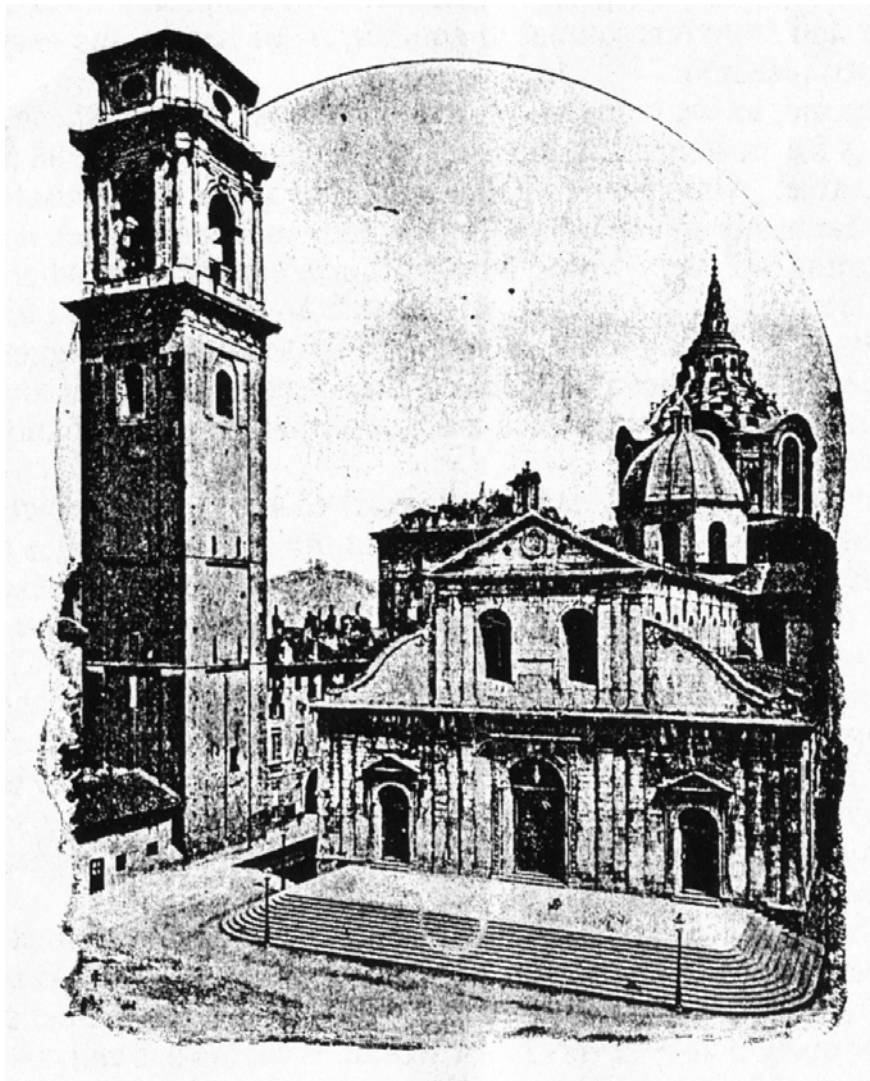




SHROUD NEWS

A NEWSLETTER ABOUT THE HOLY SHROUD OF TURIN
edited by REX MORGAN, Author of several books on the Shroud
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Vista esteriore della Metropolitana e della Reale Cappella.

AN ILLUSTRATION FROM A BOOK PUBLISHED TO COINCIDE WITH THE 1898
EXPOSITION OF THE SHROUD IN TURIN,
"La Santissima Sindone del Signore"

EDITORIAL

It is interesting to compare three recent reports of the Paris Symposium in other journals. The French *Lettre Mensuelle* commented on the significance of the papers by Ribay, Babinet, Mrs Jackson, Fossati, Zaninotto, LeGrand, Bongert, Pfeiffer and Schlomer, Mr Jackson, Clercq, Dubarle, and Lejeune.

In the American Shroud Sources abstracts were reprinted of "some of the most significant" of over thirty papers. These were by Kouznetsov, Van Haelst, Lavoie, Morgan, Clercq and Rinaudo. On the other hand the British *BSTS Newsletter* commented on the papers of Zaninotto, Pfeiffer, Morgan, Lejeune, Bergeret, Lindner, Dickinson, Lavoie, John Jackson, Piczek, Maloney, Adler and Kouznetsov. This variation of opinion from one country to another and from one journal to another, is, of course, the very lifeblood of unbiased research.

It seems to me, as we come to the end of another year of Shroud research, that there is far greater realisation that the carbon testings of 1988 are less and less acceptable. Almost every paper delivered at the Rome conference and most of what has been written and said before and since makes it quite plain that something was very wrong with the Turin capers. Just what that is has yet to be determined, if it ever is. Research from every branch of knowledge seems only to be adding to the quantum of material which suggests that the Shroud cannot be medieval, cannot be a man-made artifact of any kind and still possesses characteristics which are inexplicable in terms of known criteria and parameters.

Our world at the end of 1993 is still marked by bitter conflicts between nations and groups. The world still looks at the grinning visages of some of its wickedest and most violent men posing as the bringers of peace accords and some of them even receive great prizes for their deception. In many branches and manifestations of the religions, and specially in Christianity, standards are being lowered and the behaviour even of some of the ordained is appalling; There are troubles in many sections of the Catholic Church; the Church of England has spawned heretics and idiots who seem to be dividing and destroying it; the Australian version of that Church is being scandalised by stupidity and the condoning of activities amongst clergy regarded as sins by most people since time immemorial.

But one Christian icon seems to remain unaffected by all this: it stands on its own, speaking for itself, surviving all attack and criticism and skepticism. It remains as a kind of perpetual miracle, a silent witness, for all believers and, indeed, for many non-believers in the world; it challenges and comforts; it excites and reveals; it mystifies and inspires as did the Man himself whose birth we celebrate this month with our families and friends. That icon is the Shroud of Turin.

REX MORGAN

ALL THOSE CARBON 14 ERRORS

by **Stefano M. Paci**

"I have just discovered that the carbon dating showing that the Shroud is a medieval object is wrong".

