN BY THE POPE



The two Italian authors Dr Orazio Petrosillo and Prof Emanuela Marinelli have again been in private audience with the Pope. Their book *La Sindone, Un Enigma alla Prova della Scienza*, first published in 1990 in Italy is widely regarded as the catalyst which led the Pope and authorities to renew interest in the Shroud and its conservation after the widely disputed C 14 "dating" of 1988. Their book exposes many of the inadequacies of the protocol used in 1988 as well as commenting on other important Shroud issues. The book has been published in several languages and the current visit to the Pope was to present His Holiness with a copy of the Polish edition. The English speaking world remains stunned that no publishing house has yet taken the initiative to produce this extremely important book in the language of widest currency in the civilised world: English. The photo shows from left to right: The Pope; Emanuela Marinelli (partly obscured); Father Adam Boniecki, General Superior of Marian Fathers; Orazio Petrosillo; Father Jan M. Rokosz, Provincial Father for Poland. Emanuela reports that the Pope said to them, "Jesus left us the Shroud together with the Sacraments." An important statement of belief by the leader of the Roman Church.

Black archbishop wants to prove Christ was black

Bangkok Post, 9 December 1992

Washington (AP) — Nearly three years after breaking with the Vatican to form his own church, the Rev. George Stallings this week hosts an international gathering of theologians, historians, anthropologists and artists in an effort to prove that Christ was an African Jew.

Stallings, who formed the African-American Catholic Congregation and became its first archbishop, says that "the identity of Jesus — who he was and what he stood for — is the lynchpin of Christianity ... That image (of Christ as a white man) was used to suppress us."

Stallings, who is black, hopes the conference on Friday and Saturday will counter that image.

"We take this to be a serious issue of faith," he said.

"If they (church leaders) will lie about the true genealogical and historical background of Jesus, they will lie about anything."

He says he broke with the Vatican to overcome the "white, male, sexist hierarchy" of the Roman Catholic church.

University of Maryland professor, Kenneth Holum, who teaches ancient history, disagrees with Stallings about Jesus' ethnic background.

"Jesus was a Jew and the sources that we have are unanimous in claiming that he was from Nazareth in the Galilee, which is now Israel," Holum said. "The conference may be a worthwhile conference, but it has nothing to do with history."

Stallings said his project will culminate next Easter, when he plans to gather church leaders from around the country. He said he will destroy white images of Jesus and replace them with black ones.

Stallings' church blends diverse elements from his past — Roman Catholic traditions, the lively spirituality of Southern Baptist churches and African and black American customs. Although baptised in

the Catholic faith as an infant in New Bern, North Carolina, Stallings regularly attended a missionary Baptist church with his grandmother.

Stallings, 44, declared February 2, 1990 that he was formally separating himself - after 16 years in the priesthood — from the Roman Catholic hierarchy.

The Archdiocese of Washington responded to Stallings' nationally televised declaration of independence by announcing that he had essentially excommunicated himself.

Since his first church opened in a public school here July 2, 1989, Stallings said, his flock has grown to 4,100, members in congregations in Baltimore: Philadelphia: New Orleans: Los Angeles, Richmond, Virginia, and Lagos Nigeria. Just over half his membership, 2,200, is in his original congregation.

But the Rev. Cyprian Davis, a Benedictine monk and author of "The History of Black Catholics in the United States," doubts that the number of Stallings' followers continues to grow.

The pastor of Washington's oldest black Roman Catholic parish, Monsignor Russell Dillard of St. Augustine's, takes a more generous view of Stallings' influence. He said there are problems of racism within the Roman Catholic Church and Stallings forced many to face those problems.

Stallings breakaway church considers abortion and birth control matters of individual conscience. The Roman Catholic Church considers abortion grounds for excommunication and has said repeatedly that Catholics are not to use artificial birth control. Also at variance with the Vatican, Stallings does not require priests to be celibate and has eliminated confessions.

The Rev. Rose Marie Booker Vernell last year became AACC's first female priest and is based in Philadelphia. Once a nun, Vernell left her order, married and had children. She is now a widow.

Item from *Columbia*, May 1993, by Tim S. Hickey

Who is the man of the Shroud? Gulf Coast councils sponsor photo exhibit of Shroud of Turin

I always expected a miracle; now I have seen one," wrote one woman in the guest book at a photographic exhibit of the Shroud of Turin sponsored by Knights of Columbus councils throughout the Gulf Coast of the United States last year. John F. Kennedy Council 2952 in Hammond, La., sponsored the exhibit from May through November. The exhibit includes 64 photo panels with more than 100 photos, a full-size transparency that is a perfect replica of the original, diagrams and drawings. The exhibit was displayed at 15 different sites in Louisiana and drew more than 51,000 people. The photo exhibit is owned by the Center for the Study of the Passion of Christ and the Holy Shroud in Gainesville, Fla. It is available on a free-loan basis to any interested group.

