Jean de Climont

THE

MYSTERIES

OF THE SHROUD

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(Maps, folding layouts, image processing
and watercolors by the author)

Assailly
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The Shroud of Turin is a linen burial cloth. A shroud was a burial cloth placed around the body of dead men. The word shroud is sometimes used for the kind of towel used in ancient times to cover the face of a man after his death. To avoid any misunderstanding, we will use the word *sudarium* in this case.

Carbon-14 dating tests were performed in 1988. It seemed they have put an end to the debate on the authenticity of the Shroud of Turin. However, an impressive number of other criteria make this cloth and the information it contains, a relic from the time of Jesus of Nazareth.

The fabric of the Shroud is presented in the first part. The results of the carbon-14 dating test are confronted with elements dating that the fabric allows.

The second part relates to the pictographic information supplied by the Shroud, especially those that allow dating. The crucifixion steps are detailed as they appear on the Shroud. Ancient texts are then presented for comparison with the Passion of Jesus of Nazareth.

The third part is devoted to the history of the Shroud. Several hypotheses have been proposed on its route before arriving in Constantinople. What has followed is less confusing. Evidences for remote dating are particularly developed.

The fourth part traces the iconography inspired by the Shroud in connection with its dating.

The fifth part presents some of the attempts to explain the pictographs of the Shroud by artifacts.

The sixth part places the messages of the Mysteries of the Shroud in the intellectual context that dominates today. Regardless of its nature, the Shroud gives a vision of Jesus of Nazareth far beyond the mere appearance and its interpretations.
PART ONE

The fabric of the Shroud

The Shroud

The Shroud is a cloth of rectangular shape, 4.41 meters long and 1.13 meters wide made from flax. Therefore, it measures 8 cubits by 2 cubits. The Philetaric cubit was the Greco-Roman standard unit used in Mediterranean basin.

The flax yarn

Flax was already known in the remote antiquity. Traces of flax fibers were found in 2008 in Georgia. They date back to 36,000 years. They could make earlier the time of the first use of textiles by man, but they are only fibers, not fabrics. Pieces of fabric left their mark on clay artifacts dating from 28,000 years. They were discovered in Dolni Vestonice, Czech Republic. Remnants of flax fabrics have been found in the remains of Swiss lake dwellings dating back 10,000 years. In Egypt, linen strips of mummies date back to about 6000 BC.

According to Virgil, linen weaving would be a Gallic invention. Pliny the Elder devotes a large place to flax in his Natural History, within book XIX. He noted that his strength allows for using linen fabrics for ship sails, hunting nets and canvases covering theaters, sometimes tinted in blue and dotted with stars such as those Nero had placed above its amphitheater. Pliny reported that the inhabitants of Cahors, France, make comfortable flax mattresses which were used all over the Roman empire. We could add that the tents of the Romans were made of linen, as they were still in the Middle Ages. Saint Paul used such linen fabrics to make tents. He had probably inherited this industry from his father, also a Roman citizen. But
in all these examples, the yarns were naturally much thicker than in the fabric of the Shroud.

Cultivating flax is not that difficult, but it requires a fine soil, sandy, and it impoverishes the earth, because the roots have to be torn out. Pliny the Elder rebelled against the damage caused by this culture. Today, flax is still grown mainly in France, in the country of Caux, which exports all of its production to China.

Once the stalks of flax were torn, they were soaked in water until the fibrils become detached from each other. This is called retting. Soaking is polluting, it is now banned. Retting is now done on site, by rainwater after stalks have been torn. The retted stalks, called straw, are dried. The following operation is scutching. Scutching involves scraping a small wooden knife down the length of the fibers as they hang vertically, pulling the broken woody bits away from the fibrils.

The separated flax fibrils are traditionally spun by hand using a distaff. The flax fibrils are longer than most other vegetable or animal fibers. They require specific ways of spinning. They are wound about themselves on a spindle. The flax fibrils twist spontaneously in S-shaped during drying. It is therefore natural to spin the fibrils in the same direction. It gives flax fibers. The appearance of the flax fibers is in S. We note, however, that the yarns used for the Shroud have a Z-shaped appearance. This shape results from a spinning in two stages, as it is still practiced today. The fibrils are spun into fibers of S-shaped and the fibers are assembled and spun again with a reverse spinning to obtain the Z-shaped yarns.

Double spinning with two twists in S, more economical, is still used for linen yarns of poorer quality. This is the case of the linen yarns used in artistic bookbinding.

The yarns of the Shroud are 0.2 mm diameter on average and contain from 10 to 15 twisted fibers. Each fiber is made of a dozen fibrils. Therefore, each yarn has an average of one hundred fibrils. The fibrils have a diameter between 20 and 40 microns. Their average length is 22 mm. Diameter has not changed, but the Shroud linen fibril length is quite low compared to flax grown later on. Today, the average length is nearly 40 mm. The yarns used for the fabric of the Shroud had certainly a
level of quality corresponding to the high quality of the fabric as we shall see. Only the longest fibrils would have been retained. The average length of the fibrils of flax harvested at the time of Jesus of Nazareth would have been even lower. This is most probably a consequence of a better selection of flax thereafter.

It should be added that measures of tensile strength of flax fibres of the Shroud were conducted in 2012 at the University of Padua. Comparison with fibres dating from 3000 BC to AD 2000 shows that the fibres of the Shroud date from the time of Christ.

Egyptians, 1000 years ago, made very fine fabrics, often called linen. They were most probably made of yarns of a kind of nettle, Boehmaria nivea (L.), Urticaceae or China nettle. The fibrils of this nettle are the longest plant fibers, from 50 to 250 mm. They have roughly the same diameter as those of flax, from 20 to 50 microns, but they are much more resistant. They allow for making very fine yarns. It is a subtropical plant that requires two months at 25 ° C and an average rainfall. The Egyptians cultivated this nettle since high Antiquity, in irrigated fields. They made, in particular, shrouds appreciated by their finesse and strength, but the cost was very high in line with the difficulties of culture and of extraction of fibrils.

It should be noted that the diameter of the yarns of linen of the Shroud is very irregular, as can be seen in the microscope.

The fibril length and the irregularity of yarn diameter are two criteria that make it unlikely that the flax of the Shroud has been harvested and the yarn spun in the Middle Ages.

**Linen weaving**

The fabric has about 38 yarns per centimeter for the chain and 26 yarns per centimeter for the weft. These figures are averages. At the time, everything was
done by hand. The yarn diameter variation is clearly visible. The number of 38 chain yarns per centimeter implies that the average diameter of the chain yarn is about 0.14 mm. The weft yarns are approximately 0.26 mm in diameter. The yarns of the chain are always thinner than the yarn of weft. This ancient provision is still in force. It is necessitated by the resistance of the finished fabric and not by the weaving itself. The weft yarns are much less straight than the yarn of chain. They deform more easily under the effect of traction. This problem is particularly troublesome for the ship sails. It is compensated by taking a weft yarn thicker. It was not until the late eighteenth century to successfully determine the optimal ratio of the diameters of yarns by calculation. The ratio was previously fully empirical.

The average weight of the fabric is from 20 to 23 mg/cm2. For comparison, today a linen towel is 19 mg/cm2 and a linen handkerchief is 7 mg/cm2. The wool fabrics were generally heavier, 30 to 50 mg/cm2, before the recent development of super 100 which may fall below 25 mg/cm2.

The earliest drawings of vertical looms are on papyrus and Egyptian reliefs. The frame of the loom is a gantry comprising two uprights and a crosspiece; below the crosspiece a horizontal bar is secured, the beam, where are suspended the yarns of the chain tensioned at their lower end by weights, hence the Latin name *tela pendula*. The beam could also be used to wind the fabric and thus increase the length of the fabric. Weaving weights unearthed at Gezer show that these vertical looms were used initially to make fine linen clothing for priests as prescribed by Exodus (28-5): "They employ gold, blue, purple and scarlet fabrics, made of fine linen."

The Mishnah list thirty-nine works prohibited on Shabbos, including: (Mishnah Shabbos 7, 2: 18) "Ossé chenei batei Nirin" installing a loom.

A type of vertical loom, common in Roman times, was used to weave fabrics four cubits wide, for making very popular tunics. The *tunica inconsutilis* was manufactured, as its name implies, seamless from one piece of eight cubits in length. The finished fabric may be cut lengthwise to make two shrouds two cubits wide.

One can notice that the tunic of Jesus of Nazareth was a high quality *tunica inconsutilis* that the Roman soldiers drawn. St. John (19-23 and 24) gives the most details: "When the soldiers had crucified Jesus they took his garments and made four parts, one for each soldier; also his tunic. But the tunic was without seam, woven from top to bottom; so they said to one another, "Let us not tear it, but cast lots for it to see whose it shall be." This was to fulfill the scripture, "They parted my garments among them, and for my clothing they cast lots." So the soldiers did this." (19.25)
For some unknown reason, the vertical looms of Roman times are pictured like inclined Neolithic looms, made of rough wood evil squared. The Romans had iron Gallic tools. They built ballista perfectly assembled. The looms of that time should not be more primitive, particularly for making high quality fabrics. The uprights should be perfectly smooth to avoid damaging the yarns. The Egyptians and Greeks had already vertical looms, like in the legend of Arachne or that of Penelope. They were drawn on pottery. However, the uprights were often driven into the ground to ensure perfect stability. This practice still existed in the Carolingian period.

There were also, from the highest antiquity, horizontal looms, placed on the floor. The horizontal position allows greater speed of execution. At the time, this type of small looms was very common, but they did not allow for obtaining as good quality and as wide fabrics as with vertical looms.

Before starting weaving, the linen yarns shall be tied on the beam, fixed at the top of the uprights. The parallel vertical yarns are the chain. The yarns were stretched by clay or stone weights. The chain yarns were grouped by tens and attached to weights. It was necessary to drag and reattach weights along yarns at each turn of the beam to obtain the desired length of fabric.

The Shroud has about 4000 chain yarns. This number must be doubled because the looms were designed for tunics. Then, the actual weaving was passing horizontally the weft yarn between the chain yarns.

Among 8000 yarns, there were inevitably yarn passage errors, which remain all along the fabric. This type of loom does not allow obtaining a regular fabric like in the Middle Ages. The fabrics produced after the year one thousand, as the Bayeux tapestry, made of wool on linen pieces, are already much better than the Shroud. This tapestry was made between 1066 and 1082. These linen parts contain much less weaving faults and also the diameter of the yarns is much less erratic.

The Shroud has been woven in twill 3 bind one, that is to say the weft yarn of the fabric binds one chain yarn of four. But in addition, it has a herringbone pattern. This pattern is obtained by reversing the position of the chain yarns linked to each harness at regular spaces. The herringbone is not a necessity for twill, but a specific provision made for high quality fabrics. They increase the flexibility of the fabric. That is at least now the sales argument of the herringbone twill fabrics. Arguably, herringbone introduces a symmetry breaking, which can limit the transverse...
deformation of the fabric mainly in the part of tunics undergoing strains like elbows and knees.

This kind of weaving was practiced throughout the Roman Empire. This was particularly the case in the region of Tyra and Sidon, today in Lebanon, at the time of Jesus of Nazareth. This is a long and very expensive technique. Making the Shroud should have taken several weeks.

The twill was also used for fabrics found in Damascus, Palmyra and Pompeii dating from the beginning of the Christian era. It required a vertical loom with four harnesses as we have seen. Egyptians usually wove flax in plain weave also called taffeta weave.

The loom pictured by the watercolor is typical of the gallo-roman period. It includes four harnesses. The harnesses allow for changing the position of the yarns of the chain with respect to each other. In a vertical loom, pulling yarns to the back
is a result of the action of the weights. Harnesses pull some of the yarns to the front to leave a space between the yarns to pass the weft. In a horizontal loom, the harnesses are wooden vertical rectangles fitted with yarn loops, which pull the chain yarn up and down alternately.

The advantage of twill weave is its flexibility. But it has a disadvantage compared to the other two textile weaves, plain and satin, as we shall see.

The fact that there is 1 yarn above and three below, gives a different look at each side of the fabric: one has a predominance of chain yarns, the right side, the other of weft yarns, the backside. The difference in appearance is enhanced in the case of the Shroud by the herringbone. This is the right side that received the image. Details are better than if the image was formed on the backside.
Finishing the Shroud

By cutting this very costly fabric lengthwise, it was possible to make two shrouds. The problem is that on one side, the edge chain yarn is blocked by the return of the weft yarn, but on the other side, the fabric frays easily. This is the problem of twills. To remedy this, a band was sewn on that side to fix the weft yarns.

The same problem exists at both ends of the fabric. The chain yarns of the Shroud must have been darned in the fabric because there is no hem.

The band sewing is very specific. Indeed, it is not rational to cut such a high quality fabric. One might think that this practice was justified for making shrouds for the richest inhabitants of Judea and Galilee. The Hebrews adopted certain funeral rites of the Egyptians. Egyptians used to place the mumified body in linen then hemmed them in strips. At the time, the Romans practiced cremation.

The finish of the fabric and the type of sewing and stitching look like those that can be seen in the remains of ancient textiles, dating from 40 BC to 73 AD, discovered in the fortress Masada in Judea, where the last Jewish fighters resisted the Roman occupation in 73 AD. This fortress, which also included a palace of Herod the Great, was no longer occupied thereafter.

Josephus reports that the tunic of the high priest, also one piece, also included a seam to the back and chest to not let an unsuitable cut. This type of finish was unknown in Europe in the Middle Ages. They did practice the simple hem which reduces the width of the fabric.

We will see that the images that can be seen on the Shroud are in the axis of the complete fabric that is to say with its sideband. It would not be the case if the band had been added later. It is part of the Shroud as it was delivered. The workmanship of the stitching is related to the high quality of the fabric of the Shroud. Additionally, the side band has a specific weight higher than the fabric itself.

The X-ray examination of the yarn on each side of the seam would have shown that the band has been sewn with the ends of the weft yarns. One wonders why it was necessary to use X-rays to see what requires only a good lens? A magnification of 10 is sufficient. Additionally, in the direction of the length, there are roughly 11,500 cut yarns. It would have been not only necessary to sneak them, but also to return them in the band. Technically, this is not possible because of the short length of yarn available, without insisting on months of work needed.
Although the data are not very consistent, it is likely that two parallel seams fixed the folds of the fabric and of the band, one nested inside the other. This is the most common mode of joining end to end, always used. It is not clear what would be exceptional? But this joining end to end, allowing for increasing a bit the width of the fabric, while preventing fraying, may be particular. The stitch used may itself be special?

The band itself has necessarily its external side blocked by its own weft yarn. Remains whether it is the same on the Shroud side? That is to say, was the band woven separately or does it come from the edge of another fabric?

One can notice that the tunic of Trier also has a band at the bottom. The fabric was not cut like a shroud, but the ends of the fabric have the same problem. It is imperative to have a hem or some yarns fixing. For a tunic, it is mainly to strengthen the bottom against wear.

Note that the visible images on the Shroud are in the axis of the complete fabric that is to say with its side band. It would not be the case if the band had been added later.

**Bleaching of the fabric**

The Shroud fabric has been bleached after weaving, as is still the case today. Bleaching was done, until recently, by exposing fabrics on the ground to air and to water through periodic watering. This technique may take weeks. The bleaching results from the action of ozone from air and water, but also from sunlight. Bleaching by liquid means only is used since the eighteenth century. Lactic acid and chlorine was first used. In recent years, one uses calcium hypochlorite.

Pliny gives no information on the method of bleaching used at his time. Authors report that the yarns of the Shroud covered by another yarns at intersections where they have not been exposed to light, remained a little brown. This information is doubtful. On the one hand, the entire Shroud has yellowed with time. On the other
hand, such a phenomenon does not exist for fabrics bleached by air and water that can still be found on the market.

This method has another consequence. Pollens carried by the wind are embedded between the yarns under the action of water. Such fabrics may contain more pollen than fabrics bleached by liquid means, especially if they have been bleached during the flowering period. Watering leaves deposits of evaporation. Pollens and yarns are covered with calcite, the main deposit in limestone regions. In this case, the latter pollens received less than those arrived first. Pollens of the Shroud are actually covered with widely varying amounts of calcite. The isotopic analysis could determine the geographical origin of the water used. The isotopic composition of some rare components such as strontium is very characteristic of a particular region. We already know that there are calcium and strontium in the Shroud.

**The absence of wool in the fabric**

There is no trace of wool in the fabric, what was however common in fabrics at that time. Thus the linen has been spun and woven in a workshop not using wool. This situation was necessary for fabrics made for Jews. Jewish law forbade mixing wool and linen in the same fabric. Deuteronomy (22-11) states: "You shall not bear a garment woven of various species of yarns, wool and linen together". This text is more flexible than Leviticus (19-19): "You shall not bear a garment woven of two kinds of yarns."

Only the weaving was subject to the rule of non-mixture of wool and linen. Jews could wear wool on linen or cotton underwear.

However, a shroud was a garment of a dead; it was not subject to the law on mixed yarns. But the fabric that the Shroud was made from should normally have been used to make a tunic. Tunics were made in large quantities. There were certainly no specific workshops for shrouds.

Fabrics made in other areas always contain traces of wool. Equipment necessary, looms in particular were expensive and were also used interchangeably for all types of yarns.

**The presence of cotton in the fabric**

The presence of trace of cotton has been demonstrated essentially on the surface. These traces of cotton may have been added during repairs. However, the presence of cotton in fabrics was common at the time, because the weaving operations were
performed in the same workshops and with the same equipment for all types of yarns except wool. But obviously, there is no reason that cotton fibers would be mixed with linen. The yarns of linen and cotton had very little chance to be manufactured in the same place. It is only in the repaired parts that there has been a mixture of the yarns of linen and cotton, not only traces.

Note that the band does not contain any trace of cotton. It does not come from the same loom, or even, perhaps, from the same workshop.

Cotton is more recent than flax. It is cultivated in India for over 3000 years and the Rig-Veda, written in 1500 BC, mentions it. Thousand years later, the Greek Herodotus mentions Indian cotton: "There are trees that grow in the wild; the fruit is a much more beautiful wool and soft as sheep. Indians make clothes". Strabo discovers cotton, a few years before our era, at the entrance to the Persian Gulf. Pliny reports this information in his famous Natural History (VI-XXI) and adds that the Persian Gulf cotton is much better than Indian one. It may be recalled, by the way, that Pliny died in 79 AD, asphyxiated with the whole crew of his ship. His insatiable curiosity prompted him to commission a ship of the Fleet to see more closely the eruption of Vesuvius. They landed near Pompeii and were caught in a cloud of toxic gas.

The fact is that the Jews wove cotton at the time of Christ. The examination of the traces of cotton of the Shroud has allowed identifying the specie of cotton: *Gossypium Herbaceum*, specie characteristic of warm and sunny regions. This specie is characterized by its torsion. However, it is possible that this cotton has been added long after manufacturing of the Shroud. There could be a way to ensure its origin: those traces of cotton should have been tinted ocher when within the pictographs.

**The absence of silk in the fabric**

There is not any trace of silk in the fabric for a very simple and general reason. Pieces of silk fabrics were discovered in the Valley of the Kings with an Egyptian mummy dating from 1070 BC. Pliny the Elder in his Natural History again attributes the silk to bombyx: "These insects are like spiders; they make webs, which are used to make clothing for women. This fabric is called bombycine. The art of unwinding and making cloth with their webs was invented in the isle of Ceos." This is the tiny island of Kea in the Cyclades archipelago. This location is so improbable that Pliny mentions with a deep irony the glory of this island. He added that the bombyx would be found in another Greek island: the isle of Kos. There are many insects called bombyx, but only the larvae of *Bombyx mori* produce silk. There is certainly confusion.
Silk is mentioned in the Bible (Ezekiel 16, 10) and it is likely that the court of Herod used it. Had they known that silk is produced by an invertebrate, the Jews might have prohibited it. Shortly after the conquest of Egypt in 30 BC, a regular trade started up between the Romans and the Far East. Their silk fabrics were sold by the Parthians. The Roman Senate tried in vain to prohibit the wearing of silk, both for economic and moral reasons.

Silk was imported from China exclusively as tissues. There was no loom for silk in the Middle East or in Europe at the time of Jesus of Nazareth. The silkworms were first imported to the West under Justinian 1st in 552-553 AD. Nevertheless, the silk weaving remained quite specific. It is unlikely that there are traces of silk in Middle Ages linen fabrics.

**The presence of other elements in the fabric**

Traces of pigments used in painting were found in the Shroud. We will see that these pigments can in no way be the cause of pictographs that are discussed in the second part, with the exception of recently discovered writings around the face. They could come from the workshop which would make also the dyeing, or be near a dyeing workshop with such pigments carried by the wind or by casual contact. The Shroud was also examined by painters who may have born involuntarily pigments during handling.

It was also found traces of some spices, unrelated to the amount that would have been poured for embalming.

**The presence of pollen in the fabric**

We have seen that the bleaching of the fabric after weaving brought pollen incorporated between yarns. Subsequently, other pollens may have been deposited, but unlike a tunic, a shroud has no reason to be exposed to air before being unfolded to receive a dead. Thereafter the Shroud remained folded during practically all its stay in the Middle East. Almost all pollens come from the bleaching operation.

Among the 58 species of pollen found on the Shroud, 44 come from the Mediterranean area and even from Palestine, and 28 of them were identified as species flourishing between Jerusalem and Jericho, but it seems there is no pollen of oak and of olive. Pollen specialists think it is very difficult to identify plant species from pollen. Often, the examination allows only the determination of the type or the family. Anyway two species have been identified: *Cistus Creticus* well known
by Egyptians who used it as stimulant, and *Gundelia tournefortii*, thorny shrub found in the Middle East.

Examination of pollen collected shows that they are covered with calcite. Some, yet similar to others, have no calcite. Calcite can hardly come from the very short and limited aspersion in the fire of the Holy Chapel of Chambery. This mineral deposit is most likely due to bleaching.

On the surface of the tunic Argenteuil, another relic that would be the garment worn by Jesus of Nazareth before being crucified, was found pollens of two particular species of tamarind and pistachio that would meet that Palestine species that are also found on the Shroud and the *sudarium* of Oviedo.

**The presence of mineral dust on the fabric**

Dust of aragonite was found at the location of the nose, knees and feet. Aragonite is a form of calcium carbonate. The aragonite comes from travertine. The aragonite is
recrystallized in calcite with time, but most of the travertine quarries, especially the famous and ancient quarries of Tivoli, still contain aragonite. There is travertine in Jerusalem, especially near the Damascus Gate. Again, isotopic analysis could provide interesting information on the place of origin of the dust. Exegetes think Golgotha was on the road to Damascus, always crowded, but rather near the Herod’s Gate which is just aside.

**Carbon in the linen yarns**

Linen yarn consists of 64 to 74% cellulose, 11-17% hemicellulose, 1.8% pectin, 2 to 3% lignin, by 1.5% wax and 8 to 10% water.

Flax fiber cells are surrounded by different layers forming the walls. The walls, which provide most of the mechanical properties of the fibers are composed of cellulose unidirectional micro fibrils surrounded by polysaccharide matrix [Cx (H2O) y] n, such as pectin and hemicellulose. The formula of cellulose could be written: (C6 H10 O5)n.

![Cellulose structure](image)

Pectin, hemicelluloses, lignin, and wax, essentially paraffin, consist exclusively of carbon, oxygen and hydrogen.

The key here is to see that all of the carbon in the linen yarns is integrated into macromolecular structures. There is no chemical process that would allow replacing the carbon atoms by other atoms, or even by another carbon isotope, without destroying the structure. They are attached to the structure. Even the production of nitrocellulose does not involve any replacement of carbon, but an addition of nitrogen in the cellulose chains. But there are physical processes which allow, not for replacing, but for converting the carbon atoms.

Flax fibers contain virtually no nitrogen after harvest. This is not the case of linseed. The seeds require some nitrogen supply during growing, but not the fibers, to which nitrogen can lead to uncontrolled growth.
The presence of carbon and nitrogen in a linen fabric, outside the molecular chains, may only result from the incorporation between linen fibers of products foreign to these fibers.

These products may have multiple origins: fibers embedded during weaving on a versatile loom, deposits from water cleaning and bleaching, pollens carried by the wind and a few interstitial gas: dioxide carbon and nitrogen from the air. But the main contribution comes from repairs.

Only repair with additional yarns may represent a significant part of the weight of carbon of the fabric. Other carbon inputs can only be a tiny fraction of the weight of the fabric. Carbon (atomic weight 12) represents 40% of the mass of a linen fabric, oxygen (a.m. 16) 53% and hydrogen (a.m. 1) 7%. External inputs can not, in any way, represent more than a fraction of one % of the total weight of the fabric. As for the air, it cannot be fixed within the tissue structure. Nitrogen and carbon dioxide from the air trapped between the fibers are in minute quantities.

Although the shroud does not contain wool, it can be reminded that wool is essentially composed of keratin and thus of amino acid. Very roughly, we can say that the basic structure of amino acids contains nitrogen instead of carbon atoms of the cellulose. Wool has other carbon components, thus containing carbon-14, which determine its age.

![Amino Acid Structure](image)

**Carbon-14 in the atmosphere**

The carbon exists in the form of four isotopes: carbons 11, 12, 13 and 14.

Carbon 11 is unstable. It has a period of 20 minutes. It breaks down quickly and therefore it does not exist naturally on Earth.

Carbon 12 is stable and is almost all terrestrial carbon that is in the soil, water or air. Its stability is so high that graphite, almost pure carbon, is used as a moderator in some nuclear power plant designs. It is generally possible to change the nature of an atom by neutron bombardment. But it is impossible to transform a carbon 12 atom, which constitutes the major part of terrestrial carbon and therefore the Shroud. One can only transform the carbon-13 and nitrogen-14 in carbon-14.
Carbon 13 is 1.1% of terrestrial carbon. It is stable, but can transmute in carbon-14, just like nitrogen, under the effect of neutron bombardment.

\[ ^{15}_{6}C + ^{1}_{0}n \rightarrow ^{14}_{6}C \]

Carbon-14 is unstable. Carbon-14, or radiocarbon, is a radioactive isotope of carbon. The only mode of decay of carbon-14 produces, simplifying a bit, an electron and is transmuted into nitrogen 14.

As a result, the carbon-14 atoms of the molecular chains are replaced gradually by nitrogen. The old linen fabrics contain therefore, within the molecular chains, a proportion of nitrogen equal to the proportion of carbon-14 that has transmuted over time. This proportion is extremely low.

\[ ^{14}_{6}C \rightarrow ^{0}_{1}e + ^{1}_{7}N \]

The half-life of carbon-14 is 5734 ± 40 years according to calculations of particle physics dating from 1961. However, we continue to use the conventional dating value evaluated in 1951, 5568 ± 30 years. This period corresponds to the time taken for half of a given amount of carbon-14 to transform into nitrogen 14. This is the half-life.

