

## Scientists and Semantics

by Mark Antonacci

We presently stand at a unique point in history and face a great scientific challenge. Extensive scientific tests and experiments have been conducted on the Shroud of Turin and its samples over the last four decades, along with a wealth of medical, archaeological and historical examinations throughout the 20<sup>th</sup> and 21<sup>st</sup> centuries. These investigations have yielded a wide array of objective and independent evidence that the Shroud of Turin appears to have wrapped a dead human male who had intimate contact throughout both sides of this burial cloth. This man was beaten about the head and face. He was scourged throughout his body with a Roman flagrum and crowned with a bundle of sharp pointed objects or thorns. He had broad excoriated areas across the back of his shoulders, endured falls and was crucified. After dying in the crucifixion position, he was pierced in the side by a Roman lancea causing blood and watery fluid to flow from the wound. Afterward his body was wrapped in a linen shroud and appears to have been buried according to detailed Jewish burial customs in the same rock shelf in which Jesus was reputed to have been buried. All of these events appear to have occurred in Jerusalem in the spring of the first century. Within two to three days of having been wrapped in the Shroud, the body left the cloth in a mysterious manner.

An unprecedented event occurred to this body prior to or during its disappearance that caused the man's full-length frontal and dorsal body images and 130 blood marks (along with several secondary features) to be encoded on this burial shroud. The full-length body images and blood marks are so unique they have never been duplicated in any age by any artist, scientist, physician or anyone utilizing any type of artistic, naturalistic or other method. While the most sophisticated science of today has been unable to duplicate the Shroud's body images and blood marks, it has revealed numerous unique features throughout the cloth at both the microscopic and macroscopic levels that have never before been seen in history.

More than thirty of these unique or extraordinary features are found throughout the length and width of the anatomically flawless frontal and dorsal body images. These full-length images are encoded *only* on the inner parts of the cloth that wrapped the bloodied and crucified corpse — and only radiation can account for *all* of these body image features.<sup>1</sup> This indicates not only that radiation caused the body images on the Shroud of Turin, but the source of the radiation was the body wrapped within it as first noted by Harvard physicist Thomas Phillips and STURP physicist John Jackson in 1989.<sup>2</sup> Four additional reasons contend the source of the radiation could only be the body wrapped within this cloth.<sup>3</sup>

Several of the leading hypotheses state that radiation emanating from the body of the man wrapped in the Shroud would account for the Shroud's body images.<sup>4</sup> Two of these hypotheses argue that if the body suddenly disappeared as it gave off radiation that the 30 or more unique features on the Shroud's body images would all be encoded.<sup>5</sup> One hypothesis, called the Historically Consistent Hypothesis, contends that if the body underwent nuclear disintegration and gave off particle radiation, all 30 itemized features found at the microscopic and macroscopic levels on tens of thousands of fibers comprising the full-length frontal and dorsal body images would be encoded. The neutrons within this particle radiation would also explain the Shroud's aberrant 1988 radiocarbon dating, the cloth's excellent condition, its coin features and flower images (if any), and the still-red color of its centuries old blood — features that no other hypothesis explains.<sup>6</sup> The protons within this hypothesis would not only explain the Shroud's body images, but also the possible image discoloration on the outside of the cloth opposite the man's hands and face.<sup>7</sup>

Scientific testing that could indicate whether such an event occurred is clearly justified. Scientific technology exists that, when adapted to the Shroud of Turin, could test this hypothesis in several ways and test whether such an event actually occurred. The Shroud of Turin could be examined at the molecular and atomic levels, which could not only prove whether this unique event occurred, but also indicate when it happened, where it happened, and to whom it happened, as well as ascertain the actual age of the Shroud linen and its blood marks.<sup>8</sup> This relatively new technology should first be adapted, tested and perfected on control linen, blood, limestone and charred cloth samples. Only then could samples be removed from the actual Shroud, and be tested, along with limestone samples from the reputed tomb(s) of Jesus Christ.

