Who is the man of the Shroud?
ACKNOWLEDGEMENTS

Sincerest thanks to the following for their interest and kind assistance in this exhibition

Prof. Bruno Barberis, Director of the International Centre of Sindonology, Turin – Italy

Mr. Jean-Paul Barth, Vaison la Romaine – France

Mrs. Mimicha Bobbio de Reutemann – Argentina

Mr. Christian Borghese, Nice – France

Mr. José María Castillejo, Madrid – Spain
Conde de Florida Blanca

Mrs. Ana Chico de Guzmán, Madrid – Spain

Prof. Emeritus Avinoam Danin, Botanist, The Hebrew University of Jerusalem – Jerusalem
École Biblique et Archéologique Française de Jérusalem – Jerusalem

Mr. Aldo Guerreschi, Turin – Italy

Mr. Roland Marghieri, Nice – France

Mr. Luigi E. Mattei, sculptor, Bologne – Italy

Mr. Anthony and Mrs. Laurie Mijares – USA

Monegasque donors – Monaco

Fr. Eamon Kelly, L.C. – Ireland

Serre publisher – France

Mr. Petrus Soons – Holland

The Brotherhood of Red Penitents of Nice – France

The Confraternita del Santissimo Sudario, Torino – Italy

The International Centre of Sindonology, Torino – Italy

Mr. Brian Wilson, L.C. – Ireland

Maquette: Martine Ferré – France

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From the Inauguration Day of the first permanent exhibition, July 22nd 2006 - Jerusalem.
What is known today as “the Shroud of Turin” is a linen cloth of herringbone weave that measures 436 cm long and 110 cm wide (14 ft. 3 in. by 3 ft. 7 in.) with an 8 cm (3 in.) strip of cloth added lengthwise to it. It is imprinted with the images of both the front and back of a man who died after having been crucified; the image appears on one side of the Shroud only.

The imprint of the front and the back of the body is faint and of a light brown color that varies in density depending on the distance between the body and the cloth. There are also stains of a carmine tint that have been shown to be bloodstains.

What first strikes the eye are the two lines of scorched material intercepted by patches over holes burnt in 1532 by a fire in the Sainte Chapelle of Chambéry, France, where the Shroud was kept in a silver protective case. Water used to extinguish the fire got into the case and left marks visible along the borders of the Shroud, between the front and the back of the head, on the breast and on the knees.

An ancient tradition identifies the Shroud with linen cloth in which the body of Jesus was buried according to the Gospels. In actual fact, the detailed coincidence between what the Shroud reveals and the historical record of the passion found in the Gospels is truly remarkable.

Whatever the answer, down through the centuries it has strengthened the faith of millions of Christians, increased their sensitivity to the sufferings of Christ and inspired an answer of love. Today, it can help you come to know and appreciate more deeply the passion Jesus suffered to redeem us all.
Unlike most other venerated objects, the Shroud of Turin has been the subject of extensive multidisciplinary research. For over a century now, its authenticity has been intensely debated by scientists, historians and theologians.

According to reliable historical documents, the Shroud can be traced back to 1349 in Lirey, France, when a purported “Shroud of Christ” appeared under mysterious circumstances.

In 1355, the owner Geoffroy II de Charny, a French knight, arranged its first known public exposition in a modest wooden church in Lirey. His wife, Jeanne de Vergy, was the great-great-granddaughter of Otho de Roche, who was a leader in the Sack of Constantinople (1204). It immediately began to draw large numbers of pilgrims. In 1453, his granddaughter, Margaret de Charny, traded the Shroud for two castles with Duke Louis I of Savoy.

When Pope Sixtus IV acknowledged his personal belief that the Shroud was the real burial cloth of Jesus, the Savoy family built a special chapel for it in Chambéry, France, in 1464, where it was preserved in a silver shrine.

In 1532, a fire in this chapel damaged the Shroud; reportedly, a drop of molten silver from its container fell on the folded linen and pierced all the layers, partially destroying the fabric. This explains the symmetrical repetition of some peculiar triangular holes as well as two dark linear scorches located on either side of the image.

The Poor Clare nuns of the convent of Chambéry repaired it in 1534, by sewing it onto a backing cloth (known as the Holland cloth) and stitching 22 patches over the holes.

In 1578, the Shroud was moved to Turin, Italy, so that Cardinal Charles Borromeo, who intended to make a pilgrimage on foot to see it, would be spared a journey over the Swiss Alps. Except for a period during World War II when it was hidden in the Abbey of Montevergine in Avellino, Italy, the Shroud has remained in Turin ever since.

Umberto II of Savoy, deposed as king of Italy in 1946, died in 1983 and bequeathed the Shroud to the Vatican, thus ending over four centuries of control of the Shroud by the House of Savoy.

