

A COMPLETE EXPLANATION OF THE SHROUD'S BODY IMAGES, BLOOD MARKS, AND CARBON DATING RESULTS, WITH DIRECTIONS FOR FUTURE TESTING

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Scientific testing, experiments, and observation that is exhaustively discussed in my book now allows us to state that the images and blood marks on the Shroud of Turin could not have been painted or forged in any way, nor could they have occurred naturally. All of the known evidence indicates that radiation caused the body images on the Shroud. Like the Shroud image, an image created by radiation would be stable in water, neither impeding its flow or being altered by it. It would also be stable to heating and would not change color until an actual scorch was produced. Like the Shroud image, it would not fade with time, would not consist of foreign materials, nor be soluble in acetic acid, redox, or organic solvents. In fact, the translucent fibers from the lightly scorched areas on the Shroud not only have all the qualities just mentioned, but they closely resemble the Shroud's body image fibers. The body image fibers are also similar to light scorch chemistry in their microscopically corroded appearance and their lower tensile strength. The relative reflectance curves were also very similar for the body images and light scorches. This similarity could also be observed with ultraviolet visible and reflectance spectra, as well as in the way both reduced the background fluorescence of the cloth.

The Shroud's highly resolved image and clearly defined edges are also difficult to imagine, unless light or radiation coming from the body is somehow directed onto the cloth. Similarly, the body image was encoded in a straight-line vertical direction from the body to the cloth even through the space where the cloth was not touching the body. As STURP scientist John Heller stated, "It is as if every pore and every hair of the body contained a microminature laser." (1) Only mechanisms involving radiation have been able to account for these features. It is also difficult to conceive of another source besides radiation that could encode three-dimensional information over the length and width of the cloth with various intensity. As another noted scientist who is very familiar with the Shroud observed, "An agent acting at a distance with decreasing intensity is almost by definition, radiation. The limitation of the cloth darkening to the outermost surface pointed to a non-penetrating, non-diffusing agent, like radiant energy..."(2) In fact, scientists have only been able to simulate the Shroud's three dimensionality, vertical directionality and high resolution by using radiation attenuated in a liquid and captured in a vertical straight-line direction by a camera. (3) Radiation will also produce the Shroud's superficial effect, uniform color, and will operate on skin, hair, coins or flowers.

Moreover, radiation and exposure to air and light will also produce the oxidized dehydrated cellulose that is found on the Shroud's body image. In fact, this is the same type of yellowing that occurs to cloth as it ages. When linen cloth is initially exposed to certain low temperature radiation, it leaves no visible effect; however, as time passes, the yellowed body image then appears. Scientists have reproduced this effect in the laboratory using radiation and accelerated aging techniques. (4) The Shroud image clearly appears to have developed over time. As my book shows, this is clearly consistent with the historical evidence of Jesus' shroud, which neither the Gospels, nor any other sources describe as containing his image after his death and resurrection. It is also consistent with the historical accounts of the Image of Edessa/Mandyllion which no sources prior to the sixth century describe as containing any kind of image like the Shroud, but which thereafter contain numerous such references and depictions.

The Shroud's yellowed body images are also caused by conjugated carbonyls, which means that carbon atoms, which occur naturally in linen as single bonded elements, have been broken and have doubled bound themselves when they reattached and reunited over time. Certain types of soft low temperature radiation have produced this same type of unusual effect. (5)

Doctors and scientists have identified internal skeletal features on the Shroud body image. They have identified parts of the spinal column, forehead, thumb and finger bones. (6) This clearly indicates that the body image has qualities analogous to x-rays and other radiation, and clearly indicates that the body was the source of radiation. We also know that the reason a truly proportional three-dimensional image resulted on the Shroud was because the various degrees of lightness of its image correlated to the distances that the cloth was from the body. Since the various degrees of lightness of the body image was received by and encoded onto the cloth, it could only have come from the body. We also know the Shroud's image was encoded in a vertical straight-line direction from the body to the cloth draped over it. Since this information is also contained on the cloth, the radiation clearly had to have come from the body.

The extensive medical evidence derived from the body images and blood marks clearly shows that the Shroud contained a body. (7) Since both the frontal and dorsal images, containing all of their various physical and chemical characteristics accounted for by radiation, are found on the inside of the cloth, they further indicate that the body wrapped within was the source of radiation. Another example that the radiation had to have come from the body can be seen from the body's accurate and proportionate internal skeletal features seen on the Shroud's body images. Normally when these features are made visible by x-rays, magnification or enlargement of the body's internal features occur. That is because the rays leave an external tube before hitting a part of a person's body and being recorded on film. The degree of magnification will vary with the degree of distance. For the short distances that existed between the Shroud cloth and the underlying body, extensive magnification would have clearly been present if the source of radiation came from outside the body. However, the Shroud's body image clearly lacks any such magnification. According to doctors, this is one further indication that the source of light came from under the cloth or film----from the body itself. (8) All indications are that the radiation not only came from the body, but from the length, width and depth of the entire dead body. This by itself is evidence for the Resurrection.

The type of radiation has even greater implications. Recent research published in the last decade has caused scientists to look at particular forms of radiation that previous scientists may have overlooked. This began in 1994, when Kitty Little, a retired nuclear physicist from Britain's Atomic Energy Research Establishment in Harwell, stated what many other scientists previously observed regarding the Shroud, but then added another important point: "Now it seemed almost certain that the image must have been caused by some sort of radiation However, there was one source of ionizing radiation that they did not try." (9)

Dr. Little actually conducted numerous experiments with various combinations of protons, alpha particles, neutrons and gamma rays at the Atomic Energy Research Establishment in Harwell in the 1950's, but did not publish or relate them to the Shroud until the 1990's. Dr. Jean-Baptiste Rinaudo also conducted numerous experiments with protons and neutrons in the mid to late 1990's. While neutrons and gamma rays have very interesting and significant effects on cloth, which we will address later, they would not affect the body image on the Shroud. Rinaudo and Little's research, however, show that protons and alpha particles produce all the known physical and chemical features on the

Shroud's body image fibers. Protons and alpha particles are not penetrating particles. They are easily attenuated in air and did not penetrate more than 2 to 3 fibers once they reached the experimental cloths. They evenly and uniformly distributed their energy over the fibers. Moreover, low intensities of protons and alpha particles radiated onto white linen cloth will leave it white without any discoloration. Only after artificially aging the cloth did the superficial straw yellow color like that on the Shroud appear.

The straw yellow color resulted from dehydrating oxidized degraded cellulose like that found on the Shroud. Furthermore, the coloring resulted from conjugated carbonyl groups within the molecular structure of the cellulose, just like that on the Shroud. This straw yellow coloring caused the linen cloth's natural fluorescence to disappear as is the case with the straw yellow body image on the Shroud. Where body image fibers crossed, underlying parts of fibers were protected and remained white while the inner part of the straw yellow fibers also remained white, just like the same features found on the Shroud's body image fibers. (10)

The protons and alpha particles utilized by Drs. Riuauo and Little were produced nuclear reactors. This capability obviously did not exist until the mid 20th century, so how could they have gotten on the Shroud? Dr. Little noted that, "Some scientists have suggested something in the way of a nuclear disintegration, acting almost instantaneously, as with the flash from a nuclear explosion." (11) Professor Wesley McDonald, Elizabethtown College, summarized the viewpoints of many scientists who think that radiant energy coming from the body caused the Shroud's images: "Many scientists now describe this burst of energy as a pulsed laser beam caused by dematerialization of the body into energy in a millisecond." (12)

Protons, electrons and neutrons are the main building blocks of matter. Alpha particles, consisting of two protons and two neutrons, behave like protons and are one of the simpler things that result from these building blocks. If the body on the Shroud dematerialized, a portion of these main particles and their products would be given off along with gamma radiation. (13) Moreover, if this occurred, all of the unique and mutually inconsistent features of the body images and blood marks would become encoded onto the cloth. This method is described as the Historically Consistent Method in my book *The Resurrection of the Shroud*.

