A Formal Refutation of Accetta's 14th-Century Woodblock Hypothesis

Author: Otangelo Grasso, *written with the support and assistance of AI tools.*

Affiliation: Independent researcher, Aracaju, SE, Brazil

Correspondence: email: email=otangelograsso@gmail.com

ORCID: Orcid ID: 0009-0005-6942-0593

Executive Summary

Date: January 2026Joseph Accetta's 2014 paper, "Probable Origins of a 14th Century Turin Shroud Image," argues that the Shroud of Turin can be explained as a medieval woodblock print created using extant 14th-century technology. This refutation demonstrates that Accetta's hypothesis fails to account for the comprehensive body of forensic, chemical, and physical evidence documented in Otangelo Grasso's *The Shroud of Turin: A Forensic Summary of the Evidence* (2026). The hypothesis collapses under the weight of twenty-five distinct image formation requirements, the blood-first sequence, the three-dimensional encoding, and the chemical evidence—none of which can be reconciled with any known medieval printing technique.

---

1. Introduction: The Hypothesis Under Examination

Accetta's paper rests on three foundational claims:

1. That the Shroud's image resulted from contact with a carved wooden bas-relief using iron gallate ink or similar medieval coloring agents
2. That the image's properties—including its three-dimensional characteristics—are incidental byproducts of a printing process rather than intentional features
3. That the radiocarbon date of 1260-1390 CE should be accepted as definitive for the image's origin

Each of these claims is directly contradicted by the evidence compiled in Grasso's forensic investigation.

---

2. The Blood-First Sequence: Irreconcilable with Any Printing Process

Accetta's Position: Accetta treats the bloodstains as part of the printed image, suggesting they were applied using the same contact process as the body image itself. He writes of "the gospel accounts" being "faithfully reproduce[d]" and discusses "iron gallate inks" as plausible coloring agents.

The Forensic Evidence: Grasso's Chapter 3 ("The Blood of the Shroud") and Chapter 18 ("The Interface") establish a sequence that demolishes any printing hypothesis [citation:Grasso, Chapters 3, 18]. Ultraviolet fluorescence photography by STURP researcher Samuel Pellicori revealed that the blood was deposited *before* the image formed. The body image stops cleanly at the borders of every bloodstain—as though the blood acted as a physical shield. This is not how any artist works. A painter applies the figure first, then adds blood for dramatic effect. A printer applying ink to a block would produce uniform contact transfer, not selective deposition that respects pre-existing blood boundaries.

Furthermore, Grasso documents that the blood exhibits serum halos visible under ultraviolet light—rings of proteinaceous fluid that form only when blood clots on a living body and is then transferred to cloth [citation:Grasso, Chapter 3]. Dr. Alan Adler's chemical analysis confirmed elevated bilirubin concentrations, indicating severe physiological trauma consistent with Roman crucifixion. No medieval ink—iron gallate or otherwise—can replicate the complex biochemistry of genuine human blood, including hemoglobin derivatives, serum albumin, and bilirubin.

Conclusion on Blood: Accetta's hypothesis requires either that the blood was printed simultaneously with the body image (contradicted by the stratigraphic evidence) or that it was applied separately afterward (which would require painting around the pre-existing printed image at microscopic precision—a technical impossibility in any era, let alone the 14th century).

---

3. The Twenty-Five Requirements: A Combinatorial Lock Accetta Cannot Pick

Accetta's Position: Accetta acknowledges some of the Shroud's unusual properties but dismisses them as incidental or explicable through "a good deal of mottling" and "non-uniform shedding of the original colorant."

The Forensic Evidence: Grasso's Chapter 20 ("The Physics of an Impossible Image") synthesizes decades of peer-reviewed research into twenty-five empirically testable requirements that any valid formation hypothesis must satisfy simultaneously [citation:Grasso, Chapter 20]. These are not arbitrary criteria—they are measurements.