This statement sounds like the "profession of faith" of one of the incorrigible supporters of the Shroud's authenticity who have defended it with apologetic tones in recent years. But, in a low, soft voice, it comes from Jérôme Lejeune, one of the most illustrious geneticists in the world. He is a Fellow of the Pontifical Academy of Sciences, the exclusive international "club for scientist" which counts 25 Nobel Laureates among its 80 members, a Fellow of the prestigious Académie française des Sciences morales et politiques and Professor of Medicine at the University of Paris. Lejeune bears little resemblance to a credulous pro-authenticity exponent. "I am a scientist, not a theorist", he told *30 Days*. "And I reason only on the basis of documentable proof.

The evidence I am bringing to the issue on the Shroud's dating is unquestionable, unless there are those who would deny evidence. But no scientist would".

An excellent article on the recent work of Professor Jérôme Lejeune reprinted from the American journal *30 Days* No 9, 1993



The discovery Professor Lejeune has now revealed to *30 Days* is likely to open new debate on the true dating of this mysterious linen conserved in Turin, North Italy. Some believe it is a relic, others the most spectacular fake of all time. Five years ago on October 13, 1988 all doubt seemed definitively dispelled at the expense of the Shroud's authenticity. Three authoritative laboratories - at Oxford, Tucson and Zurich under the British Museum's supervision - used the Carbon 14 dating test to date a few Shroud samples. And at a packed press conference, then Cardinal Archbishop of Turin

ALL THOSE CARBON 14 ERRORS (cont'd)

Anastasio Ballestrero accompanied by his scientific advisor, Professor Luigi Gonella, and by the director of the Holy See Press Office, announced the sensational verdict. The C14 scientists believed the Shroud to be of medieval manufacture, woven between 1260 and 1390. Many observers were perplexed to note the nonchalance with which the "custodian of the Shroud" dismissed the whole argument. "I have never considered the Shroud a relic", said the cardinal. "And given the results of the tests perhaps I was right".

Professor Gonella, a Turin University don, adopted the opposite attitude and said bluntly a few days later in an interview: "We are not satisfied at all with the way the laboratories conducted the study on the Shroud - the scientific procedure they adopted is not without fault". And, irritated that the laboratories had first obliged ecclesiastical authorities to forego an interdisciplinary study on the Shroud in favor only of the C14 dating test and that they had gone on to be able managers of the tam-tam of press leaks for months, he went on: "There was one imprecision after another. Our C14 colleagues behaved despicably. These scientists ordained a plot proper to discredit the Shroud".

But the impassioned reactions soon died down, making way for more pondered reflection and giving rise to serious scientific doubts.

It was discovered that the C14 test is not as reliable as it was thought to be and that even the laboratories entrusted with the Shroud analysis had carried out other dating procedures which turned out to be absurd at the very least. In December 1988 a few months after the Turin press conference, the highly esteemed review, *Science*, revealed that a C14 test on a snail shell dated it at 26,000 years old. But the snails had still been alive when they were robbed of their shells. Conversely according to the scientific review, *Radiocarbon*, a mammoth which had lived 26,000 years ago had been C14 tested as only 5,600 years old. The same laboratories which had been commissioned to test the Shroud also managed some comical datings. The Zurich lab director had tried to date a linen tablecloth belonging to his mother-in-law which could have been no older than 50 years. The test showed 350 years and "detergent was to blame", he said in justification.

In recent times, the growing perplexity of the scientific community found its

ALL THOSE CARBON 14 ERRORS (cont'd)

main expression in two conventions organized by the Centre international d'etudes sur le linceul de Turin (CIELT). The first was held four years ago in Paris and the second in June in Rome. But more likely to open new discussions will be the findings of Professor Lejeune and the studies of an "impeccable" Russian scientist, Dimitri Kouznetsov, holder of the prestigious Lenin Prize (he outlines his discoveries in the box).

But now over to Professor Lejeune.

Tell us about your discovery...

JERÔME LEJEUNE: As you probably know, the Shroud was caught up in a fire on December 4, 1532 at the Sainte Chapelle of Chambéry, France where it was being kept at the time. A drop of silver from its casket fused and made holes in the linen as it dripped. The Poor Clares, who had been appointed custodians of the

Shroud, set about patching them and that work is perfectly visible today. Used as I am to the topological study of chromosomes in examining complex forms and in my attempts to discover how they were produced, I analyzed these holes in the Shroud. And I was able to see how the Shroud had been folded in its time because the burn holes could be superimposed exactly. It had been folded and folded again until it formed 48 layers.

Well, there are other burns, which were not the result of the Chambéry fire, which were not patched by the Poor Clares and which are not in line with the folds the Shroud had at the time. There are four of these holes, forming an 'L' shape. There are three large holes and a smaller one. These holes were there before the fire and existed as far back as 1516 since they are reproduced exactly in a

ALL THOSE CARBON 14 ERRORS (cont'd)

copy of the Shroud which was dated by its manufacturer and which is conserved in the Church of St. Gommaire at Lier. I was allowed to examine it and I noted that it is an exact copy of the Shroud of Turin although its dimensions are reduced by a third. For the burn holes to be superimposed exactly, the Shroud had only to be folded four times. This Lier Shroud is in its turn a copy of a work by Albrecht Dürer which is now lost to us.

The Carbon 14 dating of the Shroud of Turin suggested some date between 1260 and 1390. The lab technicians could reply that those holes, while antecedent to the Chambéry fire, were formed in any case after the manufacture in the Middle Ages of what they called the "false image of the body of Christ" ...

LEJEUNE: No they could not and here we are at the core of my discovery.

In the National Library of Budapest, Hungary the country's most important manuscript is conserved - the so-called Pray Manuscript. It is the first manuscript of the Hungarian language and so it bears the classification number 1 and is jealously guarded. This highly valuable manuscript is dated without doubt because of the historic facts it reports and it cannot be dated after 1192, when it was bound. Furthermore, some passages of music manuscript, transcribed the way it was done before the introduction of the Gregorian (adopted universally in the

13th century) are further proof that the manuscript is 12th century.

Last month I was granted the rare privilege of being able to examine it.