The Shroud’s history before 1350 is at first sight rather obscure. There is no evidence of a burial cloth during the first couple of centuries of the Christian era.

Still, history is not totally silent on the possible preservation of Christ’s burial cloth.

In Byzantine art, beginning in the 6th Century, Christ was frequently represented with details resembling the Shroud of Turin.

Scientific study of this unique archaeological object has been going on for over a century now. It all really began on 25 May 1898, when the cloth was photographed for the first time by Secondo Pia, an enthusiastic amateur photographer. When the picture was developed, Pia discovered that the image on the photographic plate was not a negative, as he expected, but instead a positive image. This astonishing discovery led to the conclusion that the image mysteriously imprinted on the Shroud is a photographic negative – a finding confirmed in 1931 when the professional photographer Giuseppe Enrie was able to take a new set of photographs of the Shroud.

The first photograph of the Shroud marked a turning point in its history. It began a fascinating period of scientific research on the Shroud. It is fair to say that, since then, probably no object has ever been subjected to such extensive multidisciplinary research as has the Shroud.

A controversial dating of the Shroud by carbon-14 testing in 1988 assigned it a medieval age, but this result has always been considered unreliable. A broad-ranging debate among scholars regarding the reliability of using radiocarbon dating on an object with such peculiar historical and chemical-physical characteristics as the Shroud is ongoing.

At any rate, when the scientific results obtained to date by the different disciplines are collated, the only logical conclusion possible is that the Shroud constitutes evidence mirroring, in quite extraordinary detail, the exactness of the Gospel account of the Passion of Christ. Both the image itself and supporting evidence contained on the Shroud would be impossible to fake.

An International Scientific Symposium held in Turin from 2-5 March 2000 stated that if the same epistemological standards regularly used in the study of physical phenomena are applied to research on the Shroud, then science can only conclude that it is authentic.

Symposium participants concluded that « what is now known scientifically enables us to state with certainly that the body image is not a painting, as chemical and physical investigations and computer analysis have shown ».

There are now numerous study centers throughout the world (in Argentina, Australia, Brazil, Canada, France, Great Britain, Italy, Japan, Mexico, Spain, the United States and other countries) that coordinate and conduct scientific and technical research related to the Shroud.

As His Holiness Pope John Paul II said in his address in Turin on 24 May 1998:

[...] “The Shroud is a challenge to our intelligence. It first of all requires of every person, particularly the researcher, that he humbly grasp the profound message it sends to his reason and his life”. [...]
Presumed route of the Shroud from Jerusalem to Turin.
Precious miniature from the Byzantine chronicler John Skylitzès’s manuscript. (11th Century. National Library, Madrid, Spain).
Transfer of the Holy Face of the Christ from Edessa (Sanli Ufra, Turkey) to the Emperor of Constantinople (Istanbul) on the 15 August 944.
The head of Christ is seen naively drawn on a long cloth folded several times.

Icon dated 945 A.D. and preserved in St Catherine’s Monastery (Sinai) shows King Agbar V receiving the Cloth of Edessa.

Miniature from the “Pray Codex” manuscript kept in the National Library, Budapest, Hungary. It depicts the Entombment (with the hands of Christ crossed, and only four fingers visible on each hand, as on the Shroud) and the visit of the Holy women on Easter morning (where the burial cloth is shown with the Shroud’s characteristic weave).
In the year 1150, ambassadors from Hungary were shown the imperial treasures, including the reputed burial cloth of Christ, in Constantinople. The Codex is dated 1192-1195 and the actual miniatures some decades earlier.

Since the fourteenth century the Shroud has been often exhibited to the public.
The rare weave of the Shroud was depicted around 1348 on a lead pilgrim’s badge of Lirey preserved in the Cluny Museum in Paris (France).
Exhibition of the Shroud. The Miniature is dated 1559. This print shows an exposition “in the fashion of Chambéry”; in other words: in the open air with the Shroud held up by bishops.

Descent from the cross with the Shroud of Turin, painting by Giovanni Battista della Rovere ("Il Fiammenghino", 1561 – 1627).

The poor Clares of Chambéry repairing the Shroud in April 1534.