The resurrection of Jesus Christ is mentioned many times in numerous books comprising the Gospels and New Testament. These were the most attested books of ancient history. Whether comparing these sources to other works of antiquity by the *number* of their existing ancient manuscripts, their *closeness* in time to the original works and events, and the number of *languages* in which they were congruently translated, the attestation of these works is incomparable to all other works of ancient history. These were easily the most widely circulated books in history, and, of course, remain so today. They correspond precisely with archaeology and with historical titles, names, places, dates and customs. Their eyewitness testimony and the lack of either hostile or recanted testimony to the events described within these sources further solidify their ranking above all sources of antiquity. If the occurrence of the resurrection of Jesus Christ, or any other events recorded within these sources, can be objectively investigated by science, medicine, archaeology, history or any other field, then it should be undertaken. This is true for any recorded event or source of history, especially if the recorded events are of interest or importance to people today.

If neutron or particle radiation emanated from the dead body of the man in the Shroud, this event could not have been forged and would have left unique signatures throughout the Shroud that could indicate the amount of radiation, the source, when, where and to whom this

event occurred. This miraculous event would be consistent with the resurrection of the historical Jesus Christ.

If such an event occurred, two radioactive atoms or isotopes (Cl-36 and Ca-41), which virtually do not exist in nature, would be found in varying amounts well above their natural infinitesimal levels throughout the Shroud's linen, blood and charred material. Although these radioactive isotopes would be found in various amounts throughout this burial cloth, they would be distributed in direct proportion with the Shroud's closeness to and its position upon the body.

New radioactive C-14 atoms or isotopes would also be created and found in varying amounts in all four of these materials. While these C-14 isotopes would be found in different amounts throughout this burial cloth, they would also be distributed in direct proportion with the Shroud's closeness to and its position upon the body. Tests and experiments sponsored by the Resurrection of the Shroud Foundation have demonstrated that these new C-14 isotopes would survive all stringent pretreatment cleanings, heat or other conditions that have occurred to the Shroud during its history and would still remain on the Shroud today.<sup>9</sup> The variety, amounts and proportions of all three radioactive isotopes located throughout the Shroud can be shown to have been caused by neutron or particle radiation that emanated from the length, width and depth of the dead body wrapped in the Shroud of Turin.

The entire Shroud and its various samples could also be examined at the microscopic and molecular levels. Molecular microscopy and imaging spectroscopy with a multi-spectral camera could be adapted and utilized for the most comprehensive investigation of the Shroud to date. Multi-spectral imaging could conceivably scan the entire Shroud in a matter of hours, thereby allowing scientists to spend years analyzing all of its data. It could map the entire cloth and its samples, and potentially identify not just every fiber of every thread, but what is on every fiber. If a Cary or Agilent infrared microscope could be attached to an arm, or placed in a stable manner over the length and width of the entire Shroud, it could examine the full linen, its fibers, blood marks, limestone, pollen and any of its other materials at the molecular level. These technologies could also possibly identify individual chemical compounds on the Shroud.

If these technologies were applied to both the inner and outer sides of the Shroud and to strategic samples removed from it, many or all of the Shroud's outstanding questions could be answered. In many ways too numerous to describe here, these technologies could also affirm or refute many of the Shroud's naturalistic, artistic or other image-forming hypotheses, such as radiation, corona or electrical discharge. These technologies could also test whether neutron radiation or some other explanation, such as an invisible repair or reweave occurred to the Shroud to explain its medieval carbon dating.

As many of you know, scientists at the University of Padua recently dated samples from various locations on the Shroud to 33.B.C. +/- 250 years. These scientists utilized three scientific methods apart from C-14 testing.<sup>10</sup> When their results were announced in 2013, the

provenance of their samples was questioned. Those who subscribe to the invisible reweave hypothesis challenge whether the radiocarbon labs exclusively tested Shroud linen samples in 1988. The tests that I just described could non-destructively verify the provenance of the Shroud samples used by the University of Padua scientists as well as the samples remaining with the radiocarbon laboratories that dated the Shroud in 1988.