As the cloth fell through the body region and received the particle radiation, the very penetrating neutrons, electrons, and gamma rays would pass completely through the cloth, without encoding body images. However, the easily absorbed protons and alpha particles would penetrate no further than the topmost two to three fibers of the cloth, resulting in a straw-yellow color that developed over time. The parts of the draped cloth that were closest to the body would have been the locations over the highest parts of the supine body. They would have fallen through the radiating body region longer than the other parts of the cloth. The next closest parts of the cloth would have received not quite so much radiation as the closest parts, and so on. Yet even parts of the cloth that were not originally touching the body would have fallen into the radiating body region and received some radiation. Thus, a perfectly encoded, three-dimensional frontal body image would have developed.

The directionality of the image would have been a straight -line, vertical direction through space from each point of the draped cloth to each part of the body immediately below it. Gravity would naturally encode this feature of the frontal body image. Since the entire image encoding event is completed while the cloth is only partially through the body region, only internal skeletal features closest to the body's surface (e.g., the hands and the face) would become encoded like those found on the Shroud. This explains why the man's internal organs are not encoded. Some of the skeletal images may be somewhat convoluted,

such as the thumb, because the surface skin and tissue above it would be encoded ahead of it, which is also found on the Shroud.

Under this method, the oxidized, dehydrated, straw-yellow fibers consisting of conjugated carbonyls would lack any cementation or added pigments, powders, or foreign materials. They would be uniformly encoded and stable in water, and stable in heat up to temperatures that would produce scorches. Moreover, this process would leave a negative image on the cloth with left/right and light/dark reversal. However, when the negative was developed into a positive, every detail of the body would be revealed because each detail was encoded vertically onto the cloth in three-dimensional correlation. The collapse of the cloth through the body, encoding each particular point directly below it, would provide the image's highly detailed resolution.

This event would also explain the unique blood marks found throughout the body images, yet contained within the threads of the cloth itself. These blood marks have never been displayed so realistically on cloth, canvas, or any surface. These wounds were inflicted by several different instruments (lancia, flagrum, nails, thorns or sharp pointed objects, crossbeams, fists, et cetera) and were incurred over a period of several hours while the body was in different positions. Serum surrounds the borders of each of these wounds and blood flows. This feature, along with many other findings, reveals that this is congealed or clotted blood. Moreover, all of these different kinds of blood flows, marks, and wounds---numbering 130 or more---are displayed on and within the cloth with perfect correspondence as to how they would look on a real human that bled from each of these wounds.

Throughout a century of study, physicians and other experts have described these blood marks as anatomically precise, perfect, and pristine, with clean outlines or borders yet without any evidence of having been broken or smeared. Interestingly, many of these blood marks would not even have been in contact with the cloth when it originally draped over the body, and others would only have been in partial contact. Yet each of these blood marks obviously did come into contact with the cloth—intimate, direct contact. This is best seen in the approximately one hundred scourge marks found all over the body, where photographic enlargers, microscopic examination and ultraviolet lighting reveal that each of the scourge marks on the cloth contain upraised edges with indented centers and borders surrounded by serum. Such contact seems even more intimate than what direct surface contact would leave. Only a cloth collapsing into a body could explain how these blood marks could have acquired such intimate contact.

When the cloth falls through the body region, it comes into complete and intimate contact with all the blood marks that were below the cloth. This leaves a much more thorough and precise blood mark than mere direct contact could do with a stationary body and stationary cloth. Because the blood marks are attached to the body they do not fall through it, however, as the cloth passes through, the blood marks become encoded and embedded into the Shroud in the same configuration that they were in while they were on the body. (Alternatively, because the blood consists of the same molecules, atoms, DNA, et cetera, as the body, it too, allows the cloth to pass through it, but once embedded into the cloth and no longer attached to the body, the blood does not disappear when the body does.) We cannot say for sure, but the Gospels do record Jesus speaking of his resurrection in the days before he died, and he speaks of his body and his shed blood as two distinct things.

Each of the blood marks in their complete configurations were transferred onto and into the cloth regardless of how congealed they were or whether any had started to scab. When the cloth was initially laid over the man, some of the blood that was in contact with the cloth

could have been partially encoded onto it, especially if the blood was still semi-liquid. This would most likely be found with blood from the postmortem or most recent blood flows. Because they are so easily attenuated, the protons and alpha particles that encoded the body images would not have penetrated the blood marks on the skin or on the cloth. Therefore, body image would not be found underneath the blood marks on the Shroud.

Moreover, only a cloth collapsing through a body could explain the blood marks' pristine condition with clean outlines and borders, yet without any evidence of having been broken or smeared. After acquiring such intimate contact between the entire wound and the cloth, this event also explains how each of the blood marks separated from the man's body and embedded into the cloth, leaving the original smooth surfaces between the wounds and the skin unbroken and intact on the cloth. Had the body been removed from the cloth by any human or mechanical means, the intimate and complete blood marks found on the more than 130 wound throughout the body, would have shown numerous signs of breaking or smearing when the cloth was removed from the body.

A cloth collapsing through a radiant body would also account for all the other previously unexplained features found with the Shroud. It would explain the excellent condition of the centuries old cloth, the displacement of the blood and the body's distortion found near the edges of the body and within the body images, the subtle coin and flower images, as well as the Shroud's 1988 carbon date.

Whether the Shroud is going on seven hundred years old or two thousand years old, everyone who has ever examined it has noted its remarkable condition. As STRUP scientists Roger and Marion Gilbert remarked quite some time ago in an observation section of a scientific paper, "The cloth [Shroud] is in excellent condition, extremely soft and pliable with no apparent degradation of strength." (14) Needless to say, ancient cloth is rarely, if ever, described as "in excellent condition." The only friable parts are its topmost two to three fibers, which contain the superficial body image.

Under this model as the Shroud passed completely through the body region, the gamma rays, electrons, and neutrons would pass completely through the cloth thereby strengthening it and making it more durable in a number of ways. As we have seen, the Shroud's linen consists of cellulose, which contains long chain molecules. These molecular chains have repeating sub-units that pass through crystalline, partly crystalline, and noncrystalline regions. (A crystalline region has a specific internal and symmetrically arranged structure.) Gamma rays, electrons, and neutrons (unlike protons and alpha particles) are long-range particles or radiation and easily pass through linen cloth. As they did, a very small fraction of them would have caused a limited number of molecular bonds to break and re-form in the non-crystalline regions, thus cross-linking these molecules and giving the cloth greater resistance to solubility, oxygenation, and chemical reactions. According to Dr. Little, "Given a high crystallinity such as one would expect to find in good quality linen. . ." this type of cross-linking "would account for the lack of degradation and 'aging' that might be expected in a material two thousand years old, and that had been subjected to repeated handling and ill-treatment." (15) Dr. Little continued: "Such a reduced chemical activity would also account for the fact that although the Shroud was reported to be covered with mildew spores there were no mildew reactions, so that the fabric was unharmed." (16)

Under this method the cloth would acquire the full and complete blood marks from the sides of the man's head as it fell down, and would then displace them into the hair as it flattened and encoded the image of the hair around them. My book also explains how several other odd features naturally occur when the cloth collapses through the radiant body region that other models do not even consider, let alone attempt to explain. For example, the man's fingers would remain naturally bent from the crucifixion. As the cloth falls

through the hand it would encode the fingers since they are near the surface of the draped cloth. After the two-dimensional cloth is then straightened or flattened, it results in a longer area of the cloth having been used to encode the fingers than if the fingers had been straight. Thus, the encoded fingers look somewhat longer when encoded under this method.