With a half-life of 5,734 years, carbon-14 would have disappeared long ago from the atmosphere if it was not produced continuously.

In the upper atmosphere, nuclear reactions initiated by cosmic radiation, mostly protons, substantially hydrogen, produces a stream of free neutrons. After being slowed by collisions with air molecules, neutrons, in a known range of kinetic energy, react with nitrogen to form carbon-14:

\[ ^{1}_{0}n + ^{14}_{7}N \rightarrow ^{14}_{6}C + ^{1}_{1}p \]

Nitrogen makes up 78.11% of the Earth's atmosphere. The likelihood of this transformation is quite high. It occurs between 15,000 meters and 18,000 meters at high geomagnetic latitudes.

The cosmic ray flux is relatively constant over a long period of time. The rate of production of carbon-14 in the upper atmosphere is generally constant. However, it
turns out that this production compensates quite well the decay of carbon-14 by natural radioactivity. Finally, the ratio of carbon-14 to carbon 12 is stable. Its value is 1.2 \times 10^{-10}\%

This proportion is fairly uniform in the atmosphere and the biosphere because of ongoing exchanges between living organisms and their environment. The carbon-14 atoms react rapidly with oxygen to form carbon dioxide. This gas flows throughout the atmosphere and oceans. Carbon dioxide also reacts with the biosphere. Plants assimilate carbon-14 in the atmosphere through photosynthesis. It spreads throughout the cycle and alive.

However, variations of the magnetic field cause variations in the rate of production of carbon-14 over time. Climate change and the massive rejection of fossil carbon into the atmosphere by industry and transport since the nineteenth century have also changed the content of carbon-14. In addition, during the 1950s and 1960s nuclear tests almost doubled the amount of carbon-14 in the atmosphere.

Japanese researchers have discovered in 2012 in the rings of two trees, corresponding to the years 774 and 775, a strong and rapid increase in the rate of carbon-14, about 1.2%. Such an increase is 20 times greater than variations attributed to changes in solar activity. It is attributed to the explosion of a supernova or a solar proton storm. Variations observed in carbon concentration just change the measured age of the tree rings involved, but only those. This increase contributes to a give a more recent age to the rings involved by about 150 years compared to neighboring rings. This type of radiation excursion could have occurred several times in the past. But it is not a general correction applicable to all measurements. It concerns only the plant fibers or animals alive at the time of the radiation excursion.

These variations may in no case lead to give an erroneous age to flax fibers if the fibers were not exposed during their growth to such variations. Once harvested, the variations in the amount of carbon-14 in the atmosphere have no influence.

The carbon-14 dating

A living organism assimilates carbon with an invariable overall proportion of carbon 14. Upon the death of an organism, any exchange with the external environment is stopped, but the carbon-14 remains trapped and its amount starts decreasing exponentially. So that it is possible to determine by how long the body is dead.

Carbon-14 is commonly used for dating archaeological objects up to 50 000 years. Corrections are sensitive for periods much earlier than the first century of our era:
1000 BC becomes 1200, 2000 becomes 2500, 3000 becomes 3650 and 4000 becomes 4800. These corrections are systematically taken into account since the 1970s in all estimates.

A calibration curve was established to allow the necessary correction.

Another correction results of isotopic fractioning during photosynthesis of the plant. Plants disadvantage heavier isotopes of carbon absorbing proportionately less carbon-13 and carbon-14. In addition, the carbon-13 and 14 content of plants depends on the cycle of photosynthesis of the plant. Almost all plants of continental temperate countries use the C3 cycle and prefer carbon 13. This is not the same in tropical countries and desert where plants prefer carbon 14. These phenomena, which ultimately correspond to a very small reduction of the initial rate of carbon-14, go in the direction of assigning dates slightly older than the reality.

The measurement itself is very reliable and cannot be questioned. But the correspondence with a specific time can be distorted by the presence in the samples of body at different times. This is why dating is more accurate for compact plants like wood. Fabrics and papers may have been contaminated by foreign fibers and solid particles that can disrupt not the measured proportion of carbon-14, but the match with the actual date of the development of plant fibers.

Correspondence with the actual date may be distorted by bombardment with neutrons. Neutrons can convert nitrogen-14 already produced by the radioactive decay of carbon-14, but mostly carbon-13 in carbon-14. The proportion of carbon-13 should be very slightly abnormal after the bombardment. It is also measurable with a mass spectrometer. The mass spectrometer measure does not result of radioactivity, but of the mass of the atoms, as its name suggests. Changes due to photosynthesis may be sufficient to hide the change.

Old linen and cotton fabrics irradiated in nuclear reactors, gave rates of carbon-14 higher than the rate corresponding to their age. The presence of carbon-13 allows for dates in the future for a fabric, even recent, that does not yet contain nitrogen-14.
It is even easier with wool fabrics, which contains a lot of nitrogen-14 from the beginning.

The drawback of the method of carbon-14 dating is that it needs to destroy the samples. Great progresses have been made. The new method called SMA for accelerator mass spectrometry used for the Shroud in 1988, is itself evolving. It now allows analyzing samples containing less than one milligram of carbon instead of several grams and it needs less than one hour instead of several days to several weeks. Just a few milligrams of tissue are needed instead of 50 mg 20 years ago, and of course, much less than before. Simple mass spectrometry requires several grams. The first measurements in 1940 the Geiger counter require tens grams.

It may be noted that a new method of carbon-14 dating by carbon dioxide emissions by the fabric, and therefore without destruction of the sample, was developed in 2010. Without destruction does not mean, however, without alterations. The emission of carbon dioxide should partially alter the structure of the fibers themselves.

**Anomalies in carbon-14 dating**

The carbon-14 method has experienced some failures: live snails dated 24,000 BC, Viking horn, made in about 500, dated by carbon-14 in 2006 AD, a difference of 1000 years between an Egyptian mummy and bandages.

Some anomalies have been explained. Thus, an Egyptian sarcophagus that had stayed in the courtyard of a Chicago laboratory has been dated to the twentieth century. This error dating back several millennia had been caused by a cloud of radioactive waste that had flown over Chicago after atomic experiments in the desert of Nevada.

The carbon-14 dating of Lindow Man places the date of his death between -2 and 119 AD. There is no problem about it. Jarno measurements on Britain megalithic site civilization gave 3000 BC, with remains dated with carbon 14. These dates are not disputed.

Problems of this method concern the anomalous isotopic compositions resulting from unknown nuclear effects:

- Bones of an Egyptian mummy skeleton: 2,000 and 4,000 years,
- Carrot of Bering Strait: 6 steps from 4,000 to 16,000 years,
- Muskox carcass: 17,000 and 24,000 years
- Prehistoric cave paintings: 14,000 and 28,000 years 15,000 and 30,000 years
- Paintings in the cave spatially close and identical in terms of design, style and performance by the artist, sometimes have differences exceeding 10,000 years.
- Paints and other datable objects (furniture, animal remains, charcoal, ...) of the cave sometimes have differences exceeding 10,000 years.
- Paintings identical in pattern, style and performance by the artist, sometimes have differences exceeding 10,000 years in a cave to another.

The measurement accuracy is several orders of magnitude below those errors. The anomaly is certain. The three hypotheses to explain the differences for cave paintings are:
- Pollution by newer carbon
- Use by the artist of charcoal more or less old
- Modifying later work by another artist.

However, these examples are much older than the Shroud.

The Carbon-14 dating of the Shroud

In 1988, the Vatican authorized the taking of a sample of the Shroud for its carbon-14 dating.

This sample was cut into four pieces given to three laboratories, instead of the 7 originally planned, Radiocarbon Accelerator Unit at the University of Oxford, the University of Arizona and the Federal Institute of Technology Zurich. The remaining laboratories were finally not retained because they used an old method requiring significant amount of fabric as we have seen.

The samples were made near the lateral band, which we spoke of, at the bottom of the Shroud part with the front view. Top left of the photograph.

By the way, this part of the band was missing, like the similar part at the other end. They were probably completed at the same time as burns repairs after the fire of 1532.

Laboratories received three control samples of different origins:
- A linen cloth from Nubia dated by historical methods of the eleventh-twelfth century AD;
- A linen fabric associated with an Egyptian mummy estimated first century AD;
- Yarns from the cape of Saint Louis of Anjou, historically dated 1290-1310 AD

The three laboratories divided the samples and submitted them to several different procedures of mechanical and chemical cleaning. All laboratories have examined
the fabric samples under a microscope to identify and remove foreign materials. Oxford samples were cleaned with a vacuum pipette and a petroleum ether to remove fats and candle wax, for example. These cleaning methods successively used acid and alkaline solutions. Zurich used an ultrasonic bath for pretreatment. After the initial cleaning procedure, each laboratory cut the samples into pieces.

Each sample piece was converted into graphite on which were performed the measurements. Each laboratory implemented from 3 to 5 independent measurements for each sample piece over a period of about a month. The results have been statistically analyzed by the University of Oxford, which published the following table. Figures are numbers of years before 1950, conventional for this type of dating.

The results give a medieval time between 1260 and 1390. It is impossible that the reported margins of error explain the overall dispersion.

<table>
<thead>
<tr>
<th>SAMPLES</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHROUD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona</td>
<td>646±31</td>
<td>927±32</td>
<td>1,995±46</td>
<td>722±43</td>
</tr>
<tr>
<td>Oxford</td>
<td>750±30</td>
<td>940±30</td>
<td>1,980±35</td>
<td>755±30</td>
</tr>
<tr>
<td>Zurich</td>
<td>676±24</td>
<td>941±23</td>
<td>1,940±30</td>
<td>685±34</td>
</tr>
<tr>
<td>Unweighted average</td>
<td>691±31</td>
<td>936±5</td>
<td>1,972±16</td>
<td>721±20</td>
</tr>
<tr>
<td>Weighted average</td>
<td>689±16</td>
<td>937±16</td>
<td>1,964±20</td>
<td>724±20</td>
</tr>
<tr>
<td>Value of Khi2 (2 freedom degrees)</td>
<td>6.4</td>
<td>0.1</td>
<td>1.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Significance level</td>
<td>5%</td>
<td>90%</td>
<td>50%</td>
<td>30%</td>
</tr>
</tbody>
</table>

The significance level is abnormally low. The dispersion of results does not come from measurement facilities. The other results are consistent. Curve correlation with age of the samples is itself verified on such a number of examples that it cannot be called into question.

There is a problem with the samples. It is inconceivable, from a scientific point of view, to present these results as evidence of fabric creation in the Middle Ages. Not only anomalous dispersion dates should encourage the most elementary prudence, even though ultimately, as we shall see, the carbon-14 dating cannot be very far after the actual date, but one single criterion can never be isolated from others. One must at least acknowledge the problem of the Shroud. No belief in any field whatsoever, should allow divesting from a minimum of objectivity. However, human passions outweigh most often. The faculty of reasoning is clouded by preconceived ideas, by the prevailing opinion, but mainly by our days by a morbid desire to shock in order to be highlighted.
Lateral band with its two missing parts replaced after they have been cut probably during eleventh century by an emperor to make a scapular.

1973 sampling within the repair of the lateral strip

1988 sampling

Arizona 1 1238
Oxford 1246
Zurich 1376
Arizona 2 1430
However, there is no need to be an expert in anything to notice significant differences in weaving between the parts closest to the band against others parts. For the latter, the twill armor 3 bind 1 is clearly visible. In these parts, one may see perfectly the offset of chains that contributes to give the fabric of the Shroud’s its very particular aspect, the famous herringbone pattern. This is in no means the same case for the upper parts.

One of the pieces of Arizona laboratory samples, which has been preserved, was recently photographed under a microscope. It shows very clearly the armor 3 bind 1 twill of the Shroud. But the other sample pieces, which should have to be also kept seem to have disappeared without much hope of finding them back.

Part of the Shroud has been skillfully repaired in continuity with the original fabric, but certainly using, at least in part, the yarns which remained. So that the contribution of 60% might be a bit overstated. It is assumed that these repairs date back to the sixteenth century. There were two processes at that time for repairing tapestries. The French Weave was used for small repairs. Yarns of the same colors were used to mend the gaps. The Inweaving was used for larger repairs. It was to take a piece of tapestry made for this purpose and to fix it in the tapestry hole by mixing fibers frayed on the edges of this piece. The quality repairs are almost invisible to the naked eye.

In addition, the comparison of the position of the samples and the dates obtained shows that they are later when the more away from the edge of the Shroud. It seems in fact it corresponds to the proportion of twill fabric 3 bind 1 versus all the coupons. There is an undeniable correlation between the proportion repaired and
the date obtained. Finally, the average specific weight of the samples is higher than the average specific weight of the Shroud.

The causes of erroneous dating

The causes of erroneous dating can only come from the nature of the samples themselves. The carbon-14 measurements are not contestable. Similarly, the link between the proportion of carbon-14 in the samples and the date itself is indisputable.

The decrease in the amount of carbon-14 is exponential. So, if after 5734 years, there are only 50% of the original carbon-14, after 2000 years, there are still 87.5% and 96% after 450 years, corresponding to a material dating from 1550. The amount of carbon-14 is itself proportional to the weight of the samples.

In order to obtain a date at the beginning of the first century for the original linen parts, from the average date of 1300 obtained with carbon-14 it would require that the contribution of the 1550s additions accounted for 87% of the total weight of the samples. This value is more than 8 times the original weight of linen fabric before repair.

The appearance of fabric samples would suggest a maximum proportion of 50% of yarn of 1550s. Thus the date of the original parts would be pushed towards the millennium due to the exponential decay. If the additions are related to the second repair in 1694, then the date could not go back before the ninth century. Despite the problems that surround it, we can assume that the carbon-14 dating of original twill included in the samples cannot go much before the beginning of the second millennium.

Facts that allow for assigning a date much earlier to the Shroud led to hypotheses to explain such a dating.

The best known is the irradiation of the fabric with a stream of protons and neutrons.

The fact that the distant parts of the body, which is the case of the samples, have been irradiated without being burnished is a problem. Browning concerns only the superficial parts of linen fibers, close to the body. To change the ratio of carbon-14 significantly, the entire mass of the linen yarns should have been irradiated. The carbon-13 required for this modification is, in fact, present within all the fibers of the yarns.
It should be imagined that the protons would produce browning. Neutrons would have turned carbon-13 flax fibers into carbon-14. Since the fabric was new or very recent, virtually no nitrogen had time to appear by decomposition of carbon-14. The date change can only come from carbon-13. But what is difficult to understand in this thesis is the fundamental difference between the two radiations. Protons were mainly issued in well-defined directions, while neutrons have spread everywhere to reach parts of the fabrics even the farthest from the body.

The brown image formation by proton irradiation encounters another difficulty. The micro photographic examination of fibrils of flax of the Shroud does not show any difference between brown fibrils and the others. Particles crossing the fibrils generate defects. There are always such particles emitted especially by radon abundant in the regions of igneous rocks. Flax fibrils of the Shroud exhibit many defects of this nature. They are much more numerous than in the yarns of the liner and this is incidentally a criterion of antiquity, unfortunately difficult to be related to a date. But the number of defects is not higher in browned fibrils than in others. Hence, the hypothesis of browning by proton radiation is excluded. But there is a more serious reason also applicable to another theory of the brown image formation.

The protons should therefore be ignored and replaced by a flash of light. Indeed, browning could be achieved with lasers. The coins of money deposited in the eyes of Jesus of Nazareth carried a trace on the Shroud. How is this possible? If the radiation that has formed the brown image came from the body, as assumed, how could it get through these small coins, while it did not get through the blood stains? The coins have also issued a radiation? How this radiation could it form the contours of small coins, the crook and letters on the Shroud? There is no answer to these questions.

Very thorough cleaning done before dating greatly limits the scope of other assumptions based upon other types of contributions. Calcium carbonate which could be deposited on the yarns in the Chambery fire was eliminated by acid treatment and washing with water before dating. Moreover, the Shroud was only slightly dampened near burned areas; some water has infiltrated into the hole caused by the silver shrine very partial fusion in one place. There are only stains but not traces of a full immersion.

Anyway, calcium carbonate in water is mainly of mineral origin and therefore contains no carbon-14, but only carbon-12. The limestone was formed there are hundreds of millions of years and there is no longer any trace of carbon-14 inside. The presence of calcium carbonate should somehow age the fabric. There would be less carbon-14 per unit weight of total carbon.
As for manipulation during exposure, one can imagine that the Cardinals had their hands very clean to handle this fabric!

Another more scientific hypothesis has been proposed. An excess of carbon monoxide during the Chambery fire in 1532 would have caused a carboxylation of the cellulose, that is to say the fixing of this oxide in the molecular chains of the linen. The linen would have thus got younger since the added carbon contains more carbon 14 than what was contained in the Shroud at that time. The problem with this hypothesis is the origin of this carbon monoxide since the Shroud was locked in a silver chest, opened only in one point by the fusion of silver. Carbon monoxide should therefore come from the burning of linen of the Shroud by the fall of drops of molten silver. However, the burned area is a few percent of the overall linen. This is a very small mass relative to the total mass of the Shroud. It still faces the famous 87% of this mass contribution needed to rejuvenate the linen even though all of that carbon monoxide was fixed by the linen, which is already inconceivable.

*The vanillin test*

Vanillin is one of molecules present in the lignin that can be observed as dark deposits at the nodes of fiber growth. It disappears with time and under the effect of temperature. To detect the presence of this molecule, a binary test is carried out using color indicator. This test is negative for the fibers taken from the entire surface of the Shroud in 1978. But it is positive for fibers from the sample cut by Raes in 1973 near the place where the samples were cut in 1988. This test is also positive for the canvas used for the lining of the back of the Shroud which replaced in 1868 the lining of the Poor Clares of Chambery.

This test does not allow dating of the Shroud because it was subjected to high temperatures during the fire of 1532. It could only confirm that the samples used for the carbon-14 dating contain recent fibers.
The Shroud has many colored areas, burns, stains and inscriptions grouped under the name of pictography, which can be defined as a form of imaging remembering some facts. The pictography differs from iconography, which involves representations subsequent to the facts.

In the opposite way we proceeded for the fabric, which began with the flax yarn, the general characteristics will be presented before a review of all the details that appear on the Shroud.

**The burn marks of 1532**

The most visible signs are burn marks. They result from the fire of the Holy Chapel of the Castle of the Dukes of Savoy in Chambery during the night of 3rd to 4th December 1532.

The Shroud was folded in 16, but to be contained in the shrine, one side has been folded again by about 30cm so that for a portion of the length there were 32 layers.

During this fire, it has been pierced in one place by drops of molten metal from its silver shrine. Drops pierced the folded parts of the Shroud and 16 thicknesses. This fold is the cause of burns in the middle and ends of the Shroud. The latters obviously do not have the same symmetry as the others, the fold is not symmetrical. Additionally, the thickness of the fabric has entailed the middle part to be standing back from the ends and burns are there very light.
Finally, there are 4 small holes in the middle, 8 holes at the ends and 16 largest ones in the rest of the fabric. In 1534, the Poor Clares sewed triangular pieces to fill the holes. These pieces appeared white in photographic prints as on the Shroud, but black on the negative, of course. They have been removed in 2002.

Holes in L will be discussed later. They exhibit a symmetry resulting from a folding in four.

**Moisture stains**

The main water stains are a result of the fire of 1532. These stains correspond to the folding of the Shroud at that time and therefore to the burned part symmetries and to those resulting from the additional folding we talked about. It is not possible to distinguish any earlier water stains. Again, we can assume that isotopic analysis would provide useful indications.

**The essential elements**

An Italian lawyer of Turin, Secondo Pia, obtained on May 28, 1898 the first photograph of the Shroud.

After several attempts, an exposure time of fourteen minutes allowed him to get a negative on the glass plate, but it was two positive views of a man laying both in front and back. Thus the Shroud was itself a negative.
A contrasting inverted paper allowed reproducing this negative. It should be noted that the dark stains appear white on the negative photograph. They have not been formed by the same process as the brown stains. These are blood as we shall see.

The Shroud includes images viewed from the front and back of a naked man with his hands clasped. The body was placed in the longitudinal axis of the fabric, with the top of the head just below the horizontal axis, so that when enveloping the head, the Shroud covered the face well below the horizontal axis.

The fact that the face is substantially below the horizontal axis has the effect that by folding the Shroud in 8 in the direction of the width, the face is fully contained between two folds and it is obviously possible to fold the fabric in such a way that the face appears above.

The side parts of the body do not appear. There are no traces of blood as well. The Shroud had not been secured around the body by strips or even with brooches.

These two images have two essential characteristics. On the one hand, they are borne by the surface fibrils of flax yarns to a depth of 20 to 40 microns. This coloration results from oxidative dehydration of the fibrils of flax. On the other hand, the color depends on the distance from the fabric to the body. The presence of more or less altered fibrils gives the appearance of the body image more or less dark. This variable color allows making a 3-dimensional representation.

None of the images obtained by the different artifacts envisaged that we will discuss, allows obtaining such relief image. Even a photograph does in no way give reliefs. This is the most troubling aspect of the pictographs of the Shroud.
By their very nature, these colors cannot appear on the backside of the fabric. It has been photographed recently when replacing the protective sheet attached to the back of the Shroud in 1868 by Princess Clotilde of Savoy. We see dark stains corresponding to blood flows on the fabric. Strengthening tones shows that there is no match with the light and dark areas of the right side of the Shroud. Looking closely, you can see the lines corresponding to the dark lines of the right side.
This body is not that of a rich man like the quality and thus the high price of the Shroud would allow thinking. Traces of blood are not the result of an accident. Moreover, we may see that some phases of burial according to the Hebrew’s rites at the time of Jesus of Nazareth were not met.

**The death penalty in Roman law**

This man has been sentenced to death by crucifixion according to the rules of Roman law. But it was first flagellated. He receives a double punishment. It could result only from two crimes that should have been tried separately. At the trial of Verres, Cicero enumerated the main penalties known to the Romans "Chaining a Roman citizen is an abuse, scourging him is a crime; put him to death is almost parricide, what shall I say of the crucifixion. It is impossible finding a term that is worthy for such an abomination". Tacitus mentions (Roman History XXXIV, 27) putting to death by flogging: "We beat them with rods and made them perish under the blows", but not a double punishment.

The rule "*non bis in idem*" or "*ne bis in idem*" is a classic principle of criminal procedure of Roman law: no one can be prosecuted or punished twice for the same facts.

In Rome, during the classical period, the crime of *perduellio*, high treason, means acts against the Roman people or against its security. Thereafter, lawyers also suppressed crimes against judges and against the emperor and his family, the *crimen maiestatis* such as willful damage to the statues of the prince.

The *crimen maiestatis* was normally punished by death by beheading for Roman citizens like St. Paul, but others, especially the slaves, were generally crucified.

Attempt to the emperor *Maiestas* was not only committing a crime within the meaning of the secular word. It is at the same time attacking a protégé of the gods, bearer of the divine attribute what is the *Maiestas*. Also the responsibility of *crimen maiestatis* goes beyond the common law liability. The proceedings could begin postmortem. *Damnatio memoriae* allowed confiscation called *publicatio*, of property in favor of the state treasury. The proceeding after death involves in the nullity of the dispositions made during the life of condemned.

The crucifixion was a very ancient practice, long before the Romans. It seems they borrowed it to the Phoenicians. It was done in several steps. The condemned man was nailed and, most likely, temporarily attached with a rope to the *patibulum* still on ground. The *patibulum* is the suspension crossbar of the cross and not a full cross a man, even in perfect physical condition, would have been unable to bear. The
pole, the *stipes crucis*, remained driven at the place of execution. Fixing a vertical pole in rocky soil is particularly long. It is unthinkable that it was made at each crucifixion. Similarly, the Montfaucon gallows, near Paris, was always ready to receive condemned men. The condemned could be required to bear the *patibulum* to the place of execution.

It is also very doubtful that the Romans used a hoist to place the *patibulum* on the pole. The operation was certainly done at arm’s length that is to say that the pole should not be more than two meters high considering the width of the *patibulum*. The feet of the condemned were then nailed to the pole. The feet should not be more than twenty centimeters above ground. Finally, the fixing rope was removed. The arms were then extended and legs slightly bent.

There were two methods of fixing the *patibulum*. For the T-shaped cross *crux commissa*, the *patibulum* had a mortise or hollow in its middle portion to be able to fit it in the pole which had a pin or a reduced cross section at the top. For the *crux immissa*, the pole had a notch or a cantilever at the upper part and the *patibulum* when placed in the notch or on the cantilever was attached by a rope. In both cases, the head of the victim descended below the *patibulum*, leaving enough space to fix the panel giving the reason for the conviction, the *titulus*.

There were also variations all more terrible than each other. The condemned could be nailed on a single pole, the *simplex* without *patibulum*, or on an X cross. He could be nailed upside down, which significantly reduced survival.

It is likely that more expeditious means were used as nailing the condemned to trees. This was the case during the crucifixion of 6000 condemned after the revolt of Spartacus in 71 BC. Josephus relates the difficulty of finding poles when Florus, governor of Judea the year 66 AD, cruelly quelled a rebellion by crucifying hundreds of men, and killing their wives and children. Similarly, in 70, Titus did crucify besieged men in Jerusalem who tried to escape. Josephus has counted up to 500 in one day.

The inclined face of the crucified should be almost at eye level. This height is not incompatible with the length of the *pilum*, which was used to verify the death of Jesus of Nazareth. The Roman spear did not exceed 1.50 m and perforated the chest with a very small angle to reach the heart. Hitting on the right was part of the practices taught to the Roman soldiers to dodge the buckler of the enemy held to his left arm.

The torture could last for hours. To prolong survival, a board, the *sedecula*, could be nailed to the pole. The condemned could sit very uncomfortably but it could relieve pain of hands. This was certainly not the case for Jesus of Nazareth as the Shroud
shows no trace of such a board on the wounds of the flagellation. However, Irenaeus and Justin Martyr both describe the cross of Jesus of Nazareth with five ends instead of four. The fifth could be the *sedecula*, but in this case there would be six ends as in the Russian crosses that, in addition, show the *titulum*.

To prolong the agony, support could be fixed to the pole under the feet, the *suppedaneum*.