Please understand that atomic and molecular testing needs to be adapted and modified to apply to the Shroud and its samples. While atomic testing has been performed on relatively solid materials such as limestone, it needs to be adapted to less solid materials such as linen or blood. And, while other materials have been examined by multi-spectral imaging and molecular microscopy, these technologies need to be adapted to the Shroud itself and the various materials distributed throughout it. Only after all of these technologies are proven to repeatedly work to perfection when applied to control samples, should they ever be utilized on the Shroud or its samples. Once perfected, these tests could also be utilized on the Sudarium of Oviedo to ascertain if it too was in the tomb when an unprecedented radiating event occurred.

The name of this paper is “Scientists and Semantics.” Semantics is not just the branch of linguistics concerned with the structure, development and changes of the meanings of speech, or their meanings in context. It can also include conscious or unconscious, negligent or deliberate twisting or distortion of meaning (as in some types of advertising or propaganda). I think semantics are often employed when phrases or concepts are used that have no application in certain contexts. I can’t tell you how many scientists I have come across over the last three decades that have utilized semantics or phrases and concepts that have no application to investigating whether particle or other radiation was emitted from the body of the man in the Shroud.

Some of the common phrases or concepts that have been employed against this kind of testing are:

- a) No plausible physical mechanism has been proposed to explain how the resurrection was accompanied by a significant neutron flux.
- b) Particle or other radiation cannot emanate from a body, let alone a dead body.
- c) Unless we can reproduce an event in the laboratory, we can’t argue for its occurrence.
- d) Miracles or the resurrection are beyond the realm of science.

A common response to all of these arguments is that we’re not trying to duplicate the resurrection; we’re investigating whether it occurred this one particular time in history. The resurrection of the historical Jesus Christ is not a recurring event, but neither is any other event in history. There will be only one Battle of Hastings or Gettysburg, only one assassination of

Abraham Lincoln or Julius Caesar. Certainly other battles and assassinations have occurred, but these did not have the identical impact and influence upon history or future generations. If you tried to recreate any of these events in a laboratory, or on the actual fields of battle or in the original Roman Senate, it would be *impossible* for many reasons. Yet, this does not prevent us from acquiring relevant evidence of important historical matters by scientific analysis. While such evidence will not always provide absolute proof, it will shed light on or even be dispositive on a number of questions. For example, attempts have been made to gather evidence to prove if Yasser Arafat was poisoned. Different forms of scientific analysis have also been utilized to determine which bullets struck which victims in the Kennedy assassination, and at what angles or directions the bullets were traveling. Scientific analysis is conducted every day on past events that relate to the public welfare or other matters of importance.

Scientists have spent decades studying the Big Bang or the creation of the universe. The fact that this event obviously cannot be duplicated in a laboratory, yet was obviously an important occurrence, does not preclude its scientific investigation. This event was arguably more supernatural or miraculous than the resurrection of the historical Jesus Christ. Not only was all matter and all energy within our universe created from a tiny speck according to this theory, but so was all of space and time. Yet, the fact this event could be considered the most supernatural of all does not preclude its scientific investigation. And, although we cannot provide a plausible physical mechanism or explanation how all of this matter, energy, space and time were formed within and released from such a tiny speck in a momentous explosion — we are clearly not precluded from investigating this occurrence. Since we can scientifically investigate the occurrence of the Big Bang, or the creation of our universe, then surely we can investigate the occurrence of the resurrection. The fact the resurrection arguably has much more *relevance* to peoples' lives than the Big Bang provides even more reason to investigate it.

Thankfully, science has never had a known or fixed realm. If a predetermined definition of a known “realm of science” existed that prevented scientists from inquiring and investigating into various areas, then most of our advances in science and medicine would never have occurred. The objective evidence acquired from an investigation has always determined the worthiness of scientific inquiries. The key question has always been whether or not a particular matter was within our *realm of investigation*, not whether it was within a predetermined “realm of science.”