Other examples abound. The photographic negative, positive and three-dimensional images of the face clearly reveal that part of the beard is upturned. The most likely explanation for this and the gaps along the sides of the face is that a small chin band held the mouth closed. The photographic negative also reveals vertical lines running down from the man's beard, especially below the right side, which is not so upturned. As part of the cloth lying over the chin fell, and flattened, it would acquire such lines or motion blurs, especially in the area that did not have to fall down and through as much beard before flattening. The wide rectangular area of body image below the man's chin and beard could also have been caused when the cloth came into contact with and encoded the neck or throat area, leaving this appearance after the cloth is straightened or flattened. Similarly, the odd-shaped feature encoded as body image next to the neck area and below the end of the length of the hair on the man's left side, could be displaced hair image caused by the cloth's motion under this method. There are also two faint body images in the blank space off the left side of the man's face, next to the eyebrow and cheekbone. They, too, could be from motion blur caused by the cloth in this region, but their faintness and the lack of any such image on the right side, could be due to the chin band slowing or impeding the complete collapse or encoding of the overlaying cloth in this region. In addition, the small lateral distortion at the femoral quadriceps (17) would most likely be encoded by a cloth collapsing.

This process would also encode the blood marks on the dorsal side. When the body dematerializes, a small vacuum would be created. This would draw or pull the dorsal cloth up a short distance into the body region, encoding all of the blood marks and the parts of the dorsal body image not initially touching, along with its skeletal features. All of these features would also be encoded if the body vanished or disappeared vertically in the same direction in which the cloth collapsed. Since radiation is emitted from the entire body, the amount of time that the dorsal part of the cloth is exposed to the radiation would be equal or nearly equal to the frontal part, thus leaving both images with nearly equal intensities, as is also found on the Shroud's body images.

When the cloth fell through the body image it would encode additional features that were not observed until modern technology was applied to the Shroud. Since the man's teeth would be a high point on the supine body, they would be subtly encoded as body image (18) as the cloth fell through the mouth. The coin and flower images would be even more faintly encoded, however they would be encoded in a different manner. It's well to remember that these images are unlike the body image in that they are not three-dimensional, nor as highly resolved or focused, and they lack the vertical directionality of the body image.

When some of the many neutrons that flew out of the body region hit the coin or flowers, they could have caused these objects to leave faint images on the cloth in several ways. For example, when a neutron hits the nucleus of copper, the primary component of ancient bronze coins, the nucleus can absorb the neutron and give off either a proton, alpha particle, deuterium, or a low energy gamma ray. Each of these particles—protons, alpha particles or deuterium—encodes superficial images on the cloth and, if they were given off the coin's surface, could encode the coin's features. Similarly, flowers contain trace amounts of heavier elements such as iron, calcium, and potassium. When any of the countless neutrons hit these three heavier elements, each could also absorb the neutrons and

give off protons and alpha particles. (19) Any protons or alpha particles given off the flowers' surfaces would also encode a superficial image on the Shroud.

Gamma rays are also given off by all these heavier elements and could also encode faint coin and flower images on the Shroud. These gamma rays would radiate at low energy, and when they hit the electrons in the heavier elements of the coin and flowers; their atoms could fluoresce long-wave X-rays from the objects' surfaces, which, again, could also encode superficial images on the Shroud. They could also fluoresce as short-wave X rays, or even as visible light, and encode an image more than two or three fibrils deep at these particular locations, or fluoresce as ultraviolet and leave a superficial image. The most common element in ancient coins—copper—would be the best of all the heavier elements above at absorbing the neutrons and giving off these gamma rays. However, the heavier elements found in flowers, iron and potassium, are also excellent at absorbing neutrons and giving off gamma rays. Calcium could also do this fairly well. (20)

If further research confirms the presence of the coin and flower images, they would certainly fit into this image-encoding event. While both coin and flower images would be faint, the coin image would not necessarily be encoded much more intensely than the flowers. Many of the nonpenetrating X rays and ultraviolet rays would not escape from the coin, but would not have nearly as much difficulty with the flowers. Flowers have some tendency to leave images on cellulose. There are many examples of flowers having left images on paper. Unlike the coin, throughout this image-encoding process the flowers would have maintained or increased their original contact or closeness to the frontal and dorsal sides of the Shroud, where their images have been observed. The coin could have made only a faint image on the cloth from its original position over the eye. (There could easily have been another coin over the left eye, but it did not leave an impression that is clearly detectable at present.) It would have fallen through the body region faster than the larger, connected cloth after briefly and faintly encoding the letters, lituus, and motif of a Pontius Pilate lepton.

However, something else quite interesting is also revealed by studying the area of the man's eyes. Notice on the positive images of the face that the man's closed eyes appear normal, that is eyeballs or round curved objects appear under the eyelids. In fact, these round curved eyeballs appear at the same locations on the three-dimensional images of the face. (The coin itself would be simply too small and would lack sufficient relief to encode this type of three-dimensional image.) The overall area of the eyes is three-dimensional and vertically directional and possesses the photographic resolution of the body images. These facts indicate that the coin features were encoded in one manner and the eyeballs in another. Under this method, the coin's features are faintly encoded at the beginning of the event. After it falls through the body, the cloth collapses through the same area encoding the eyelids and eyeballs (over the faint letters, lituus, and motif) in the same manner as it did the rest of the body image. Only a method such as this can explain both kinds of different images in the area of the eye.

This method not only produces the radiation that matches all the chemical and physical features of the image fibers, but it accounts for all of the unprecedented and mutually inconsistent body image features and blood marks encoded on the Shroud. It also explains the excellent condition of the centuries old cloth, the blood displacements and the image distortions, the subtle coin and flower images. As we will discuss shortly, its radiation also produces additional C-14 that would only be partially removed by the standard pretreatment cleaning processes employed by the carbon dating laboratories. Obviously, no other method has ever accounted for all of these features; however, there are even more significant advantages possessed by this method.

In my book I refer to this method generally as the Historically Consistent Method for it is consistent with the most authentic and reliable sources of ancient history in three very significant ways. Unlike all other methods, this makes only one assumption---that the body disappeared or dematerialized. With this dematerialization, particle radiation is given off naturally and the cloth falls through the radiant body thereby encoding or causing all of the Shroud's numerous images and non-image features summarized above. This is one of the real strengths to this method, for all of the Gospels that describe Jesus' burial also declare that his body disappeared without any human assistance. This disappearance was a startling occurrence to the people of this historical time.

At Jesus' resurrection, his body clearly disappeared from his shroud and his burial tomb. Moreover, after the resurrection event, the same historical Jesus was described by these historical sources as having the ability to pass through walls, appear in other forms, and to make his body vanish. Of all the remarkable or miraculous things attributed to Jesus, he was never described as passing through walls or making his body change or vanish until after his resurrection.

Furthermore, when Jesus was seen again early in the morning on Easter Sunday, he was not described in any of the Gospels as having any of the blood flows or blood marks on his body that he necessarily would have had from his being crowned with thorns, scourged, crucified, or stabbed in the side. Mary Magdalene and two of his disciples even mistook him for the gardener or another man, yet make no mention that this man had any of the numerous wounds that Jesus necessarily had. These initial unbloodied appearances of Jesus on that Sunday could be a corroboration that the blood marks completely left the body and became embedded in the cloth, as stated in the Historically Consistent Model.

In addition, these same historical sources also describe another event in Jesus life, the Transfiguration, where his face and clothes shone brightly in the presence of God, but did not cause any immediate effect to Jesus. Similarly, Paul was blinded by a light, yet it did not harm him, his companions or their clothing.