Enlarged images of the repairs and patches. View of the weave of the Shroud which is quite unique. It is rare woven linen herringbone pattern.
Address of His Holiness Pope John Paul II, Sunday, 24 May 1998 in the Cathedral of Turin:

“[…] The Shroud is a challenge to our intelligence. It first of all requires of every person, particularly the researcher, that he humbly grasp the profound message it sends to his reason and his life. […] Since it is not a matter of faith, the Church has no specific competence to pronounce on these questions. She entrusts to scientists the task of continuing to investigate, so that satisfactory answers may be found to the questions connected with this Sheet, which, according to tradition, wrapped the body of our Redeemer after he had been taken down from the cross. […]

For the believer, what counts above all is that the Shroud is a mirror of the Gospel. […] We cannot escape the idea that the image it presents has such a profound relationship with what the Gospels tell of Jesus’ passion and death, that every sensitive person feels inwardly touched and moved at beholding it. […]

The Shroud shows us Jesus at the moment of his greatest helplessness and reminds us that in the abasement of that death lies the salvation of the whole world. The Shroud thus becomes an invitation to face every experience, including that of suffering and extreme helplessness, with the attitude of those who believe that God’s merciful love overcomes every poverty, every limitation, every temptation to despair: […]”

Meditation of His Holiness Pope Benedict XVI, Sunday, 2 May 2010 in the Cathedral of Turin:

“[…] Holy Saturday is a «no man’s land» between the death and the Resurrection, but this «no man’s land» was entered by One, the Only One, who passed through it with the signs of his Passion for man’s sake: Passio Christi. Passio hominis. And the Shroud speaks to us precisely about this moment testifying exactly to that unique and unrepeatable interval in the history of humanity and the universe in which God, in Jesus Christ, not only shared our dying but also our remaining in death the most radical solidarity. […]

[…] This is the mystery of Holy Saturday! Truly from there, from the darkness of the death of the Son of God, the light of a new hope gleamed: the light of the Resurrection. And it seems to me that, looking at this sacred Cloth through the eyes of faith, one may perceive something of this light. Effectively, the Shroud was immersed in that profound darkness that was at the same time luminous; and I think that if thousands and thousands of people come to venerate it without counting those who contemplate it through images it is because they see in it not only darkness but also the light; not so much the defeat of life and of love, but rather victory, the victory of life over death, of love over hatred. They indeed see the death of Jesus, but they also see his Resurrection; in the bosom of death, life is now vibrant, since love dwells within it. This is the power of the Shroud. […]”
Scientific study of this unique archaeological object has been going on for over a century now. It all really began on 25 May 1898, when the cloth was photographed for the first time by Secondo Pia, an enthusiastic amateur photographer. When the picture was developed, Pia discovered that the image on the photographic plate was not a negative, as he expected, but instead a positive image. This astonishing discovery led to the conclusion that the image mysteriously imprinted on the Shroud is a photographic negative.

In 1931, Giuseppe Enrie, a professional photographer took a new set of photographs of the Shroud. His negatives confirmed what Secondo Pia had discovered more than 30 years earlier. The most striking image obtained by Enrie was that of the face of the Man of the Shroud; he was able to take a close-up photograph without the interference caused by the glass protecting it, revealing the impressive majesty of the face.

The image on the cloth is a natural negative of which photographic reversal provides a positive image of great nobility. We know the nature of the image thanks to numerous physical and chemical analyses carried out on it, but its origin remains inexplicable. Even today all attempts to reproduce it have failed.
Mt 26:67: “Then they spit in his face and struck him; and some slapped him, saying, ‘Prophesy to us, you Christ! Who is it that struck you?’”

Mt 27:26: “Then he released for them Barabbas and having scourged Jesus, delivered him to be crucified.”

Mk 14:65: ...“Some began to spit on him and to cover his face and to strike him, saying to him, ‘Prophesy’ and the guards received him with blows”.

Mk 15:15: “So Pilate, wishing to satisfy the crowd, released for them Barabbas; and having scourged Jesus, he delivered him to be crucified”.

Mk 15:16-19: “And the soldiers...plaiting a crown of thorns...put it on him...And they struck his head with a reed and spat upon him”.

Jn 19:1: “Then Pilate took Jesus and scourged him”.

Jn 19:5: “So Jesus came out, wearing the crown of thorns and the purple robe. Pilate said to them, ‘Behold the man!’”.

Jn 19:17: “So they took Jesus and he went out, bearing his own cross, to the place called in Hebrew Golgotha. There they crucified him…”

On the imprint of the face, a short trickle of venous blood in the shape of a reversed 3, caused by a lesion of the frontal vein, is visible in the middle of the forehead. Near the hairline, two small trickles of arterial blood come from an injury that has damaged the frontal part of the superficial temporal artery.

On the back of the neck, several marks similar to those on the forehead can be seen. The thorns, which caused deep puncture wounds in the head, probably damaged some parts of the occipital artery and some deep veins: the blood is in fact of the arterial-venous type.
Countless signs of scourging on the back and, in the lumbar region, a crosswise flow of blood which came from the wound in the chest after the body was taken down from the cross.

Forehand strokes spread fanlike from the shoulders to the calves of the legs.

The blows of the scourge covered the entire body of the crucified man with sores. “Altogether I counted more than a hundred, perhaps a hundred and twenty.” (P. Barbet).