15 coffins filled with human skeletons were discovered in Givat Ha-Mivtar near Jerusalem, one of which had suffered the agony of the crucifixion in the first century AD. This skeleton is that of a man crucified at the age of 24-28 years. His name was Jehohanan, John, son of Shaggol. He still had a nail fixed in the heels. Pieces of wood remained attached to the nail. One, olive, is coming from the pole, the other, acacia, from a wooden plate which avoided that the feet can get out of the nail. This plate flattened feet on the pole and it is likely that this practice was used for Jesus of Nazareth. This is likely that this plate is represented by the Russian crosses rather than the *sedecula* or the *suppedaneum*.

The nature of the wood pole could surprise. But in reality, the olive trees are normally large trees that may reach fifteen to twenty meters. They are often cut to facilitate harvesting olives.

An injury of the radius of the condemned shows that he was nailed at this place, a little above the wrist. It should be noted that the wrist has always been considered a part of the hand. We always say that we push with our hands while we push, the more often, in fact, with the wrists, much more resistant. In Latin *manus carpi est*, the wrist is part of the hand. But Latin may also use the word *manu* to refer to the wrist. Greek may distinguish the wrist *καρπούς* from the hand *χέρια*, but the wrist may also be said *χειρός* or in ancient Greek *χεῖράς* which is the word used by St. John (Jn 20, 27).

There are vocabulary problems in English. English people bear watch on the wrist. In France, they bear watch on their arm, the left in general. It seems, however, that it is not very far from the place where English people do.
A mistranslated text of Tertullian led to represent, from the Renaissance to the nineteenth century, the two thieves roped to their cross, although they were certainly nailed.

The Romans used ropes during the crucifixion. The ropes could maintain the condemned to the *patibulum* before nailing him so that it makes impossible any accidental release of the body during handling. But the Romans always used to nail condemned, unlike the Egyptians who used only ropes as reported by Xenophon (second century AD).

To hasten death, the Romans broke the tibia and fibula of condemned to death with a bar, the *crucifragium*. This new shock resulted in a quick death.

After his death, the condemned was got down with the *patibulum* after releasing the feet.

This punishment was banned by Constantine (272-337). The death sentence for non-Romans condemned was then limited, if I may say so, to the flagellation. There is virtually no documentation of the time of this torture considered shameful by the Romans.

The Jews never proceeded to crucifixion. Rather they practiced stoning, as Muslims continue to do so, especially for women in cases of adultery, according to the requirements of Hadith (Ibn Ishaq 970), although the Muhammad’s Qur’an did not specify the means of killing.

Jesus of Nazareth answered to scribes, "Let him who is without sin among you be the first to throw a stone at her." (John 8,7). This happened in the Temple of Jerusalem in Judea. This woman would not have been stoned within the temple. Scribes were asking a question. The death penalty in Judea at that time was within the Roman procurator, but Hebrews have not to refer before acting because adultery was one of the few exceptions.

The hanging was also common. But in the Jewish tradition: "If a man has committed a sin worthy of death and he is put to death, and you hang him on a tree, his body shall not remain all night on the tree, but you shall bury him the same day, for a hanged man is cursed by God. You shall not defile your land that the Lord your God is giving you for an inheritance."(Deuteronomy 21:23). Crucifixion can be likened to a hanging so that St. Paul said that Christ became a curse for us, for it is written: "Christ redeemed us from the curse of the law by becoming a curse for us, for it is written: cursed is everyone who is hung on a pole". (Galatians 3:13).
**Burial practices of the Jews**

Jewish practices are predating the exodus and they recall the Egyptian burials. They still exist in part.

Upon the death, after the blessing, *Baruch ata Hashem Melech Elokenou haolam Haemet dayan*, “Blessed are You, Lord our God, King of the universe, judge of truth,” the first steps are to close eyes and mouth of the deceased, to hide the face and to extend his arms along the body, hands open. These first steps are still practiced. They differ from the Egyptian rites. Egyptians on the contrary practiced a ceremony of opening of mouth and eyes, replaced by more or less precious stones or by painted onions.

The body is then sprayed with warm water and cleaned. This is the purification toilet, Tahara. The deceased is finally clothed with a mortuary cloth, a shroud of white cloth, the takhrikhim.

At the time of Jesus of Nazareth, the dead were embalmed and wrapped in more or less fine cloth according to the riches of the deceased. Embalming is in no way, mummification, contrary to Jewish laws.

The hair was surrounded by a small fabric, the pathil, to be kept together. The pathil was attached under the chin to keep the mouth closed. The body was then laid on a large fabric, the sindon or shroud, which was then folded around the head to cover the entire body. This practice is confirmed by the discovery in 2009 of the remains of the shroud of a man with leprosy. The tomb is located in the lower part of the Valley of Hinnom, next to the tomb of Hanne, father-in-law of Caiaphas in Jerusalem. The leper was isolated in a sealed chamber that was never reopened. The fabric of the shroud is in plain weave and of good quality, but poor compared to that of the Shroud, truly exceptional.

The sindon was probably set around the body by strips, although Hebrew texts do not give any detail about it. Wee may think this was the case as by Egyptian customs, but also by the fact that the body was prepared before being placed in the tomb, often very small. It was necessary to secure the shroud for transport. Subsequently, the Jews replaced the simple white fabric by clothes, linen also. However, Rabban Gamaliel II, the son of one of the leaders of the revolt of 66 AD, the last head of the Sanhedrin, imposed a white cloth not tied at the ends.
Did Hebrews place a portrait of the dead on his face as Egyptians at Fayoum, but also at Antinoe, like this well-known portrait, said the European? The site of Antinoe, Egypt, has a Christian necropolis of the second century where portraits of dead were discovered in the early twentieth century.

This is another portrait of a Christian bearing a golden chrism, inspired by the Egyptian sign of eternity. She carries in her hand the first and last letters of the name of Jesus, IC, hardly visible on this old photograph. It dates from the same time as the other portrait. The tombs of the catacombs of Rome have sometimes a portrait of the deceased. In fact, the funeral rites of the early Christians, many converted Jews, are those of Jews. The Syrian Christians still wield a portrait of the young dead behind the coffin. The Greeks and Romans adorned their graves with a portrait of the dead surrounded by signs of the zodiac.

This practice would explain the presence among the relics of a tablet bearing the image of the face of Jesus of Nazareth, reported on several occasions. That of Constantinople was made of wood covered with a layer of clay finely engraved. It appeared in the relics of the Holy Chapel in Paris. In any event, it could not be in the tomb of Jesus of Nazareth. It could not have been made before his death.

In the case of the Shroud, the body was simply placed on the fabric without being washed and before being embalmed. But there was a difficulty. The last drops of blood paid as a result of an act of violence or serious injury are related to the last moment and, somehow, the cause of death. They are part of the body, and should be buried too, according to the Hebrew rites. They did not remove the bloody clothes in this case. Jesus of Nazareth was not wearing clothes except the sudarium covering his face. But could they remove the blood covering his body?

The Shroud was then folded to cover him completely, but it would have been only let down. Before that, it seems that the pathil after being laid has been removed and folded on the side. It would have been difficult to remove it later to anoint the face because of the solidification of blood clots. These provisions show a hasty and temporary burial, with only a few spices, waiting for embalming and fixing the pathil and the sindon, the Shroud.
The small fabric, the *sudarium*, which had covered the face of Jesus of Nazareth in the descent from the cross, should be placed in the tomb, according to the rules, but it was removed from the face, probably for the same reason as the pathil. The image of the face would not have formed on the Shroud if it was interposed. It is true that the Shroud itself was folded over the body. He might, too, have attached to blood clots! We see that nothing is really simple and a good reason can always find faulty.

After complete decomposition, the bones were gathered in an urn, a practice known today as reduction. Shrouds and other fabrics used in the burial rotted completely. Therefore it should normally remain no example. The case of the leprous we just spoke of is really exceptional.

**Features of the images of the body**

This is a man whose size is difficult to measure because of the deformation of the fabric. The measurements ranged from 162 to 187 centimeters.

The lack of injuries on the back in two locations of the body certainly indicates two folds of the fabric. The legs would be shorter than they appear and more balanced with the body size. The body was about 175 cm. It was a rather tall man for the time. It has long hands. The hair is long as those of most Galileans unlike Judeans. This illuminates incidentally the remark: "another insisted, saying this is certain: this one was with him, and besides, he is a Galilean."

He has a mustache and a beard with two points that experts call bifid.

The image of the right foot lies at full length. It lies, almost flat on the Shroud and therefore in extension relative to the leg, a rather peculiar position resulting from the position of the foot applied to the wood of the cross. This position was found frozen by the so-called *rigor mortis*.

Anthropometric characteristics of the man of the Shroud are more similar to Semitic populations than any other human group.

By applying a three-dimensional processing to the digital image of the back face, one obtains a view in relief. The image is a bit distorted at the back because of the many traces of flagellation that disrupt the conversion. However, we can see the thickness of the hair down to the middle of the back.
The details of the images of the Shroud

The blood stains are treated separately. They bring very different elements from brown stains.

The details directly visible or reconstructed by imaging methods allowed today by the computer will be detailed beginning from the top and from the front.

The first striking finding is that the hair appears horizontal when they should have fall down. It would have been maintained in one way or another. It is possible that the hair has been surrounded by the pathil as was done at the time. This fabric would have received the image which would not have been produced on the Shroud itself. Indeed, traces of blood prevented the image from forming on the fabric, another fabric interposed between the hair and the Shroud would have had the same effect. Thus the pathil was not in place. Sweating and blood flows, mingled with the dust could have stiffened hair.

There are swelling of the eyebrows and the left cheek, and the base of the nose which means a fracture of the cartilage. Right eyelid wears a mark of tear.

The right cheek is swollen and a triangular wound can be seen under his right eye. These injuries give an asymmetrical appearance to the face.

A dark band, in the face, gave rise to various interpretations as the presence of a sudarium. Techniques of image processing show that in fact the image is present in this dark band. There was no linen between the face and the Shroud. No explanation has been found.

It seems to lack the right end of the mustache and part of the beard, also on the right.

The arms are brought forward, but they are not attached by any mean. They should not have normally been able to maintain in this position. If they have not fallen on the sides, it is probably due to rigor mortis. They had to be placed in this position as soon as the descent from the Cross.

Both hands are crossed, but we see only four of their fingers. The thumbs are curled back and hidden by the hands.

Further down on one knee, there are grazes similar to that of a fall.
The knees are slightly bent, the feet extended. This position logically results of *rigor mortis* due to a violent death that is likely to occur quickly, even in a few minutes. If this is the case, the body was placed on the Shroud in the position it had at the time of his death except the arms that have been placed in the position we just said.

The legs were not broken.

Both feet, inwardly directed, intersect, the left one over the right.

The 3D views render aimless the debates on the position of the body. Head and trunk are slightly raised and tilted forward, stiffened by the *rigor mortis*, like knees and feet.

The *rigor mortis* is quite visible on the facial image where no space can be seen between the torso and the head. The neck is practically invisible. While on the dorsal side the neck is like elongated indicating that the death occurred while the head and the shoulders were ahead the base of the neck.

Both areas without traces of flagellation that was mentioned seem to correspond to the location of the four "L" formed by four symmetrical holes in right angle.

There is no trace of decay on the Shroud. If the body was deposited in the Shroud approximately 2 hours after death, the corpse did not stay more than 48 hours in this fabric.

Dark lines appear everywhere more or less marked and with no symmetry. Brown traces are present in the line, which bar the face. Hence these traces were made after the brown traces were produced. They do not seem to have received any explanation.

**The dark red traces**

Dark red traces appear on the fabric. They correspond to various injuries. These are blood stains resulting from contact of the fabric with wounds and blood trails. The brown traces that we have examined and that characterized the body image are not found under these hematic traces. The blood was deposited on the fabric when the body was placed in the Shroud. Body image was not formed before because it does not exist below the bloodstains.

The examination of flows and blood stains shows that the blood has coagulated on the body before it was placed on the Shroud: it has not dampened the fibers of the
Shroud and was not distributed transversely along the fibers forming a rounded stain around the point of contact as would still fluid blood.

The large majority of these stains are not made from whole blood, which would have been in a liquid state at the time of their formation, but they come from exudates of blood clots. These were moist enough to leave an image on the fabric, along with a ring of clear serum around each of them. Serum rings are clearly seen under ultraviolet light.

There are clear signs of abrasion of most exposed surfaces. The Shroud has been often manipulated.

In general, the pathways of blood on the Shroud follow wrinkles, accumulate on the natural obstacles such as the eyebrows, they widen, thicken.

There is nothing similar for brown traces of the body. These do not appear on the backside of the fabric, since they affect only superficial fibrils of linen yarns. The backside of the Shroud has been photographed, as we have seen, after removal of the protective fabric sewn in the nineteenth century. However, the backside of the fabric shows a picture following the general forms of the right side, but only with dark stains. These stains correspond to those of the fabric, we will examine. Blood exudates transversely seeped among the fibers of the fabric.

We will also begin by the head.

Runoffs of blood on the top of the face and traces of blood above the neck have a general form describing the injuries of a crown of thorns. But the crown was larger than a ring of thorny branches that have been set by a band of woven reeds.

The symbol of the imperium was the laurel wreath. I do not see why the executioners would have been pushed to do something else than a crown of thorny branches. It is, however, possible that a fast execution has left branches inwards, which would explain the bloodstains on the top of the head. The *sudarium* of Oviedo, which would have covered the head of the crucified after his death, according to Jewish custom, shows, moreover, that it is a crown. Spines could come from a shrub, the buckthorn, now called *spina Christi zizyphus* or in vernacular, the jujube. The spine of Pisa belongs to this kind of bush.
On top of the face at the hair birth, there is a large clot that goes down to the eyebrow marking the front lines and forming a sort of inverted 3. This injury comes from a frontal vein and the blood seems to have flowed slowly.

This median flow took the form of wrinkles of the forehead, accentuated by the muscular contractions caused by pain.

On the left side of the face, that is to say on the right side on the Shroud, a flow starting into two direction, has different characteristics and would come from a front surface artery, causing small streams of blood. One distinguishes very clearly the flow with an arterial origin from the venous flow with a very different appearance.

On the back of the head, there are a greater number of other flows coming from perforations of small blood vessels of the top of the head, a highly vascularized area.

The right wrist is hidden by the left hand. The left wrist shows a circular trace. This trace is related to a visible hole about 8 mm diameter. This trace is the location of a nail. We do not see the place where the tip of the nail exits. The nails were not driven into the palm. Tests on cadavers have shown that the palm would not in any way support the weight of the body. Just look at a radiograph of the hand to see that the bones of the fingers are extending up to the wrist. There is virtually nothing between them that can hold in tension. The palm of the hand cannot hold the body of a crucified man because the nails would tear small muscles and ligaments, and victim would fall from the cross.

There is a space strong enough to support a person's body without breaking a single bone: the Destot’s space. However, this space is the side of the little finger, while the hole visible on the Shroud is centered on the wrist. Moreover, the median nerve that would cause the curling of the thumb goes on the side of the hand opposite to Despot’s space.

Almost the entire iconography shows the nails in the palms. Therefore it was quite naturally considered that the nails were planted inclined in the palm of the hands so that the nail exit location matches the trace of the Shroud and crosses an area of the wrist strong enough to support the weight of the body. To achieve this, the nails of the hands would have been very inclined. Driving nails in these conditions seems quite difficult, unless, perhaps, a suitable hole for the nail have been prepared in the *patibulum*. All these precautions had certainly not been taken at the crucifixion of the 6000 condemned of the revolt of Spartacus. Thus there is a
possibility of suspending the body of a man with nails driven right. Moreover, this is confirmed by the discovery of the bones of a man crucified at the time of Jesus of Nazareth, but in this case the nails were planted farther from the hand between the radius and the ulna, a more resistant area. This suggests that the nails of the crucified of the Shroud were driven right in the wrists, at the location visible on the Shroud. The nails have necessarily parted bones of the wrist, but not necessarily broken them. Moreover, the Destot’s space itself is much smaller than the nails and bones should have also been parted as well. Resistance of the wrist does not result from bones, but from the muscles and tendons that are much stronger there than in the palms. The exact position throughout this area should not be important.

The retraction of thumbs is effective and it cannot result from the distance of the thumbs to the fabric of the Shroud. As a matter of fact the body can be seen around the hands, and the thumbs would be far less distant from the fabric. It is therefore likely that the median nerve has been hit.

The right forearm appears to show two directions of blood flow which would correspond to two positions of the victim on the cross. Forearms were oriented upwards. The flow angle relative to the vertical is estimated to 55 ° and 75 °. Logically, it was concluded that the forearm, and thus the entire body, oscillated between 2 positions, high and low.

The position of the arm in extension upward does not block, nor even discomfort, breathing. It occurs primarily by movement of the diaphragm. The exercise of the horizontal bar is the proof. These changes of position cannot be the result of an effort to breathe. Death by asphyxiation is very unlikely. Moreover, blocking breathing, and especially at the end, would not have allowed Jesus to Nazareth to speak until his last breath: “Then Jesus, crying with a loud voice, said, "Father, into thy hands I commit my spirit!" And having said this he breathed his last”. (Luke 23,46).

To explain these flows, it is likely that the crucified pushed himself up on his legs to relieve the pain in the arms by pressing the nail fixing feet, then sank letting himself be borne by the arm. But, the lifting supported on the feet is taken primarily by bending the arms under their own weight and not by a rotation of the wrist. The flow angles at the wrist could be instead a result from the simultaneous section of a vein and an artery, which do not have the same tension. They predate the spear in the heart that stopped any further flow of blood elsewhere that in the wound of the lance. They formed clots before the descent of the Cross.
It is more difficult to explain the flows on the forearms. The image processing tools make it easy to isolate the arms and put them in a position such that the left wrist blood flows vertically. The view is reversed of course. In addition, we see the back of the hands, laying on the *patibulum*. One then realizes that the blood of the forearms does not seem to come from the visible injuries of the wrist. Was it retained on the angle of the lower part of the *patibulum* by capillary, and then flowed to different locations on the back of the arm? This is what we observe with the rain on a horizontal board placed on edge. It is, however, difficult to conclude.

The Romans broke the legs of the crucified after several hours. This new shock, also causing further loss of blood internally, was enough to cause a quick death. The crucified of the Shroud has not his legs broken, but he had been subjected to a terrible flagellation before being crucified. These tortures could cause rapid death. In fact, flagellation could be fatal by itself.

On the right side, next to a repair, there is an oval wound 48 mm by 15 mm, between the fifth and sixth ribs. These dimensions correspond to spear-end of Roman *pilum*. The spear-end had stricken by a movement upward and slightly oblique towards the heart. He pierced the diaphragm to reach the chest and there puncture lungs and heart. The soldier struck almost at head height. Should the cross be much higher, as it is always represented, the spear would have gone well above the heart. High cross like positioning nails in the palms of the hands is a result of the falling in oblivion of the real conditions of this torture, disappeared centuries ago when the first crucifixions have been drawn or sculpted.

This spear was inflicted post mortem; otherwise the wound would have closed. But less than an hour after death, because it is in these conditions that this injury could shed red blood and a clear serum as observed on the Shroud.
Indeed, under the wound is a great flow of blood, mixed with serous material. It flows down the body, proving that the injury was done while the body was upright. This same flow appears to extend over the back of the man of the Shroud at the loins level. This proves that the gaping wound continued to bleed while the man was this time horizontally on the Shroud. This injury unambiguously indicates that the man of the Shroud was already died when a sword pierced his side.

The back is characterized by a large number of marks, between 100 and 120, which have mostly a dumbbell shape about 3 cm. These small parallel wounds about 1 cm in diameter and separated by 1.3 cm are generally grouped by 2 and arranged in a fan across the back, from shoulders down to the lumbar region and lower limbs, indicating that the man was naked when these marks were made.

The Jewish law provides "forty lashes minus one." In addition, the blows were to be divided equally between the right and left shoulders and lower neck. This law was still applied in the seventeenth century. Uriel Acosta, but especially the famous philosopher Baruch Spinoza were lashed for their statements considered as heretics, both in Amsterdam.

Sufferer of the Shroud was subjected to Roman flagellation infinitely more terrible in duration, intensity and number of blows, from the upper back to the legs. It was not uncommon that the sufferer dies during or shortly after the flagellation.

These marks are characteristic of Roman lashes, flagrum. It was a small whip with leather straps. Strips ended by pairs of lead balls or bones. The lashes were distributed on the back equally and symmetrically from the shoulders to the legs by two executioners placed on each side of the victim. From the angle of the straps on the shoulders, one of the executioners should have been taller than the other. Another possibility would have been that only one executioner struck by direct lashes and backhand lashes. But this is unlikely. There is an undeniable symmetry, despite the difference of inclination that the reverse does not allow, unless the executioner had moved between each hit. It may be noted that flagra usually included two or three strips. The number of lashes was therefore between 30 and 60.

Specific injuries can be seen on the back. On the right scapula, a kind of plate extends over the right shoulder and his collarbone. On the left scapula, we find the same type of mark, but on a smaller area.
These injuries look like abrasions. Magnification reveals that areas of skin were torn away as a result of friction and crushing on existing wounds caused by flagellation. All injuries correspond to a beam carried across the upper back.

The back view shows the soles of the feet applied on the Shroud. On the right foot, here on the left, we see a round stain in the heel, another in the middle of the sole of the foot between the second and third metatarsals and a trail that connects the two, and finally a blood flow towards the outside. The heel of the left foot is higher than the right; it has also a stain that goes outward. A large nail pierced both feet at the same time.

All these blood flows are consistent with knowledge of the bloodstream, largely post-dates obtained with carbon 14. The first discoveries date from 1551, year of publication by João Rodrigues de Castelo Branco of his description of the blood circulation. He attributed it to the valves in the veins that would have returned the blood to the heart. The role of the heart was discovered by Andrea Cesalpino (1519-1603). Finally, William Harvey (1578-1657) discovered the circulation of the blood affects the whole and not a small part as it was thought. He was able to give a complete description of the bloodstream.

It should be noted finally that there is no trace of tearing of human tissue at the place of clots, or conversely no tearing of the yarns of the Shroud.

**Analyzes of blood and serum, and of DNA**

Analysis of blood stains allows finding the main constituents of red blood cells: porphyrin, hemoglobin, albumin, bilirubin and iron oxide. It was even noted an excess of bilirubin, responsible for the red color the blood has kept; that results in a large excess of suffering by the victim. Normally bilirubin, a protein, is present in small amounts in human blood, but its rate increases considerably under certain conditions such as violent repeated trauma before death. The yellow-orange bilirubin has clarified the dried blood.

According to immunological controls in 1981, the blood is of human origin, blood group AB, which is one of the rarest with only 3% of the world population.

Finally, DNA analyses have shown that the blood was coming from a male individual and its Y chromosome is characteristic of Eastern Jewish ethnicity.
Coins on the eyes

Computer imaging methods have improved the image quality. They revealed a coin on each eye. These coins were sometimes used in antiquity to prevent the eyes to open.

When three-dimensional information is extracted, the letters on the coins become visible. It would be a dilepton lituus issued by Pontius Pilate in the sixteenth year of the reign of Tiberius, corresponding to the year 29 AD. The crook of astrologer was the emblem of Herod. This type of copper coin is similar to Roman quatrails and has been designated by the Greek equivalent, two lepta, in the Greek version of the Septuagint; the Vulgate translated it by duo minuta.

One of the lepton has a C instead of a K in KAICAPOC, Greek caisaros or Latin caesar. But a coin with the same spelling error was recently found, also made at the time of the same Herod.

These kinds of coins are mentioned in the Bible in the Gospel of Saint Mark (12, 42): "But a poor widow came and threw in (in the temple treasury) two mites, which make a quadrans" and according to Luke (21.2-4) "He also saw a poor widow put in two very small copper coins. I tell you the truth, he said, this poor widow has put in more than all the others. All these people gave their gifts out of their wealth; but she out of her poverty put in all she had to live on."

These coins were leptons. Two leptons! Those very same?

The mode of production of images of these coins is inexplicable as we have seen.
In 1979, letters in Hebrew, Latin and Greek around the face of the man of the Shroud were highlighted. These traces, not visible to the naked eye, and extremely tenuous are confirmed by image processing. They include:

- On the left side of the face, IN NECEM Latin words, under a N split reminiscent of both N of IN NECEM meaning you will go to death.
- On the right of the face the Greek word ΡΕΖΩ, performing a sacrifice, and Greek letters Ψ, Σ, ΚΙΑ that could mean shadow of a face or face barely visible.
- On the left face Latin letters SB Signum Baldinii that are supposed to be the seal of Baldwin, King of Jerusalem.
- A set of letters for the Greek word ΝΑΖΑΡΕΝΟΣ the Nazarene, but once again, the letters are barely visible and the translation is disputed.
- Greek letters ΑΔΑΜ evoke the word ADAM, under the chin letters ΗΣΟΥ be a set consisting of the word Jesus.
- On the forehead two letters IC as on the Byzantine icons which are the first and last letters of Jesus IHEOYC.

The letters around the face of the man of the Shroud were found using different methods. The words are sometimes found dated a few centuries after Christ, but their interpretation is difficult. We know neither the date of inscription and it is unclear how they were inscribed.

It was hypothesized that a death certificate on papyrus would have been placed as usual at that time on the Shroud or on the body for identification on return after one year. It was written in Latin, Greek and Hebrew. The amount of information of this certificate and its form, necessarily condensed, are hardly compatible with the pieces of words that have just been mentioned and which are placed in all directions over a large area which does not suggest that they may belong to the same document.
Burns holes

There are also holes and burn marks distributed as symmetrical L. These small traces cannot have been caused by the fire of 1532, because they do not appear with the same symmetries. Their symmetry suggests that the shroud was folded in half lengthwise and then in half widthwise. There are also just near but only on the back part of the Shroud some small traces also symmetrical. It was during such a folding that these burns would have been made.

It is unlikely that these holes come from fixing the folds of a shroud with attaches such as *fibulae* because the holes are exactly distributed and almost symmetrically. The slight lack of symmetry may result from creases or imperfect folding. It is really impossible to set fibulae in such a way.

Moreover, the most common case of shroud fibulae has only two brackets. Ordinary *fibulae* are large safety pins. It is not clear how they could make four holes in L?

In addition, only one of the traces on the left side L is pierced. Other two are not, and the fourth is almost invisible. Moreover, mere holes have not an aspect of burns.

Finally, it is not possible that they result from fixing the two parts of the Shroud folded over the body. They are too close to the body that could not hold inside.

The regular distribution of these traces seems to exclude that they may result from the fall of grains of incense. This distribution implies a coordinated if not voluntary action.