The Shroud of Turin is a 14-foot strip of linen believed by some to have wrapped the dead body of Christ. Images of a man can be seen on the front and back. The images show the man was badly beaten from head to foot and had a gash in his side. Puncture marks around the head suggest a crown of thorns.

The Shroud of Turin has been in Turin, Italy, since 1578. There is little documented evidence of its existence prior to that. The earliest evidence surfaced in the 1300s, when a French nobleman who participated in the Crusades deposited it in Lirey, France. It had been brought from Constantinople by the Crusaders. In the 15th century, the shroud came into the possession of the Savoyes, one of Europe's most important noble families. They moved it to Chambéry, France. It was damaged by fire in 1532.

In 1983, the shroud was left to Pope John Paul II in the will of Umberto of Savoy, who was deposed as Italy's king in 1946. The shroud is kept rolled up in an airtight oblong container in a special chapel in St. John the Baptist Cathedral in Turin, in northern Italy. It was publicly displayed most recently in 1978 for six weeks and was seen by more than 3 million people. Scientists who have studied the shroud, most recently in 1988, have concluded that it was produced sometime in the 14th century.

The carbon testing that dated the shroud, however, did not solve a basic mystery: How did the image of a man, apparently crucified, get on the cloth?

It is that mysterious image that drew people to the exhibit, said Al Ferreira, past grand knight and a trustee of Council 2952, who served as the statewide coordinator of the shroud exhibit. A lifelong interest in the shroud led him to contact the Center for the Study of the Passion to inquire about the exhibit's availability. He described the exhibit as a natural project for councils to undertake. From the episodes he recounted, he believes the exhibit had a major impact on many visitors.

At the exhibit sponsored by St. Thomas More Council 10428 in Eunice, 18 motorcyclists, complete with tattoos, chains and leather, came roaring into the parking lot shortly before closing time. They swaggered into the exhibit hall, moved through the exhibit, taking their time, then crowded up to the desk. Field Agent Barry Soileau, who was manning the exhibit at the time, said he had "visions of cashing in on the million-dollar policy carried by the exhibit." The bikers purchased some pictures, a couple of books, then politely thanked the Knights and left.

The exhibit was set up in shopping malls, council homes and churches. It was also on display for Knights attending last spring's Louisiana State Council convention in New Orleans. At every venue, councils distributed printed programs on the shroud exhibit and the Knights of Columbus. Some councils wrote up to 500 letters to churches of all denominations inviting their congregations to the exhibit. Others visited schools to promote attendance.

"At the Church of the Ascension in La Place, one male visitor went up to the deputy grand knight of the host council and said, 'I never knew the KCs did anything like this. If this is the kind of work you do, I want to join. Give me an application,'- said Ferreira.

One episode summed up the positive effect the exhibit had on viewers. "Three teenagers came into the exhibit," said Ferreira. "One, a slightly built young man, was totally decked out as a punk rocker: four nose rings, three earrings in one ear, a dangling ring in the other. The sides of his head were shaved, and the top was braided and hung down to his shoulders. His friends were similarly dressed, but not to the same extreme.

"They wandered around the exhibit for a few minutes, then the young man with the rings stopped in front of the transparency of the shroud. His friends tried to pull him away. Two hours later, he was still there watching the videos on the shroud's history," Ferreira said.

Eighteen councils hosted shroud exhibits. Two exhibits were hosted by ladies' auxiliaries. More than 319 people helped staff the exhibits, volunteering nearly 1,000 hours to the project. Councils also held prayer services or Stations of the Cross in conjunction with the exhibit. Council chaplains and parish priests blessed the exhibit, spoke on Christ's passion and led prayers for the success of the display.

At every venue, Ferreira said, there was at least one entry in the guest registry that read, "Thank you Knights for bringing this to us."

Tim S. Hickey is Managing Editor of *Columbia*.

LETTERS TO THE EDITOR

There are significant links between the Holy Shroud of Turin and the Blessed Eucharist as defined by Catholic Doctrine.

The living Person of Jesus Christ - Body, Blood, Soul and Divinity in the glorified state - has an historical real presence in both entities. The appearances of bread and wine are like a Eucharistic Shroud (see St Thomas Aquinas, "The Hidden God").

Pope Paul VI sanctioned a scientific committee to investigate the Eucharistic miracle of Lanciano, 3rd April, 1971. The Lanciano miracle has the same blood group as that of the blood on the Holy Shroud of Turin (see John Simons, *SN* 30, p8).