There is a design on parchment in the manuscript that represents the embalming of Christ. Christ is depicted as bearded, with a trace of blood on his right forehead, his right arm resting on his left, the thumbs bent back and there are three nail holes as opposed to the four usually represented at the time. He is stretched out, nude (he was never represented in this way at the time) on a shroud folded in two perfectly equal parts while Joseph of Arimathea and Nicodemus are pouring funeral ointments on him under the thoughtful gaze of St. John. Curiously, the physical characteristics coincide perfectly with the Shroud.

But the most extraordinary image of all is to be found in the lower foreground of the image: an angel is pointing out the Shroud to the pious women who had come to the tomb with perfumed oils on Easter morning. Well, in that design the four 'L'-shaped holes are perfectly visible, the holes the Turin Shroud still has today. And they can even be seen, perfectly superimposable, on the back of the cloth, which is also represented in the design.

It is absolutely unthinkable that a painter could design, without

ALL THOSE CARBON 14 ERRORS (cont'd)

ever having seen it, an image showing holes of the same size and in the same place (and which are the result of the rather anomalous folds of the cloth so that the holes can be superimposed one on the other) as the holes that the Turin Shroud still has today. In short, the Turin Shroud existed before 1192. This is a definitive historic certainty. There can be no further discussion on the point.

So the British Museum and the other scientists were wrong...

LEJEUNE: There is no doubt about it. The Carbon 14 dating by the three laboratories does not give the age of the Shroud of Turin. Their dating (1260-1390) is in disaccord with the historic certainty that between 1100 and 1200 a painter saw all the details of the Shroud today kept in Turin, including the burn holes which are not at all interesting from the artistic point of view.

The C14 dating was authenticated by the British Museum authorities. Your criticism of it is likely to cause controversy...

LEJEUNE: That wouldn't be surprising - it happens often in the scientific world. Something gets published and then they realize it is not true. The errors of science can also be made in good faith. But sometimes certain tricks are used. The British Museum itself fell foul of them. For 20 years it exhibited the so-called 'Pildown Man' whose image appeared on every book on evolution. But in the 1950s they realized

it was a fake. It had been covered up by British Museum authorities who had attested to its authenticity and that error spread throughout the world.

Have you formulated any ideas about how the image on the Shroud came about?

LEJEUNE: No, that's not my job. All I know is that there is no counterfeiter in the world who could have painted it. Recently, Professor John Jackson of the University of Colorado found that by photographing the hand on the Shroud with the so-called 'Wood Light' an image under the palm is visible. It corresponds exactly to the thumb bent back. No counterfeiter could ever have imagined that. It is impossible. The Shroud cannot be a constructed image. So how was it produced? Some have mentioned radiation or other processes. But no one really knows. And that's to be expected. But anyone who sustains that it is a painted image, has no real grasp of the thing. Or, they are in complete bad faith. No painting in the world could possibly have the features of that image.

Are you hoping for new examinations of the Shroud?

LEJEUNE: There is no doubt', that the laboratories commissioned to Carbon 14 test the Shroud were authoritative ones. But instead of saying, when we arrive at a result in contradiction with all the known facts, 'everything done before is false', we should ask ourselves 'and what if we are

ALL THOSE CARBON 14 ERRORS (cont'd)

wrong?'. Or, 'is there some other explanation we are not yet aware of?'. The finding of the C14 contradicted all the information we had. And in science a finding must be questioned if it contradicts other, equally credible findings.

Many Carbon 14 tests, including some by the same laboratories commissioned to date the Shroud, have given absurd results. There has been some criticism of the excessive weight ecclesiastical authorities gave to that one experiment, instead of integrating it within a series of inter-disciplinary examinations. Do you share that view?

LEJEUNE: That poor custodian of the Shroud at the time, Cardinal Anastasio Ballestrero! He knew nothing at all about Carbon 14. He was obviously not an expert on it. What he said of the Shroud before or after that experiment is not important. It is with respect that I say that because a cardinal is not an expert in Carbon 14.

A SHEET IN THE WIND?

The Russian scientist Dimitri Kouznetsov accuses Western laboratories

It could be the plot of an unlikely fanta-religious novel. On one side, the brilliant Russian scientist, awarded many years ago for his research into radio-carbons with the most important prize of the whole Soviet Union - the Lenin Prize - who is now stirring the waters of the international scientific community with his new findings. On the other, the most prestigious radio-carbon laboratories in the West which are the target of the Russian's accusations. In the middle is the Shroud, a relic which by some still inexplicable phenomenon bears the image of Christ taken from the cross. The Russian scientist is accusing western laboratories of making a sensational error in their dating of the Shroud: the linen was not manufactured in the Middle Ages as their tests sustained but is 19 centuries old. In short, it is a contemporary of Christ.

However it appears, this is not the plot of a novel but reality, a tale of today. And the Russian scientist Dimitri Kouznetsov is nothing like a fantasy figure. Excitable but courteous, he speaks fluent English and began by explaining why he devoted his time to

ALL THOSE CARBON 14 ERRORS(cont'd)

this research. "I knew nothing about the Shroud and, naturally, it is not the 'sacred' object that interests me for I am not Catholic. But the studies on the Shroud are important for us, who study radio-carbons, because they make for better understanding of the nature of the C14 dating method. While it appears a simple method it is very complex". Kouznetsov recounted his first approaches to the Shroud. "I was in London where I was participating in a congress and where I expounded on the results of a new method of carbon dating. I had applied it to dinosaurs and discovered that they are much younger than geology sustains. When I had finished my address, I was approached by Dr. Guy Berthault, a French scientist, who proposed that I apply this method to verify the findings on the Shroud. I found that an interesting prospect and agreed to do it. As I studied the history of the Shroud, I realized that the linen had fallen foul of an extremely traumatic event, the Chambery fire in 1532. So I set about creating the same conditions in the laboratory: a humid, gassy atmosphere that also featured carbon dioxide, carbon and oxygen raised to a temperature of 140 degrees. I then hunted for a piece of ancient linen and procured some threads which had been definitively dated at about 750-840 AD, at about the time of the Emir of Bukara. I placed them within those conditions of heat and humidity and carried out the tests". And the findings? "Well, it clearly emerged that there had been a considerable exchange between the gasses in the air and the fabric and that modified the O14 content of the cloth. The exchange was great in volume, about 25 per cent of the total. This falsifies the results of the test and, when examined for radio-carbon deposits, the linen proves much more recent than it really is". This is the first time that the doubts of some in the scientific community about the medieval dating of the Shroud have been confirmed by experimental evidence. But the Russian professor had another broadside to launch at the findings of