We’ll talk about these holes in relation with the iconography inspired by the Shroud.
The lightening of the Shroud at the level of the face

The area surrounding the face of the crucified of the Shroud appears somewhat lighter. The contrast-enhanced photograph of the Shroud, clearly shows a circular area around the face of Jesus of Nazareth lighter than the rest of the Shroud. Hence the Shroud has been placed behind a frame having a circular aperture and then exposed to light. It seems to have been folded into 8, and then both sides around the face folded symmetrically on the back, to be placed in a square frame. This folding complies with the text of the Acts of Thaddeus; an apocryphal of the sixth century; it speaks of tetradiplon which means doubled in four.

One could imagine that this lighter disc could have given the idea of putting an aureole to the Christ and to the saints. In fact, the lightening of the Shroud itself is barely visible. In addition, it is not surrounded by a dark ring that appears in most aureoles. Finally, the circular aureole of Jesus of Nazareth appeared in the early second century, probably even before this lightening has occurred.

The frame was square and the circular aperture is corresponding to enlightenment. But why have they made a circular opening?

The appearance of the edge of the rings may have been influenced by milled edges. In the art of medals, milled edge is small grains at the edge of coins, medals and tokens. The example chosen is a drachma of 350 BC. The milled edge was designed to protect the edges of the wear.
This theory is very doubtful. Indeed, the milled edge of this tetradrachm of 150 BC, representing Artemis, is not really on the edge of the coin. Such decorations appear on coins widely prior to the fourth century BC.

They are dedicated to the gods. In the cosmology of Pythagoras (-570, -480), the orb of the stars is surrounded by the supreme fire, the true Olympus, home of the gods. It is obviously difficult to place deities around the circle of stars. In fact the milled edge is the starry sky as seen from Earth. The deities are theoretically beyond the stars. Artists have placed them in the middle of the dotted circle, but we should imagine they are beyond. The orbs were echoed by Aristotle without the supreme fire but it was already natural to represent the gods in a circle symbolizing what is beyond the circle of stars.

The Sun is represented on this bas-relief representing Apollo (60-40 BC). The same detail is found in the famous Palmyrene triad of the Louvre museum which is dated 32 AD. The circular aureole, which appears in both cases, refers, no doubt, to the divine nature of the characters portrayed.

The coin of Constance 1st showing the Egyptian god phoenix with a radiating aureole is dated from the fourth century. It is a Byzantine addition that the Egyptians never used. This aureole is taken from the legend of this mythical bird that was born of the Sun.

The circular opening for the exhibition framework of the Shroud results therefore quite likely from the use the symbol of Pythagoras, the true Olympus, the divine milieu, emerging from the dotted circle, the starry sky. The dark edge of aureoles, often dotted with beads would be a milled edge inspired by the starry sky.

The circle in a square is another symbol that has now lost any meaning. However, in the first centuries of our era, the cosmology of Aristotle reigned fully and for a long time. Aristotle’s vision is itself deeply materialist, but it was very early interpreted in another way.
The square represents the four elements of the sublunary world, ours. The starry sky in perpetual rotation on the famous orbs of Aristotle was symbolized by a circle. The Christian therefore attributed to the square the meaning of earthly word and to the circle the meaning of the divine world, which through Christ, is down to earth inside the square. It was perfectly coherent to represent Jesus of Nazareth, God descended on Earth in a circular aureole in the middle of a square. This theme was echoed by the circular rose window in the tympanum of the cathedral Notre-Dame de Paris, enclosed in a square stone structure. But nearly a millennium before the circular apses of the churches was surrounded by a square structure of stone, as we shall see.

The term aureole is from the Latin "corona aureola" golden crown. The curious thing is that the idea of a crown, which would have been logical, was not used, but the idea of gold, which is a little the Shroud color. Traces of water radiant from the face could not inspire some representations of aureoles. They have the symmetries of the burns of Chambery. They are therefore unlikely to be older.

The oldest known aureole of Jesus of Nazareth is on gems, supposed to be of Gnostic origin. One of the two gems is dated second century.

The attribution of an aureole to a saint is necessarily more recent than for Christ. If Jesus of Nazareth was later depicted with long hair and a beard, according to the Galilean custom at that time, the circular aureole is already present in the earliest representations.

The chalice from the sanctuary of St. Sergius Rosafa Syria, dating from the year 380, has a Christ crowned with a cruciform aureole.

This was also the case of the most famous fresco: the Christ of the catacomb of Commodilla of the late fourth century. At the same time, the catacomb of Saints Peter and Marcellinus shows Christ between St. Peter and St. Paul, all with a beard. Christ alone has an aureole.
Roman emperors Constantine the First, end of the third century, Theodosius the First, end of the fourth century and Justinian the First who lived in the sixth century, among others, wear aureoles. But these frescoes or mosaics were made after their death. Coins struck in their time does not include aureole, already reserved for saints.

However, Justinian the First appears in mosaics of the Basilica of San Vitale in Ravenna with an aureole and it seems that this mosaic was made before the consecration of the church in 547 and thus during his lifetime.

A Hellenistic Representation of Buddha with an aureole appears on a gold coin of Kanishka the First (127-147). This coin comes from the region of Gandhara in India. Bodhisattva statues of Gandhara, dated third - fifth centuries AD, also wear aureoles. The Guimet Museum in Paris coin comes from Shahbaz-Garhi, a monastery on this site. Art of Gandhara Buddhist and of surrounding areas is a mixture of Indian, Persian and Hellenistic influences. The statues are clearly of Greek influence.

The Caves of thousand Buddhas of Kumtura in the Xinjiang Autonomous Region, China, on the Silk Road, have many frescoes of Buddhas with aureoles. These frescoes date from the fifth to the eleventh century so that they are more recent than those of the site of Gandhara.

The statue of Maitreya, from Sarnath, Uttar Pradesh, also dates from the fifth century AD. The future Buddha wears an aureole which could not influence the earlier works of Gandhara. It might even be the opposite.
The Sun overlooking the Egyptian gods, mainly Horus solar God, but also, much later, in the Fayoum, fresco of Anubis of the first century, for example, can hardly be mistaken for an aureole. The Sun is characterized above all by its position above the head and its astral nature. Aureoles have no solar reference. The only artistic influence is itself doubtful.

The square nimbus is a special case. It was originally part of the portrait. Egyptians were in the habit, very late, around the fourth century AD, drawing the framework itself on panels.

In the Christian interpretation of Aristotle's symbol, the square is the earthly world, the world of the living. However, the square nimbus was not exclusively for the living, as we found on frescoes, while the saints depicted were long dead. This was the case with ancient frescoes Lateran replaced by Benedict XV.

Muslim use of the aureoles after the seventh century is obviously much later.
The information given by the biblical texts

To facilitate comparison, the four Gospels were cut and assembled by topic.

The priests and elders and Jesus of Nazareth
(Matthew 27.1) When morning came, all the chief priests and the elders of the people took counsel against Jesus to put him to death.
(Mark 14.53) And they led Jesus to the high priest; and all the chief priests and the elders and the scribes were assembled. (Mark 14.63) And the high priest tore his garments, and said, "Why do we still need witnesses? (14.64) You have heard his blasphemy. What is your decision?" And they all condemned him as deserving death. (14.65) And 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.
(Luke 22.54) Then they seized him and led him away, bringing him into the high priest's house.

Herod and Jesus of Nazareth
(Luke 23.11) And Herod with his soldiers treated him with contempt and mocked him; then, arraying him in gorgeous apparel, he sent him back to Pilate.

Pontius Pilate and Jesus of Nazareth
(Matthew 27.24) So when Pilate saw that he was gaining nothing, but rather that a riot was beginning, he took water and washed his hands before the crowd, saying, "I am innocent of this man's blood; see to it yourselves." (27.25) And all the people answered, "His blood be on us and on our children!" (27.26) Then he released for them Barabbas, and having scourged Jesus, delivered him to be crucified. (27.27) Then the soldiers of the governor took Jesus into the praetorium, and they gathered the whole battalion before him. (27.28) And they stripped him and put a scarlet robe upon him, (27.29) and plaiting a crown of thorns they put it on his head, and put a reed in his right hand. And kneeling before him they mocked him, saying, "Hail, King of the Jews!" (27.30) And they spat upon him, and took the reed and struck him on the head. (27.31) And when they had mocked him, they stripped him of the robe, and put his own clothes on him, and led him away to crucify him..
(Mark 15.12) And Pilate again said to them, "Then what shall I do with the man whom you call the King of the Jews?" (15.13) And they cried out again, "Crucify him." (Mark 15.16) And the soldiers led him away inside the palace (that is, the praetorium); and they called together the whole battalion. (15.17) And they clothed him in a purple cloak, and plaiting a crown of thorns they put it on him. (15.18) And they began to salute him, "Hail, King of the Jews!" (15.19) And they struck his head with a reed, and spat upon him, and they knelt down in homage to him.
And when they had mocked him, they stripped him of the purple cloak, and put his own clothes on him. And they led him out to crucify him. (Luke 23.22) A third time he said to them, "Why, what evil has he done? I have found in him no crime deserving death; I will therefore chastise him and release him." (23.23) But they were urgent, demanding with loud cries that he should be crucified. And their voices prevailed. (23.24) So Pilate gave sentence that their demand should be granted.

After he had said this, he went out to the Jews again, and told them, "I find no crime in him." (19.1) Then Pilate took Jesus and scourged him. (19.2) And the soldiers plaited a crown of thorns, and put it on his head, and arrayed him in a purple robe; (19.3) they came up to him, saying, "Hail, King of the Jews!" and struck him with their hands. (19.4) Pilate went out again, and said to them, "See, I am bringing him out to you, that you may know that I find no crime in him." (19.5) So Jesus came out, wearing the crown of thorns and the purple robe. Pilate said to them, "Behold the man!" (19.6) When the chief priests and the officers saw him, they cried out, "Crucify him, crucify him!" Pilate said to them, "Take him yourselves and crucify him, for I find no crime in him." (19.7) The Jews answered him, "We have a law, and by that law he ought to die, because he has made himself the Son of God." 19.16 Then he handed him over to them to be crucified.

Jesus of Nazareth to Golgotha

As they went out, they came upon a man of Cyre'ne, Simon by name; this man they compelled to carry his cross. (Mark 15.21) And they compelled a passer-by, Simon of Cyrene, who was coming in from the country, the father of Alexander and Rufus, to carry his cross.; (15.22) nd they brought him to the place called Golgotha (which means the place of a skull). (Luke 23.26) And as they led him away, they seized one Simon of Cyre'ne, who was coming in from the country, and laid on him the cross, to carry it behind Jesus. (Luke 23.32) Two others also, who were criminals, were led away to be put to death with him. (Luke 23.33) And when they came to the place which is called The Skull, there they crucified him, and the criminals, one on the right and one on the left. (John 19.17) So they took Jesus, and he went out, bearing his own cross, to the place called the place of a skull, which is called in Hebrew Gol'gotha. (19.18) There they crucified him, and with him two others, one on either side, and Jesus between them.

Jesus of Nazareth crucified

And when they had crucified him, they divided his garments among them by casting lots; (Matthew 27.35) And about the ninth hour Jesus cried with a loud voice, "Eli, Eli, lama sabach-thani?" that is, "My God, my God, why hast thou forsaken me?" (Matthew 27.50) And Jesus cried again with a loud voice and yielded up his spirit.
(Mark 15.23) And they offered him wine mingled with myrrh; but he did not take it.
(15.24) And they crucified him, and divided his garments among them, casting lots for them, to decide what each should take.

(John 19.23) When the soldiers had crucified Jesus they took his garments and made four parts, one for each soldier; also his tunic. But the tunic was without seam, woven from top to bottom; (19.24) so they said to one another, "Let us not tear it, but cast lots for it to see whose it shall be." This was to fulfill the scripture, "They parteded my garments among them, and for my clothing they cast lots." (19.25) So the soldiers did this.

(Matthew 27.57) When it was evening, there came a rich man from Arimathea, named Joseph, who also was a disciple of Jesus (27.58) He went to Pilate and asked for the body of Jesus. Then Pilate ordered it to be given to him.

(Matthew 27.59) And Joseph took the body, and wrapped it in a clean linen shroud, (27.60) 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. (27.61) Mary Magdalene and the other Mary were there, sitting opposite the sepulchre.

Jesus of Nazareth buried
(John 19.28) After this Jesus, knowing that all was now finished, said (to fulfil the scripture), "I thirst." (19.29) A bowl full of vinegar stood there; so they put a sponge full of the vinegar on hyssop and held it to his mouth. (19.30) When Jesus had received the vinegar, he said, "It is finished"; and he bowed his head and gave up his spirit.

(John 19.33) When it was nine of the hour, there was darkness over the whole land until the ninth hour. (19.34) And at the ninth hour Jesus cried with a loud voice, "E'lo-i, E'lo-i, la'ma sabach-tha'ni?" which means, "My God, my God, why hast thou forsaken me?" (Mark 15.37) And Jesus uttered a loud cry, and breathed his last.

(Luke 23.44) It was now about the sixth hour, and there was darkness over the whole land until the ninth hour, (23.45) while the sun's light failed; and the curtain of the temple was torn in two. (23.46) Then Jesus, crying with a loud voice, said, "Father, into thy hands I commit my spirit!" And having said this he breathed his last.

(John 19.38) After this, when the prescption had come, since it was the day before the Sabbath, (19.39) Joseph of Arimathea, a respected member of the council, who was also himself looking for the kingdom of God, took courage and went to Pilate, and asked for the body of Jesus. (19.40) And Pilate wondered if he were already dead; and summoning the centurion, he asked him whether he was already dead. (19.41) And when he learned from the centurion that he was dead, he granted the body to Joseph. (19.42) And he bought a linen shroud, and taking him down, wrapped him in the linen shroud, and laid him in a tomb which had been hewn out of the rock; and he rolled a stone against the door of the...
tomb. (15.47) Mary Magdalene and Mary the mother of Joses saw where he was laid.

(Luke 23.50) Now there was a man named Joseph from the Jewish town of Arimathea. He was a member of the council, a good and righteous man, (23.51) who had not consented to their purpose and deed, and he was looking for the kingdom of God. (23.52) This man went to Pilate and asked for the body of Jesus. 23.53) Then he took it down and wrapped it in a linen shroud, and laid him in a rock-hewn tomb, where no one had ever yet been laid. (23.54) It was the day of Preparation, and the sabbath was beginning. (23.55) The women who had come with him from Galilee followed, and saw the tomb, and how his body was laid;

(John 19.31) Since it was the day of Preparation, in order to prevent the bodies from remaining on the cross on the sabbath (for that sabbath was a high day), the Jews asked Pilate that their legs might be broken, and that they might be taken away. (19.32) So the soldiers came and broke the legs of the first, and of the other who had been crucified with him; (19.33 but when they came to Jesus and saw that he was already dead, they did not break his legs. (19.34) But one of the soldiers pierced his side with a spear, and at once there came out blood and water. (19.35) He who saw it has borne witness—his testimony is true, and he knows that he tells the truth—that you also may believe. (19.36) For these things took place that the scripture might be fulfilled, "Not a bone of him shall be broken." (19.37) And again another scripture says, "They shall look on him whom they have pierced." (19.38) After this Joseph of Arimathe'a, who was a disciple of Jesus, but secretly, for fear of the Jews, asked Pilate that he might take away the body of Jesus, and Pilate gave him leave. So he came and took away his body. (19.39) Nicode'mus also, who had at first come to him by night, came bringing a mixture of myrrh and aloes, about a hundred pounds' weight. (19.40) They took the body of Jesus, and bound it in linen cloths with the spices, as is the burial custom of the Jews. (19.41) 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. 19.42) So because of the Jewish day of Preparation, as the tomb was close at hand, they laid Jesus there.

Resurrected Jesus of Nazareth

(Matthew 28.1) Now after the Sabbath, toward the dawn of the first day of the week, Mary Magdalene and the other Mary went to see the sepulcher.

(Mark 16.1) And when the Sabbath was past, Mary Magdalene, and Mary the mother of James, and Salome, bought spices, so that they might go and anoint him.

(16.2) And very early on the first day of the week they went to the tomb when the sun had risen.

(Luke 23.56) then they returned, and prepared spices and ointments. On the Sabbath they rested according to the commandment. (Luke 24.1) But on the first day of the week, at early dawn, they went to the tomb, taking the spices which they had prepared.
(John 20.1) Now on the first day of the week Mary Magdalene came to the tomb early, while it was still dark, and saw that the stone had been taken away from the tomb. (20.2) So she ran, and went to Simon Peter and the other disciple, the one whom Jesus loved, and said to them, "They have taken the Lord out of the tomb, and we do not know where they have laid him." (20.3) Peter then came out with the other disciple, and they went toward the tomb. (20.4) They both ran, but the other disciple outran Peter and reached the tomb first; (20.5) and stooping to look in, he saw the linen cloths lying there, but he did not go in. (20.6) Then Simon Peter came, following him, and went into the tomb; he saw the linen cloths lying, (20.7) and the napkin, which had been on his head, not lying with the linen cloths but rolled up in a place by itself.

The information given by other texts

There is no text in the first four centuries of the Christian era that suggests a possible conservation of burial cloths of Jesus of Nazareth. Subsequently, some texts exploit the literary theme of burial cloths empty. Cyril of Jerusalem (387-397) saw a proof of the resurrection, Peter and John "ran to the tomb and found no more than the sudarium or the Shroud ... the remains of the dead" (Catechesis XIV, 22). But it provides no details about it, unlike for the wood of the cross.

St. Jerome, in his De viris illustribus (393 AD) mentions a Gospel "according to the Hebrews" of which there remains not a trace. He cites a passage: "When the Lord had given the Shroud to the priest's servant, he went to Jacques and appeared to him."

The Gospel of Nicodemus, also called the Acts of Pilate, is an apocryphal text of the fourth century. It gives, in the first chapters, a very detailed version of the judgment of Jesus of Nazareth by Pilate. Jesus is not brought prisoner of the Jews, but summoned by Pilate by a messenger. Signs of the Roman guards bowed irresistibly in front of Jesus. This version, adopted by the Copts, tries to justify Pilate, which would have converted. Moreover, after undergoing martyrdom with his wife they were considered saints by Copts. Jesus of Nazareth would have received 39 lashes under Jewish law, which does not conform to reality.

Joseph of Arimathea took Christ's body and placed it in a "shroud fully clean, and he placed him in a new tomb he had built for himself." (Chapter XI). Then, Joseph of Arimathea, who was imprisoned by the Jews was liberated by Jesus and carried in the empty tomb, "and he showed me the Shroud and linen in which I had wrapped his head." (Chapter XV).
The Coptic Gospel of the Twelve Apostles mentions the burial cloths in connection with their worship of Pilate. This text would be of the beginning of the second century. It is mentioned by Origen in the third century. Pilate said: "O mankind! Who hate your own life, if someone had taken the body, (he would have taken) bands too. Then, they said to him: Do not you see that it is not his cloths, but of somebody else? Pilate remembered the word of Jesus: Big miracles will take place in my grave. Pilate therefore hastened to enter the tomb. He took the shrouds of Jesus. He pressed against her breast. He wept over them. He kissed joy as if Jesus was surrounded with."

The Gospel of Ethiopia, said of Gamaliel, dates from the second half of the fifth century. It would Coptic origin. In fact, it takes up the themes relating to Pilate from the apocryphal gospels of the Twelve Apostles and of Nicodemus.

**Problems of vocabulary**

It is not, in any way, neither in my abilities nor in my intention to comment on these texts. I would just transcribe what I have read about some problems with vocabulary.

From the standpoint of hours, Romans divided the day and night into twelve hours between sunrise and sunsets. The duration of Roman hours vary therefore according to the season. Jesus of Nazareth died on the cross on a Friday at the ninth hour, that is to say, about three o'clock in the afternoon, two or three hours later in the evening, Josephus of Arimathea just gets his body, put it in the tomb, wrapped in the Shroud. Saturday is a day of rest for the Jews, the Sabbath. It is therefore at the dawn of Sunday morning that women went to the tomb. From Friday night where Jesus of Nazareth died to Sunday morning, which is the day of resurrection, there are less than 36 hours, very similar to Roman hours during spring equinox.

The Shroud itself is named in different ways. Latin words: *sindon*, and *lineteum lineteamen* and Greek: *Sindon* and *othonia* denote all linen fabrics. *Sindon* and *Sindôn* apply rather to fine linens, like the Greek *othonê* whence *othonia*, a diminutive idea that inspires small or lightweight. We can say that these words apply in the Gospels to the Shroud of Jesus of Nazareth.

*Othonia* was sometimes translated by strips. This is certainly possible. Either St. John mentions only strips that were used to fix the shroud around the body or he took the term used by the Egyptians, with no other intention than to speak of burial cloths. In fact, John says that Jesus' body was wrapped according to the custom of the Jews. Finally, the Egyptians also put fabrics around the body before the strips.
In addition to these words, St. John mentions the soudarion or *sudarium* in Latin. Misinterpretation of the text gave the meaning of shroud. The apostles had seen in the empty tomb, rolled up next to the linen and bandages lying on the ground.

In fact, the Greek soudarion as *sudarium* Latin, word coming from *sudor*, was a handkerchief for wiping perspiration from the face. This very same word soudarion is found in the Acts of the Apostles (19.12) where it means handkerchief and especially in St. John who employs a first time (11.14) to denote the chin-piece surrounding the face of Lazarus. However, in the case of Jesus of Nazareth, the *sudarium* is a cloth used to veil the face of the dead before burial. It is possible that it was used to temporarily block the chin of Christ and keep his mouth shut, and it would have been found between the folds of the shroud. However, the browned image does not suffer discontinuity under the chin. The *sudarium* would have prevented the image to form here.

Jewish burial rites consist of two elements: the sindon or shroud, and the pathil. The pathil enveloped the hair, leaving the face uncovered and had a chin-piece. If the pathil would have been placed around the head of Christ, the fabric of the Shroud would not have received the image of hair since traces of blood have prevented this impression. It was thus folded aside pending embalming, but as we have seen, it may have been put in place and removed. In the case of Jesus of Nazareth, there must also be in the grave the *sudarium* that veiled his face to the Descent from the Cross. Strips maybe mentioned by St. John, remains a question. Such strips cannot have been used because the body was not tightened in the Shroud, but it seems they have even not been brought in the tomb. Presumably they were not necessary since all actions of burial were performed in the tomb. The strips were most needed to secure the shroud around the body for transport. It will never matter thereafter.

When the holy women went to the tomb to perform the embalming after the Sabbath, they found it empty. St. Peter alerted saw there only the burial cloths lying on the ground, says St. Luke.

St. John is more explicit and the text is very important that imperfect translations have hidden until our time. A series of works restores its true meaning, which is roughly this: "Peter ... saw the burial cloths, the Shroud lying on the ground, the *sudarium*, which was on his head, not lying with the burial cloths, but wrapped separately in the same place."

Clearly, Peter and John saw the Shroud collapsed flat. Is this really the *sudarium*, or the pathil, which had remained wrapped in his place? The important thing is that the body had disappeared without disturbing the burial cloths, he had not been abducted!
Thus, we can better understand the effect of the vision that the Apostles had seeing cloths remained in place.

Finally, I can add a little clarification. The phrase "to wash hands" is so customary that it is exclusively attributed to Pontius Pilate. It is obvious that this Roman procurator did not proceed to an ablution for some meal, as can be read sometimes. The Romans had a deep sense of greatness. He would never have had this weakness in a dramatic moment for him too. The verb wash retained a figurative sense he had in Latin. Thus, Cicero was killed by the centurion Herennius he had previously "washed from a charge of parricide." But the origin of the term is much older. To be initiated into the Eleusinian mystery cult, one shall "have clean hands and be free from crimes ...".

The same argument is in a Cicero's speech: *ab ista suspicione religionis tom pura atque vacua*. The word *pura*, used here in the sense of strengthening the word *vacua* also means clean. The Romans therefore quite naturally mean they had no suspicion by the act of washing the fingers. But in the case of Pontius Pilate, it was, above all, to escape liability for having enforced a double punishment for the same cause. He had hoped that flagellation would have satisfied the crowd. The Romans were very finicky about the strict enforcement of a brutal right but precise. Pontius Pilate could not ignore the fact that there were strong enough personalities in the entourage of Jesus of Nazareth, as "Joanna the wife of Chuza, Herod’s intendant, and many others, who assisted him with their wealth" (St. Luke 8.3). He may fear a postmortem claim. By the way, violence and provocations of Pontius Pilate were the reasons he was summon back to Rome in 36 or 37. He apparently escaped a trial by the death of Tiberius.
PART THREE

The history of the Shroud

The first document attesting the existence of the Shroud of Turin dates from 1353. It is the gift of the Shroud to the canons of Lirey, France, by Geoffroy de Charny.

But there are many more ancient testimonies of the existence of burial cloths of Jesus of Nazareth. There are also many miniatures, frescoes and sculptures that are, of course, evidence of the same order as written documents. Nevertheless, the multiplicity of these cloths could lead to confusion. It is sometimes difficult to understand which cloth the writings are referring to.

The tunic of Trier

The earliest evidence of this cloth dates from 326. Helena, mother of emperor Constantine (265-327) went to Palestine to venerate the relics of Jesus of Nazareth. She would have discovered the cross of Christ. She donated to the city of Trier a tunic. This tunic still exists. It is also made of one seamless piece, but bears no trace. This is probably a tunic which was worn by Jesus of Nazareth, but not related to his passion.
The tunic of Argenteuil

I mentioned another tunic stained with blood, somewhat similar to the Shroud. It does not wear any body image. The super-position of the marks of the Argenteuil tunic to the Shroud is identical to the level of 97%. It was offered by the Empress Irene to Charlemagne in the ninth century. He would have given it to the monastery of Argenteuil whose prioress was his daughter Theodrade. Hidden during the Norman invasions, it was rediscovered in 1156. It was buried two years during the Revolution. This tunic is made of wool, with short sleeves. This kind of garment was wear in Roman times under the linen tunic, the outerwear, such as the one preserved in Trier.

Blood group AB is the same as that of the Shroud. The DNA is that of a man of Eastern Jewish origin. Pollens are also similar. Dust that was found is characteristic of desert areas.

Two Carbon 14 dating were performed. The tunic would date of a period from 530 to 880 AD. This inaccuracy and even this erroneous date could result from deposits and pollution. As we have seen, the wool is an animal fiber and therefore based upon keratin. It contains very little carbon, which makes the dating delicate.