Some strokes were backhanded as evidenced by the marks on the back.
Shown here are the two different positions of the man as he hung on the cross: “fallen” and “raised”, the latter adopted to avoid immediate asphyxia.

The wounds caused by the nailing to the cross can be seen in the fold of the wrist and not in the palm of the hand (which could not have supported the weight of the body), in clear contrast with long-time artistic representations.

The nails of crucifixion perforated the wrists in the space between the bones of the carpus, injuring the median nerve. Besides provoking atrocious pain, this would have caused the thumb to be bent over inside the palm, which explains why only four fingers left an imprint.

Blood flows along the arms and from the wrist indicate two suspension positions on the cross.

Breaking the legs of the crucified man brought on a rapid death by asphyxia because he was no longer able to push himself up in order to breathe. The legs of the man of the Shroud were not broken, as was in fact the case with Jesus, because he was already dead (Jn 19:33-34).
The bloodstain of the wound in the side is at least 6 cm wide and 15 cm long (2.4 x 5.8 inches). This wound could conceivably have been caused by the stroke of a lance.

A detailed look with the aid of macro-photography would permit us to observe clear rings around the traces of blood due to the exudation of serum. Since the separation of blood corpuscles (red) from serum (watery) only occurs in a corpse, it follows that the wound in the side was inflicted when the crucified man was already dead. The serum exudates offer a convincing explanation for the water John saw flowing from Christ’s pierced thorax.

In December 1981, three Italian researchers – P.L. Baima Bollone, M. Jorio and A.L. Massaro – proved that the hematic traces on threads taken from the Shroud are of human blood and, in December 1982, they came to the conclusion that: “the traces of blood on the Shroud are of the AB group”.

Jn 19:33: “But when they came to Jesus and saw that he was already dead, they did not break his legs”.

Is 53:2-5: “For he grew up before him like a young plant and like a root out of dry ground; he had no form or comeliness that we should look at him and no beauty that we should desire him.

He was despised and rejected by men; a man of sorrows and acquainted with grief, and as one from whom men hide their faces he was despised and we esteemed him not. Surely he has borne our grief and carried our sorrows, yet we esteemed him stricken, smitten by God and afflicted.

But he was wounded for our transgressions, he was bruised for our iniquities; upon him was the chastisement that made us whole and with his stripes we are healed”.

The right foot (on the left looking at the photo) has left a complete imprint while of the left foot you can see only the mark of the heel and the hollow of the foot. The two feet were nailed crosswise: the left foot was placed on the right one, which was against the cross.

To avoid asphyxiation, the crucified man had to continually lift himself up to breathe by pushing on the nail in the feet and pulling on the nails in the wrists. Thus, breaking a crucified man’s legs brought on a rapid death by asphyxia since he was no longer able to push himself up.
Jesus’ tomb was probably similar to this one.

**Mt 27:59-60:** “And Joseph took the body and wrapped it in a clean linen shroud and laid it in his own new tomb, which he had hewn in the rock; and he rolled a great stone to the door of the tomb and departed”.

**Jn 19:39:** “Nicodemus also, who had at first come to him by night, came bringing a mixture of myrrh and aloes, about a hundred pounds weight”.

**Jn 19:40-42:** “They took the body of Jesus and bound it in linen cloths with the spices, as is the burial custom of the Jews. Now in the place where he was crucified there was a garden and in the garden a new tomb where no one had ever been laid. So because of the Jewish day of Preparation, as the tomb was close at hand, they laid Jesus there”.

**Jn 20:4-8:** “They both ran, but the other disciple outran Peter and reached the tomb first; and stooping to look in, he saw the linen cloths lying there, but he did not go in. Then Simon Peter came, following him, and went into the tomb; he saw the linen cloths lying and the napkin, which had been on his head, not lying with the linen cloths, but rolled up in a place by itself. Then the other disciple, who reached the tomb first, also went in and saw and believed”.

Jesus’ tomb was probably similar to this one.
In 1954 Francis L. Filas S.J., of Loyola University in Chicago, examining enlargements of the photographs taken by G. Enrie in 1931, discovered the imprint of the letters U-C-A-I on the right eyelid.

In 1978, scientists, including John P. Jackson and Eric J. Jumper, working with NASA’s VP-8 3-D Image Analyser also discovered what appeared to be raised, button-like shapes over each eye.

Three years later, Fr. Filas, working with Michael Marx, an expert in classical coins, interpreted the letters he had identified in 1954 as part of the inscription UCAI (from TIBERIOU KAISAROS).

They also found a lituus design (an augur’s staff), Filas concluded that this was a dilepton lituus, a coin minted by the Procurator Pontius Pilate between 29 and 32 A.D. under the Emperor Tiberias.

Though the Lepta (plural of lepton) minted in Palestine were Roman-produced coins, the inscription of Tiberius Caesar would have been written in Greek as TIBERIOU KAISAROS.