his western colleagues. He continued: "The work of the laboratories, whose conclusions were published in Nature, betrays another, really serious defect. Those scientists did not take account of the enrichment of C14 that takes place during linen working to transform it into fabric. It is changed to become cellulose - a polysaccharide increases and a lipid decreases. In short, in this case too there is an enrichment of Carbon 14 that makes the fabric seem younger". *30DAYS* asked Professor Kouznetsov if, by carrying out the two modifications he mentions, it would be possible to arrive at a date for the Shroud's manufacture. "That's just what I did", he smiled. "I took the results of the radio-carbon dating of the Shroud published in Nature. And I calculated both the enrichment of Carbon 14 following the working of the linen to transform it into fabric and that deriving from exposure to a fire". Well? "The linen must be at least 19 centuries old. It cannot be dated at the Middle Ages".

What effect does working on an object which is so important for so many people have on this non-Catholic professor? "I did not approach it as a religious problem but as one of the most intriguing archaeological questions that can be proposed to a scientist. It is a question which allows us to demonstrate the limitations of the current Carbon 14 dating method. And, I must say, I am surprised at all the animosity surrounding this dating. The scientists themselves coordinated by the British Museum showed little scientific aplomb. But at the most the proof we scientists may be able to bring can only turn out to show that that linen was used to wrap a contemporary of Jesus Christ and that he suffered exactly the same passion as that described in the Gospel".

S.M.P.

SHROUD SPECTRUM INTERNATIONAL - A REVIEW

- Rex Morgan

The journal under this banner is widely regarded as the only "prestige" Shroud publication in the English tongue. Begun in 1982 by its editor Dorothy Crispino, also Chief Executive Officer of the Indiana Center for Shroud Studies, the magazine has been produced, mostly regularly, ever since. In her first issue, Mrs Crispino said in part of her mission statement, "SHROUD SPECTRUM INTERNATIONAL proposes to offer its readers reliable information about the Holy Shroud of Turin; information ranging over the entire spectrum of Shroud studies, from sources around the world and across the centuries."

This she has unquestionably done: there have been 42 issues of *Spectrum* since that time (one or two of them combined) and every one has contained a goodly selection of highly scholarly work from the most reputable Shroud authors from many countries. Some of these articles have been written by Crispino herself, and properly so, since she is one of the world's foremost experts on the Shroud and particularly is she a fine medieval historian, explorer and photographer. Her frequent forays into Europe have furnished her and her readers with valuable pieces of research in the "Shroud country" of its most perplexing period, the middle ages.

Although often biased towards the religious point of view (justifiably in view of the nature of the fundamental subject) *Spectrum* has provided us with a wealth of information over these years. Indeed, I have always kept closest at hand, as the two basic reference tools whenever writing about the Shroud, a full set of Crispino's *Spectrum* and Ian Wilson's original, and as yet unsurpassed book, *The Turin Shroud* (1978). Together these provide the quickest handbooks to many of the dates, places and events one needs to recall frequently. One of the most valuable parts of the magazine has been that devoted to the accurate biographies of contributors. There was also a rudimentary "index" published in 1985 which turned out to be not an index at all but rather a table of contents and sections of the first fifteen issues.

It was said by Dorothy this year that December 1993 would see the last issue of *Spectrum*. Number 42 duly came out this month and contained an excellent summary of the historical papers given at the Rome conference. Dorothy Crispino, who was a leading light in the organisation of that

conference, wrote her own précis of each of these papers in her masterly and poetic style. Hers is heroic prose such as we rarely read these days as we observe the decline of the twentieth century, the decline of the millennium and particularly the decline of the standards of English literature and reporting. Her gargantuan command of vocabulary makes her one of the few contemporary writers who send me running to the dictionary.

I was grateful that in her description of my own paper on the work of Heaphy, of my expedition into the catacombs this year to find Sylvia Bogdanescu's cubiculum containing the mysterious first century portrait of Christ, Crispino, despite having been a trenchant critic of my work when it was first published in 1986, is gracious enough now to allow the possibility of verity in my thesis but without the rancour or indignation sometimes displayed by certain others in the field.

The aspect most pleasing about *Spectrum* 42 is that there is no reference whatever to its being the final issue. I suppose this might mean that Dorothy has decided to let it pass away with neither a bang nor a whimper but simply make a dignified departure from the scene rather like a passing wraith. On the other hand, it might mean that she will, indeed, produce more. If the first alternative is true then *Spectrum* will certainly not become the mere ghost of something people will have forgotten. Rather, will it remain as a singular and significant contribution to Shroud studies of the twentieth century. If the second alternative be the case then I certainly hope Dorothy Crispino will be enabled to continue, by whatever means, to provide her many admirers in many countries with this quality product.



Dorothy Crispino - *Shroud Spectrum*

DESHROUDING THE HISTORICAL JESUS

Robert Halisey (USA)

(1)

The Shroud of Turin and Reason

In 1988 the Shroud of Turin, the reputed burial cloth of Jesus, was allegedly carbon dated to 1260-1390. One should say "*allegedly*" because the scientists who conducted that test refuse to release the "complete data" of the test, and therefore their peers cannot confirm the test results. The C-14 testers refusal raises questions which should be obvious: (1) Why the refusal? (2) Why the widespread acceptance of the test results? (3) Why have the media branded the Shroud "fake"? (4) Why haven't the media informed the public that the testers are withholding test data? (5) Where are the investigative reporters questioning why data are withheld? (They would be out there beating down doors had the C-14 testers dated the cloth to the first-century and dared to conceal test data.) (6) Why have "the rules of the game" been set aside in this instance? (7) Why would reasonable men accept the results of a test when they are denied access to all the data of that test?