Future testing that is described in my book, and in even greater detail in a pending proposal, could corroborate that particle radiation caused the body images on the Shroud. If the body in the Shroud gave off particle radiation it would also affect the C-14 content in the cloth in ways that can easily be tested. In fact, future testing of the Shroud could not only prove that it was radiated with a neutron flux, but that it came from the body, the amount of flux, the amount of additional C-14 that it created, the amount of original C-14 and the true age of the cloth.

Neutrons are very penetrating. While some would collide with the countless atoms in the cloth and bounce off in another direction, many would pass through the linen and the blood, bouncing off of or even penetrating the limestone surroundings, with some ricocheting back onto the cloth. After many bounces, a neutron would lose most of its energy but would then be in a position to alter the nucleus of another atom.

Thomas Phillips first stated in the same issue that the Shroud's carbon dating appeared that neutrons would have converted some of the C-13 atoms to C-14 by the capture of a neutron. It is also true that a neutron flux would convert some of the N-14 atoms into C-14 atoms because when N-14 captures a neutron it emits a proton thereby converting to a C-14 isotope. Air is about 78% nitrogen and 99.63% of all nitrogen on earth is N-14. This nitrogen would be found in the cellulose of the linen fibers themselves from the soil in which the flax plant grows. It would also be found in the air permeating the porous cellulose, as well as on the fiber and various contaminants on the fiber.

When these reactions occur with N-14 or C-13 within the flax itself, or within the air permeating or passing through the porous fibers, these newly created C-14 atoms also

become part of the flax. These reactions also produce energy allowing the newly created C-14 to penetrate approximately .3 micron farther into the cellulose and break its chemical bonds.

Dr. Rinaudo irradiated ancient linen cloth known to be from 3400 BC with a neutron flux, then subjected the sample to a standard pretreatment cleaning process like the carbon dating labs used on the Shroud, and carbon dated the sample. In order to create similar conditions of observation or comparison between his experimental sample and the centuries-old Shroud, he artificially aged his sample by subjecting it to elevated temperatures for a short time, for 10 hours at 150 degrees C., which caused the irradiated sample to take on a very similar appearance to that of the Shroud's body image. The new radiocarbon date for Dr. Rinaudo's sample showed a shift forward in age of a few hundred centuries. *After calculating the approximate amount of particle radiation to create the body image on the Shroud, he then observed the corresponding number of neutrons that would have been present. Based on the 3400 BC radiocarbon dated sample, he then calculated the age change that would have resulted from this corresponding number of neutrons. Significantly, he found the result to be an age shift of thirteen centuries. (21)

Even more significant are the experiments by three Italian scientists headed by Mario Moroni, (22) they took six mummy samples that were approximately 2,110 years old and exposed all but one of them to various conditions or treatments before radiocarbon dating them again. Two samples were not irradiated, but exposed to fire conditions to simulate what the Shroud incurred during the actual fire of 1532. One sample was only irradiated. The last two samples were irradiated and then exposed to the simulated fire conditions. Like Rinaudo's radiation, this radiation consisted of a neutron flux.

The two fire simulation experiments showed insignificant radiocarbon age changes. The irradiation-only sample showed an age range to 360 years younger----after it was pretreated and dissolved so extensively that a mere 10% of it remained. However, the two samples that were irradiated and then heated in the fire simulation models showed significant age changes----1,120 to 1,390 years younger. These samples received pretreatment processes in the standard-to-harsh range, but these were not nearly so extreme as those applied to the irradiation-only sample. These results are extremely significant for a number of reasons.

In Moroni's last two experiments, two samples originally carbon dated to 160 BC were irradiated and subsequently placed in fire-simulation models. Both were then radiocarbon dated again----to the Middle Ages. One of these samples was dated 1,120 years younger. Its pretreatment cleaning technique left 79% of the cloth sample to be carbon dated. For the other sample, the age changed to 1,390 years younger. Its pretreatment cleaning left more than half of the sample to be carbon dated. These pretreatment cleaning methods better approximate the extent of the cleaning methods that were applied to the Shroud samples in 1988. At that time, those labs announced that the Shroud of Turin---which all other evidence consistently points to as originating from the first century AD----carbon dated from 1260 to 1390 AD.

When these high-energy neutrons bounce throughout the cloth, they also break chemical bonds within the cellulose. This provides an opportunity for the newly created C-14 atoms to bind to and become part of the linen over time, and survive the pretreatment cleaning process better. This can occur in different ways. The breaking of the chemical bonds causes other atoms within the broken molecular structure of the cellulose to become unbound. These atoms (oxygen, hydrogen, and carbon) need to bind to other atoms and, like the newly created C-14, will actively seek to bind to unbound atoms. The newly created C-14 and the oxygen and other carbon atoms from the broken bonds will bind to each other within the molecular structure of the cellulose. For this reason, the longer period of time that passes,

the more embedded the C-14 can get into the molecular structure of the cellulose. Heat would naturally speed this process as well as cause the binding to be more extensive.

Moroni's results are very similar to Dr. Rinaudo's results. Rinaudo irradiated his sample and aged it artificially by baking it at 150 degrees C for ten hours. His pretreatment cleaning method was also similar to the Shroud's and to Moroni's last two samples. When he then radiocarbon dated his sample and calculated the dose of irradiation that would have created the image, he too, got a shift in age of thirteen centuries.

Both groups of these scientists may very well be simulating what happened to the Shroud. All the medical, scientific, archeological and historical evidence consistently indicates that the Shroud is from the first century and that some form of radiation was involved in the creation of its image. Only after many centuries was it pretreated (and carbon dated) for the first time. The passing of many centuries would also have allowed a great deal of time for the newly created, unbound C-14 atoms to single or double-bind with the unbound chemicals from the broken bonds caused by the neutron radiation. Moreover, the Shroud was also involved in a fire in 1532 and was clearly exposed to its heat for an unknown period of time. This would have speeded up the above processes and more permanently or extensively bound the newly created C-14 to the molecular structure of the linen. When the Shroud's three samples were pretreated, they, too were treated in a manner similar to Rinaudo's sample and Moroni's two samples, which were originally irradiated with neutrons and then heated. *All six* cloth samples were then dated to a period between 1,120 to 1,390 years younger than their ascribed historical dates.

The carbon dating labs were warned that since the Shroud has a long, varied and mysterious history, not to treat it like the normal or standard samples that they usually pretreat and date. (23) The contention that the Shroud's image may have been caused by radiation was first made long before it's carbon dating. Immediately after the carbon dating scientists and their coordinator announced the Shroud's date, they even acknowledged that a neutron flux could alter the Shroud's carbon dating in the above processes. (24) One of them even admitted these processes were "considered by the participating laboratories," but were evidently rejected. (25) When these carbon dating scientists have acknowledged the above possibility, they have also skeptically stated that it would have been quite a coincidence that the amount of neutron flux would have been so exact as to give the Shroud a date that approximates the time it was allegedly painted. (26) Yet, these statements only show a lack of understanding about the Shroud. If a neutron flux irradiated a cloth, the amount of carbon remaining on its samples would only partially result from the amount of radiation they received; it would primarily depend upon the extent that the carbon dating labs pretreated the samples and removed the additional C-14 from them.

My book also points out that at the beginning, the carbon dating labs joined STURP's efforts to carbon date the Shroud at STURP's invitation in 1979. Throughout this process, they ignored a wealth of published scientific and other articles and books by various scientists from which they could have benefited and applied in their dating of the Shroud, ignored expert advice on the Shroud's contaminants and history, and were caught unprepared to adequately and accurately date the Shroud. It further indicates how the carbon dating laboratories and their coordinating institutions inappropriately verified that a new method of carbon dating small cloth samples was sufficiently accurate and reliable to be used on the Shroud of Turin. Moreover, throughout the process, the leader of the carbon dating labs, Harry Gove, conducted a covert and clandestine effort to eliminate STURP from playing any role whatsoever in the Shroud's carbon dating, such as selecting or advising the site from which the sample was removed. If STURP had been allowed to select the location of the sample, it would have prevented many of the numerous mistakes and criticisms that

occurred during the Shroud sample removal and dating. The group of scientists comprising STURP had more knowledge of and experience with the Shroud than any scientists in the world.