The Sudarium of Oviedo

Another fabric has received the imprint of the face of Jesus of Nazareth and is often mentioned in the writings. This is a sudarium allegedly used during the descent from the cross to hide the face of the crucified death, according to the Jewish custom. This fabric is small and could only get the image of the bloodied face. It has been folded from the beginning, which explains the symmetry of bloodstains. The blood group of the Sudarium of Oviedo is also AB.
The headdress of the holy cathedral of Cahors

The Cathedral of Saint Etienne in Cahors, France, preserves a relic attributed to Christ by a very old tradition. It has the shape and dimensions of a cap leaving the face uncovered and has two parts for closing it under the chin.

The cap consists of eight small fabrics stacked and sewn together, with a hem around. Blood stains located on the inner sides of the cap complement those that are visible on the forehead and the neck of the man of the Shroud and draw the complete layout of wounds caused by a crown of thorns. The cap has the characteristics of what Jews called a pathil, which actually means thread or cord, but may be closer to pethila, hair. They used it to cover the head of their dead.

The Véronica

There are several veils called Veronica. The best known, the Veronica, is preserved in the St. Peter Basilica in Rome. Montaigne, the famous French moralist, was in Rome during a presentation at the Lateran Basilica in 1580. This is not a burial cloth. It has been the subject of many paintings from the fifteenth century, but it does not seem to have been subject to examinations.

The Holy Face of Manoppello

A face is imprinted on the veil of the Holy Face (17x24 cm) preserved at Manoppello Italy. The examinations so far confirm the absence of paint pigments. The image of the face of the Shroud can be perfectly superimposed to the Holy Face of Manoppello, but it is not a burial cloth.
The Mandylion

The word Mandylion is derived from the Arab mandil, which itself comes from the low-Greek and Latin Mantile, which means cloth or towel. Some specialists think it is the Veil of Veronica, a tradition which is, moreover, reported only in the Latin version of the apocryphal gospel says acts of Pilate.

Constantine VII Porphyrogenitus (905-959), a particularly cultured and talented painter emperor, seems to be himself the author of the History of the Image of Edessa. He tells the purchase of this relic in 944. The emperor Roman the First Lecapenus, his father-in-law and co-emperor, agreed to give up in return of ransom to military campaigns against several eastern cities of the empire, including Edessa, occupied by Arabs and besieged by the Byzantine general Kourkouas. After several months of dealings, he asked the Arabs to give the image "acheiropoietos", that is to say "not made by human hands", preserved in the Hagia Sophia in Edessa. But then the Arabs required in addition two hundred prisoners, twelve thousand gold crowns and a promise of immunity. Such a price could not be explained if it was not an exceptional object: the image of Edessa.

A proof of the identification of the image of Edessa with the Shroud, is given by the homily of Gregory the Referendum, delivered on the 16th of August 944 into the church of the new imperial palace of Blachernae, the day after the triumphal arrival of the relic in Constantinople. Indeed, in paragraphs 25 and 26 of his homily, Gregory the Referendum describes the entire image of Edessa, showing that he is not a painting, and distinguishing image of a body (obtained according to him by the sweat of Gethsemane ordeal) and blood picture (due to death on the cross): "For it is not the means by which the painting form images ... who also designed the resplendence... The resplendence ... was marked only by the sweat of agony on the face of the Prince of life, that flowed like blood clots ... They are the ornaments that have colored the actual impression of Christ, because since they have sunk the impression was embellished by drops of blood from his own side. The two things are instructive: there blood and water, sweat and image here ... They come from one single being."

Nicolas Mesarites evoked the linen burial in a speech he gave in 1201 to divert the crowd of his intention to sack the imperial palace and chapel of Blachernae: "In this chapel, Christ resurrects (or get up); the burial cloths gives clear evidence ... The funeral sindon of Christ: it is flax, always smelling myrrh, defying decay, because he wrapped the dead body, naked, mysterious, after Passion ... ". It is indeed a cloth fitted around the whole body and not a veil with only the image of the face.
Writings recently discovered in the monastery of Iveron, Republic of Mount Athos, confirm this information. The image of Edessa was not only a face, but a body.

A cause of confusion may come from the fact that the iconoclast patriarch John VII the Grammarian did remove the effigies of Christ in Constantinople in the ninth century. A miniature shows him clearing the image of Edessa, which decorated the church of Sainte-Marie-Chalkoprateia. In fact, it was a fresco copying only the face of the image of Edessa, as there were many others. It is moreover exactly what shows the miniature of the Psalter of Chludov. It is somehow difficult to interpret it otherwise. This miniature is reproduced below, in the iconography part.

We can thus identify, without much risk of error, the Shroud in Turin with the relic, called Mandylion, preserved in Constantinople from 944 to 1204. We will now take back the facts from the beginning.

**The facts related to the Shroud up to the 4th Crusade**

Jerusalem was virtually destroyed by Titus in 70. The relics have been hidden, probably in the same way as the Dead Sea Scrolls in Qumran. The banishment of the Jews from Jerusalem and from the country in its vicinity, up to 160, and the persecution of Christians, certainly helped to keep the relics in a safe place.
The lack of documented references up to the fourth century could also result from the nature of the Shroud. Jews did not represent God, but Christians themselves could avoid showing objects covered with blood.

There are many texts from the fourth century, which mention a shroud. We will see that all converge to assimilate these burial cloths to the Shroud currently preserved in Turin, despite many unknowns.

Helena, mother of emperor Constantine the First was born in Trier in 265 and died in 327 at Nicomedia. She is attributed the discovery of the cross of Christ. St. Cyril of Jerusalem (d. 386) describes this legendary discovery in a letter to Constant, son of Constantine the Great. Shortly after, in 348, the same Cyril says in a homily: "All that the Lord suffered during His Passion, we can see on these burial cloths that we keep in the church of the Holy Sepulcher." It is not only the *sudarium*, but the Shroud.

Another statement of belief in the preservation of burial cloths of Jesus of Nazareth is in the "Consultationes Zacchaei christiani Apollonii philosophi" apologetic treatise dated probably 408-410, in which the doctrines of Christianity are explained to a pagan. "Behold, the cloths of his blessed tomb still contains the indices of the cross and death of the Lord." It is not only the face.

At the same time, Jerome Stridon cites the passage from the Gospel of the Hebrews, which has already been mentioned. It is about burial cloths, but not about its conservation.

The following century has left no trace. It was the time of Nestorian and Monophysite heresies. Disputes were not only words, but engendered violent clashes. It is likely that the remains of Jesus of Nazareth were sheltered. The same precautions should have been taken in the eighth century when, in 730, emperor Leo III the Isaurian banned the use of icons of the Christ, the Virgin Mary and the saints, and ordered their destruction.

The Shroud would have been found by chance in 544 in Edessa, now Urfa in Turkey, in the tower of one the gates of the city. It was probably during the reconstruction.
The Chronicles of Edessa report, in fact, that a great flood occurred in 525, which destroyed the St. Sophia Cathedral. It was rebuilt by Amidonius, 38th bishop of Edessa. The decoration consisted of a coating of white marble, "bright as the Holy Face of Edessa." This precision is given by a Syriac hymn that celebrates the cathedral, written after reconstruction during the reign of Justinian the First, probably shortly after the siege of 544. The presence of the Shroud in Edessa at this time is well established.

A pilgrim of Piacenza, in 560-570, relates a legend that the linen, which covered the face of Jesus was guarded by seven virgins in a cave at the mouth of the Jordan. If he had seen it, how could he avoid to report?

Evagrius the Scholastic mentions, in his Ecclesiastical History Chapter XXVII, the image of Edessa during the siege of the city in 544: "Not knowing what to do, they took the picture that has not been made by the hands of men (θεότευκτον εἰκό ἣν ἀνθρώπωννα) but was once sent to Agbare by the Savior, and having brought it in the mine, they poured water on it, then threw the same water on timber, and fire, and at that very time God rewards the confidence they had had in Him by making the flame reaching the trees, and it sent a black smoke till the top." The city was not taken.

Jerusalem was attacked and taken in 614 by Chosroes II, King of Persia. According to the history of Pelagius, bishop of Oviedo in the twelfth century, the sudarium, still in Jerusalem, was transported to Alexandria. Then in 616, before the taking of Alexandria by the same king, the sudarium would have been taken away to North Africa, then in Cartagena, Spain, Ecija, in the province of Seville, Seville, and Toledo.

St. Braulion, Bishop of Saragossa in 631 and friend of the famous St. Isidore of Seville, wrote: "Many things have occurred that have not been documented, and it is the case of the Shroud and of the sudarium, which wrapped the body of the Lord; it is said in Scripture that the Shroud was found, but it is not said that it was kept ...
I do not think, however, that the apostles failed to keep these pieces as relics for the time to come." He justifies the existence of these relics, but did not indicate where they are. St. Braulion never went to Jerusalem, but he clearly states in his letter 42, both the "linteaminibus et sudario quo corpus Domini is involutae," the Shroud and the sudarium of the Lord whose body was wrapped. Then he discussed the dispersion of wood of the Cross around the world.

The key date in the history of sudarium is March 14, 1075, when the shrine was officially opened in the presence of King Alfonso VI, his sister Doña Urraca, and Rodrigo Díaz de Vivar, better known under the name El Cid. A list was made of the relics that were in the shrine, which included the sudarium. In the year 1113, the shrine was covered with silver plating, and an inscription was added inviting all Christians to venerate the relic which contains the sacred blood. Since that time the sudarium has always been preserved in the Cathedral of Oviedo.

In 622, a huge army of Avars and Slavs under the command of the khan of the Avars, besieged Constantinople, at the same time a Persian army, commanded by General Schahr-Baraz, occupied the Asian shore of the Bosphorus. Patriarch Sergios exhibited the icon of the Mother of God, Theotokos, of the Church of St. Mary of Blachernae in the streets of the city. Piety then attributed the salvation of the city to the image of the Theotokos brandished against the enemy by the patriarch. History makes no reference to the image of Edessa. The Shroud was still in Edessa. Such a notorious case would inevitably have been reported by contemporaries. It is quite possible, however, that other icons have been used that day, and maybe a copy of the image of Edessa.

Edessa was taken by the Arabs in 639. But the Christians were allowed to stay and to keep the St. Sophia Cathedral which was destroyed by the Turks after the capture of the city and the massacre of Christians in 1144.

Adomnan of Iona relates in his "De sanctis loci" of the seventh century (Book 1, Chapter XI) that St. Arculf said to him he saw, during a pilgrimage to Jerusalem in 670, a relic of the Holy Lance and a fabric, red on one side green on the other, woven by the Virgin Mary, depicting Christ and his twelve apostles. But he says he also saw the fabric that covered the head of Jesus of Nazareth. It tells the whole story until Mavias king of the Saracens, who would have thrown the fabric into a great fire but it did not burn. He would have given it back to the Christians of Jerusalem.

Arculf would have embraced the fabric. It measured eight feet long according to the English translation. It's a bit large for a fabric that would have covered only the face. This relic was placed in a shrine in the Church of the Holy Sepulcher. It was get out periodically to be shown to the crowd. But its size should be small because
Arculf compares it to the embroidery fabric of Christ and the apostles and he found it smaller. At no time, it alludes to the face of Christ, which would have been inevitable if the case occurred. It was therefore certainly not the Shroud, which had left Jerusalem for a long time. This could well be the *sudarium*. The story of his trip to Oviedo is really known only after 1075. The *sudarium* could have left Jerusalem much later than Pelagius reported in the twelfth century.

Handwritten comments on a fifteenth-century manuscript of "De sanctis loci" of the Venerable Bede, which summarizes the writings with the same name of Adomnan of Iona identify this fabric to the shroud of Cadouin, France, which was taken by the Bishop of Le Puy during the First Crusade. Its presence in Cadouin is attested since 1214 by an act of Simon de Montfort. But this fabric was found in 1934 to be a Muslim cloth dating about 1100.

A first gold coin bearing the head of Jesus of Nazareth was struck in Constantinople by Justinian II between 685 and 695. We will see that the resemblance to the Shroud is striking. Moreover, in 692, the Council of Constantinople ordered to present the Christ as a man and not as symbolic lamb.

Shortly after, Leon, reader of the church of Constantinople, reports during the second Council of Nicæa he has seen in Edessa the image, which Pope Stephen III had already spoken of in 769 during a synod at the Lateran. It was therefore probably the visible face in its gold frame.

One of these ancient references to the Shroud is in the tenth century Codex Vossianus of the Vatican Library. This paper presents a quote from a man named Smera, living in Constantinople in the eighth century: "*(not tantum) faciei figuram sed totius corporis figuram cernere poteris*" a fabric on which you could see not only a face, but the body whole. He saw this fabric in a church of Edessa. It is most probably the Shroud.

Irene, the Empress of Constantinople, donated in 800 to Charlemagne the tunic of the Christ. In turn, Charlemagne gave it to his daughter, Théodrade, nun of the abbey of Argenteuil. It has been hidden and rediscovered in 1156.

In 944, as we have seen, the emperor Roman the First Lecapenpus acquired the image of Edessa "acheiropoietos" previously preserved in the Basilica of St. Sophia of Edessa.

Among the narrations of lavish festivities that accompanied the arrival of the image of Edessa, the Mandylion, in the Byzantine capital, one of them due to Pseudo-Simeon highlights the vagueness and indistinct aspect of the famous image.
In this text of the tenth century, the Pseudo-Simeon explains that when of the image of Edessa arrived to Constantinople, Roman Lecapenus’ children have difficulties to see a face, while Constantine Porphyrogenitus distinguished eyes.

A homily of Gregory the Referendum, preserved in the Vatican Library, speaks of the "impression coming from Edessa" which he says was "embellished by drops of blood welling from his side." He then saw the wound in the side and, according to him, "blood and water" that had sunk. This wound was not normally visible on the Mandylion evoked by Gregory: hence they had removed the fabric from his gold frame and unfolded it. He suggests a new explanation of the image due to "a liquid secretion, without color or paint art."

Constantine VII announced his armies in 958 sending water consecrated by contact with several relics, including the "Shroud bringing God."

In 944, the Shroud was placed in the imperial chapel in Constantinople.

The imperial chapels of Constantinople

Which imperial chapel is it about?

The first point to make is that Constantinople was subject to many earthquakes. They destroyed parts of the city and its churches. The most serious took place in 446, 478, 554, 740. In 869 an earthquake destroyed the Church of Our Lady of the Lighthouse, and in 990, it was the turn of the Basilica of Saint Sophia, shaken again in 1063. This earthquake also caused the ruin of the imperial palace of the Bucoleon.

The Basilica of Saint Sophia was the patriarchal seat and has never been an imperial church.

The building called the imperial basilica cistern, located at the foot of the wall of the ancient Byzantium, is actually a cistern that was built by Justinian the First in the location of an ancient Roman basilica destroyed during the Nika sedition. It was no longer a church. This cistern still exists.
Under the reign of Constantine in the early fourth century, the church of the Holy Apostles, in the center of the city, was an imperial church and became the imperial necropolis when he died.

One of the largest churches of Constantinople was St. Mary Chalkoprateia. The area of the former imperial palace, before 532, was also called the Chalce, name from the copper crafts practiced in the old town. St. Mary Chalkoprateia was located in the northeast corner of the former imperial palace. It was built in 450 by Pulcheria sister of Theodosius II, or twenty years later, by Verina, wife of Leo the First. It became temporarily the Patriarchal Cathedral, in 532, after the destruction of the first Hagia Sophia, which was nearby. The Council of 536 which condemned Monophysitism was held in this church.

St. Mary Chalkoprateia has a fresco of the Mandylion, which was erased during the iconoclast crisis under Emperor Leo III (717-741). At the end of the crisis, the patriarch Pothios pronounced two famous sermons on the representations of the Virgin Mary. The first in Hagia Sophia. The second most likely in Sainte-Marie-Chalkoprateia. Its golden doors were requisitioned in 1100 by emperor Alexius the First to finance his armies against the threat of the Franks.

During the Nika sedition in 532 opposing initially the Blues, the wealthy merchants and ship-owners, to the Greens, the proponents of small business, several buildings of Constantinople were looted, burned and destroyed, especially around the hippodrome where the insurgency began. This was the case of the former Roman basilica, of the Hagia Sophia and of Bucoleon, the palace of Justinian the First, emperor at that time. The famous general Belisarius circled the hippodrome and executed tens of thousands of rebels, ending the revolt. It is said that misfortune never comes alone. Ten years later, a dramatic plague reduced the population by almost half, two hundred thousand deaths! From Egypt, it spread to the West. It was as dramatic as that of 180, which cost the life of emperor Marcus Aurelius himself, or the only one we have in mind, the Great Plague of 1347, just at the beginning of the Hundred Years War.

Justinian wished to shelter his palace from riots. He built a new palace in the quarter of Blachernae near the walls of Theodosius, which had been built two centuries before. The Chapel of St. Mary Mother of God, Theotokos, also known as
St. Mary of Blachernae was in the immediate vicinity of the new palace. It became an imperial chapel. It should be noted that the imperial palace of Blachernae was occupied until the fourteenth century and was used in particular by Latin emperors after 1204. The restored former palace of Bucoleon remained however used by the imperial family, especially by Constantine Porphyrogenitus. His famous Book of Ceremonies is an essential source for knowledge of Constantinople of his time.

St. Mary of Blachernae originally contained only the relics of the Blessed Virgin. The emperor Leo III had brought these precious relics to Constantinople and built this chapel 473. He placed the shrine containing the Holy Robe and the Maphorion, the Veil of the Mother of God. Another relic of the Blessed Virgin, the belt was preserved in the church of St. Marie of Chalkoprateia. It was transferred to St. Mary of Blachernae by Justinian the First. This transfer of relics is nevertheless the subject of scholarly debate.

The Chapel of St. Mary of Blachernae was enlarged by Justinian the First and probably again before the end of the ninth century, marked by a huge architectural revival movement that affected up to the extremities of the West with the Romanesque art. This chapel was destroyed by an accidental fire in 1434.

The map of Constantinople by Buondelmonte in 1422, the oldest known, shows on the left the imperial palace of Blachernae, more specifically the Palace of Porphyrogenitus that was initially an annex. The dome of the chapel of Blachernae appears behind the palace.

In the middle stands the Basilica of the Holy Apostles, the imperial necropolis.

At the other end of the city, stand Hagia Sophia and the Hippodrome. In this area, there are several other churches and monasteries such as St. Demetrius, St. George Mangana and St. Lazare. The space of the old palace, in front of the Hippodrome, is virtually empty. There are no more palaces, but south of Saint-
Lazare, one church, which is necessarily the Nea, since it was destroyed only in 1490.

The Nea was known for its five golden domes. Built in 880 by Basil the First on the Sigma place, it was often used for imperial ceremonies because of its size, until the fall of Constantinople to the Turks in 1453.

Nea is not a church name. Nea simply means new. This church is in fact the new church Our Lady of the Lighthouse, located at the same place, on the Sigma place, but destroyed in the earthquake of January 9, 869. All the faithful gathered for the feast of St. Polyeucte were killed except twelve. This earthquake was followed by a replica in October 870, which destroyed many parts of the ancient palaces and, in particular, the Bucoleon.

This state of things was not new. Benjamin of Tudela went to Constantinople in the late twelfth century. He did mention only one single imperial palace, the Blachernae.

The former church Our Lady of the Lighthouse was qualified as a naos. The naos was the most sacred part of the Greek temples. It was a shrine in the eighth century. All the texts mention a small chapel. The Nea was the new church Our Lady of the Lighthouse rebuilt bigger than before, eighty years before the arrival of the Shroud in Constantinople in 944. Many relics were transferred there and it took, therefore, the name of Holy Chapel. But it was still also known as the Imperial Chapel. It is sometimes difficult to know in this case which chapel the chroniclers are speaking of.

The Lyca, the only watercourse, flows into the harbor of Theodosius. The two large churches that are on the map by Buondelmonte between this port and the port of Julien are St. Sergius and Bacchus and St. Demetrius. This church is not the same as the Bosphorus. This is St. Demetrius of the Imperial Palace. Built by emperor Leo the Wise around 900, it was probably destroyed after the capture of Constantinople by the Turks. Patriarch John Calécas delivered there a famous homily in 1341, well after the passage of the Franks. Saint Sergius and Bacchus, built first in 520, still exists.

There was near the former imperial palace and the Hagia Sophia, a monastery named Our Lady Hodegetria. This name literally means Our Lady who shows the
way. An ancient Orthodox Church in Kosovo, destroyed by the Muslims in 1999, had the same name. It is translated by Our Lady Protectress. Many Russian churches bear this name.

The chroniclers of the Fourth Crusade speak only of the imperial chapel, without more precision. Social disturbances were recurrent and continued under Turkish rule as well. A large part of the treasures of the emperors was kept safe in the Blachernae. They could easily be evacuated out of the city in case of crisis. However, Villehardouin reported in his chronicle of the conquest of Constantinople that there were still considerable treasures in the Bucoleon.

The emperor Baldwin the First, elected in December 1204 by the Crusaders settled in the Blachernae Palace. The Crusaders found considerable treasures in Blachernae
and Bucoleon palaces. The treasures were shared between the Franks, the Venetians and the emperor Baldwin.

The Shroud had been deposited in the imperial chapel of Blachernae in 944. But it would have been transferred later to the church Our Lady of the Lighthouse, the Nea. The purpose of the transfer would have been to be able to show it to the faithful. This information is questionable, as Robert de Clary, which we will speak of later, reports that the Shroud was in the church of Blachernae in 1204, during the capture of Constantinople by the Crusaders. The Shroud has most probably never left the St. Mary of Blachernae.

How these churches and chapels looked like? The Basilic of Mushabbak Syria was built by the Byzantine emperor Zeno in 475. It is characterized by its typical Roman technics. Semicircular doors were common at the end of the Roman Empire. The two aisles are an innovation of that time. Previously, the churches were made of a single rectangular nave as Roman temples often used later as churches. The church of the ghost town of Kfeir near Qalb Lozeh, Syria, built in the fourth century, has a single rectangular nave, but it has another innovation also present in Mushabbak.
The apse is semi-hemispherical within a rectangular structure. The most curious thing is that the rectangular structure is not involved in any way in the resistance of the apse to earthquakes. It has partially collapsed while the apse has not budged. It is therefore a purely decorative element whose square shape surrounds the circular section of the apse. We find again the symbol of the heaven in the earthly world, the Christianized symbol of Aristotle. The church of Seit Aroum nearby unfortunately lost the apse under many earthquakes in this region.

The symbol of Aristotle was forgotten later on and the outside part of apses became circular. Another symbol has been used in the following centuries with a justified force: the Cross. The cross-shaped churches led to another innovation that would characterize the Byzantine architecture: the dome. It was designed to cover the crossing of the nave and transept. The Armenian Church of the Holy Cross on the island of Van in Turkey dates from the tenth century. Aachen cathedral, of the ninth century, has been so much restored, that you hardly recognize one of the oldest implementations of the Byzantine art in the West. The domes were then used to cover the entire main nave. This was the case of the Nea in the East and of the cathedral St. Front of Perigueux, France, in the West, with their five domes.
The imperial chapel of Blachernae built by Justinian the First should be the same model as the Basilic of Mushabbak since it is of the same time. It is quite probable that the chapel was rebuilt in the eighth century with several domes like the Church of Van in Turkey, but probably bigger.

Western architects improved the economy and speed of execution by replacing the domes of the nave by a barrel vault, but keeping the central dome. The vaulted nave characterizes the Romanesque style. This is the case of St. Benoit-sur-Loire, France. A roof on wood trusses was then necessary above the nave, but it was less likely to take fire. The fire was a big problem at that time when lighting required torches. Then, the central dome was replaced by crossing barrels, often under the tower, like the basilica of St. Sernin in Toulouse, France, which maintains a nave and a transept supported by semicircular barrel vaults. The aisles are covered with crossing barrels. These provisions were applied to the ogival arches, buttressed by half-barrel aisles.

The ultimate evolution led to the use of intersecting ribs for all the naves. The loads were then transferred to the pillars and large windows could be pierced in the walls. This architecture, curiously called Gothic, was made possible by chaining the stones horizontally with iron spikes on two levels. This device is particularly
effective because, since the thirteenth century, no Gothic cathedral was affected by earthquakes; it is true relatively low in Western Europe. However, if the interior of Gothic churches reached a remarkable brightness, which is not necessarily an advantage in the circumstance, the outside is covered by a proliferation of buttresses that may be judged of a doubtful aesthetic.

The symbol of the cross itself was abandoned by the Baroque in favor of a lush interior.

The facts related to the Shroud up to the 4th Crusade (continued)

These details about the symbol of the circle within a square lead us back to the testimonies related to the Shroud.

In a letter to Robert of Flanders, Alexius the First Comnenus (1081-1118) mentions "linteamina post resurrectionem" that is flax linen, common term to designate the Shroud, found in the tomb after the resurrection. This letter is now considered as false but it has been written at that time to encourage volunteers to engage in the First Crusade. However, the time is not questionable and it gives evidence of the presence of these relics in Constantinople.

In 1147, during the Second Crusade, preached by St. Bernard, King Louis VII of France venerated the relics of the chapels of Constantinople. The chronicler of the crusade Odo de Deuil is fairly accurate. He visited the sumptuous palace of Blachernae "Ibi palatium, quod dicitur Blacherna...Exterior ejus pulchritudo fere incomparabilis est, interior vero quidquid de illa dixero superabi " "whose beauty is beyond anything I can say." But he said also that many relics are in the chapel of the palace of Constantine. This is not the Blachernae palace but the Bucoleon. This is the chapel Our Lady of the Lighthouse, which must be identified to the Nea. But he did not speak of the Shroud. The famous chronicler Othonis bischoff zu Freising refers primarily to the dramatic military events of this crusade.

Following him, in 1151, Nicolas Soemundarson, abbot of the Benedictine monastery of Thingeyrar, Iceland, looked in Constantinople to the strips and the sudarium of Christ’s covered with blood. This is the first and last mention of strips, probably a risky translation.

We talked about the description given by Nicolas Mesarites during popular protests in 1201. Mesarites talk further on of a towel and of a clay tablet bearing the image of the "Legislator". It is an icon "engraved with art" and a fabric. We shall see that Robert de Clary mentioned also these relics. When Nicolas Mesarites died, his
brother uses the same list during his funeral oration: towel and clay tablet reproducing the face of the Shroud. He does not mention other linens. It should also be noted that Mesarites spoke of the church near the Imperial Palace. This is most likely Our Lady of the Lighthouse.

Dobrynia Jadrejkovic, future Archbishop Anthony of Novgorod, when he was not yet a monk, had a journey to Constantinople between 1204 and 1209. He returned to Russia in 1211 after visiting all the relics of the churches. He did not mention burial cloths, but only the board on which the Christ face laid when got down from the cross. The quite remarkable sum of details of relics he has seen, cannot suggest that he forgot the Shroud. It was no longer in Constantinople.