Was the C, where a K would be expected, a misspelling?

This was a problem that seemed to preclude positive identification until an actual dilepton lituus was discovered with the errant spelling. Several more have since been found. The anomaly, therefore, actually gives added credence to the identification of the coin.

The word lepton means “small” or “thin” and in Roman times a lepton was always a low value coin, usually the smallest available denomination of another currency.

The Roman mite was informally called lepton in the Greek-speaking parts of the Roman Empire; this use is found in the New Testament.

The lituus was the wooden staff which the augurs held in the right hand; it symbolized their authority and their pastoral vocation. It was raised toward heavens while the priests invoked the gods and made their predictions. Legend records that Romulus used it at the time of Rome’s foundation in 753 B.C. It is interesting to note that the bishop’s crozier used in present times is the direct descendant of the lituus.

Over the left eye, Fr. Filas also identified what he believed to be a lepton simpulum coin minted by Pontius Pilate around 29 A.D. (the simpulum was a ritual cup used by the priests during their religious ceremonies). This discovery was confirmed by Prof. Baima Bollone and Nello Balossino in 1996.

A fairly frequent symbol from the Roman religion of the time, the simpulum was a little ladle, provided with shaft and handle. The priests used it to taste the wine which they poured on the head of an animal destined for sacrifice, after which the soothsayer was empowered to examine the animal’s entrails for signs and portents sent to men by the gods through the medium of the interpreter.

This wasn’t the first time that the simpulum appeared on Roman coins, but it was the first time it figured alone: a fact that renders Pilate’s coins all the more distinctive, not only in the context of Judea but in relation to all the other coins of the Empire.
In 1988, the Holy See agreed to a radiocarbon dating of the shroud. For this purpose a small piece of fabric was cut from a corner of the Shroud, divided into three parts and sent to three laboratories, at Oxford University, the University of Arizona and the Swiss Federal Institute of Technology. The result dated the fabric to the period between 1260 and 1390 A.D.

Nevertheless, experts in various disciplines have since called into question the reliability of the results, given the history and characteristics of the Shroud and the way the test was conducted.

While Carbon-14 dating has turned out to be, as one scientist put it, “not quite the alchemist’s stone we once hoped it might be”, it is generally accurate and reliable when the requisite protocols are followed.

Even then, as one of the Swiss experts who dated the Shroud in 1988 admitted in a paper three years earlier, “the existence of significant indeterminant errors can never be excluded from any age determination. No method is immune from giving grossly incorrect datings when there are non-apparent problems with the samples... the results illustrated [in this paper] show that this situation occurs frequently” (W.Woelfli, Archaeological Shard dating: Comparison of TL Techniques with Radiocarbon Dates by Beta Counting and Accelarator Techniques. Paper read at the International Radiocarbon Conference, Trondheim, Norway, 1985).

In the case of the Shroud, even known problems were not given due consideration. Moreover, several important protocols were violated.

Discussing a 1000-year discrepancy between radiocarbon dates given for an Egyptian linen cloth and its actual age as known from other reliable sources, the same expert explained: “For the particular case discussed here it is obvious that the number of 4 investigated samples is still too small to properly understand the observed disparity between radiocarbon dates and historical chronology.” (Nuclear Instruments and Methods in Physics research, B29, 1987 1-13).

Yet for dating the Shroud, one single sample was used, divided into three parts for the three laboratories. Raymond N. Rogers, retired Fellow of the Los Alamos National Laboratory, and leader of the chemistry group in the STURP scientific team that performed the first ever in-depth scientific examination of the Shroud in 1978, has shown in a peer-reviewed study published January 20, 2005 in Thermochimica Acta Volume 425 that:

“...the sample used... was taken from a rewoven area of the Shroud. Pyrolysis-mass spectrolometry results from the sample area coupled with microscopic and microchemical observations prove that the radiocarbon sample was not part of the original cloth of the Shroud of Turin. The radiocarbon date was thus not valid for determining the true age of the shroud”.

Carbon 14’s Biological Cycle

As well as ordinary carbon atoms (C\(^{12}\)), all plants assimilate a portion of radioactive C\(^{14}\). Animals feed on plants containing C\(^{14}\).

The collision of cosmic radiation with the atmosphere produces high-energy neutrons. The neutrons combine with ozone to from radiocative carbon 14 (C\(^{14}\)) and hydrogen. C\(^{14}\) and oxygen combine to from radioactive CO\(^{2}\). Animals feed on plants containing C\(^{14}\).

When living beings die, the C\(^{14}\) deteriorates its half-life is 5,730 years. The ratio of C\(^{14}\) to C\(^{12}\) makes it possible to determine the age of the organic matter.
A hundred images of plant parts, such as flowers, flowering buds, fruits, stems and leaves seem to be found on high-grade photographs made from Enrie’s 1931 negatives.