(2)

Is the Shroud a First-Century Artifact?



A Coin minted by Pontius Pilate in 29 A.D. and an enlargement of the right eye area of the Shroud figure. Note the similarities. Both are the same size (15 mm) and roughly the same shape. The coin is stamped with an astrologer's staff, Pontius Pilate's emblem, and letters to the upper left. Similarly, the eye area enlargement shows shadowy outlines of a staff and, to the upper left, four letters — UCAI. The Roman Emperor at the time of Jesus was Tiberou Caisaros; coins bearing his name still exist. (Note: Few observers detect all four letters in the eye area enlargement, but most see at least two of them; in a survey of fifty college students a statistically significant twenty percent of them — without foreknowledge or improper prompting — discerned the CAI.* That one in five saw the same three letters cannot reasonably be attributed to chance; evidently, those letters are there — and they date the Shroud to the first century, not to 1260 - 1390.)

* Whereas the "complete data" of the Shroud C-14 test is privy to the chosen few, survey data on the alleged letters over the right eye of the Shroud figure are readily available to the many. If the reader doubts the data of the survey cited here, he has the option of conducting his own survey, tabulating the data and doing a probability study to determine if, in fact, the letters UCAI are imprinted on the coin-like protuberance over the right eye of the man of the Shroud. Such a survey/study conducted properly, documented, certified and subjected to peer review could establish beyond a reasonable doubt that the Shroud is a first-century artifact.

CONSERVATION OF THE SHROUD OF TURIN

ALAN D. ADLER and LARRY A. SCHWALBE

This text of the paper presented at the Rome Symposium 1993 was first published in *Shroud Spectrum International* No 42 (December 1993) and is reprinted with the permission of the authors and the editor of *Spectrum*. The typesetting is also taken from *Spectrum*. The paper is widely regarded as one of the most significant contributions to current Shroud research and seems destined to become a hallmark resource over the next few years.

Introduction

Nothing lasts forever! All material objects do deteriorate with time (e.g., people, mountains, and statues). While the identification of the Shroud of Turin as the actual burial cloth of Christ is an issue of severe polemic, there are, nevertheless, many who unreservedly view the Shroud as a symbol of their faith. These people deserve the very best advice that science can offer for the preservation of this unique and remarkable relic. It must be strongly emphasized that one is not simply interested in the preservation of the linen cloth, but equally concerned with the preservation of the images found on that cloth. The pressing need for a conservation program and some of the issues involved have been previously reported by the authors.^{1,2} Some further matters bear consideration.

In order to design a conservation program, it is first necessary to identify unequivocally the chemical structures involved in the object one desires to conserve, i.e., here, the images on the cloth.² Unfortunately, for the Shroud of Turin this is a subject of prolonged strong controversy.^{3,4} There are those who contend that the Shroud is a 14th century painting made with iron oxide as the pigment, held to the cloth with a proteinaceous binder for the body images, and with some mercuric sulfide admixed with this "paint" to produce the blood images.⁵ On the other hand, there is a large corpus of evidence that the Shroud is definitely not a painting; that the body images have been formed by some as yet unidentified process producing a dehydrative oxidation of the cellulosic surface of the linen cloth itself and with the blood images having been formed by the cloth enfolding and contacting a wounded human male body, thus transferring blood derived materials to the surface of the cloth.^{6,7,8,9}

This difference of opinion must be resolved before a serious conservation program can be undertaken. A number of relatively noninvasive, non-destructive modern analytical methods and techniques could be used onsite to accomplish this, although a minimum amount of some specific designated sample material might be required for offsite analysis in order to remove all ambiguities in the identification. The body image is only found on the top surface of the cloth, i.e., one to two fibers deep, as evidenced by the

CONSERVATION OF THE SHROUD cont'd)

observation that the body images, unlike the blood images, cannot be seen in a transmitted light photograph.^{6,7,8} Further, since the chromophore itself is only a thin layer on the surface of these fibers,^{5,6,7,8} it is easy to estimate that the concentration of the chromophore is only of the order of a part per billion of the total cloth. Therefore, the instrumental methods employed should emphasize surface techniques and reflection rather than transmission methods.

Such instruments could be left onsite to be employed in an ongoing monitoring program designed to continuously check the condition of the Shroud and its stability.¹ It must be noted that a considerable amount of research will be required in order to design such a monitoring program to assure that the Shroud and its images are in fact being preserved. There are several physical, chemical, and biological processes that can lead to various types of deterioration of the cloth itself and/or the images found on its surface.

CONSERVATION PROBLEMS

- Ionizing radiation
- Non-ionizing radiation
- Mechanical stress
- Humidity
- Pressure
- Temperature
- Biology
- Chemistry
- Miscellaneous Factors
 - Debris
 - Protection
- Archiving

Ionizing Radiation

Although it will be a considerable period of time before the accumulation of its damaging effects are evidenced (on the order of millennia — barring a nuclear catastrophe), exposure to ionizing radiation arising from nearby sources of natural radioactivity and cosmic radiation must be considered, as it influences display and storage considerations. The energy of primary cosmic radiation varies from a few Bev to the order of several Pev.¹⁰ In particular, the high energy end of the cosmic radiation spectrum can produce secondary ionization covering areas of the order of 10 square feet, i.e., air showers. These in turn will induce extensive *Bremsstrahlung* in metallic materials near or about the Shroud that will slowly but surely destroy the integrity of the cloth through the ion and radical chemistry induced by the chemical bond breakage such radiative interactions produce (as the strengths of these bonds are only of the order of 4 to 5 ev). Therefore, as only low atomic number materials would be indicated, glass would be the preferred construction material employed in all supporting and containing

CONSERVATION OF THE SHROUD (cont'd)

structures. To minimize cosmic ray exposure, all display formats should place the plane of the cloth perpendicular to the earth's surface. Appropriate shielding should be considered and tested (bearing in mind the problems of possible earthquakes). The amount of such radiation should be assessed and monitored routinely. Note that plastic type construction materials should be avoided in the immediate vicinity as they invariably contain low molecular weight diffusible structures that can chemically react adversely with the cloth and especially the images.