Yet, the most unforgivable conduct and behavior of the carbon dating scientists was their successful efforts in eliminating STURP from examining the Shroud in 25 other areas of scientific testing, some of which would also have yielded valuable information about the Shroud's age, origin and history. Some of this testing may have even resulted in a far more scientific indication of the age of the Shroud than carbon dating ever could, such as testing to determine if a Pontius Pilate lepton minted in 29-32 AD had been placed over the eye of the man in the Shroud. My book discloses how the carbon dating labs exhibited some of the most arrogant, unprofessional and unscientific conduct, and inaccurate results that has ever been seen in history.

However, the consequences of their actions can be alleviated, the age of the cloth can be established, the cause of it's image can be known, and even more significant historical events can be proven with the undertaking of future testing.

If the Shroud were irradiated with a flux of neutrons, this would have measurable consequences: radioactive or unstable isotopes would have been formed. (27) More than two decades ago, STURP scientists discovered that calcium (along with strontium and iron) was distributed uniformly throughout the Shroud, probably as a result of the retting process when the cloth was originally manufactured. (28) Almost 97% of all calcium consists of calcium-40 (Ca-40); the other 3.1% consists of Ca-42, 43, 44, 46, and 48. Conspicuously absent is Ca-41, which does *not* occur naturally at all. However, if a neutron flux had irradiated the Shroud, it would convert some of the Ca-40 in the cloth to Ca-41. If Ca-41 were found on the Shroud, it would confirm that the cloth had been irradiated with neutrons. (29)

Since calcium has been found distributed uniformly over the Shroud, any portion of the original cloth could be examined for the presence of Ca-41. Similarly, limestone matching the same rock shelf that Jesus was buried in has also been found on the Shroud. Limestone consists mainly of calcium carbonate. If the limestone resulted from the man's burial, similar limestone particles might still be found trapped between the cloth's threads, especially on the back of the dorsal side, which would have been in contact with the limestone floor of the tomb. STURP was not allowed to remove the backing cloth in 1978; the backside of the Shroud has never been examined scientifically. In 1998, the Holland backing cloth that was sewn onto the Shroud by the Poor Clare nuns in 1534 was removed and replaced with another backing cloth, which rests against the now straight and horizontal Shroud in an atmospherically controlled container. The Shroud's entire backside and both it's new and old backing cloths, especially the one from 1534, should be examined for microscopic particles of limestone. These limestone samples could be examined to see if they, too, match the same rock shelf in which Jesus was buried. Furthermore, these particles could be examined for Ca-41 because, if the Shroud was irradiated with a neutron flux, some of the Ca-40 within the limestone's calcium carbonate could have converted to this radioactive isotope. (If access could be acquired, and if enough remnants still exist, the ceiling, walls, and floor of both tombs, the Holy Sepulchre and the Garden Tomb, reputed to be Jesus' and part of the same rock shelf, could also be investigated for the presence of Ca-41.) An investigation for and of limestone particles could help confirm the location of the burial and its victim and whether a neutron flux occurred at this location after burial.

In addition, when STURP scientists made x-ray fluorescence measurements on thirteen threads that had been removed from the Raes sample, they detected small traces of chlorine. (30) If a neutron flux irradiated the Shroud, it would convert chlorine-35 (Cl-35), found

naturally, to chlorine-36 (Cl-36). Like Ca-41, Cl-36 does not occur naturally. As stated by Thomas Phillips in the scientific journal *Nature*, “The presence of either [Ca-41 or Cl-36] would confirm that the Shroud had been irradiated with neutrons.” (31)

Determining whether Ca-41 and/or Cl-36 are present on the Shroud would involve the destruction of samples from the cloth. Fortunately, there is an abundance of samples on the Shroud that could be removed for this purpose without disfiguring or damaging the cloth in any way. At eight different places over the entire length of the Shroud, there are basically two sets of patches covering various burn holes from the fire of 1532. Shroud cloth can be found behind each of these sixteen locations. Excluding charred material, from behind just some of these patches can easily be found more than enough material for these analyses. So much cloth lies behind these patches that the Shroud could even be carbon dated by the conventional method with this material. (32) In fact, chemist Larry Schwalbe and Ray Rogers of STURP stated that:

Large amounts of material could be removed from beneath the patches. Mottern et al. presented a radiograph of one of the patched-hole areas that reveals some of the Shroud material that could be recovered; a total Shroud area of approximately 400 cm² lies concealed beneath all of the patch work. This is sufficient for literally hundreds of carbon-14 tests with the latest techniques. Any of this material could be removed without affecting the visual appearance of the Shroud or damaging the fabric structure. (Indeed, as a conservation measure, this charred material should be removed to prevent further irreversible soil-contamination of the cloth.) (33)

Furthermore, as we saw earlier, scientists concluded that the blood marks were on the Shroud first, and shielded the underlying cloth from the body image encoding event. If this event involved a neutron flux, it would also have affected the blood chemically. Iron, abundant in blood, will undergo nuclear reactions with neutrons. A likely product is chromium-53 (Cr-53), which is not normally found in blood. Cr-53 found in blood samples from the Shroud would also confirm that the cloth was irradiated with neutron.

Moreover, if the Shroud was irradiated with neutrons, it could have affected the blood in another significant way. The solid part of dried blood contains mostly proteins, which typically contains about 12% nitrogen by weight. This is a much larger amount of nitrogen than is found in cloth. If a neutron flux irradiated the blood in the cloth, it could convert the nitrogen-14 (N-14) into C-14 on a much larger scale than it would convert in cloth. As such, the blood would carbon date to a much younger date than the cloth. In fact, it could easily date well into the future. Such a date alone would refute the 1988 radiocarbon dating of the Shroud. (Any date appreciably younger than 1350 would seriously discredit the 1988 dating since the Shroud with its body and blood images has been known in Europe since then.)

The blood from the Shroud of Turin should be examined for Cr-53 and should also be carbon dated. Performed in that order, these tests could determine if the Shroud was irradiated with neutrons and if that affected the 1988 carbon dating of the cloth. These tests could not only explain the effect; they could completely refute the earlier radiocarbon dating of the Shroud. Both tests could be performed on the same sample with a mass spectrometer. (See also Appendix H of *The Resurrection of the Shroud* regarding similar and corroborating testing of the Sudarium of Oviedo.)