The photographs were enlarged to life size and many were photographically enhanced to show the faint images more clearly.

These images are mainly clustered around the head area, but also extend down the sides of the upper body and onto the abdomen. They were observed initially by Dr. A. and Mrs. M. Whanger, and were confirmed more recently by Prof. Avinoam Danin, Professor Emeritus of Botany at Jerusalem’s Hebrew University and an internationally renowned specialist in the vegetation and flora of Israel.

While the images are of slightly wilted flowers, rather tightly clustered together, many of them are quite identifiable, even though they are faint, partial and of low contrast.

Nearly thirty species have been identified visually from the Shroud images. These results show significant agreement with studies carried out by forensic microscopist Dr. Max Frei, who took sticky tape samples from the Shroud in 1973 and 1978. He found many pollen grains on these tapes and tentatively identified some fifty-eight genera or species, mostly from plants growing in the Near East. Dr. Frei’s study does not, however, allow for identifications of types at the species level; pollen grains would have to be collected anew and studied with contemporary methods and equipment to achieve this.

Because the boundaries of their distribution areas almost overlap only in Israel, three in particular were identified by Prof. Danin as geographical indicators.

These indicators are *Zygophyllum dumosum*, *Gundelia tournefortii* and *Cistus creticus*. The place that best fits distribution boundaries of the assemblage is an area 10-20 km (6-12 miles) east and west of the line between Jerusalem and Hebron. The common blooming time of the three plants occurs in the Spring, in the months of March and April.

Distribution map of *Cistus creticus* (yellow squares), *Zygophyllum dumosum* (red squares), *Gundelia tournefortii* (blue squares) from Prof. A. Danin’s data base. The geographical indications lead to the conclusion that fresh flowers from the three indicators could have been placed near or on the body of the Man of the Shroud only in the Jerusalem-Hebron area.

Each square of the map represents a square of 5 x 5 km (3.5 x 3.5 miles) where the plant is recorded.
Images of *Zygophyllum dumosum* Boiss, a plant endemic to Israel, Jordan and Sinai, do not need any verification by pollen grain, although they are present in Frei’s list. Two kinds of leaf images as well as flower images of this plant were identified on the Shroud. The unique leaf pattern development is visible on the Shroud. Other species of *Zygophyllum* do not have this morphology. These images are observed on the Enrie (1931), Miller (1978) and Pia (1898) photographs and were identified by Prof. Avinoam Danin, seen by him on the Shroud itself, March 2000.

Prof. O. Scheuermann used the Van de Graaff generator as a high-voltage source to create corona discharge images by electronic emission on photographic paper. Above, plant morphology features created experimentally. The rose leaf shows prominent teeth at leaflet margins and an almost white center. In the *Chrysanthemum* sp. inflorescence, the ray florets are clearly displayed, each with a dark margin, as in the rose leaflet. The tubular central florets are seen as dots at the center. The white border surrounding them corresponds to the depression between the two florets kinds.

Experiments with corona or electrostatic discharge by physicist O. Scheuermann produced images from flowers similar to the images found on the Shroud.

The plant images on the Shroud resemble “corona discharge” prints (or Kirlian photography). The image on the left here is of a Chrysanthemum coronarium prepared by Prof. O. Scheuermann.

The image of a loose coil of rope can be seen on the Shroud. A curved section of it is visible just to the right of and below a replica which was twisted in the ancient manner by Professor Danin and is being held by him.

For Professor Avinoam Danin, as a botanist, the images of *Gundelia tournefortii* and of *Zygophyllum dumosum* leaves on the Shroud of Turin confirm its genuine Middle Eastern origins.
Several icons and mosaics have been placed here around the face of the man of the Shroud to allow comparison between the mystery presented in the icons and the mysterious Face of the Shroud.

No description of Jesus’ appearance is offered in the New Testament or in any contemporary sources.

However, around the beginning of the 4th Century, iconography began to develop an important role in Byzantine art, benefiting in part from the religious tolerance brought about by the Edict of Milan (313).

And then, quite abruptly, in the 6th Century, through the Middle East and eventually throughout eastern Mediterranean Europe, numerous icons, mosaics and frescoes presented full frontal portraits with distinctive facial characteristics remarkably reminiscent of the face of the Shroud.

Icons (Greek for ‘images’) are known to us since at least the 6th Century. The sacred image, the liturgical icon, principally represents Christ.

Though it cannot represent the invisible and incomprehensible God, the Incarnation of the Son of God has ushered in a new “economy” of images. It is not merely a work of art that illustrates the Sacred Scriptures. It constitutes a confession of religious truths.

An icon is not only a painting but a prayer and shows us what Christ is in the Mystery of God: in St. Paul’s words, “Christ is the visible image of the invisible God” (Col. 1:15).