Non-ionizing Radiation

Exposure to non-ionizing radiation, such as visible light, will also lead to either direct photochemical damage to both the cloth

and the images or indirectly to similar damage through photocatalyzed reactions brought about by the presence of photosensitizers.² Trace transition metal compounds and, particularly, the relatively large amounts of various iron-containing structures present^{5,7} can serve as such photosensitizers. Such reactions can strongly affect the images. For example, the red color of the blood has been attributed to the presence of protein-bound bilirubin being admixed with methemoglobin.^{7,8} Overexposure to ultraviolet and/or visible radiation could modify this color,² as bilirubin can be readily and quickly photodecomposed under a variety of conditions.¹¹ Alternatively, if the red color of the blood is due to the presence of vermilion, i.e., mercuric oxide, light exposure will blacken the image, as has been evidenced in many older paintings.¹² Until such considerations have been completely assessed, a continuous lighted display of the surface of the Shroud would be inadvisable and the display of a photoreplica should be considered. While a protective ultraviolet filtering glass cover might prove effective, the use of such filters for the visible region would be most unaesthetic. The employment of any possible chemical quenching agents should be disregarded, since there is no way of really predicting what would be the long-term sequelae following their use. Clearly, the Shroud should be maintained, as now, in the dark until such matters are thoroughly investigated.

Mechanical Stress

Various types of mechanical stresses can also lead to damage. Unless properly supported, the cloth can stretch under gravity when displayed vertically and distort portions of the image. This stress can be reduced by horizontal display, but that increases the exposed target area for damage due to ionizing radiation as discussed above. More important, such stretching causes cracking and flaking of any adherent materials such as proteinaceous blood derived materials or pigment binders, whichever is present. (It is of some historic interest to note that Vignon used the lack of such effects on the body images to argue against the Shroud being a

CONSERVATION OF THE SHROUD (cont'd)

painting.) Low magnification micrographs of the blood image areas of the Shroud already show marked extensive abrasion of this type of damage from past rolling and folding activities.^{6,7,8} Moreover, the sampling tapes demonstrate that these abraded materials have become redistributed over the entire cloth surface, leading to some confusion in assigning specific chemical structures to specific parts of the images.^{7,8} Folding also produces such stress as evidenced by signs of fatigue, i.e., wrinkles. It should be noted that stressed and/or curved surfaces are more chemically reactive than the unstressed structures, particularly with respect to oxidative reactivity. Ultimately this leads to fractured and broken fibers and therefore deterioration of the integrity of the cloth itself. Therefore, the Shroud should not be kept folded or rolled. The backing cloth and its mode of attachment also contribute to this stress problem. However, a decision about removing or modifying the attachment of the backing cloth is not a trivial problem. This will depend somewhat upon the choices made for display and storage formats. Vibrations will also produce the same kinds of problems, although extended over a much longer period of time. Consideration of antivibration designs should be incorporated into display and storage formats.

Humidity

Humidity control is recommended for similar reasons. Hydration/dehydration cycles will produce the same effects as vibrations, as the cellulose fibers will stretch and shrink as their degree of hydration changes. Further, as the chemical mechanism of formation of one of the suggested chromophores constituting the body images involves dehydrative reaction steps, this must also be given some consideration. For this reason it is not recommended that the cloth be either stored or displayed under vacuum. The extent to which such effects enhance oxidative activity should also be ascertained, as it is well known that drying linen increases the effects of mechanical stress. On the other hand, excess moisture will increase the absorption of ambient air pollutants that can lead to adverse chemical effects.² It is readily seen that determining the actual conditions of humidity control for proper maintenance of the Shroud is a matter requiring further investigation.

Pressure

Pressure regulation is also desired. Although the direct effects of small pressure variations on chemical reactivity for the reaction types of interest can be predicted to be negligible, these changes can affect the state of hydration with the subsequent consequences alluded to above. Such small pressure variations can also increase the convective influx of atmospheric pollutants and contaminants by at least an order of magnitude over that expected from simple diffusion. Serious consideration should be given to the possibility

CONSERVATION OF THE SHROUD (cont'd)

of maintaining the Shroud in a sealed glass container under an inert gas atmosphere, but only after the possible microbiological problems have been determined as discussed below. Some provision for these matters should be made in the proposed designs for any recommended forms of analytical monitoring, e.g., various spectroscopic and electroanalytical methods.

Temperature

Temperature maintenance is imperative. Small variations in the temperature can enhance all the pressure, humidity, and mechanical stress effects previously discussed. Further, small temperature variations can have pronounced effects on chemical reaction rates, particularly under various types of catalyzed conditions. The problem of the continuous thermal oxidation of the cloth background has been previously reported.² If the body image chromophore has been produced by an oxidative mechanism, the subsequent thermal oxidation of the non-body image background to the same degree of color saturation will lead to the apparent disappearance of the body images. They will no longer be distinguishable from the nearby surrounding cloth background. Using literature information on chemical reactivity of this type, it was shown that this process could be expected to require as long as a millennium to be manifested. However, it was also shown that it could happen in one to two decades, if steps are not taken to prevent various types of predictable catalytic phenomena from occurring, as would be expected from interactions with various air pollutants, light, radiation, etc.²

It should be noted that simply placing the cloth in an inert gas atmosphere with the exclusion of oxygen will not immediately stop all this activity. Previous chemical reactions on the cloth, e.g., the retting process in manufacture of the linen, the known historic fire and its extinguishment, and previous display and storage procedures, have left a variety of chemical structures on the surface that can act as oxidants and also as catalysts. For example, the acidic structures produced by previous oxidative activity can strongly promote various types of autocatalysis. As much of this sort of material resides in the scorch marks, a very difficult problem is presented. Should they be removed or chemically treated in some fashion? How to deal with it without defacing the cloth or producing new problems will call for some extensive basic research. The recent strong concern by library conservators over the rapid degradation in books of acidic paper, another cellulosic material, should give us some pause for thought.