The electromagnetic radiation, including visible light, from Christ at His Resurrection (like the Transfiguration), was associated with Shroud image formation. The radiation of light from the Blessed Eucharist is recorded in Church history (see *The Life of St Clare of Assisi*, Thomas of Celano, Ch3).

Jenny Wilson, (*SN* 32, p18), recorded a private revelation that the Holy Shroud cloth was the 'Last Supper' table cloth linking the first Eucharistic celebration to the Holy Shroud. The revelation records also "A constant stream of electron s..." with respect to the power of the life essence. Science, with Church permission, could place a "Technological Shroud" around the Blessed Eucharist to measure its electromagnetic activity by non-invasive, non-destructive means. This could complement Holy Shroud investigations.

- (Dr) VAUGHAN DAVIS, Maroubra, NSW

(Editor's Note: In view of the recent claims, widely regarded as outrageous, by Mrs Rebecca Jackson of USA, that the Shroud is the tablecloth from the last supper, the letter referred to by Dr Davis from SN 32 is reprinted here for discussion purposes since not all SN subscribers will have issues from as long ago as December 1985)

I have on hand a book: MOTHER MARY'S MEMOIRS. May I quote p117: "Well do I remember Holy Thursday! After the Disciples and the Master had finished the 'Last Supper' and had gone to Gethsemane, the other ladies and I came and gathered together the linen cloth which I had woven and folded it carefully knowing in myself that within a day that cloth would enfold the body of My yet vital, shining and beautiful Son! In a napkin We carefully wrapped 'the Cup' and gave it to Joseph of Arimathea for safe keeping. That Cup was to travel far ... "

And on p124 she is talking of the power of the life essence: "A constant flowing stream of electrons ... flows into your heart with such rapidity that

there is no other means by which it can be photographed. However in the near future, there is coming a much greater sensitivity in the photographic world and many of the magnificent things of which We have spoken will be recorded and confirmed by the sight of men."

I had not taken note of these mentions in her book until I saw the Shroud photographs and read your book ... it all fits in and we are able now to realize the tremendous flow of light that must have revived the body and performed the "miracle" of resurrection and later public ascension.

- JENNY WILSON, COMO, Western Australia

Oldest cloth found in Turkey

14 July 1993

CHICAGO: A fragment of cloth dating back to 7000 BC has been discovered at an archaeological site in southeastern Turkey. It is the oldest cloth ever found.

"This is a fascinating discovery because it pushes back the date at which we know textiles were produced," said one of the scholars studying the cloth, the director of the Stitching Textile Research Center at the National Museum of Ethnology at Leiden in The Netherlands, Ms Gillian Vogelsang-Eastwood.

The semi-fossilised cloth — still clinging to what was probably the handle of a tool — was recovered from Cayonu, a site near the upper

Tigris River, about 50km from the city of Diyarbakir. The site has been the scene of joint explorations by the University of Chicago and Istanbul University for 30 years. The two universities planned to announce their find today.

No cloth made earlier than about 6500-6000 BC had been discovered previously but some minute clay impressions of textiles about the same age as the Cayonu cloth had been found.

The fragment is believed to be linen and measures 7.6cm by 3.9cm. It was clinging to a tool handle believed to be a portion of an antler.

A P

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*) and editor of several others, began sending a few notes about current developments in the study of the Shroud of Turin (Sindonology) for a small circle of interested people in his home country of Australia. He didn't expect it to go beyond a few issues.

Today, the bulletin, now highly acclaimed, reaches subscribers all over the world and is written, produced and disseminated more quickly than any other Shroud publication in the English language. 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 which gives 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 and knows numerous Shroud researchers in many countries. His quest for Shroud information became, as he described it, "a passionate hobby". He took 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 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 Board member of the US 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 (ESSJ). He has made a number of original contributions to Shroud research has presented major papers at international Shroud conferences has written numerous articles and has given hundreds of broadcasts and telecasts on the subject in many countries.

The list of *Shroud News* subscribers continues to increase internationally and it has been described many times as one of the best available. *Shroud News* comes out six times a year. Its production is obviously privately subsidised as we request a subscription in Australia of only \$6 for six issues posted. The USA subscription is \$12 (posted airmail - there is no longer any surface mail from Australia). Postage to other countries varies. ALL back issues are available for \$1 (US or Aust) each plus postage. The famous 50th issue is \$3 plus post. Customers should note that as it costs us \$8 to negotiate each foreign cheque we request all payments be made in currency banknotes of your country or charge to Visa, Master or Amex cards.

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