Instead of a fixed or static realm, the realm of scientific inquiry, knowledge, and even its boundaries, has expanded in all areas of modern science throughout the relatively *few* centuries it has existed in the course of human history. Yet, the more we inquire and learn, the more we realize how very little we actually know. We know very little, if anything, about 95% of our universe, which scientists think consists of invisible dark energy and dark matter. We also know very little about the 5% of visible matter/energy in our universe, most of which is well beyond our reach or inspection. We don't even know how many dimensions there are or when they operate. We know of three spatial dimensions and we understand some concepts about what is

called the fourth dimension of time, yet the fourth dimension could easily contain more attributes than we currently understand.

Since science indicates that 95% of the universe is comprised of invisible, dark energy and matter, contains quantum strangeness and hidden dimensions, and that all of the matter, energy, space and time in the universe were formed within and then released from a tiny speck in a momentous explosion, why would it have been impossible for the resurrection of the historical Jesus Christ to have occurred? Unless scientists can absolutely prove that neither God nor a Godly power exists, they can't absolutely and arbitrarily rule out an event that is attributed to this power in numerous historical sources.

When the Shroud's controversial 1988 radiocarbon dating was published in the scientific journal *Nature*<sup>11</sup>, a letter from Thomas Phillips of the High Energy Physics Laboratory at Harvard University was also published in the same issue. In the letter, Dr. Phillips noted that the body images on the Shroud had not been duplicated and had qualities "indicating that the body radiated light and/or heat."<sup>12</sup> Phillips asserted that the body may have radiated neutrons, which would have increased the C-14 content within the linen shroud thereby making it appear much younger than its actual age.

Dr. Robert Hedges of the Oxford University radiocarbon laboratory, who participated in the Shroud's controversial radiocarbon dating process, replied in turn to Dr. Phillips. His reply appeared on the same page as Phillip's letter. Hedges pointed out that a much lower dose of neutron radiation — a thousand times less than what Phillips proposed — would have been sufficient to create the number of C-14 isotopes within the Shroud to account for its medieval C-14 dating.<sup>13</sup> Hedges even admitted that "the processes suggested by Phillips were considered by the participating [radiocarbon] laboratories."<sup>14</sup> Hedges had also acknowledged after the radiocarbon dates were announced in 1988 that a "sufficient level of neutrons from radiation on the Shroud would invalidate the radiocarbon date which we obtained."<sup>15</sup>

Despite these considerations and admissions, Hedges dismissed the possibility that such an event could have influenced the Shroud's medieval radiocarbon date.<sup>16</sup> And, the *first* reason he asserted was that "No plausible physical mechanism has been proposed to explain how the resurrection was accompanied by a significant neutron flux."<sup>17</sup> That wasn't even the point! The point was that if the Shroud was irradiated with a neutron flux, it would have invalidated the 1988 radiocarbon dating, and it was the laboratories' job to accurately date this cloth. Neutrons were discovered by scientists in 1932, so it is conceivable the Shroud could have been irradiated by neutrons before 1988. I agree that because of the cloth's unprecedented and unduplicated images, their 130 corresponding blood marks, and the numerous similarities between the passion, crucifixion, death and burial of the historical Jesus Christ with the victim in the Shroud, the resurrection is the most likely explanation for the neutron flux. But, it is completely ludicrous to state that you have to provide the physical mechanism for the neutron flux or the resurrection in order to consider their occurrence. If the resurrection was accompanied by a neutron flux, it

neither happened in the 20<sup>th</sup> century nor was it caused by humans. It could *only* have been caused by God and no human could possibly provide a *plausible* physical mechanism. Hedges just arbitrarily applied an artificial Catch-22 to the questions of whether the Shroud was neutron irradiated or whether the body was the source of the radiation.