As the *Catechism of the Catholic Church* (Part Two: “The Celebration of the Christian Mystery”, paragraph 1160) puts it: “Christian (orthodox) iconography expresses in images the same Gospel message that the Scripture communicates by words. Image and word illuminate each other”.

![Image of icons and mosaics](image_url)
In 1930, Paul Vignon, a French scholar, was the first to categorize the common facial attributes visible in early artistic representations of Jesus. He described a square-cornered U shape between the eyebrows, a downward-pointing triangle on the bridge of the nose, a raised right eyebrow, prominent cheekbones, with the right cheek somewhat less accentuated, an enlarged left nostril, an accent line below the nose, a gap in the beard below the lower lip and hair shorter on one side of the head than on the other.

Images of Christ which look like the Shroud can be found on coins struck in 692 during the reign of the Byzantine Emperor Justinian II.

With modern image analysis it now seems apparent that the depiction of Jesus in numerous works of art is probably sourced from a single image: the Shroud of Turin.

A Michael III (842-867) Byzantine coin that depicts Christ with a forelock, very probably an interpretation of the blood dripping on the forehead of the Man of the Shroud.

Side-by-side comparison of a Michael III Byzantine coin and the Christ Pantocrator icon.
Detailed study of the imprint that the body left on the Shroud revealed that its intensity varies gradually in a way which is inversely proportional to the distance between the body and the cloth. The information obtained enabled the development of a three-dimensional picture with the use of various techniques.

In 1973, P. Gastineau obtained real relief by measuring the reflections of the intensities of the 1931 photograph by Giuseppe Enrie.

In 1974, using a microdensitometer (instrument measuring intensity of a photograph) and a reconstruction of how a cloth model of the Shroud drapes over a body, American physicist John Jackson and his colleagues were able to show that, indeed, image intensity does vary with cloth-to-body distance with a significant degree of correlation.

This correlation can be convincingly demonstrated using a special image analysis technique. The idea is to plot image intensity as corresponding levels of three-dimensional topographical relief. If the intensities of the Shroud image indeed correlate with cloth-to-body distance, then the resulting relief image should correspond to a sensible three-dimensional form of a human body (excluding the second order effect of cloth drape).

Jackson later brought a photograph of the Shroud to the image analysis laboratory of Bill Mottern. The Shroud image was viewed with a device called a VP-8 Image Analyzer, an analogue computer that converts image intensity directly into vertical relief. Astonishingly, the relief image looked quite anatomically plausible, even down to the most subtle details of the face.

The fact that the frontal body image on the Shroud is highly correlated with cloth-to-body distance presents major problems for hypotheses describing the origin of the Shroud image. The “three-dimensional” characteristic of the image argues forcefully that it could not be the work of an artist.

It is interesting to see how the intensities of various image features in the Enrie photograph (e.g. face, chest, hands, etc.) have been interpreted by the VP-8 as corresponding levels of relief. The overall 3-D structure of the VP-8 image distinctly resembles a realistic human form.
One side of the Shroud of Turin shows the front and the back of a crucified man. The image is topical, meaning it is located on the surface of the upper-most fibres. The image itself shows some qualities that are important for the 3D investigations.

Studying the image in the early part of the last century, the French Professor Paul Vignon made the observation that the image on the Shroud varied inversely with cloth-to-body distance; that is, closer body parts appeared darker than those that were farther away. The density of the image is proportional to the distance between the body and the cloth and is caused by the fact that more fibres per unit area are discoloured. This translates into 3D information-encoding of the image in the greyscale of the photographs.

Drs. Jackson and Jumper confirmed the 3D information in 1977. Later work done by Prof. Tamburelli from the University of Turin confirmed this also.

More recently, Prof. Peter Soons and a team of experts investigated this possibility and finally succeeded in producing holograms from the Shroud based on the scientifically proven 3D information in the greyscale of the image.

The Hungarian physicist Dr. Dennis Gabor invented Holography in 1947. Dr. Theodore Mainman developed, in 1960, the first laser which eventually enabled many practical holography applications. Both were honoured with Nobel Prize.
No matter how good, a normal photograph of any three-dimensional (3D) object can only reproduce it in two dimensions.

The image of the Man of the Shroud displays the light and dark characteristics that are normally observed in a photographic negative, as discovered in 1898 when Secondo Pia took the first photographs of the Shroud. In their greyscale (all variations from light to dark), photographic images contain a representation of the distance between the cloth and the surface of the original 3D body. That is, greyscale photos of the Shroud provide us with an extraordinary 3D encoding of the body.

Colour photographs do not contain this 3D information.

Holography consists of the tracing and reproducing (‘play-back’) of a real 3D object. The play-back provides an image in light that can be viewed from different angles and is an exact copy of the original 3D object.