Fortunately, an adequate amount of blood for both purposes is also easily available and, unlike the other blood on the Shroud, (a) is off of the body image, and (b) provides no other useful information. This blood can be found off the man's anatomical right foot on the dorsal side of the Shroud. (Normally, blood is not the best candidate for carbon dating, because it does not contain a great deal of C-14. However, if the C-14 were enhanced by the large amount of N-14 found in blood, there would easily be enough C-14 present. The approval to carbon date blood from this location could even be given after the above Ca-41 and/or Cl-36 tests are completed to confirm whether the Shroud was irradiated with neutrons.) Naturally, the Shroud's owners should be reluctant to destroy any blood on it, especially in light of the possibility that it was shed by Jesus Christ. Yet, there is an enormous amount of blood on the cloth, literally from head to feet on both the front and back of the man. (34)

These tests could have great significance for the world. From only the tests to measure the ratios of Ca-40 to Ca-41, Cl-35 to Cl-36 and Fe-56 to Cr-53, we could calculate the original age of the Shroud! From these ratios we can determine the average amount of neutron flux required to produce three different, independent amounts in both the Shroud linen and blood, which were removed from various parts of the cloth. (If the Ca-40 to Ca-41 ratio can also be determined from the limestone particles, it could provide an additional independent measure of the amount of neutron flux that occurred after the body was placed in the burial cloth inside the tomb.) From the amount of neutron flux, scientists can determine the amounts of newly created C-14 from the known "cross-sections" or conversion rates of N-14 and C-13. This amount of newly created C-14 can then be subtracted from the C-14 found in the C-14 to C-12 ratio in the above samples to arrive at their true original C-14 to C-12 ratio. (35)

The equipment that would most likely be used to measure the Ca-40 to Ca-41, Cl-35 to Cl-36, and Fe-56 to Cr-53 ratios in the cloth, blood, and limestone particles would be an accelerator mass spectrometer or a thermal mass spectrometer. The primary focus of those using accelerator mass spectrometers has been on measuring the C-14, C-13, and C-12 isotopic amounts and ratios, at least as compared to measuring the above calcium, chlorine, and iron-to-chromium ratios. If the operators of this equipment cannot measure these calcium, chlorine, and iron-to-chromium ratios as accurately as they can the carbon ratios, then they should develop and refine such existing technology. However, it should certainly be refined and confirmed by testing that is far more detailed, certain, comprehensive, and proven to be repeatedly accurate on similar samples of cloth, blood and limestone than was the Trondheim intercomparison experiment and report for cloth samples. (See discussion of Trondheim experiment and report in Chapters 8 & 9 of my book.) Failure to develop, refine, and employ this ability, with the same type of equipment used for carbon dating could perpetuate----and fail to correct----the most infamous error of all on the most important object ever carbon dated.

Cloth samples from behind the patches, blood from the off-image area of the right foot, and limestone particles are all that are necessary to be removed from the Shroud to determine if a neutron flux affected an accurate carbon dating of the cloth. This would allow the most minimal and unobtrusive amount of material to be taken from the Shroud that contains vital and dynamic information, and that serves no other useful purpose. Since these samples are critical in establishing whether a neutron flux irradiated the Shroud and the amount of flux, it would be the height of negligence not to also carbon date them prior to their destruction, especially since that would also allow for the amount of newly created C-14, and the true age of the Shroud to be determined.

A piece of the thread that was sewn along the entire length of the Shroud, possibly to give it support, should also be removed and carbon dated to help determine when this thread was sewn onto the cloth. The sewing thread, as opposed to the cloth, would not likely have been part of the original Shroud, and would not have been present if the cloth was irradiated with neutrons.

One could argue that the C-14 to C-12 ratios obtained from the samples behind the patches might be suspect. While this is one additional reason carbon dating the blood sample off the right foot is critical, there is plenty of material behind the patches that is not charred that can be used. STURP thought these samples were excellent choices. The carbon dating part of their 1984 proposal recommended taking “200 mg from each of the burned areas under and around the patches” (correctly excluding a dorsal shoulder fold mark intersection) as well as from other locations. The carbon dating laboratories even looked into this prior to the 1988 dating and had concluded that this material would provide an accurate date. (36) (They only avoided this area to be on the safe side, but it would have been a much better choice than the area from which the 1988 sample was taken.)

Remember also that other portions of the Shroud are not going to be so unobtrusive as these samples, and, if the Shroud were irradiated with neutrons, would also contain additional C-14, thus presenting a misleading C-14 to C-12 ratio, as well. It should also be remembered that many other excavated samples necessarily from or near fires have repeatedly been dated successfully. (Frequently, the reason archaeological remains were originally destroyed, as well as preserved, was due to fire.) Moreover, the fire would not have affected the calcium, chlorine, and iron-to-chromium ratios of these samples. These ratios must be taken regardless. Since taking these ratios would necessarily destroy these samples, their C-14 to C-12 ratios should also be measured at the same time. If it is determined that these samples were affected by the fire, much smaller samples than these could be removed to measure their C-14 to C-12 ratios. (37)

A flux of neutrons onto the Shroud at any time would have *necessarily* been an unprecedented event. Since all of the other evidence indicates that the events depicted occurred to the historical Jesus Christ, we need to consider whether any unique events also occurred to him after his death and burial. Historical sources indicate that a very unique event also occurred to him after he was buried in a tomb in the first century. If the recommended research establishes that the Shroud was also irradiated with a flux of neutrons, even if scientists can't specifically measure and calculate the exact century prior to medieval times in which it occurred, its uniqueness would still strongly indicate that it, too, occurred in the first century.

In the last year or two, a superb form of spectral imaging has been developed and proposed to be applied to the Shroud of Turin. Dr. Warren Grunfest and STURP photographer Barry Schwartz first proposed this technique. This technique has the ability to obtain information on wavelength intensity from each type of light, at each point in space, and from every point in an optical image----simultaneously. With this new technique, an object can now be viewed under the entire visible and infrared light spectra simultaneously, allowing its corresponding composite image to become visible from all spectra simultaneously. (38) Items such as the vessels in a retina, the hemoglobin bands in the eye, and the spectral patterns of human chromosomes are routinely viewed and examined with this new spectral-imaging technique.

This new technology could scan the entire Shroud in only six hours, thereby allowing scientists to spend years analyzing all of its data. It could map the entire cloth and identify not just every fiber of every thread, but what is on every fiber. It can even identify tissue at

the molecular level. By using carefully calibrated light sources, the pattern of reflected light could identify individual chemical compounds on the Shroud.

In particular, this technique may allow us to view whether any chemical bonds in the cellulose had been broken by protons, neutrons, or newly created C-14 and whether the chemicals had reattached themselves to molecules throughout the cloth. These broken bonds and chemical reattachments could confirm or corroborate the scientific challenges to the Shroud's carbon dating posed by the various experiments of Dr. Rinaudo, Mario Moroni, and their associates. Correspondingly, their absence could refute these challenges.

Moreover, this spectral imaging technology should be applied to the areas over the eyes of the man in the Shroud. This could help reveal whether the appearance of the letters, *lituus*, and motif of a Pontius Pilate coin minted between AD 29 and AD 32 is due to encoding on the cellulose fibers of the linen thread. Confirmation of such a coin over the eye(s) of the man in the Shroud would far more specifically indicate the age of the burial cloth and when the images and the events depicted thereon occurred than would any carbon date.

By the same token, spectral imaging would be useful in confirming or determining whether plant images are on the Shroud. Numerous flower images matching pollens from the same species or genus have been identified primarily in the off-image regions of the Shroud. Furthermore, pollen and images from thorns have also been identified on the Shroud. If spectral imaging, or other scientific examination, can confirm the presence of such plant images and/or pollen, it would additionally confirm the location and time in which these events occurred----Jerusalem in the spring. Such findings, along with much other evidence, would be consistent with and help corroborate the time of the events depicted on the Shroud and the age of the burial cloth. Since this is a new area of investigation developed since the Shroud was last examined in 1978, and since these images are subtle, examination by this new technique of spectral imaging could be particularly useful for this subject.

The spectral imaging techniques could also be applied to the entire Shroud to ascertain whether the molecular bonds of the cellulose had been broken and to what extent their chemicals had reattached or recombined. If the Shroud's body images were formed by the radiation indicated by the Historically Consistent Method, these new bonds should have developed on the Shroud's body images and/or background portions, only much more so on the body images. Perhaps the types of cross-linking in the cloth's non-crystalline background region that strengthen the linen might also be ascertainable by spectral imaging technology. These assessments or measurements should be compared to existing 2,000 and 650-year-old linen cloth samples.