Neither Copernicus, Galileo nor any of the generations of scientists after them had to first provide a plausible physical mechanism for the creation of the universe before they studied its features and component parts. Likewise, scientists can study whether certain events took place, or whether various kinds of matter or energy exists — with or without plausible physical mechanisms for their occurrence. Scientists can often provide better explanations for such questions after they confirm the existence or occurrence of such an event, matter or energy, or the various attributes thereof. Dr. Hedges' irrelevant precondition has been repeated by other scientists and serves to deter or prevent legitimate scientific inquiry into a subject that could have relevance to people throughout the world. I personally know of a scientist who, like Hedges, is unfamiliar with the vast amount of scientific and medical evidence relating to the authenticity of the Shroud as Jesus' burial garment. This scientist was one of the relatively few who was qualified to help conduct some of the proposed sophisticated scientific testing referred to earlier in this paper. The specific reason he gave for declining to participate was the same erroneous, inapplicable reason from Hedges that was quoted above.

Of course, we're not trying to preclude any further testing of artistic or naturalistic methods, we just want to include testing for unprecedented events that are consistent with very attested historical accounts and are also indicated by extensive scientific, medical and archaeological evidence. It is also relevant to note that naturalistic and artistic methods have been tested since the beginning of the 20<sup>th</sup> century, but all have failed to duplicate the Shroud's body images, their blood marks and other remarkable features.

Countless natural experiments in natural laboratories have also been conducted long before and after the time of Christ. Millions of people have been bloodied and/or buried under a variety of circumstances and covered with shrouds, blankets, sheets, shirts, jackets, soldiers' uniforms, bandages etc.; yet none have left any images approaching the full-length, frontal and dorsal images on the Shroud or their 130 corresponding blood marks.

The only absolute condition in life is that every single one of us is going to die. This is the most universal condition for all of humanity, and of course, is the fundamental problem facing all of us. The most attested sources in all of ancient history, which may be corroborated by extensive scientific and medical evidence, clearly state that the historical Jesus resurrected from the dead. This event occurred after he also predicted his resurrection on several occasions before his death. Jesus Christ is also recorded in the same sources to have raised three people from the dead, and to have said on numerous occasions that if, among other things, you believe in his resurrection — that you, too, could have life after death.

Thousands upon thousands of people are literally testing this promise or hypothesis, if you will, every single day with their natural deaths. Moreover, every single one of us will literally test this promise in full when we die. If possible, why not scientifically test a critical part of this hypothesis while we are still alive on earth? If scientific evidence could be obtained that related to the authenticity of Jesus' burial cloth and his physical resurrection, then it would be relevant to every person who will *ever* live, and thus die. If God and Jesus Christ left extensive evidence of Jesus' physical suffering, crucifixion, death, burial and resurrection in the recorded annals of history, then corroborating scientific and medical evidence of the same events could also have been left on Jesus' burial cloth. Since an extensive and surprising amount of scientific and medical evidence has already been acquired from earlier *accidental* discoveries and *limited* inquiries of the unprecedented, full-length body images on the Shroud of Turin, then we should obviously continue to investigate and acquire all additional evidence that may be available to confirm the occurrence of all of the above events.



## *Endnotes*

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9. A.C. Lind, M. Antonacci, D. Elmore, G. Fanti, J. Guthrie, "Production of radiocarbon by neutron radiation on linen." *International Workshop on the Scientific Approach to the Archeiropoietos Images*, (2010), Frascati, Italy, May 4-6: 255-262.
10. G. Fanti, P. Baraldi, R. Basso, A. Tinti, "Non-destructive dating of ancient flax, textiles by means of vibrational spectroscopy," *Vibrational Spectroscopy* 2013, <http://dx.doi.org/10.1016/j.vibspec.2013.04.001>.
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13. R. Hedges, "Hedges Replies," *Nature* 337 (1989): 594
14. Ibid.
15. P. Jennings, "Still Shrouded in Mystery," *30 Days in the Church and on the World* 1.7 (1988): 70-71, 71.
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17. R. Hedges, "Hedges Replies," *Nature* 337 (1989): 594.