Not having had access to the original Shroud, second and third generation copies of the original photographs made by Giuseppe Enrie in 1931 were used. They were digitized to facilitate translation of image density information into greyscale numbers.

The digitalization process focused on extracting all the 3D information present in this very special Enrie photograph in such way that a virtual 3D image could be generated by a computer, and from it, a hologram.

The hologram provides an excellent opportunity to view the image on the Shroud in 3D.

80% of the Holograms of the Man of the Shroud reproduce the data on the Shroud. The upper-arms, damaged by the 1532 fire, and spots, deprived of holographic information, have been simulated.
Luigi E. Mattei, born in Bologne in 1945, is the sculptor of the Holy Door in the Basilica of St. Mary Major in Rome, a Vatican-sponsored work dedicated to the Third Millennium and the Body of the Man of the Shroud, displayed at the Museo della Sindone (Shroud Museum) in Turin.

A member of the Academy of Engraving Arts in Rome, of the international Center for Sindonology, Turin, and the Professional School of Graphic Arts, Professor Mattei has received numerous international awards and distinctions for his work in the field of Sindonology. Many of the sculptures of this art professor are displayed in Bologne and other Italian locations.

Speaking about his three-dimensional reconstruction of the body of the Man of the Shroud, Luigi Mattei says:

“I approached the Holy Shroud image with respect and curiosity, charmed by the mystery and the allure emanating from it. I felt challenged to give form to the physicality associated with the sacred linen cloth. The solemn result: a man’s mysterious corporality.

As one more among many artistic tributes to the subject, it can perhaps make a contribution to research on a discovery with repercussions for science and faith, but whose immediate message is conveyed primarily in aesthetic terms.

The 'true God, true Man, who lived among us' could not help but enjoy an extraordinary high ‘visibility’, witnessed to by the Scriptures and rendered visible by the Shroud.”
In the city of Oviedo, in northern Spain, there is a small bloodstained piece of cloth, measuring 82 cm by 53 cm (33 in. by 21 in.), traditionally held to be the cloth that covered the head of Jesus. Sometimes, referred to as “the other Shroud”, it is more correctly named “the Sudarium” (the “face cloth” of Christ).

Scientists believe it was a Jewish burial custom to put such a cloth over the head of a corpse when the death was so awful that the family would not have wanted to see the face set in rigor mortis. The face cloth (sudarium in Latin), would have been draped over the head of the crucified Christ while awaiting permission from Pontius Pilate to remove the body.

It is referred to in the Gospel of John 20:5-8, as one of the cloths found in Jesus’ tomb.

The existence of the Sudarium and its presence in Oviedo is well attested to since the 8th Century and in Spain since the 7th Century. Before these dates the location of the Sudarium was less certain.

But until very recently, even in Spain, very few people knew about it. However, in 1969, a Shroud investigator, Monsignor Ricci, while going through church archives, became aware that there was another cloth in Oviedo and felt it had to be more carefully examined because, if it demonstrated similarities to the Shroud, it would constitute important corroborating evidence. With the establishment of the Spanish Society for the Study of the Sudarium in 1987 it became popularly known.

The linen of the Shroud is of a fine herringbone weave but the Sudarium is of a rougher weave.

Unlike the Shroud of Turin, which has an image of a crucified man, there is no image on the Sudarium, but it contains stains of blood and lymph that match the blood type on the Shroud.

These patterns have been extensively mapped to enable researchers to compare their shape and measurements with those on the Shroud.

A 1999 study by Prof. Mark Guscin, member of the multidisciplinary study group of the Spanish Center for Sindonology, investigated the relationship between the two cloths. Based on the historical sciences, forensic pathology, blood chemistry (the Sudarium, like the Shroud, has type AB blood stains and six parts of pulmonary edema fluid – significant because it indicates that the man died from asphyxiation, the cause of death for victims of crucifixion) and stain patterns, he concluded that the two cloths covered the same head at two distinct, but close moments in time.

From the bloodstain patterns, it appears that the Sudarium would have been placed on the man’s head while he was in a vertical position, presumably while still hanging on the cross. It would have then been removed before the shroud was placed on the body.

The Dr. Max Frei found pollen from North Africa on the Sudarium, consistent with the traditional story of its transfer from Jerusalem c.614 A.D. via Alexandria to Cartagena, Spain, later to Toledo and finally in 711 A.D. to Oviedo. The Shroud lacks this pollen but has pollen grains specific to Turkey and France, which are not present on the Sudarium.

The Sudarium is currently kept in the Cámaras Santa, the chapel built specially for it in Oviedo Cathedral.

Around the world, several copies of the Shroud are known. Not a single one of them, however, is a photographic negative.
Who is the man of the Shroud?