Although it would be expensive to maintain, some form of cryogenic storage and display could minimize these effects by slowing the rates of chemical reactivity. A research program should be initiated to find an appropriate temperature that will compromise

CONSERVATION OF THE SHROUD (cont'd)

expense with some designated degree of preservation. An interesting advantage arises here if the blood images are partially comprised of mercuric sulfide as has been suggested.⁵ This chemical compound exists in two forms, the usual red colored structure associated with the mineral cinnabar, frequently used as a medieval artist's pigment (vermilion), and a black colored form to which it can convert, especially at elevated temperatures.¹³ Such a possible discoloration of the blood images would be more than effectively prevented by the use of cryogenic conditions. However, such conditions would not prevent the photodecomposition of either bilirubin or the vermilion, as discussed above. This illustrates the importance of unequivocally determining what these chemical materials really are before attempting to design an appropriate conservation program.

Biology

An electron microscope examination of the dusts and pollens removed from the Shroud by G. Riggi by a microvacuuming technique at the time of the 1978 testing has revealed that some species of mites are resident on the cloth. Lichenothelia have recently been both observed in and cultured from Shroud samples and may even have affected the radiodating of the cloth.¹⁴ Arachnids have also recently been observed in one of the tape samples.¹⁵ Information on what other types of fungi, molds, and other species of microorganisms present that should be considered in a conservation program is entirely lacking. A thorough microbiological study to assess such matters should be undertaken, especially to determine what the activities of such organisms might do to the stability of the materials found in the various images, e.g., any proteinaceous structures or partially degraded cellulosic structures. For example, if obligate anaerobes are present it would be strongly inadvisable to place the Shroud in an inert atmosphere, as that would stimulate their activity. This determination of what flora and fauna are already resident on the Shroud is absolutely necessary to any considerations for a proper conservation program.

No insecticides, pesticides, fungicides, fumigants, detergents, or similar materials should be applied to the cloth to generally remedy any projected problems in these regards, as such chemical structures will invariably act as photosensitizers, oxidative catalysts, or reactants or ligands for some of the proposed chromophores. Such remedial treatments should be employed only after extensive research into all possible long-term consequences.

Chemistry

It has already been seen that most of the chemical problems that will be encountered in a conservation program for the Shroud of Turin can be met by controlling the physical factors involved such as temperature, pressure, radiation exposure, and humidity.

CONSERVATION OF THE SHROUD (cont'd)

Conjugated carbonyl groups, one of the postulated image chromophores, are readily reactive with a wide variety of other organic functional groups. Restriction of air-borne pollutants and contaminants from further contact with the cloth is probably one of the most pressing matters to be investigated. How to deal with problem materials now present on the cloth will also require a considerable amount of thought and original research. Contact with plastic materials should be strongly avoided as their volatile effluents will be reactive with the chemical structures postulated to be of importance on the Shroud. Further, one rigid rule that must be followed with no exceptions whatsoever is that no chemical materials will be applied to the cloth without the most searching investigations into the possible risks involved, especially for the future. One should adopt the simple rule that any material giving off a detectable odor should be excluded from contact with the cloth and should not even be employed in the immediate vicinity of the Shroud.

Miscellaneous Factors

There is a relatively large amount of extraneous debris found on the surface of the Shroud,^{5,7} e.g., wax, red silk fibers from the backing cloth, occasional traces of various types of artist's pigments (ascribed to either the artist who painted the Shroud itself⁵ or alternatively to artists making copies of the Shroud and then sanctifying the copy by contacting it to the original⁷), pollens, hairs, insect parts, etc. Some of this material has historic value and context.^{15,16} However, the traces of artists' pigments present could become more finely dispersed over the surface of the cloth¹⁷ and, as these can act as photosensitizers, they present a conflict of interest between conservation and historical investigation. A decision will have to be made as to whether any of it should be selectively removed or all of it left where it is. It is recommended that any such designated removals be accomplished by a selective microvacuuming technique.¹⁵ Leaving it all where it is will also place some constraints on storage and display geometries, unless the recommendations for antivibration designs are incorporated.

The design of display and storage facilities must take some other more practical factors into account. Protection against damage from fire, severe storm, flood, and earthquakes must be considered. Unfortunately, one must also incorporate strong measures to guard against possible acts of vandalism and/or terrorism. A sense of the historic background should also be provided. Last, but certainly not least, it must be aesthetically pleasing. Placing the Shroud in a deep underground facility would solve many of the problems raised here, but it is unlikely that anyone would consider this a satisfactory solution.

Archiving

Hopefully, a successful program of the sort envisioned here will

CONSERVATION OF THE SHROUD (cont'd)

make the Shroud available to the public in some acceptable form for many millennia. However, unforeseen and unimaginable events can intervene no matter how carefully one plans for the future. Therefore, the present conservation plans should incorporate a variety of archiving programs to deal with any unanticipated contingencies. These should include a complete video scan of the cloth at low magnifications, preferably with appropriate spectral data for each pixel, and complete sets of large-scale photographs at a large variety of selected wavelengths from the ultraviolet through the infrared. A library of source materials should be established. Consideration should be given to the preparation of an atlas in both hard and computer formats.¹⁸ Such reference sources would permit a great deal of scholarly research to be conducted on the Shroud without the necessity for direct examination. It must be recognized that it is important to foster such continuous research interest in the Shroud.¹

Conclusion

A number of serious issues affecting the conservation and preservation of the Shroud of Turin have been raised in this article. Problems affecting the cloth itself are not really pressing. Less assurance can be given for matters concerning the stability of the body image; some studies should be initiated now if some anticipated problems are to be avoided in the near future. However, the blood images present a different story — the damage here is already extensive and requires immediate attention. History will hold those of us interested in this remarkable cloth responsible for recognizing that now is the time to initiate such a broad and comprehensive program.^{1,2} *TEMPUS FUGIT!*

Dedication

This paper is respectfully dedicated to the memory of Father Peter Rinaldi, S.D.B. — a scholar, a gentleman, and a friend. Almost seventy years of his life, from the age of fourteen, were devoted to the cause of the Shroud of Turin, setting an example that few can hope to emulate. The conservation and preservation of this cloth was always of paramount interest and concern to him.