Various other linen cloth samples should also be irradiated with various combinations of protons, alpha particles, neutrons and gamma rays, and then artificially aged. The forms of radiation from Dr. Rinaudo's Protonic Model and Dr. Jackson's Cloth Collapse method (39) should also be applied to cloth samples in varying amounts. The various methods discussed at length in chapter 5 of my book should also be tested. If they can produce superficial, straw-yellow fibers on cloth, the colored portions and backgrounds of these cloths should be examined and compared to the Shroud's on the state of their oxidized degraded cellulose, the extent of their conjugated carbonyl groups, their straw-yellow coloring, the extent to which their chemical bonds have broken and reattached, their cross-linking, uniformity of color of image fibers, et cetera.

If one of the combinations of protons, alpha particles, neutrons and gamma rays irradiated onto these cloth samples can approximate the above characteristics found on the Shroud, then the amounts of neutron flux that could be found within this combination should

be applied to other known first-century cloth samples. These samples should then be artificially aged or heated and pretreated normally, then carbon dated. Then, if these cloths carbon date to medieval times, this would be one further and critical confirmation that the Shroud is from the first century and that the radiation, as explained in the Historically Consistent Method, encoded its image.

Both sides of the cloth should be examined for non-superficial images at locations where coin or flower images appear. The lack of such images on the backside or non-superficial images on the body image side would merely mean that short wavelength or visible light waves were not created from these objects. However, the presence of oxidized, degraded cellulose on the backside of such coin or flower images would indicate that the radiation from the Historically Consistent Method encoded these images on the Shroud. Similarly, the back of the cloth behind the frontal image should be examined for oxidized, degraded cellulose, for if the body gave off ultraviolet light instead of gamma rays, it would have superficially colored the back of the cloth as it passed through the body.

Ancient coins and flowers one to two days old should also be irradiated with various forms of radiation, especially the radiation in the Historically Consistent Method, with control cloth samples placed over them to see if they will absorb such radiation and fluoresce in other wavelengths and/or give off their own protons, alpha particles and /or deuterium from the neutrons within the radiation. The coin features over the right eye and the flower images observed on the Shroud should also be carefully examined by the spectral imaging technique to ascertain if they result from encoded fibers with similar chemical characteristics as the rest of the body images. If so, it could be another indication that the radiation of the Historically Consistent Methods encoded these faint images.

Control cloths irradiated with ultraviolet light and x-rays would also indicate if these forms of radiation tend to deposit their energy superficially but exponentially, that is, more toward the end of their deposit. These and other types of radiation should be compared to the evenly distributed and uniform straw-yellow fibers produced by combinations of protons, neutrons, alpha particles, and gamma rays to see if they, too, match these features on the Shroud body image. Moreover, additional chemical studies should be undertaken on samples removed from the Shroud in order to understand its chemistry better, to further compare it to the control samples, and to better understand how to preserve the Shroud and its images.

The research and testing recommended herein not only shows how to ascertain whether the Shroud had been irradiated with neutrons and, if so, how to calculate the amount of additional C-14 created by this event, and to ascertain the cloth's true age; but also shows how to determine whether the Historically Consistent Method also caused the images on the Shroud.

This and even more extensive testing and examination should be conducted openly on the Shroud and its samples by an international group of scientists who possess an extensive knowledge of the Shroud and have studied all previous scientific articles and reports on the subject. These scientists must be willing to work as part of a team, and no one individual or segment of scientists should seek to monopolize the research testing, but should seek to include all interdependent and complementary forms of nondestructive testing and examining of the cloth. Full disclosure of all methods, data, measurements, findings, and conclusions should also be published in peer-reviewed scientific journals for the worldwide public.

When the scientific, medical and archaeological evidence derived from the Shroud of Turin is combined with the historical evidence for the resurrection of the historic Jesus

Christ, a comprehensive and corroborating case for the literal occurrence of this event can be made. Much of this evidence exists now and future testing can further establish:

1. That radiation coming from a dead body caused the images.
2. That this radiation came from the length, width, and depth of a dead body.
3. That this radiation consisted of protons, neutrons, and alpha particles.
4. That this event occurred in Jesus' burial tomb.
5. That the body disappeared from the cloth in the process.
6. That it did so within 2-3 days of being wrapped inside of it.
7. That these events occurred in the first century.
8. That the cloth could not have been separated from the body by any human or mechanical means without smearing or breaking the numerous bloodstains, and only the body's disappearance can explain how wounds that formed and flowed on human skin can become embedded into the cloth.
9. That particle radiation emanating from the length, width, and depth of a dead body that disappeared is the only method that has ever accounted for all the unprecedented features of the body images and blood marks, which cannot be forged or occur naturally.
10. That the Gospels state, beginning with and immediately after Jesus' resurrection, his body could pass through objects and vanish, and that a similar type of radiation also emanated from Jesus at his Transfiguration.
11. That on Easter Sunday Jesus' body was not described as having any of the numerous blood marks that it necessarily would have had from his numerous pre-crucifixion, crucifixion, and post-mortem wounds.
12. That the Gospels state the historical Jesus Christ was also scourged, crowned with thorns, carried his own cross, was crucified, killed, and stabbed in the side, by the same executioners, with the same weapons, in the same manner, and was buried in the same location, at the same time, by the same buriers, and then disappeared and resurrected from his shroud, under all the same circumstances.

There is now extensive and consistent medical, scientific, archaeological and historical evidence for the crucifixion and resurrection of the historical Jesus Christ. This evidence is new and empirical and can be confirmed by future testing of the cloth. This evidence was developed in a wide variety of fields, by numerous different professions, over different centuries, and on different continents. This evidence cannot be forged or occur naturally and corroborates every minute detail of the tortures, crucifixion, death, burial and resurrection of the historical Jesus Christ described in the Gospels and New Testament. Since this evidence is new and empirical and its implications could affect all individuals and the societies in which they live in a positive and astounding way, the world stands at a unique and pivotal moment in history. It is our duty to investigate, acquire and present this evidence to the entire worldwide public for the benefit of this and all future generations.

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7. For a detailed summary of this evidence, see chapter 2 of M. Antonacci, *The Resurrection of the Shroud*.
8. M. Antonacci, *The Resurrection of the Shroud*, pp. 214-215.
9. K. Little, "The Formation of the Shroud's Body Image," *British Society for the Turin Shroud Newsletter*, No. 46, Nov./Dec. 1997, pp. 19-26,20.
10. Rinaudo, "Protonic Model," "A sign", and in *British Society for the Turin Shroud Newsletter*, No. 38, Aug./Sept. 1994, pp. 13-16; K. Little, "The Holy Shroud and the Miracle of the Resurrection," *Christian Order* (April 1994); 218-231; Little, "The Formation".
11. Little, "The Holy Shroud," p. 225.
12. McDonald, "Science and the Shroud," p. 426.
13. According to Dr. Little, if a nuclear disintegration of the body occurred the nucleus would split into protons, alpha particles and neutrons, with gamma radiation being

emitted and released. Little, "The Formation," pp. 22-23, and "The Holy Shroud," p. 225. By analogy, this would also be the most likely radiation emitted if the body dematerialized into these same or similar particles and components. However, x-rays or ultraviolet light, which are next to gamma rays in the electromagnetic spectrum, could also be candidates.