Nicolas Otranto came in Constantinople in 1205 with the papal legate, Cardinal Benoit de Sainte-Suzanne. Upon his arrival, he spoke in a letter dated 1st August 1205, of the looting of relics in 1204. He says he saw the burial cloths of Constantinople in Athens.

The disappearing of the Shroud during the 4th Crusade

The Crusaders took Constantinople in 1204. Among them was Robert de Clary a knight of Picardy, chronicler of the Fourth Crusade.

At first, he describes the appearance of the magnificent Holy Chapel of Bucoleon and lists the relics he found there: in addition to pieces of the Holy Cross and the crown of thorns, two rich shrines one of which contained a tile; the icon which we have just spoken of, and the other contained a fabric which, according to the Clary’s chronicles, has made an impression on the tile.
But later in his chronicle, he describes the chapel of Blachernae where was the “sydoines” or Shroud where Our Lord was wrapped. It states that the Shroud was exhibited every Friday.

The ambiguity of the text is coming from the presence, in the Holy Chapel of Bucoleon of a garment of the Virgin, which does not seem to have left the Blachernae.

In 1204, Constantinople was sacked by the Crusaders. The Shroud disappears.

But soon after, at least two letters of the time attest of its presence in Athens. Moreover, many texts describing the relics of the Holly Chapel in Paris do not mention the Shroud. These texts refer unambiguously to the relics of the Bucoleon described by Robert de Clary and to small parts of the Shroud that surrounded the body of Jesus of Nazareth.
The fact is that Geoffroy de Charny, a famous captain in the service of the King of France, was in possession of the Shroud to 1340. This captain was in no way a knight as often stated, but a member of an old family of the nobility of Burgundy. Contrary to popular belief, the knights have been assimilated into the nobility not before the fifteenth century in France and Bavaria and much later in the other parts of the Holy Roman Empire and Austria as well.

It seems that Geoffroy de Charny had received from Philippe VI a relic taken from the treasury of the Holly Chapel of Paris. But it cannot be in any way the Shroud that was not there as we shall see now.

**Relics of the Holly Chapel in Paris**

The penniless Latin Emperor, Baldwin II of Courtenay (1217-1273), gave his cousin Louis IX (1214-1270) twenty-two relics. They were engaged, among other things, as security for large loans from a Venetian merchant, Nicolas Quirino. The King of France indemnified lenders and thus acquired the relics that were, in fact, still in Constantinople where they were verified for authenticity. The crown of thorns and the relics of the Passion so went by sea to Venice, then to Paris, crossing the lands of the Holy Roman Empire with a safe-conduct from the Emperor Frederick II. The crown of thorns was received at Paris with great solemnity in 1239. Chronicle of Matthew of Paris reports that the king came in person to welcome these holy remains at the gates of the city. By its prestige, the crown of thorns eclipsed all other relics.

The other relics arrived at the end of 1241. Cardinal Eudes de Chateauroux has developed shortly after, in a sermon, the list of the relics of the church Saint-Nicolas du Palais-Royal, subsequently destroyed to build the Holly Chapel: "De numero horum testimoniorum sunt hee sacre reliquie: sancta corona, crux, clavi, sudarium, sepulchrum, spongia, ferrum lancee et alia." What did he mean by sudarium? A narration of the same period, attributed to Gerard of Saint-Quentin, provides valuable information on relics: the "tabula quedam quam, cum deponetur Dominus de cruce, ejus facies tetigit" that is to say, a tablet that touched the face of God, when He was get down from the cross. The visible trace is attributed to the tablet or "tile" like in the description of Robert de Clary. A hymn celebrating the venerated relics in the Holly Chapel without omission speaks of the tabula not the toilla.

In confirmation of the donation, written in January 1247, Baldwin II indicates the presence of "sanctam toellam tabulae insertam" and states that part of the shroud that wrapped the body of Jesus of Nazareth is also among the relics "partem sudarii quo involutum fuit corpus ejus in sepulcro" It is a part only of "sudarium" that wrapped the body of Jesus of Nazareth, hence a piece of the Shroud.
King Charles V did make a small gold shrine containing various fragments, and donated it to his brother Louis, Duke of Anjou. A list of relics was placed inside, corresponding to the list of Baldwin’s gifts to St. Louis. A sketch is also representing the objects: spear, whips, etc.. It reads: *tablel*.

An inventory of the holy shrine in 1534 is not talking of the part of the Shroud, but only of the holy estrelle inserted in the tablet. “After many difficulties finally hath been found in a large reliquary and silver gilded the tablet where there is apparently an effigy the said estrelle as consumed against the said tablet around and inside the said effigy.”

In the description of the relics of the Holly Chapel in Paris published in 1790, shortly before the disappearance of the relics, Father Sauveur-Jérôme Morand, Canon of the said Church, mentions only one relic "of St Sudarium" (rep.17 of the engraving attached to his book). Is it the "sanctam toellam tabulae insertam" or the "partem sudarii quo involutum fuit corpus ejus in sepulchro"? This reliquary was not more than twenty square centimeters large by a few centimeters thick and therefore could not contain the Shroud.

Anyway, one of the two was taken by King Philippe VI de Valois who have given it around 1350 to Geoffroy de Charny, Lord of Lirey, Savoisy and Montfort.

This relic was taken out centuries before the treasury of the Holly Chapel was stolen or destroyed during the Revolution, when were simultaneously destroyed the royal tombs of Saint-Denis. A consequence of the glorious era of the Enlightenment.

We can reasonably assume that what Baldwin II wrote is true. The relic of the Holly Chapel of Paris was not the Shroud, but a piece of the Shroud and probably one of the two missing parts of the side band. These parts have been cut by an emperor in the tenth century to make a scapular. They have therefore been most probably preserved thereafter. The tile and associated fabric was another relic of the Lighthouse Chapel in Bucoleon matching the description of Robert de Clary.

Finally, it can be stated without any doubt that the Shroud itself has never been in the Holly Chapel of Paris.
The theft of the Shroud

The Crusaders never went to Egypt. Having conquered Constantinople, they founded a Latin empire that survived for fifty-seven years, from 1204 to 1261. Some of their leaders took advantage of the collapse of the Byzantine Empire to appropriate lands. One of them, Otto de la Roche, confiscated for his benefit Attica and Boeotia. He was given these lands in fief, in the fall of 1205, by Boniface of Montferrat.

The La Roche family is originating from La Roche-sur-l'Ognon in the Franche-Comte, France.

Otto de la Roche who became Baron by his marriage with Isabelle de Ray, took the cross of crusader in 1201 at the Abbey of Citeaux. He participated in the Fourth Crusade. He became the first Duke of Athens between late 1204 and early 1205. He probably took away in Athens the Shroud that he appropriated during the sack of Constantinople.

He was among the Burgundian crusaders who followed Henry of Flanders in the imperial palace where was the church where Robert de Clary said he saw the Shroud in 1204. This is in the Blachernae.

August 1, 1205, Theodore Angelus Comnenus, nephew of the dethroned Emperor Isaac II, wrote to Pope Innocent III, on behalf of his brother Michael despot of Epirus, a letter discovered in recent years and where he complained of the looting of the Byzantine capital. He stated: "The Venetians took in sharing of the booty the objects in gold, silver, ivory, French took relics of saints, among them, a sacred object among all, the Holy Shroud in which, after his death and before his resurrection, our Lord Jesus Christ was wrapped. We know that these sacred objects are hidden in Venice, in France and other places where looters came from and the Holy Shroud is in Athens": in Latin "Sacrum Linteum in Athenis".

There is other documented evidence that the Shroud stolen in Constantinople is in Athens. This is a letter assigned to the Emperor Alexius V Mourtzouphlos who complained to Pope Innocent III that, after the fall of Constantinople in 1204, he was dethroned and exiled by the crusaders and the treasures of his empire were stolen among which was the Holy Shroud, which is then in Athens.

A charter, established at the castle of Nafplion, April 19, 1251, indicates that possessions of Otto de la Roche the First had just been shared between his sons
Guy who receives the lordship of Thebes and Livadia including Athens, and Otto II who receives the lordship of Argos and Nafplio.

This chart refers to the sale of the territories of the Peloponnese of Otto II de la Roche to his brother Guy. But this act also indicates that Otto II de la Roche takes possession of the castle of Ray-sur-Saône, France, among others.

This is an original charter on parchment, still bearing two of the three seals that authenticated it, especially that of Villehardouin, which is the only example. By this act Otto de la Roche, Lord of Ray, notifies that, with the consent of his wife Margaret and daughter Guillermette he sold to Guy de la Roche, lord of Athens, his brother, the castles of Argos Nafplion and their dependencies, and received for this land from Guy fifteen thousands gold perpres a Byzantine currency deriving from the famous solidus.

Otto de la Roche died in 1234. He was buried in France in the church of St. Lawrence in Seveux, a small village near Ray-sur-Saône. His son Otto II (? -1254) stated according to a document of the Abbey of Charlevie that his father died in France. Another document found in the archives of the diocese of Langres, where the family de Ray had properties proves that Otto the First and his wife spent the last years of their lives in France. It is therefore possible that Otto de la Roche took himself the Shroud to France.

But in one of the towers of the castle of Ray-sur-Saône remains a reproduction of the tombstone of Otto de la Roche the First. The most interesting is the presence of a small wooden chest 46 x 27 x 32 cm. A descriptive panel on the chest indicates that it contained the Shroud of Jesus, brought from Constantinople during the Fourth Crusade by Otto de Ray in 1206. It would be a sending of Otto to his father to be donated to the cathedral of Besançon. Again, doubt is possible. In the castle there is also a fabric with the picture of a man looking like the Shroud, apparently very close to the Shroud of Besançon. Otto’s father probably kept talking about it.
The prohibition of exposing relics without authorization of the Church, and only in a shrine by the Lateran Council on November 11th, 1215 and the sanctions of Pope Innocent III against thieves of relics during the fall of Constantinople in 1204, certainly explain the lack of documentation of the time and, a fortiori, any exposure of the Shroud by the family La Roche de Ray.

Otto II of La Roche, Baron of Ray, died in 1254 leaving two daughters, Isabelle and Guillermette, and a son Jean de La Roche, Baron de Ray (? -1262). Isabelle married first Henry de Vergy (1205-1263).
The castle of Ray remained in the hands of Jean de Ray and his descendants. It was almost completely destroyed in 1640 by Richelieu during the Thirty Years War, and rebuilt in the late seventeenth century by keeping only two ancient towers.

The last descendant of Jean de La Roche, Baron de Ray, Claude-François de Ray, died childless in 1623. However, two other unions took place between Ray and Vergy families. Jean IV de Ray, who died in 1465, son of Bernard de Ray and Marguerite de Neufchatel, married Louise de Vergy and their son William de Ray married his cousin Catherine de Vergy. These late dates after the first exhibitions of the Shroud, more than a century before, cannot explain the change of owner.

The Shroud would have left the castle of Ray in 1250 with Jean de La Roche de Ray's sister Isabelle de La Roche, to be hidden in the castle of her husband, in Lirey also in Franche-Comté.

The difficulties of the La Roche in Athens may have prompted the family to sell the Shroud to the husband of Isabelle de La Roche, Henry de Vergy to finance the defense of their Greek territories. The Vergy exerted high offices: Seneschal of Burgundy and governor of Dauphiné. The acquisition of these offices required a very large fortune. It remains, however, that the conditions for the passage of the Shroud from the family La Roche to the Vergy remain obscure.

Isabelle de La Roche and Henry the First de Vergy had a son John (1249-1310) who married Margaret de Noyers. From this union was born Henri II de Vergy, Seneschal of Burgundy (1275-1335). The latter married Mahaut de Dammartin and they had a son, William III de Vergy lord of Mirebeau, governor of Dauphiné (1290-1360). Married Agnes Durnay, he had a daughter, Jeanne de Vergy and a son by a second marriage, which left no descendants.

Jeanne de Vergy married in 1340 Geoffroy I de Charny (1300-1356). She made known the Shroud and had it exposed in Lirey.

Of course, there is no evidence of the transmission of the Shroud from the family La Roche to the family Vergy. Legacies are not always notarized, especially when including elements of questionable origin.
**The Shroud of Lirey**

Ultimately the Shroud is in the hands of Geoffroy de Charny at Lirey at the beginning of the Hundred Years War.

During a first captivity in 1342 after the Battle of Morlaix against the English, Geoffroy de Charny vowed to build a church dedicated to the Holy Trinity, if he is released. This was done shortly after. King Philip of Valois met Geoffroy de Charny and granted him an annuity to build a church with some canons in his service.

April 16, 1349, Geoffroy addressed to the Pope a request for indulgence of 100 days for the pilgrims who visited his church. Meanwhile, Geoffroy participated in several battles and King Philip VI offers him many relics, but there is no question of the Shroud in any contemporary document. In January 1350, he was again taken prisoner by the English and released in June 1351 after ransom paid by the new king of France Jean le Bon. Then in January 1354, he again asks to the the Pope larger indulgences and a larger number of canons.

He left no document explaining why he asked more and more indulgences and canons. He wrote nothing about the Shroud.

Geoffroy de Charny wrote to Pope Clement VI in April 1349, to inform him about the erection of the church Our Lady of Lirey, in gratitude to the Holy Trinity, to whom he attributed the success of his escape from the English jails, but the list of relics does not mention the Shroud. The collegiate church of Lirey was completed in 1353, the Shroud was placed there in 1357. Geoffroy de Charny died at the Battle of Poitiers September 16, 1356. Jeanne de Vergy, his widow, begins expositions in 1357.

Only two sources speak of these expositions and especially of the interruption:

- A medal with the image of the Shroud of Christ with front and back, bears the coat of arms of Geoffroy de Charny and his wife Jeanne de Vergy. But no date is mentioned.
The memorandum of Bishop Pierre d’Arcis. Pierre d’Arcis wrote it in 1389 calling for a stopping of the Shroud expositions in the Lirey church evoking a fake "skillfully painted" by an artist who has been shown up by his predecessor at the time, Henri de Poitiers "around 1355" dixit Pierre d’Arcis. However, there is no trace of a document where Henri de Poitiers complained about expositions of the Shroud. Instead, a document of the time (28th May 1356) speaks of the approval by the Bishop Henri de Poitiers of divine worship in the church of Lirey without mentioning the Shroud.

The Shroud expositions lasted until 1360. At that time, the bishop of Troyes, Henri de Poitiers, prohibited the expositions arguing that the Shroud must be false because the Gospels do not mention it. Jeanne de Vergy got scared and transferred the Shroud in his fortified castle of Montfort in 1360. She left it there 28 years until his death in 1388.

Jeanne de Vergy had married a second husband Aymon of Geneva, uncle of the anti-pope Clement VII. The anti-pope allowed his aunt by marriage to resume the expositions in Lirey in 1389, when she was died. The canons of the church of Lirey proceeded again with the expositions when they were given back the Shroud by Geoffrey II de Charny.

The successive bubbles of Pope Clement VII, including that of 28 July 1389 authorised Geoffrey II de Charny to expose the Shroud. The expositions are confirmed by a bubble in June 1st, 1390 concluding the case of Lirey. The Pope grants indulgences to pilgrims of Lirey church who come to see "the image or representation of the Shroud of the Lord", preserved with veneration. In these bubbles Pierre d’Arcis’ arguments are rejected, but the Church does not confirm that the Shroud is Christ’s. Nevertheless it allows expositions.

The daughter of Geoffrey II de Charny, Marguerite, married in 1400 John de Beaufremont, killed at Agincourt in 1415. In 1418, Marguerite de Charny married a second husband Humbert Villersexel, lord of Saint-Hippolyte in the Doubs. In 1418, Humbert de Villersexel placed again the Shroud in the castle of Montfort to protect it from marauding bands during the Hundred Years War. He then moved it to Saint-Hippolyte, one of its strongholds. At his death in 1438, the canons of Lirey appealed on justice to force his wife to return the relic, but the parliament of Dole, in May 1443, and the Court of Besançon, in July 1447, gave reason to her. She traveled at that time with the Shroud to Liège, Geneva, Annecy, Paris, Bourg-en-Bresse and Nice.

The canons proceeded further and asked the excommunication of Marguerite de Charny. They finally gave up in return of financial compensations.
The Shroud of Chambéry

September 13, 1452, Marguerite de Charny exchanged the relic with Anne de Lusignan, the first wife of the Duke Louis of Savoy, in return for the Varambon castle where she died in 1464. The Shroud is therefore placed in a new church, the Holly Chapel of Chambéry, raised to the dignity of a collegiate church by Pope Paul II.

In 1464, the Duke agrees to pay an annuity to the canons of Lirey against abandonment of prosecution. After 1471, the Shroud was moved frequently to Vercelli, Turin, Ivrea, Susa, Chambéry, Avigliano, Rivoli, and Pinerolo. But it returned regularly to Chambéry.

Its presence is attested by the cantor and the chaplain of the Holly Chapel of Chambéry, as guardian and administrator of dependent furniture, on the 6th June 1483, in the inventory compiled on the orders of Charles 1st of Savoy. The reliquary containing the Shroud was made of "wood and was covered with crimson velvet,
studded gilt ". It was closed by a silver lock with his key of the same metal. The Shroud was wrapped in a cloth of red silk.

In 1502, Amadeus IX of Savoy and his wife Yolande, install the Poor Clares who take care of the Shroud in the Holly Chapel at Chambéry. It will be exposed according to the movements of the Savoy family during many years.

In 1506, Pope Julius II allows the exposition of the famous Shroud "in which Our Lord Jesus Christ was wrapped in the grave." From this moment, there is a yearly exposition. It may be noticed that one reason for the break of Luther with Rome in 1520 was, in addition to the predestination thesis, somewhat obscure, a devotion to relics considered as excessive. But Luther did not take a clear position on the Shroud.

Margaret of Austria donated to the Shroud of a new silver reliquary in 1509. A few years later François the First walked from Lyon to Chambéry with 2000 soldiers May 15th, 1516 to venerate the Shroud after the victory of Marignano according to the vow he had made before this battle against the Swiss army of Emperor Maximilian the First.

Shortly after, the Holy Shroud was damaged by a fire in the Holly Chapel of Chambéry in the night of 3rd to 4th December 1532. The silver reliquary warmed red: a drop of molten silver fall across the thickness of the folded fabric. The Poor Clares sewed parts two years later to repair the holes.

In 1536 occurred the first French invasion of Savoy during the war between Charles the Fifth and François the First. The Duke of Savoy took the precaution of removing the Shroud from Chambéry and transported it to Nice where it was exposed until 1543. Sent in Vercelli in Piedmont, it has been saved by a canon that hide it in his house during the sack of the city by the French in 1553.
The Shroud of Turin

September 14, 1578, the Shroud is permanently installed in Turin where there will be many public or private expositions, at least every 30 years.

In 1694, after the reinforcements made by Blessed Sebastian Valfré, priest of the Oratory, the Shroud is placed in the sanctuary designed by Guarino Guarini, where it still is. It is set on a new black lining by the same priest.

In 1868, Princess Clotilde of Savoy sewed a new red silk lining on the back of the shroud.

In 1939, on the eve of the war, the Shroud is placed securely in Montevergine, east of Naples. It is back in Turin in 1946.
The Shroud given to the Vatican

Umberto II, the last king of Italy, agnatic descendant of the dukes of Savoy, donated the Shroud to the Pope in 1983. But the Shroud remained in Turin.

On the night of April 11, 1997, a fire ravaged the Guarini Chapel in the Cathedral of Turin, and a wing of the Royal Palace. The Shroud was rescued by the firefighter Mario Trematore.
PART FOUR

The iconography of the Shroud

Representations of Jesus of Nazareth in early Christianity

Jesus of Nazareth did not seem to have been represented before the second century. On the first frescoes he wears short hair, and neither mustache nor beard, as you can see in this fresco of the Good Shepherd of the second century, found in the catacombs of Priscilla in Rome. But there is also, at the same time, Jesus of Nazareth with beard, like on this other fresco in the catacombs. The frescoes of this period do not include aureoles, but it should be noted that in both cases the Good Shepherd is located at the center of circles.

The Good Shepherd in the catacombs of Rome
A sarcophagus of 390 in the Praetexta Catacombs shows the same subject, but without the circle.

This is only at the beginning of the fourth century that the Shroud could be finally unveiled safely. Helena went to Palestine in 326 to contemplate the relics of Jesus of Nazareth. The fresco of Jesus of Nazareth in the catacombs of Commodilla in Rome dates of the end of the fourth century. He bears both a long hair and a beard, with an aureole.

The stained glass window of Wissembourg, dated 1060, was chosen, although recent, because it has the particularity to reproduce the asymmetry of eyebrows and eyes clearly apparent on the Shroud. This asymmetry is more apparent by changing the color curves of the Shroud. It is the result of facial injuries in particular on the arcade and cheekbone of the Christ. It is found slightly sketched on the famous icon of Sinai, dated sixth century. The other interest of the Christ of Wissembourg is to show strips in the hair. The origin of this unique evocation is unknown. The Christ of the Bible of Garima Ethiopia is the oldest known miniature
However, in no case the wounds of the Shroud face were drawn. In particular, we never see the flowing blood. The tradition of the veil of Veronica places the impression during the way to Calvary. Facial injuries thus already existed. This cannot be a reason to dissociate the Shroud from the Mandylion, or to assume the existence of another fabric that would be the Veronica's veil and served as a model, but would have disappeared. Veronica's veil should wear facial injuries that can be seen on the Shroud. This is not the case of icons, frescoes and sculptures.

**Christ on the cross (before the thirteenth century)**

One of the oldest cross of Jesus of Nazareth was discovered in Herculaneum, Italy and therefore before AD 79.

The famous Christian magic square was found in several places in Pompeii. The magic square presented here is incomplete, but it shows the cross, not normally visible, formed by the word TENET in median vertical and horizontal lines. The rearrangement of the letters gives the *Pater Noster* surrounded by A and O, alpha and omega. It is of course older than 79.

The Council of Illibéis, today Granada, Spain, in 306, forbidden to paint on the walls or to place in churches paintings of who is revered.
It was proposed for this text a number of explanations, most of which depart from the natural meaning of the words of the council. The Fathers gathered in Illiberis blame the images themselves be objects of devotion and worship. As a result they proscribe them altogether. Their motives were less radical than those of some Eastern Christians, the Docetes. They argued that Jesus did not have a physical body and could not accept showing the Christ on the Cross. They claimed that a splendor hid the Christ and nobody had seen him on the Cross.

However, the Carpocratians Gnostics had representations of the Crucified. This is the case of a gem of Syria, dating from the second century, where the crucified is engraved with a cruciform aureole, surrounded by St. Mary and St. John. The cross itself is represented by the symbol of the cruciferous aureole, unlike a seal of the third century.
So there were such representations before. This rule could not have been applied long because peace between the Church and Constantine and the sack of Rome allowed for a productive artistic period (313-410) and whose original seat was in Rome.

It was not until the fifth century that the image of the crucified Christ appears more systematically. But frescoes in Egypt, dating from the fifth century and in Italy at the beginning of the sixth century still show only the cross itself.

The Christ on the Cross appears from the fifth century with long hair and an aureole. Although the beard often bifid and the mustache are not systematic at the beginning, these representations are very similar to that of the Shroud.

The wound of the spear is always on the right side like on the Shroud. But the nails are placed consistently in the palms. It was not known until our time that the palms could not withstand the weight of the body. One can understand that it seemed impossible to drive a nail in the wrist that seemed to present only bones. Additionally the retraction of thumbs is not always present.

Representations have either a nail for each foot, or one single nail fixing both feet together to the cross.

One of the most famous representations of the crucified Jesus of Nazareth is on the door of the church of Santa Sabina in Rome. It dates from the early fifth century. There is only one part of the original panels, but this one is certainly contemporary to the construction of the church. We note that the two thieves are also nailed to the cross. The face of Christ without aureole is quite consistent with the image of Edessa. This is not entirely the case of the following example.
An effigy on an ivory casket of the crucifixion of Jesus of Nazareth is preserved in the British Museum in London. It is dated 420-430. Thumbs of ivory are broken, but they were not retracted. Note the long hair and elongated fingers. Curiously, the nails of the feet are not represented. The Christ bears neither beard nor mustache. An aureole is engraved around his face. You can see on the left, Judas hanged over his bag of coins.

Like for the vast majority of crucifix, the Christ's arms are horizontal. This is an impossibility as we have seen, not only because the angles of blood flows on his hands clearly show that the arm was at approximately 60° from the axis of the body. But it is also a physical impossibility, because the hands would have to bear a considerable effort if the arms pulled horizontally. This is a problem of triangle of forces. To support a vertical load with horizontal rods an infinite force is theoretically required. In fact, the traction lengthen the rods which always have some elasticity, they do not remain horizontal.
Outside the blood flows, the Shroud gives no indication of the position of the arms. Finally, the crucifixes the most consistent on this point are those of the Jansenists of Port-Royal, but the legs are not bent as they should be in this position.

The Bible of Rabbula, a Syrian manuscript dated 586, includes a miniature of the Crucifixion with the two thieves also nailed on the cross. The face is very close to that of the Shroud. Jesus of Nazareth wears definitely a long hair and a beard. However, the thumbs of Christ are not retracted. Only the Christ, the angel and the Virgin wear an aureole. This is one of the few ancient crucifixions showing traces of blood. You can see the soldiers casting lots his tunic. The lower part describes the resurrection with guards laying on ground.

![Miniature of the Bible of Rabulla (586)](image)

This change of representation can only come from a better knowledge of the reality of the time of Jesus of Nazareth. One possible source is precisely the Shroud.

Gold coins of Justinian II who reigned from 668 to 695 are well-known by numismatists. They show the emperor on one side and on the other side the bust of the Christ wearing the *pallium* and the *colobium*, holding in his left hand the Gospels
and the right hand up in blessing sign. The Christ does not wear an aureole, but you can clearly see the milled edge, the starry sky.

Although the beard is not bifid, the resemblance to the Shroud is really striking. We note in particular the hematoma on the right cheekbone. But most disturbing is the accuracy of the engraving compared to the lines rather coarse of the emperor on the other side.

The church of Santa Maria Antiqua located on the forum in Rome dated 741-752 contains a fresco which incorporates aspects of the miniature Bible of Rabbuna especially the tunic covering the whole body and the thumbs standing up. The decoration of the chapel is attributed to the son of a curator of Byzantine imperial palace, which would have been able to see the Shroud.
A Carolingian ivory dated about 870, has the advantage to show unambiguously the retraction of the two thumbs exactly like the Shroud. We see just below two women holding kinds of towels.