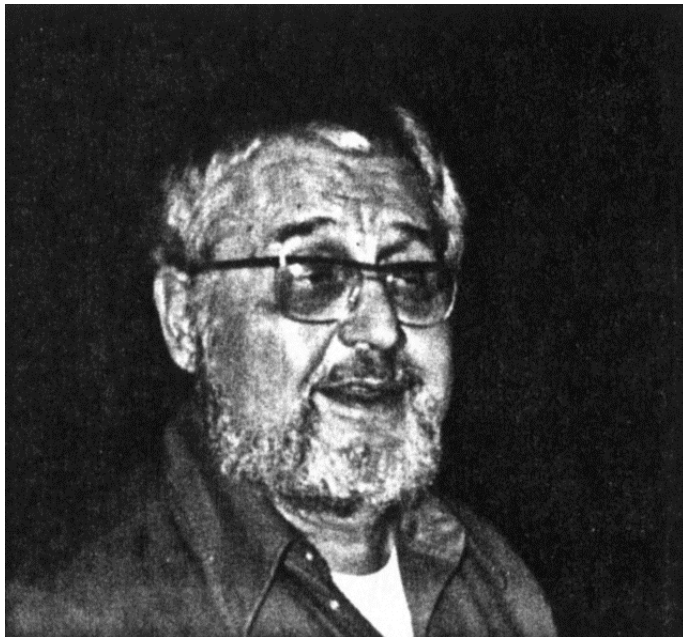
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CONSERVATION OF THE SHROUD (contd)

REFERENCES

1. L. SCHWALBE, *Shroud Spectrum International*, 35/36 (1990): 3.
2. A. ADLER, *Shroud Spectrum International*, 40 (1991): 22.
3. D. SCAVONE, *The Shroud of Turin*, Greenhaven Press, San Diego, CA (1984).
4. I. WILSON, *The Mysterious Shroud*, Doubleday, Garden City, NY (1986).
5. W. MCCRONE, *Acc. Chem. Res.*, 23 (1990): 77.
6. L. SCHWALBE and R. ROGERS, *Anal. Chim. Acta*, 135 (1982): 3.
7. J. HELLER and A. ADLER, *Can. Soc. Forens. Sci. J.*, 14 (1981): 81.
8. E. JUMPER et al., *Adv. in Chem.*, 205 (1984): 447.
9. J. JACKSON et al., *App. Optics*, 23 (1984): 2244.
10. F. RICHTMEYER and E. KENNARD, *Introd. to Modern Physics*, McGraw-Hill, New York, NY, (1947): 659.
11. A. MCDONAGH, *Ann. NYAS*, 244 (1975): 553
12. M. DOERNER, *The Materials of the Artist*, HBJ, New York, NY, (1984): 72.
13. N. SIDGWICK, *The Chemical Elements and Their Compounds*, Oxford, London (1950): 320.
14. L. GARZA-VALDES, personal communication.
15. P. MALONEY, personal communication.
16. W. MEACHAM, *Current Anthropol.*, 24 (1983): 283.
17. I. PICZEK, personal communication.
18. K. MORAN, personal communication.



Professor Alan Adler

A SHROUD REPLICA MADE BY NATURE

- **Remi Van Haelst (Belgium)**

Being a frequent traveller and historical art-lover, I am always searching for traces of the Holy Shroud in churches and museums.

In the chapel of the famous (Hamlet) castle of Helsingor in Denmark I saw recently a wonderful crucifixion altar piece, showing the nails in the wrist and a single nail through both feet.

I found the same kind of Cross on the pulpit of the old octagonal church of Riva sul Garda in Italy.

Recently I visited the historical Minster-Cathedral of York (England). Entering the chapter house, my eye was caught by a strange PIETA, made by the artist Fenwick Lawson. This artist uses the NATURAL form of trees and branches, to make his statues. Here the carving embodies the meaning of death and resurrection. This unusual Pieta shows the Mother of God looking down contemplatively upon the body of Christ lying separately.

Because the artist used only the NATURAL shapes of trees, the right arm is also showed separately from the body of Christ. To my surprise, I saw the face of the dead Christ, as one sees it on the Holy Shroud of Turin! The face was only slightly retouched by the artist with paint (charcoal?), but with no reference to the Shroud, unknown by the artist. So only Nature shaped the long bony hands, the nail wounds in the wrists and the right leg slightly more bent than the left.

The Pieta survived the big south transept fire of 1984 almost undamaged.



Belgian Shroud author Remi van Haelst in Rome recently

23 August 1993

The Editor,
The Fortean Times,
The Boathouse,
Crabtree Lane, London SW6

Dear Editor,

Clearly from her 'eating, sleeping and breathing' Leonardo da Vinci, Lynn Picknett (*Forum, Fortean Times* 70, p.54), has imbibed Leonardo's inventiveness.

It would be wearisome to refute Ms. Picknett's many inventions of what I am supposed to have said on the subject of the Turin Shroud, as quoted both in your columns and in the London *Evening Standard*. But one in particular takes the biscuit: '1492? Yes, the Shroud did disappear around then.'

Far from 'disappearing' around 1492, the Shroud had been acquired by the Duke Louis of Savoy in 1453, and remained with the Savoy family, always well-documented, until ex-king Umberto of Savoy bequeathed the Shroud to the present Pope in 1983.

Despite the bigotry Ms. Picknett claims, the British Society for the Turin Shroud has consistently offered a forum to serious detractors of the Shroud's authenticity, among these Dr. Walter McCrone, who argues the Shroud to be a 14th century painting; Dr. Michael Straiton, who argues it to be the image of a 14th century Crusader, and Professor Michael Tite, who supervised the carbon dating carried out in 1988. The Society's membership includes doctors, pathologists, chemists, physicists, genealogists, teachers, lawyers, artists, photographers and many more, and their religious viewpoints range from Jewish to agnostic.

As Ms. Picknett's arguments stood in 1991, when her followers tried to pressurise the Society into giving her a platform, her key source of information purported to come from within the mysterious 'Priory of Sion', of *Holy Blood, Holy Grail* infamy, and which could not be disclosed. Whatever the true nature of the Turin Shroud, its origins will never be learned from such 'cloak-and-dagger' sources, and this is why the Society (small, and dis-inclined to promote itself), declined to invite her to speak.

Yours sincerely,

Ian Wilson

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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