One possible explanation as to what happened to the man in the Shroud under the Historically Consistent or a related method, or to the historical Jesus Christ, was first introduced in a highly respected scientific journal in 1935 by Albert Einstein and Nathan Rosen, "The Particle Problem in the General Theory of Relativity," *Physical Review* 48 (1935): 73-77. They first devised the concept of a shortcut in space time-travel based on Einstein's theory of general relativity that allows a person or object to pass through a bridge or "wormhole" in space and time. According to modern physicists, mathematical theories of space-time travel are not only possible under Einstein's theory of general relativity, but these wormholes are completely consistent with tested theories of gravity and would allow travel between two points within the same universe. This form of travel could circumvent the speed of light barrier and may even permit travel to past or future times. The famous British physicist Steven Hawking has published and lectured on wormholes, and his best-selling book, *A Brief History of Time*, devotes whole Chapters to this subject. At this time the science of wormholes is not only mature, but in the words of physicist Matt Visser in *Lortenzian Wormholes: From Einstein to Hawking*, "... the theoretical analysis of Lortenzian wormholes is 'merely' and extension of *known physics*----no new physical principles of fundamentally new physical theories are involved." (Woodbury, N.Y.: American Institute of Physics, 1996) P. 369. NASA also has an interest in wormholes for space travel as evidenced by its hosting a workshop at Caltech's Jet Propulsion Laboratory entitled, "Advanced Quantum/Relativity Theory Propulsion Workshop" in May 1994, where wormholes were a major topic of discussion. A key element of this theory is that, as matter passes through the wormhole, the entrance and exit mouths of the hole gain and lose mass. An object could even traverse the wormhole as energy and return to its former mass upon its exit. If the unexplained disappearance of the man in the Shroud, or the historical Jesus Christ, was connected or related to this theory, the entrance mouth to the wormhole would be the point of the body's departure. The Shroud itself would have been right at the mouth of the entrance and may have received some of the increase in mass in the form of the basic building blocks of matter----protons, neutrons, electrons, and alpha particles. Space-time travel could even be said to be a possible means for Jesus to have traveled between heaven and earth.

14. R. Gilbert, Jr., and M.M. Gilbert, "Ultraviolet-Visible Reflectance and Fluorescence Spectra of the Shroud of Turin," *Applied Optics* 19:12 (June 1980): 1930-36,35. p. 1935.
15. Little, "The Formation," p. 24
16. *Ibid*.
17. W.R. Ercoline, R.C. Downs, Jr., and J.P. Jackson, "Examination of the Turin Shroud for Image Distortions," *IEEE 1982 Proceedings of the International Conference on Cybernetics and Society* (Oct. 1982): 576-579.
18. G. Carter, "Formation of the Image,"; M. and A. Whanger, *The Shroud of Turin*.
19. For all such cross-section information in this paragraph, the neutrons were at 14MeV. (Incidentally, carbon, oxygen and nitrogen, the principal components of linen, give off only insignificant amounts of gamma rays, protons, and alpha particles, and they do not give off any deuterium when hit by neutrons. Since these components are uniformly

- distributed throughout the cloth, these insignificant amounts cannot affect the contrast between the Shroud's superficial body image and the rest of the cloth. When neutrons hit nitrogen and C-13, they turn to C-14.)
20. For all such cross-section information in this paragraph, the neutrons were at thermal energy.
 21. Rinaudo, "Protonic Model," "A Sign," and in *BSTS Newsletter*, No. 38, Aug./Sept., 1994, pp. 13-16.
 22. M. Moroni, F. Barbesino, and M. Bettinelli, "Verification of an Hypothesis of Radiocarbon Rejuvenation." *Third International Congress on the Shroud of Turin*, Turin, Italy, June 5-7, 1998, M. Moroni, F. Barbesino, and M. Bettinelli, "Possible Rejuvenation Modalities of the Radiocarbon Age of the Shroud of Turin," *Shroud of Turin International Research Conference*, Richmond, VA., June 18-20, 1999.
 23. W. Meacham, "Radiocarbon Measurement and the Age of the Turin Shroud: Possibilities and Uncertainties," in *Turin Shroud: Image of Christ* (Hong Kong: Cosmos Printing Press Ltd., 1987), 41-56; W. Meacham, "C-14 Dating of the Shroud." Treasureseeker@hotmail.com, Feb. 16, 1998; H.E. Gove, *Relic, Icon or Hoax?* (Bristol and Philadelphia: Institute of Physics Publishing, 1996).
 24. Jennings, "Still Shrouded in Mystery," *30 Days in the Church and in the World* 1.7 (1988): 70-71; R. Hedges, "Hedges Replies," *Nature* 337 (1989); p. 594; J. Cornwell, "Science and the Shroud," *The Tablet*, (January 14, 1989): pp. 36-38.
 25. Hedges, "Hedges Replies," p. 594.
 26. Hedges, "Hedges Replies," p. 594; Cornwell, "Science and the Shroud," p. 37.
 27. T. Phillips, "Shroud Irradiated with Neutrons?" *Nature* 337 (1989): 594; Hedges, "Hedges Replies", p. 594.
 28. R.A. Morris, L.A. Schwalbe, and J.R. London, "X-ray Fluorescence Investigation of the Shroud of Turin," *X-ray Spectrometry* 9.2 (1980): 40-47; J.H. Heller and A.D. Adler, "A Chemical Investigation of the Shroud of Turin," *Can. Soc. Forens. Sci. J.* 14.3 (1981): 81-103.
 29. Phillips, "Shroud Irradiated," p. 594. See also Hedges, "Hedges Replies," p. 594.
 30. L.A. Schwalbe and R.N. Rogers, "Physics and Chemistry of the Shroud of Turin." *Analytica Chimica Acta* 135 (1982): 3-49, 47.
 31. Phillips, "Shroud Irradiated." P. 594.
 32. Gove, *Relic?* P. 154.
 33. Schwalbe and Rogers, "Physics and Chemistry." P. 44.
 34. The Shroud's owners also must consider that, if this abundance of blood was shed by Jesus Christ, the time and purpose for which it was shed, along with the unique event that caused the neutron flux, could be much better illustrated if a small fragment of it was tested for the worldwide public.
 35. The amount of additional C-14 could also be subtracted from the 1988 ratios for comparative purposes and to ascertain if any of the other contaminants discussed in this chapter remained on the 1988 samples at the time of dating.
 36. Gove, *Relic?* P. 154.
 37. Small samples could be removed from non-image areas of the Shroud and carbon dated after the spectra-imaging technology has been applied to it and the least intrusive locations with the least amount of contaminants have been identified. If the Shroud was irradiated with a neutron flux, while all parts of it would have been affected, some would have been more affected. The most noticeable evidence for a neutron flux, and the most noticeable difference with any nonbody image parts of the cloth (except the blood) would most likely come from a sample taken from the body image. If the Shroud

- received a dose of radiation from the body, it would probably be most evident on a sample taken from the body image. More neutron flux, with a resulting effect on the cloth's radiocarbon age, probably would have occurred on the body image than on any other part of the cloth itself. If dating from the body image was to be considered, only the smallest piece possible from the least intrusive area of the body image should be removed. Care should be taken to remove a sample with as little three-dimensional or other information as possible; nor should it contain any blood or scourge marks. Since the left thigh is a large area that is well encoded, whose elevated nature runs its entire length and contains body image between the scourge marks, the tiniest sample necessary to date should possibly be taken from there. Alternatively, for similar reasons, a sample from the left buttock should possibly be removed from the dorsal area for this purpose.
38. Dr. Warren Grundfest, lecture at the *Dallas Shroud Meeting*, Dallas, Texas, November 6-8, 1998; W.S. Grundfest, "Imaging Spectroscopy for the Non-Destructive Evaluation of Items of Historical Interest: Applications to the Shroud of Turin." *Shroud of Turin Conference*, Richmond, VA. June 18-20, 1999.
 39. J. Rinaudo, "Protonic Model," "A Sign." And in *BSTS Newsletter* No. 39; J.P. Jackson, "Is the Image on the Shroud Due to a Process Heretofore Unknown to Modern Science?" *Shroud Spectrum International* 34 (March 1990): 3-29, 18; J.P. Jackson, "An Unconventional Hypothesis to Explain all Image Characteristics Found on the Shroud Image," *History, Science, Theology and the Shroud*, A. Berard, ed. (St. Louis: Richard Nieman, 1991), pp. 325-344, 333-335.