The representations of the tomb will be discussed later, but here we do not observe any burial fabric in the tomb that you can see at the bottom.

The monastic site of Goreme in Turkey has several churches covered with frescoes. Those of the Christ on the cross are similar to the preceding. These frescoes date from the tenth and eleventh centuries.

The nave contains a fresco of the ninth century in provincial style. Three apses reveal frescoes of metropolitan style of the eleventh century. These frescoes represent the apostles, saints, and numerous scenes from the life of Jesus (963-969 and eleventh century respectively). We note that the thieves are also nailed to the cross. We also see on the right, the soldiers who share the clothes of Christ. The scenes at the bottom are related to the descent of the cross and the resurrection, but they are much damaged.

The Karanlık Kilise (dark church) of the eleventh and twelfth centuries includes only the theme of Christ’s death on the cross. The thumbs are not retracted.
Church of Christ on the Cross of Göreme

Karanlık Kilise in Goreme
The ivory plaque of Amalfi in Italy, dating of the 1100s, shows very clearly the retracted thumbs. This ivory is exposed at the Metropolitan Museum of Art in New York.

Another ivory plaque from a workshop in Salerno is dated to the late eleventh century. It took the color of the wood. It may have been long kept away from light. Contrary to what one might think in order to retain its original beige color, ivory should be kept to light. The Christ on the cross is very similar to the previous with retracted thumbs. The cruciform aureole is surrounded with a circle symbolizing the starry sky.
Christ on the Cross (after the thirteenth century)

The following painting is due to Francesco di Giotto (1266-1337). It shows the continuity in the representation of the crucified Christ. Note that the cross is a *crux commissa* T-shaped, which is particularly rare. The thumbs of the Christ are clearly retracted. Many aspects are very similar to the shroud including the blood flows.
The British Museum keeps a bulb pewter souvenir of a pilgrimage to the Holy Land from the sixth or seventh century with the crucifixion on one side and on the other side the resurrection, which is here.

This fresco of the entombment in the church of Asinou in Cyprus dates of the twelfth century. The thumbs are clearly retracted. Note the singular nature of the Shroud which could suggest an Ashkenazi tallit.
This sculpture of the monastery of La Peña, near Jaca in Spain, founded in 920, shows the Shroud of Christ wrapped with strips according to what they thought at that time of the Hebrew custom. The Christ resuscitated appears on the right of the sculpture.

A plaque of the reliquary of a stone of the sepulcher of the Christ from the treasury of the Holly Chapel in Paris is preserved in the Louvre museum. This reliquary was made under Comnenus dynasty (1081-1185). This plate shows the angel and the holy women after the Resurrection. One can notice the empty pathil, and the Shroud wrapped with strips.
The bottom of the ivory plaque of Amalfi, Italy, dating from 1100, is of particular interest. It is the burial of Jesus of Nazareth by Joseph of Arimathea.

The Christ's head is very similar to the Shroud, but it is raised by a kind of cushion. This also corresponds to the observed position on the Shroud. Another curious aspect is the Shroud itself. It is enclosing the body. The sculptor intended certainly to represent strips.

The lower part of the other ivory plaque from the workshop of Salerno is very similar. The difference focuses on the presence of a pathil on the face of Christ at the time of burial. The fabric of the shroud also has a variety of rafters which correspond to strips rather than to the fabric of the Shroud.

Did the Artists know the fresco of the Catacombs of Kom el-
Shugafa in Egypt dating from the first or second century AD? It concerns the burial of a dignitary according to the rite of the ancient Egyptian religion. The pattern is exactly the same.

The pathil and shroud strips can be found on most of the frescoes of the same period. This is the resurrection of Lazarus in the Palatine Chapel in Palermo. The fresco dates from 1130 to 1140.

It seems that the representation of the Christ in the tomb has changed significantly in the early twelfth century, since then the strips which enclosed the Shroud no longer appear. This could be the result of a better knowledge of the Hebrews’ burial rites at the time of Jesus of Nazareth. The imagery would have been modified accordingly.

The next fresco, a Pieta, is in the church of St. Pantalejmon in the monastery of Nerezi. It dates from 1164. The monastery is in Gorno Nerezi, a few kilometers from Skopje, Macedonia. It was built by Alexius Comnenus in the Byzantine style. This mural should not be much more recent. This time, the painter intended to emulate the characteristics of the Shroud herringbones. Note also that the thumbs are significantly retracted. This fresco has been restored after the earthquake of 1963.
Another representation of the burying of Jesus of Nazareth, dating back less than a century later, brings, without any doubt, details of the fabric of the Shroud and some traces on it. This is the Pray Codex.
The Pray Codex is preserved in Budapest. It is named after the Jesuit priest who discovered it in the eighteenth century. It is a high-Hungarian manuscript dated from 1192 to 1195.

It includes a miniature that has many similarities with the Shroud. The Christ looks like all the examples we have seen with this difference that is an unique case: He is naked on the Shroud. The fingers are long and thumbs are retracted.

The upper part of the miniature shows the folds of the Shroud that are not visible today.

But the most interesting data appear in the lower part of the Codex miniature. You can see the holy women coming to the tomb with spices.

The miniature is covered with gray stains. However, you can see a stain of color somewhat brown near a cloth. This stain could correspond to the blood stains of the Shroud.

The mortuary cloth fabric on the left of the miniature has very specifically the appearance of the right side of the twill fabric of the Shroud with the typical herringbones. Moreover, we see undoubtedly the 4 four holes in L that have been mentioned above. The right side of the miniature shows the characteristic texture of the backside of twills. A second set of four holes in L is also visible with one additional hole.

The wrapped linen on the right reminds a pathil. There is a third fabric under the right hand of the angel, which would be the *sudarium*.

Another miniature of this Codex presents the wounds of passion, clearly corresponding to Gospels and to the Shroud.

It should be noted that all the cases we have seen, including the Codex of Pray, predate the oldest dating of the Shroud obtained by carbon-14 (1260-1390).
Finally, we may indicate the existence of embroidered icons representing the dead Christ lying on linen richly decorated since the beginning of the thirteenth century. The oldest is in Venice. They are called Epitaphios. They incorporate the main characteristics of the Shroud, apart from the thumbs not retracted. The Epitaphios presented here dates of the fourteenth century. A first glance on the Shroud is of course for the fabric. Had the artist really tried to embroider the appearance of a twill fabric? In fact, looking in more detail to the embroidery, we see that these patterns appear in other places. Similar patterns appear on the Epitaphios Stavronikita which would be however dated of the fifteenth century.
This pieta is the work of Theophanis Strelitzas. It is located in one of the monasteries of Mount Athos and dates 1530-1540. The Shroud is obviously inspired by the same model as the fresco of the church of Asinou, but the Christ thumbs are not retracted.

This painting on canvas of Giambattista della Rovere (1560-1627), preserved in the Sabauda Gallery, has the advantage of showing how the Shroud was placed.
The iconography of the Shroud and of the Mandylion

A tradition of the third century recorded by Eusebius (265-339), in his Ecclesiastical History, reports the demand of Abgar (177-212), king of Osrhoënne, better known under the name of Edessa. He was a leper. He heard about the miracles of the Christ and sent his archivist Hannan to Him with a letter, in which he asked the Christ to come to Edessa to heal him. The Lord cannot leave the Holy Land so that He took a towel and placed it on his face which was imprinted therein. The image of Christ, brought by the emissaries, heals the king when he applied it to his flesh. A beautiful icon of Mount Sinai of the tenth-century shows the king Abgar, sitting on his throne, disfigured by leprosy, with the towel on which is printed the face of Christ.

The famous mosaics of the Basilica of Saint-Apollinaire in Classe in Ravenna, Italy, of the sixth century, is the oldest existing copy of the image of Edessa with milled edge, the Pythagorean circular orb of the starry sky.

This image appears also in an icon of the museum of Kiev, Ukraine, of the seventh century, between the saints Sergius and Bacchus, and in the Psalter of Chludov kept in Moscow, which dates from the mid-ninth century. A miniature of the latter shows John VII the Grammarian, iconoclastic patriarch of Constantinople, trying to erase the image of Christ in the center of the circle of the starry sky.
A miniature of the manuscript of the chronicle of Jean Skylitzes on the arrival of the Shroud in Constantinople in 944 shows the effigy of the Christ. This manuscript is preserved at the National Library of Madrid.

It relates the daily life in Constantinople between the ninth century and the middle of the eleventh century and includes over two hundred sheets of parchment with multiple illustrations.

This very same manuscript lists the relics transported to Constantinople: the Holy Cross, the fabric with the image of Jesus Christ, the autograph letter of Abgar, and the image of the Mother of God. It mentions only one image, which was called the Mandylion of Constantinople.

At that time the Shroud was folded so that only appeared the figure of Christ, the Image of Edessa. Ancient representations show that it consisted of a square frame covered with a lattice of gold with a round opening in the middle where the face of the Christ appeared imprinted on this part of the Shroud.

The Mandylion presents fringes in its lower part. We see them very clearly on the Serbian icon of the Holy Face, stored at Laon, France, dated twelfth or thirteenth century. They also appear on the copy of the 1310-1330 triptych of St. Clare Civico Museo Sartorio of Trieste in Italy. Conversely, the fringes are at the top in the chronicle of Jean Skylitzes.

The similarities between these reproductions and the face of the Shroud and its aureole are really striking. The white fabric with the face of the Christ with an
aureole, placed in a sort of frame with fringes, would be of course the Shroud itself. The nature of the fringes remains unexplained. Fringes appear only for tallit’s of prayer, which were cut before placing important men in the tomb. The famous icon of Novgorod of the eleventh century, preserved in the Tretyakov Gallery in Moscow, has no fringes.

A lead of pilgrimage made in 1357, kept in the Museum of Cluny in Paris, shows the shroud completely unfolded with the body of the victim with the front and back, as it was presented to the pilgrims when it was exposed to Lirey in Champagne.

This suggests that the sculpture of St. Marie du Menez-Hom is prior to the pilgrimage in 1357 because it represents only the face, the rest of the body being hidden by the folding in eight. Many Christians made the pilgrimage to the Holy Land and passed through Constantinople where they could see the Mandylion. This type of sculpture has nothing surprising, if not the date.

There are also copies of the Shroud after its presentation to Lirey. They obviously bring no elements in the dating of the Shroud.
PART FIVE

Assumptions of the artifact

The Shroud would be a painting

The idea that the Shroud is a fake is not recent. In 1389, Bishop Pierre d'Arcis wrote to anti-Pope Clement VII in Avignon, it is a "pannus [...] artificiose depictus" a kind of tablet painted by a clever sleight, representing the double image of a man, that is to say, the back and the front.

The Shroud images have been recently attributed to the illustrates brush of Leonardo da Vinci. He would have combined the techniques of relief and photography, using his own face that presents some similar characteristics. It would be a fairly early work. It was only one year old when the Shroud arrived in Turin already wearing the image!

More seriously, scientists came to the conclusion that it is a painting made of pigments of red ocher and vermilion and that blood stains are composed of the same substances embedded in a collagen-based compound.

A two-stage technique was devised. A negative impression can be made on a fabric without showing traces of brushes, using a relief coated with a dye. A simple overlapping of the model by the damp fabric followed by a buffering makes it possible to form a negative impression on the fabric.

A powder transfer was subsequently proposed. The procedure could have been used in the Middle Ages. The result is close to that of the Shroud. The method uses hematite and collagen. The result really looks like the Shroud, and the color inversion fidelity is surprising.

The Shroud would be a kind of photography

This hypothesis was issued in 1995. It requires the use of a large dark room in which is laid a linen fabric impregnated with silver sulfate on which is projected
the image of a body or a statue. This assumption has many obstacles on the light necessary to create a similar image to that present on the Shroud, and the result of the experiment does not offer the three-dimensional sharpness of the Shroud. In addition, the photosensitivity of silver sulfate was unknown in the Middle Ages.

**The Shroud would be a biological production**

Aloe, spread on a body embalmed, was burnished by ammonia vapors from a decomposing corpse. The corpse was deftly removed before the fabric rots. A variant is the browning by the sun of myrrh and aloes carefully spread.

The same arguments have been proposed by replacing the spices by simple sweating.

Finally, if I dare say so in this case without end, the Maillard chemical reaction was recently proposed. When amino acids thus of human origin, in the presence of sugars, are exposed to a high temperature, they turn brown by creating a humus-like compound and with a very similar composition. Yellowing of the image would be due to the chemical reaction between ammonia vapors and some superficial impurities on the flax due to its manufacturing process.

There are also very partial hypotheses in that they explain the formation of scorching stains, but do not provide any information on the circumstances in which the phenomena mentioned could have happened.

The corona effect was envisaged. This is produced by an electric discharge resulting of the ionization of the medium surrounding a conductor. It occurs when the electrical potential exceeds a critical value, but when the conditions do not allow the formation of an arc. This is the principle of plasma lamps.

The most famous hypothesis is the bombardment by $\alpha$ rays. The sufferer would have been a natural source of radiation for a reason that has never been met and that no known physical mechanism can account.

**The difficulties of these hypotheses**

All these attempts ignore the nature of the support. However, it is first necessary to have a fabric to make a shroud, true or false. And the fabric of the Shroud is nothing less than ordinary as we have seen in detail even for the flax fibers that constitute it.
Given its nature, we can now make an identical fabric, collecting all its components and assembling them with similar tools reconstructed. It would be necessary of course to do everything so that everything is identical. One could certainly make such a fabric today. But it was thinkable only 700 years ago?

Without going to make a fake fabric, we can always assume a shroud from the time of Jesus of Nazareth has been mysteriously preserved, has been discovered and used to make a fake of the Shroud. More, the mysterious aspects will be taken for granted, if we are to believe the famous passage of the Praise of Folly of Erasmus, "the more a fact is mysterious, the more we hasten to believe."

The examinations of the Shroud have not revealed in the traces the pigments which would have been necessary for a painting. There are no pigments of mineral, vegetable or animal origin in a sufficient amount to form the image observed. These products are only in minute quantities. This problem is basically valid for the hypothesis of powder transfer, even if the image quality is quite remarkable.

The image on the shroud is blurry. It does not have precise outline. It looses in the fabric. The microscope reveals neither trace of instrument nor traces of wicking in the fabric fibers, which is inevitable with the painting, which in this case could not be thick.

Whether you use a brush or fingers, the paint is worked necessarily in one or more directions. Nevertheless the computer imaging does not allow detecting any direction.

This would underestimate the capacity of the human imagination to think that there will be no other assumptions. Now that we are assured that it is very superficial burn marks and blood stains, new attempts are made.

Although no known cases of human body are identified with $\alpha$ radiation, radiation produced $\alpha$ scorches comparable to those of the Shroud. This hypothesis implies a nuclear fission reaction in the body, but also in the coins placed on the eyes. This last constraint seems insurmountable. We have seen two other reasons that make this hypothesis impossible.

Additionally, it is impossible to obtain such traces by simple heating. Experiments show that a contact is necessary to obtain a color close to that of the Shroud. Coloring concerns only the upper fibers of the yarns. Browning of fibers by diffusion decreases rapidly with their distance. Finally, to obtain this color for all traces, important reliefs, such as the nose, would have caused burns. These results do not match the Shroud traces.
Appearances similar to the traces were obtained with lasers. Forgers would have previously protected areas to receive the blood of a complacent individual with the same characteristics as the Shroud. Clotted blood would have been subsequently filed with the necessary tilting of the fabric, and then very gently removed with the aid of a powerful microscope not leaving any trace of tearing of the flax fibers, but only dark stains.

Finally, among a multitude of other precautions the part of the fabric wearing the face must be exposed to light, by placing it in a circular opening to reproduce the clarification, which is more accessible with an appropriate image processing.

It could be possible to make a false shroud today. We know what to do. It seems there are even several solutions.

Did the man of the thirteenth or fourteenth century know everything he had to do even if he would have had the means to do it?

But the ultimate remedy already exists. Successful websites have already invested the extraterrestrial hypothesis. Representations, sometimes surprising, of the Moon and of the Sun in the paintings, frescoes, carvings and reliefs of the Crucifixion are the subject of the boldest developments, sometimes reinforced by symbolic patterns, but often ambiguous, that the authors of these works have added to the scenery. However, for aliens, superhuman it seems, nothing is impossible.

The alien approach is fully fashion. While there are an infinite number of things to discover in the minerals of the planet Mars, the only thing that fascinates scientists is the possible presence of molecules characteristic of living beings.

The affirmation of the extraterrestrial existence of life and human life will remain as long as there are men on Earth the most widely used means to deny nature, not just special, but really singular of humans. This was already the role of the gods of antiquity for the Epicureans and the Stoics.

Beyond these attempts there are some scholars that no longer question the dating of the Shroud in front the innumerable elements that contradict the Carbon 14 dating. But, you will see how far human imagination can lead when it comes to give reasons for denying the facts, or as well, to prove the reality of pure imaginations.

Yes, the Shroud is a real shroud of the beginning of the Christian era. But Jesus of Nazareth would never have been crucified. Has He exists? They do not believe it in any way. This shroud was used to bury a man who would have been shamefully
submitted to all the tortures described in the Gospels, to convince of the reality of the events they relate.

These acts, really terrible, would naturally have been the fact that some Christians pushing proselytizing to the absurd. Is it possible to imagine something more contrary to the message of love of Jesus of Nazareth?

But how could this crucified have left traces of browning on the Shroud, and additionally variable with distance from the body to the fabric? And how could form the image of the small coins? And how could he be removed without tearing of the fabric fibers? Be answered, perhaps, that nothing was simpler: they have resuscitated him!

This hypothesis is not new. It had been imagined by supporters of Docetism, denying the human nature of Jesus of Nazareth, in the first centuries of our era, but with a completely opposite motivation. They support a really divine nature of the Christ by rejecting the possibility that he could be crucified.

The Qur'an of Muhammad repeated the Docetism thesis replacing Jesus with another man, not because of his divine nature, but because it was just a prophet raised to God: "They say: We have put to death the Messiah, Jesus son of Mary, the Apostle of God. No, they have not killed him, they have not crucified him. Another person who looked like him was substituted to him, and those arguing about him were themselves in doubt. They had no precise knowledge, it was a guess. They have not actually killed him. God exalted him, and God is mighty and wise" (Sura IV, 26).

One Islamic interpretation is that angels saved Jesus by a skylight and took him to heaven and "God cast the likeness of Jesus on one of his disciples named Serges. He had agreed it seems to the demand of Jesus who had promised him a place in Paradise, to take his likeness and to sacrifice for him. So they captured Serges believing that it was Jesus. Some say it is Judas who was captured and crucified, Allah knows best."

An anonymous text, named as Barnabas, explains in chapter 216 how Judas replaced Jesus: "Judas burst into the room where Jesus had been taken away and where the eleven were sleeping. Then admirable God acts admirably: Judas was so similar to Jesus by his speaking and by his face that they thought that he was Jesus .... The soldiers seized Judas and bound him, not without derision, because he denied he was Jesus." This text, probably of the eleventh century, is of Muslim origin and, moreover, it cites namely Muhammad.
The rejection of Christ on the cross is not a novelty. Graffiti was found on a wall of Domus Gelotiana on Palatine Hill, showing the crucified Christ with a face animal. Below, a legend was also engraved: "Alexamenos worships his God." On the left Alexamenos raises his arms in praise. Christians are crazy to believe in Christ crucified. This graffiti dates back to 150 AD. It would be, paradoxically, the oldest known depiction of Jesus of Nazareth on the cross. By the way, we may note that this is a crux immissa.

This rejection is not simply of a skeptical individual. All the great minds of the time rejected the Christ. Of course, this is first of all the case of the emperors until Constantine.

There remains no trace of a decree of Nero in the year 64, Non licet vos esse, it is not permissible for you to exist, which would have prohibited the Christian religion as contrary to the cult of the emperor. This decree is mentioned by Tertullian at the end of the second century or early third century. It remains true that Christians were martyred by all the emperors from the origin up to Constantine the First. This was the case of the Emperor Marcus Aurelius, grand-son of a wealthy Spanish manufacturer, king of the tiles as we would say today, though known for his writings on moral philosophy.

But all scientists and historians of this era also condemned the Christian religion, as did the Learned of the Areopagus in Athens against St. Paul.

Tacitus (58-120) wrote (Annals, Book XV, paragraph 44). "Auctor nominis ejus ... Christus", "the name of Christian comes from Christ, who, under Tiberius, was condemned to death by the procurator Pontius Pilate. Repressed at the moment, this pernicious superstition pierced again not only in Judea, the birthplace of evil, but even in Rome."

Pliny the Younger (61-114), in his letter to Trajan number 98, wrote: "an appointed day, they assembled before sunrise and singing in turn verses in praise of Christ, as if he were god; they were committed by oath, not to some crime, but not to commit theft, or adultery, not to miss to their promise, not to deny a deposit; after that they used to separate and then come together to eat common innocent foods; they stopped doing since my edict, by which, according to your orders, I had forbidden all kinds of assemblies. It made me try even more necessary to extract the truth by force of torments from two slave girls they (whistleblowers) reported being in the ministry of their worship, but I have only discovered a bad superstition carried to
excess.” In his response Trajan approves Pliny in his actions, “moreover, in no kind of crime we must not receive disclosures that are subscribed by nobody because it is a pernicious example, and far from our maxims”.

Suetonius (69-122) in turn states: Afflicti suppliciis Christiani, genus hominum superstitionis novae ac maledicae, Christians, people with a kind of a new superstition mixed with malefices, were sentenced to punishments.

Philosophers are today wiser than scientists. They forgot the expectations of marxist Progressists’ social tsunami. They accept what Christians want. Yes! Christians were right. But their message of solidarity is now integrated within human rights and implemented almost everywhere in the world. There is therefore no more need of Christians. Christ’s message would somehow be exhausted.

Is it only solidarity? This solidarity that was hoped, there is little in the social tsunami that never ceases not to come? Solidarity is written in the genes of man. It is as old as man, in spite of many failures. The most terrible were those shameful doctrines, which covered the twentieth century with blood.

“If I give all I possess to the poor, but do not have love, I gain nothing”.

Is it therefore question only of solidarity?
The experimental and mystical standpoints

The synthesis of information provided by the Shroud leaves little doubt that it is the Shroud of Jesus of Nazareth. However, there are still many unknowns and surprising aspects. The main problem is the lack of documentation on its route from Jerusalem. Two other problems are dating and formation of the image of the Christ. Presumably entirely different experimental dating means will develop in the future. These problems are paradoxes if we limit ourselves to the experimental vision of the world. Paradoxes are likely to disappear by a better understanding of things. It is perhaps, indeed, the problem. Our scholars are convinced to be on the verge of discovering the origin of the Universe. They have already calculated its age. The future may well bring some setbacks to these claims. The complexity of the mathematical equations does not seem really a guarantee of truth. The countless paradoxes that pure science has dragged since the Sagnac experiment in 1918 especially, may well push the science, already on the brink of a precipice, to make a big step forward, to borrow a well-known joke of the Soviet era.

Conversely, we could think impossible to ever date the Shroud to the beginning of our era. This would be a mystery, and mysteries belong to the mystic. The explanation by neutron irradiation can explain the carbon-14 dating delayed by at least a millennium. But the source of this radiation is physically totally unexplained. It should be recalled here that irradiation can in no way explain the formation of the image on the Shroud, especially due to the presence of small coins on the eyes.

Another paradox or mystery according to the point of view is the absence of any trace of tearing of the flax fibers, but only dark stains of coagulated blood.

The danger to relate these problems to mysteries, and therefore to the domain of mysticism is to be denied later by new experimental findings. This is however not the main reason for the caution of the Catholic Church about the Shroud.
During the exposition of 2010, Benedict XVI raised: "This face, these hands and feet, this side, this whole body speaks; it is itself a word that we can listen in silence. What tells us the Holy Shroud? He speaks with blood, and the blood is the life! The Holy Shroud is an icon written with blood, the blood of a man flagellated, crowned with thorns, crucified and pierced in the right side. The image imprinted on the Holy Shroud is that of a dead man, but the blood speaks of his life. Every trace of blood speaks of love and life. In particular, this abundant stain near the side made of blood and water which flowed abundantly through a large wound provided by a Roman spear; that blood and that water speak of life. This is a source that whispers in silence, and us, we can hear, we can listen in the silence of Holy Saturday."

The calvaries painted or sculpted, more or less brightly colored, can make us reflecting. But the Shroud in the extreme simplicity of coloring, in the stark outline of features, in the amazing abundance of details, irresistibly pushes the mind in the heart of the Passion.

Browsing these traces and stains is definitely the most impressive way of the cross that we can do.

We must understand the nature of the image and follow the prudence and wisdom of the Church. The Church has always been very reserved to recognize the authenticity of the relics in general and regarding the Shroud, it has never ceased to warn the faithful against idolatry that attaches to the cult objects. The Ecumenical Council of Nicaea II recalled that the image used in prayer must match specific criteria. In particular, it should not create a barrier between God and those who pray.

On this point, the tradition respects what was instituted by Jesus of Nazareth; the sacraments are the treasure of the Church and the source of holiness. The Christian desiring to grow baptismal grace has the sacrament of the Eucharist. The tradition invites to participate in the liturgical where reading of Holy Scripture is essential.

Devotions, whose images are included, are at the service of the liturgy and of the sacraments, as evidenced by the testimony of the Fathers and Doctors from St. Gregory the Great to St. John of the Cross. The act of devotion should not be confused with a liturgical action.

But to the opposite of regrets not to see this relic established as multiple relics of saints, which are revered, there is a different attitude.
The passions aroused by the Shroud

Just before the completion of the Carbon-14 dating, a famous university professor and Nobel laureate, said: "Above all, do not find a date to the time of the Christ."

It is always surprising to find scientists taking in advance a position against experimental results. Another said when velocities of neutrinos higher than that of light have been measured: "I do not believe it for one moment." More reasonably, another scholar asked to wait for confirmation. We were learned with some condescension that the erroneous speeds result of a telluric anomaly of a mountain in the vicinity of Gran Sasso.

Hence there were measurements of velocities higher than light speed, described as erroneous and even though they should be corrected. You are advised not to worry about the famous telluric anomaly.

An equally disturbing attitude followed the announcement of the results of the statistical analyzes of Professor Maurice Allais on Miller’s measurements. These were the many measurements he has done with the famous Michelson’s interferometer. These calculations exactly as mathematical as those of relativists highlight a systematic anomaly. Allais called them the anisotropy of space. The rejection was immediate and general. These results, although they are mathematics are impossible according to the foundations of pure science. These mathematical results cannot exist. They are not allowed to exist and to use a word attributed to Nero:

« Non licet esse ».

What is pathetic in these reactions, it is the a priori rejection of experimental data contrary to beliefs that have drifted into certainty. However, there is nothing more contrary to the spirit of science than certainties.

What are the certainties of those who reject a priori the veracity of the Shroud? They are first those of scientists. The resurrection of a dead is impossible for biology, impossible for chemistry, impossible for physics. Worse, it implies the disappearance of a part of the experimental world existence. Should that part of existence be either in the form of atoms, particles, or energy, would that part have a probabilistic existence or not, how can it be suppressed from the physical world? Scientifically, it’s nonsense!
But the resurrection of Jesus of Nazareth is a foundation of the Christian faith. This faith does not result in any way from experimental data. Worse, it is as contrary to the data of experience as to the human justice.

The man of the Shroud was flagellated and crucified, although he was not guilty of any crime. Pontius Pilate and Herod themselves had stated.

That's what the Shroud itself will never tell. That's why it does not matter for a Christian, whether or not the Shroud is the shroud of Jesus of Nazareth. His faith is not primarily based on experimental facts or even on historical facts, exactly as ensured as experimental facts. This equivalence has been very clearly demonstrated by Vico, in response to a Cartesian attitude pushed to the absurd.

"Love each other": this message was expressed in a historical context, which is no more doubtful than the existence of Alexander, Caesar or Charles the Fifth. But, for a Catholic, it is first expressed in the heart of each by the effect of divine grace, well beyond any experimental or historical context.

Of course, we need representations, and first words that describe them, in order to believe. We need signs. But we have first to accept to see them, to hear them. This is precisely what characterizes the great minds that I mentioned. They reject a priori the texts and signs of faith. Non licet esse. But they are far from being alone.

**The progress of science?**

The idea of scientific progress, the positivist view generalized by marxists, is no more promising.

After an absolute reign during more than one century, the positivism exists only in the minds of some belated progressists and some humanist atheists lost in the maze of the materialistic thinking. They still mix the imminent end of history, the social tsunami, and the waiting for the end of the science, the discovery of the ultimate component of matter and the understanding of the creation of the Universe.

This suicidal confusion was not an exception. Professor Tonnelat, one of the most famous relativist, wrote in his History of the principle of relativity, "Relativity is a democratic notion that implies equivalence, equality of observers" and further: "Relativity is a democratic concept, which implies equivalence and is expressed by an invariance." She links the evolution of ideas in physics and the myth of the Big Night. One cannot underestimate the link between dialectical materialism and the
development of science in the twentieth century. Does this century saw one single scientist who has not adhered to the marxist doctrine? Einstein himself was deeply marxist without stressing the influence of his first wife, a Communist egery. But the scientific pretensions of Marxism were dissolved in rivers of blood of the victims of the communists.

Pure science is splashed!

It was believed for two centuries that science would bring happiness to humanity overcoming the defects of a creation that would have been faulty. Those days are gone. The atomic bomb and the three major nuclear accidents overthrew the idol. Oil pollution and degradation of nature have destroyed the idea of progress attached to science.

Pure science is unhinged!

Louis de Broglie called "pure science" the mathematical physics, initiated by Isaac Newton and theorized by Auguste Comte. The aim of the pure science would be to account for the experience by mathematical equations. Einstein said fluid mechanics is a lumpen-science. This technique, at most, is not subject to mathematical equations only. I'm just a poor lumpen engineer.

This is an obsolete vision of science. For many years, biologists simulate phenomena directly with their computers. There are plans to simulate fluids by billions of programmed modules interacting virtually. No more mathematical equations. The positivism is negatived. Mathematics is no longer the only form of expression in sciences.

Pure science is expired!

**The technological progress**

The positivist idea of progress was followed by a surprising confusion. In reality, what is changing the most our life is not science but technology.
Scientists spread the belief that the transistor, the most fundamental basis of all computers, mobile phones, all the electronics, was invented by specialists of quantum mechanics. In reality, it is the invention of Bell technicians, under huge and bold investments decided by the directorate of this American society. The theory of transistors has been developed afterwards. Quantum mechanics has offered only 30 years later a mathematical theory of the phenomenon.

Similarly, the discovery of radioactivity as an energy source for hundreds of years was made by pure chance by Henri Becquerel (1852-1908) during his works on phosphorescence. Mathematical theories of atoms came long after.

So that the undeniable advance of technology must be distinguished from the elaboration of scientific theories. When I speak of science, I mean scientific theories. History shows that all theories are ephemeral like all human constructions in contrast to technological innovations. The simple broom is a technological invention that dates back to the dawn of time. It is always there. My conviction is that the discovery of baking bread will remain the most extraordinary technological innovation. We continue, after millennia. One may think of the fire as well, but Nature helped a lot.

Conversely, the scientific theories are upset further to new experiments that will eventually overthrow them inexorably. Evidence is denied. Scientists cling to their postulates more strongly than hanged of Montfaucon to their rope. They would like that nothing is like before. The new science, created from scratch in 1905, is the only path towards true knowledge, irreversible, unalterable. It is the triumph of the great Hegelian vision towards the universal. After the failure of the social doctrine that was drawn of it, is it difficult to announce another collapse? This is obvious.

The cult of science

Pure science, mathematical in nature, is faced since over 60 years with a variety of paradoxes, every time more unfathomable than one another, which is increasing every year. Perhaps the scientists hope that quantitative accumulation of the scientific paradoxes of science will lead to a qualitative leap, to the universal solution, in the broad sweep of the Hegelian vision.

Despite this, science continues to have a kind of aura, not to say a cult in the public. One is searching the support of science in every thing. It would be evidence. One
respects much more science that all religions have never been respected! "Sometimes a few undeniable truths (in physical facts, dates, formulas) do not suffer any discussion, because experiments that can be constantly repeated attest and certify their validity in all places and at all times, but outside this small capital of irrefutable truths, there is only changes."

Did any irrefutable truth ever exist in physics, biology, chemistry, history? Science would not be subject to change, which affects all things in this world? In fact, new knowledge is coming constantly, which upsets old certainties.

The new atheists declare they are humanists. Their goal is to enforce the standards of science and reason in the whole of humanity. They want to eliminate the beliefs and dogmas, which they consider irrational. They want to eradicate religion.

Science has long been considered as fully rational. Unfortunately, the last paradoxes of quantum mechanics led to believe that physics may not be rational. Reason is no longer the essential support of science. Science today therefore accepts irrational thoughts! But it is not only in the latest development of quantum mechanics. The foundations of modern science are irrational. It is irrational to put the absolute within the reality of the physical world. The invariants of the physics of Poincare and Einstein are absolutes. They are absolutely constant for all eternity. These are all totally irrational beliefs. There will never be absolute in the experimental world. There will never be invariant things for eternity in the experimental world. The experimental world is a world of relationships and movements: πενταριε, everything flows in the physical world. The absolute does not change. The Absolute cannot exist in physics. The physical existence of the Absolute is an irrational belief. Thinking that science can have an indisputable value is assigning it a transcendental nature. The most basic foundations of language render absurd this naïve vision.

**The linguistic problem**

The first problem is that of words. Where is the problem? There are dictionaries and everyone can check the meaning of words. The meaning of all the words? How is that possible? In a dictionary, you only go around in circles like a squirrel in a cage. It is absolutely necessary to have some given words to begin with. There are necessarily words that cannot be defined.

These were the ideas of Plato, the simple ideas of Descartes. Kant called these words concepts, more specifically transcendental concepts. Hegel has devised a theory of their making-up in the mind. He called them universals. They would result from a pathetic clash of opposites: the dialectical fusion. But regardless of the
name given to them these words have no definition. They are not related to other words.

The most basic example is the word "straight" of geometry. We are told that what is straight is the shortest path between two points. Fine, but how to be sure? By measuring of course. And with what may we measure? At last! With a standard length! But what is a standard length? I'll tell you: it is the shortest distance between two specific points. This is very interesting! The definition contains the definition. The word "straight" cannot be defined; neither the infinite nor the continuous that characterize what is straight. If the infinitely large is only a number as large as you want then it is, as well, infinitely small because there is still the infinity beyond the largest number that may be considered.

There are of course many other indefinable words as these very simple examples. These words are called transcendental. They are absolute like the absolute itself equally indefinable.

Relativism is a total impossibility for the language. The language has necessarily benchmarks: the transcendental words, in order not to turn round endlessly in dictionaries.

The language reference consists on the one hand of the absolute concepts of the transcendental world and on the other hand of the concepts acquired by memorizing determinations of accumulated perceptions of the experimental world.

Nobody doubts of that part of the language reference acquired by memorization. But the very idea of freedom is rebelling against the authoritarian vision seemingly arbitrary of the transcendence. Arbitrary! This is the very definition of intellectual relativism.

The problem is compounded by the almost exclusive use of the English language in the scientific community. The English language, like the Arabic, suffers from a lack of concepts. Arab writers escaped the trouble by starting with clarifying the meaning they gave to the words they used. Their books when they still had philosophers begin with details, which their Western contemporaries called comments.

We do not fully measure the disastrous influence of the intrusion of the absolute in the experimental world that Hume has caused unintentionally perhaps. Hume has actually written: "all our ideas are copies of perceptions", holding to the initial tabula rasa of Aristotle. When this vision is exclusive of any other source of thought, then purely materialistic, it led to put the time among the realities of the experimental world and therefore assigning it a movement, a flow. Hume did it.
This is not a mistake, this is stupid. Time measures the flows, how would it flows itself? It would measure itself? This dark thought is an absurd generalization of a famous phrase: "Nihil est in intellectu quod prius non fuerit in sensu", there is nothing in the mind that was not first in the senses. But St. Thomas Aquinas, the author of this sentence, did not limit the perceptible world to its experimental aspect, since, first, he believed in God, who is not known only by a sensitive approach. But even more, St. Thomas Aquinas gave the mind access to transcendence through its capacity for abstraction; therefore, the mind has a transcendent dimension by virtue of this capacity for abstraction.

Hume’s vision was essentially the origin of the positivist crisis, of which science is not yet out. It is always in search of invariants and absolutes in the context of an excessive mathematical vision, not so much as an expression of the phenomena but rather by an assimilation of the mathematical formula, such as the curvature of space, to the reality of phenomena in Nature.

**The negation of transcendence**

Transcendence has certainly an authoritarian nature. It is by no means arbitrary. It contains not only a vision without boundaries: the absolute and the infinite that sense perceptions will never find in the experimental world. It mainly carries the mind to its fulfillment. This achievement is a horizon which is still to be discovered. Conversely, one can despair of an inaccessible perfection. It is despairing living to die one day. This is the human condition. Deny the transcendence is the mineral, the vegetable and the animal condition. The stone should despair rolling. The torrent, flowing. The seed should despair germinating. The animal, eating.

Pure science brought an enormous confusion in minds. One repeats again and again that everything is relative. One adds: as Einstein said. Nothing is more contrary to reality. Einstein’s theories are based, rather, on the assumption that there would be a multitude of invariants in Nature, fixed once and for all. The speed of light as an impassable absolute, making students laughing today, is a special case of these invariants.

The situation is strangely paradoxical. On the one hand, the mathematical pure science, the modern physics, places in the experimental world a multitude of invariants, therefore absolutes. This would be the final and unalterable benchmarks for any knowledge of the experimental world with its alleged immutable laws. In the mean same time, relativism has invaded the mind.
The relativism

Men of today reject any reference in all areas. Except in science! This is very strange. This is inconsistent. We do not see how the mind should be free of all references in all its activities, including art and philosophy, and accept fully passively the immutable references of the ranting theories of physics? Are they really in the experimental world rather than in the imagination of some high spirits who interpret the experimental results on the basis of their own assumptions?

The relativism and, by a strange inconsistency, obstinacy in the sustainability of relativism is an inconsistency, because relativism is opposed to any form of external imposition. But he wants to impose itself as the only form of thought.

The follower of relativism has only one thought: to show that any contrary thought is absurd and has no basis. It is a totalitarian and exclusive vision, which negates itself.

One cannot escape the Socratic logic. The Plato’s dialogues are highly topical. Unitary visions contradict themselves. It is impossible to say that everything flows. This is a statement that goes into everything. This statement itself should flow, should change, and so become the opposite statement: there are statements that do not change. If everything was relative, even this statement should be relative. This opens the door to the opposite statement: there are absolute. Saying that you can only have a relative vision on things, and that each can determine its truth; it is setting forth at the same time that this vision must be put in perspective, i.e. relativized. There must therefore exist visions based on absolute or, at least, on authorities.

Everyone has not the freedom to think what he wants of all things. An authority must be admitted. Accept an authority does not mean accepting everything blindly. But refusing all authorities and adopting for everything the relativism is inconsistent. If relativism was the only acceptable position, therefore it would have authority to be enforced. It would be then necessary to deny this authority and reject relativism. There is no symmetry of opposites.

When rejecting all authorities, one contradicts himself. One accepts the exclusive authority of the refusal. Accepting the authority does not preclude also accepting doubt, even refusal, as a possibility, even as a necessity in extreme cases.

The absolute belongs to the transcendental world. This is the only domain of thought where objects can exist independently of each other, as shown by the most
basic linguistic. The word absolute is also used in the mystical world whose statements can only use words that exist in the language.

The absolute is a matter of thought, whether philosophical or theological.

The absolute has nothing to do neither in physics, nor in science.

Poincaré and Einstein put invariants, absolutes in the nature. Instead they put the time among the measurable material realities. What is time? "The time is the number of movement" Aristotle said. Time would be only a number?

Plotinus wrote: "we have ourselves a clear sense of the time, but when we try to make a careful examination, we are embarrassed by our thoughts." It's a bit like what St. Augustine will say.

The time cannot exist physically, because it is composed of past and future that cannot physically exist in the material world. Only the present moment exists. And its existence is itself quite mysterious as it fades into the infinitely small. Even worse, how could it have a flow? This is the time that measures the flow.

One will have a good laugh of pure science of the twentieth century for millennia.

Relativism is totally contrary to the most fundamental concepts of linguistics.

Thought exists primarily to be communicated. But it must first be expressed. Thought is expressed with words. However, the language is based primarily on a number of indefinable words and therefore of transcendental nature and thus escaping to any form of relativism. But to speak, we have to assemble words into statements.

The hermeneutical problem

The following problem is the problem of statements. This is what is called the hermeneutical question. It is to understand. Understanding each member of a statement is an irreducible necessity. This is the first step. It is far from being enough. The history of sciences of Nature is full with examples of discarded statements, although they are expressed by perfectly understandable and acceptable words.

Hermeneutics considers these statements as sets. Decomposing the statement in words is the first step of understanding. This decomposition is carried out not only by words, but for each word in its determinations. The mind judges each
determination in relation to the concepts of the transcendental world. However, this analysis does not provide an understanding of the statement.

A statement is a whole that does not depend only on the recognition of its members. A statement has a meaning from its own.

What are now the references of statements? Statements are relationships between words, they cannot be absolute. They escape the systems of Aristotle and Plato. No philosophical system provides criteria for judgment of statements. There are no references. Therefore statements can only be accepted. They are accepted based on their authority.

Allais, after so many others, asserted the referent character of experiments "total submission to the data of the experiment is the golden rule that dominates any discipline, any worthwhile activity." This dogma is still the foundation of scientific thought and its justification. However, experiments are inevitably expressed through statements. The raw experimental results are meaningless by themselves. A table of figures is nothing by itself. It makes sense expressed by intelligible sentences; by statements. Unfortunately, these statements can not, in any way, ignore the intellectual framework in which they have a meaning. It is impossible that the statements are not conditioned by assumptions that are by no means assured. These assumptions can be those accepted by a vast majority or by a dissident. He expresses himself within his own frame, and its opposition to the dominant doctrine does not justify his own position. Maurice Allais is a bit of a special case. He wanted first to find support for experimental theories, then uncontested, of pure science. He found himself moved by the experience to fully question the dogmas of relativistic physics. But he made himself no new proposal, if it is to propose a list of solutions that could be considered. However, he spoke in terms of space and time according to the vision of Poincaré and thus of Hume; space and time belonging to the experimental world and therefore likely to have an anisotropy. This vision was and is, unfortunately, still authoritative.

It should be understood that the acceptance of this evidence will not make further statements true by them. Space and time are concepts of the mind that allows us to express what the movement is. This admitted the statements of science will not have more value than statements of Law or History. There are many other misconceptions that we do not realize that guide our discourse in all domains. The objectivity of experimental scientific knowledge is a lethal myth for mind.
Transcendence

Transcendence characterizes the data used by the mind it holds by nature.

The best example is the logic. It is by no means an acquisition of thought by some superior minds. The logic corresponds to the structure of our brain. It is given to us. Of course, we need to explore our own thoughts to express its rules. Aristotle remains the master of logic as Euclid was the master of geometry.

The logic is the foundation of all rational thought. Thought is expressed by statements chained by logic. Such statements consist of words. And these words are based on a number of transcendental concepts as we have seen. We must have, at the outset, such concepts to bring the reason to knowledge.

We must admit that it was a little the vision of theorists of the axiomatic approach. We need support points, baseline data, or departure basis. But the axiomatic approach relativizes the bases. The best choice would result from the experiment. This approach is based on the myth of the experimental truth. It completely disregards the fact that the experience is expressed in statements. These statements have not, in any way, a superior value to others. Experience is necessarily interpreted by its formulation into statements. The axiomatic method has its proper place in the mathematical which are manipulations of absolute concepts, which have no material existence in the experimental world. It can be used in science provided you keep in mind that the axioms of science are related to the experimental world and can in no way establish irrefutable truths.

Unfortunately, one always forget the ephemeral nature of postulates, assumptions and hypotheses of scientific theories. One refuses to change, but it is not hopeless, if we believe Max Planck, "A new scientific truth does not triumph by convincing its opponents, but rather because its opponents eventually die, and a new generation grows up that is familiar with new ideas."

Logic uses transcendental concepts that do not correspond to any reality of the experimental world. The first example is the time. Time with his past that no longer exists, its present so evanescent and its future that does not yet exists, is a transcendental data. This is the way we have been given with our mind to understand the movement.

Space, I mean geometrical space is, with time, the other concept that is attached not only to the movement, but also to existence. The space cannot be confused with the existence, as Descartes thought, because what exists can only be discontinuous while the geometric space is perfectly continuous. There are no small holes in space
that would have to be spanned to move from one point to another. This is what a few bold spirits wish to imagine. But they refer to a space that would physically exist. I speak of the geometrical space. If there are holes, hence two straight lines may cross without intersecting. One can imagine of course. It does not cost much. Will that eliminate the thought of continuity?

Philosophers have written heaps of books on other transcendental concepts which are not in the experimental world: the well, the beautiful and the good for instance. Try to define these great ideas!

These concepts are the preferred domain of the supporters of the relativism. They deny all forms of criteria. Free for you to take beautiful what you want. Are they really free to choose? What is the freedom of those who bend their choice to theories, to modes, to a priori?

A theory inspired by Hegel still reigns in certain artistic circles called advanced. The quantitative accumulation of certain elements would lead to a qualitative leap. The composer assembles dissonances hoping to leap to universal music. He is now quite alone. Other music took a different path and it accompanies the songs that have invaded the planet.

The painters follow without waiting: let us accumulate the horrors! Eye on the same side of the nose, square heads, green feet, blue hands. Let us accumulate, let us accumulate the horrors! the quantitative leap will come; the universal painting.

Is the Beautiful really relative? Is the Well really relative? Is the Good really relative?

And yet we are unable to define what is beautiful, what is good, what is well. We always find exceptions to the definitions we would imagine.

There are good things for almost all, except for a few. What is well for one person may look bad to the same person in other circumstances.

These concepts: beautiful, good and well do not correspond to reality. As soon as we begin to apply them to our perceptions of the world, they reveal a paradox. They are as indefinable as the concept of “straight” in the straight line of geometers. There is no objective reality behind these concepts.

These are transcendental ideas that scientific theories not only false, but devoid of any meaning, claim to eliminate. A crowd of spirits, often very deep, rushed into the breach. They tried to eradicate the transcendental ideas; these ideas that cannot be defined except by them, as Hegel explained so clearly.
Of course, the first transcendental idea that was to be eliminated was the idea of God. It was easy to justify. The gods of the ancient were naive ideas. The idea of God drove the gods. There is then only one step forward to get rid of the idea of God. But the logic is not very secure. The gods of Ancients were linked to material reality. They could not correspond to any transcendental idea. This is what Plato expressed the first.

In the depths of their frenzied anticlericalism, the Enlightenment did not deny God. They believed in the Supreme Being, the Great Geometer. Their most positivist direct heirs, the Masons still believe, for the most part, in the Grand Architect. This is a problem of word. They do not want the word God. Is their Grand Architect, creator of the universe, subjected to the necessity of the world he created? It would be an absurd statement. He has therefore a transcendental nature! It is a synonym of the word God.

But in fact the most serious problem is not there.

Science aims to explain the nature. One thing scientifically possible is automatically considered as natural and acceptable.

This reasoning includes a monstrous begging. Things considered possible by science and achievable by technology are not necessarily natural and even less necessarily acceptable.

Ultimately, mathematics is nothing natural. Something possible with mathematics is certainly not, by that fact alone, possible in nature. You will never find parallel lines in nature, for the fairly basic reason there are no straight lines in nature.

Something possible with science is certainly not possible de facto in nature. Postulates and assumptions of science should first be true. Who can prove it? Coincidence with experiment? This is a necessary condition, but it will never be enough. Fortunately by the way: Galileo’s experiment came one day and contradicted the assumptions of Aristotle, despite all the consistent facts he had enumerate.

But there is behind the word natural, another meaning than the possible realization in Nature. The atomic bomb was made and used in Nature. One might even say it is natural, because there is evidence of a probable realization of a nuclear explosion in uranium mines in Africa some hundreds millions of years before man succeeds in making a bomb.

The word natural has a deeper meaning. It is compliance with the order of things. But in this sense too, the atomic bomb is natural, not only because it seems it has
existed in nature but also because it is closely linked to nuclear power essential to
the humanity. Moreover, nothing says that one day the bomb will not be necessary
to reduce into safe fragments a comet or an asteroid threatening the Earth.

We feel, however, that there is a deeper meaning in the word natural. There is not
only what is humanly possible or impossible. Not only what is useful or useless.
There is the idea of acceptable.

We are or better we have infinitely more than a few molecules cleverly organized.
Our mind has access to transcendence. And first to the idea of God.

By writing this, I think first to mind. Religion is something else. I am not a
theologian.

Indeed, the negation of the idea of God is a process of intellectuals. There is an
attitude far more widespread. It was expressed the most dramatically by Ingmar
Bergman who placed this sentence in the mouth of an actress in one of his films: "If
God existed, I would hate him." We recognize, of course, behind these words, the
hatred influence of French marxist filmmakers of the time. This cry of hatred is first,
it is true, an allusion to the difficulties of life. How can I be so unhappy? Much
more generally, if God existed, He would not have allowed that there are so many
dramas on Earth, from cyclones to the earthquakes and tsunamis.

The first reaction is purely rational. The more the knowledge of the universe is
accurate, the more it appears that nothing is left to chance, that everything goes
within deep necessity. Science, the true, the only one, is the search for causality. It is
endless, of course. Tsunamis inevitably result from some earthquakes. And
earthquakes themselves are the direct result of the phenomenon of gravitation. The
universe is as it is, neither good nor bad. It is only. He leads us in its irreversible
flow. It cannot be different from what it is. All events that take place are related to
each other. One thing would be another, nothing would be. But causality that
emerges is unknowable because it is limitless.

Thus, it is absurd to hate the world. This is the condition of our existence.

But in fact, we may hate this life to the point of put an end to it. Hence the rational
response alone cannot satisfy the mind. Reason alone will never answer the
question of the finality of man.

If this finality was of the order of science, it would fall in causality. But the search
for causality is endless. What would be the cause of the first cause? One smiles to
the claims of some scientists to hold the key to the universe! It's so new! The human
finality, like the universe finality is beyond the scope of science.
The idea of ending his life does not come to man only by physical constraint. Some animals may be pushed to let die in circumstances that are sometimes misunderstood today. For man it is, in most cases, despair. Despair is a look at the nothingness, at the matter brutal causality. It is the absence of any reason to live, of any finality in the microcosm where we can lock ourselves.

God: a man?

As long as men reject the transcendental world, and at first the idea of God, how could they even consider that a man, worst, a man disfigured, a man flagellated, a man crucified, a man pierced, would be God who comes on the Earth to bring precisely the meaning of life?

Dead and resuscitated?

As long as men consider as irrefutable truths the positions of the science, how could they accept the loss of a part of the experimental world existence?

God: Father, Son and Holy Spirit?

As long as men admit only the rationalism, how could they accept the idea of an absolute God who would not be unique, according to the mind of Socrates and Plato, but multiple?

These are the mysteries surrounding the Shroud beyond a way of cross traced with the blood of Jesus of Nazareth.
Sources

All information and images in this book, apart from some developments and additions by the author, were exclusively found in the Internet.

The author has endeavored to find in the Internet the original texts or translation related to the Shroud. There are some rare cases where it was necessary to merely repeat what has already been written, but they are limited to extracts from documents more difficult to find, if, indeed, they exist on the Internet.

The authors of the pages used can be easily retrieved with the various search engines available in English, French, German and Italian.

The absence of other references does not result from a kind of provocation against the claim of scientific seriousness that would be in proportion to the number of references. It is rather the result of the method used. The author did not consult any hard printed book to write this book. It is an Internet compilation exclusively with the most used search engine. This approach explains that parts of sentences could have remained identical to those of the original authors. Future researches will be thereby facilitated.

This is first logic and mainly history. One could mention the major theses of Vico. The answers presented were deemed the most logical, but that does not mean they are true. Research continues in many areas. New discoveries are inevitable that will certainly challenge the current findings.

Finally, it will be readily understood that the last part is the only one that bears both the interest and the thought of the author. It was an opportunity to express it.

Sources of illustrations:

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After a summary of all available information on the Internet about the Shroud, the author discusses the place of God in the contemporary world.

Since in the name of science, men reject the transcendental world, and first the idea of God, how could they only envisage a man to be God? Even more a man disfigured, a man flagellated, a man crucified, a man pierced, would be God who came to earth to bring the meaning of life?

But also resurrected?

If the principles of science are entirely contrary to any idea of resurrection, philosophy should it not also reject the idea of an absolute God and therefore unique, according to the thought of Socrates, but would multiple?

Father, Son and Holy Spirit.

These Mysteries are recalled by the Shroud, beyond a way of cross drawn with the blood of Jesus of Nazareth.