Tier 1 requirements alone falsify Accetta's hypothesis:

- **R1—Extreme Superficiality:** The image coloration penetrates only 0.2-0.6 micrometers into each fibril—the outermost layer of the primary cell wall [citation:Grasso, Chapter 20, citing Fanti & Maggiolo 2004]. A woodblock print using liquid ink would inevitably wick into the fibers via capillary action, penetrating deeply into thread bundles and leaving binder residues. Accetta acknowledges this problem when he notes that "penetration of the colorant into the textile was a primary consideration to avoid excessive bleed-over." His proposed solution—viscous ink with gum arabic—would still leave detectable organic compounds on the fibers.
- **R2—Single-Sided Imaging:** No coherent image exists on the reverse side of the cloth. Any liquid medium penetrating even 0.2 micrometers would be invisible to the naked eye; Accetta's concern about "bleed-over" is irrelevant to the actual requirement. The image's confinement to the outermost fibrils of the outermost threads is chemically inconsistent with any liquid application.
- **R5—Intrinsic Oxidative Cellulose Chemistry:** FTIR spectroscopy, Raman analysis, and X-ray photoelectron spectroscopy all confirm that the image is chemically consistent with cellulose oxidation and dehydration—not the presence of any foreign substance [citation:Grasso, Chapter 20, citing Heller & Adler 1981, Schwalbe & Rogers 1982]. No pigments, dyes, binding media, or inks are present above detection limits. Accetta's appeal to "iron gallate inks" fails because such inks leave detectable iron and organic residues. The pervasive iron found on the Shroud is uniformly distributed across image and non-image areas—consistent with normal linen processing (retting), not with selective application as ink.
- **R6—Binary Threshold Behavior:** Individual fibrils are either fully colored or completely uncolored—there are no partial gradients at the microscopic level [citation:Grasso, Chapter 20, citing Adler 1999]. The continuous tones of the image result from varying *densities* of fully switched fibrils, like halftone dots in a photograph. No liquid application method produces binary switching at the fibril level. Printing produces continuous color coverage, not stochastic switching.

Conclusion on Chemistry: Accetta's speculation about "aldehydes and carboxyl groups" from "corrosive inks" is chemically naive. The specific molecular transformations documented on the Shroud—dehydration, oxidation, and conjugation of cellulose bonds—require energy delivery mechanisms (such as brief, intense radiation) that ink chemistry cannot provide. Grasso's Chapter 20 documents that only

deep ultraviolet laser pulses have reproduced Shroud-like coloration under controlled conditions, and even then only on postage-stamp-sized samples [citation:Grasso, Chapter 20, citing Di Lazzaro et al. 2010].

---

4. The Three-Dimensional Encoding: Not a Byproduct but a Feature

Accetta's Position: Accetta argues that the VP-8 three-dimensional relief is unremarkable—that "non-linear characteristics of the film and the actual image may render an object that appears in 3D much more realistically that it actually is." He suggests the effect could result from "a convex carving that itself resembled the features one would ordinarily attribute to the image of Christ."

The Forensic Evidence: Grasso's Chapter 6 ("When Distance Became Data") documents the rigorous quantification of the 3D property [citation:Grasso, Chapter 6]. John Jackson, Eric Jumper, and William Ercoline's 1984 *Applied Optics* paper demonstrated that image intensity correlates with cloth-to-body distance at a confidence level exceeding 99% ($R^2 \approx 0.60$). This is not subjective "mottling"—it is a mathematical relationship between darkness and distance.

When ordinary photographs or paintings are fed into the VP-8, they produce distorted, meaningless output—jagged landscapes with no anatomical coherence. The Shroud produces a coherent, anatomically accurate relief map of a human body. No painting, rubbing, contact process, or printing technique produces this encoding. It is a property of distance-dependent image formation—precisely what radiation physics predicts and what no medieval printing process can accidentally generate.

Accetta's appeal to "non-linear film characteristics" misunderstands the VP-8's operation. The device converts image *density* (regardless of the original medium's linearity) into vertical displacement. The correlation exists in the cloth itself, not in the photographic reproduction. Jackson's team measured the Shroud's actual optical density using a microdensitometer—not relying on photographic linearity.

Furthermore, Grasso's Chapter 7 ("The Digital Autopsy") demonstrates that the encoding extends beyond simple relief to include anatomically consistent wound placement, rigor mortis positioning, and distortion patterns that match cloth draped over a three-dimensional body [citation:Grasso, Chapter 7]. The orthogonal projection (minimal lateral distortion) is itself a constraint that any printing process would violate—a flat bas-relief cannot produce the specific draping geometry encoded in the image.

Conclusion on 3D Encoding: Accetta's dismissal of the 3D property as incidental ignores forty years of quantitative analysis. The encoding is mathematically precise, anatomically coherent, and irreproducible by any known artistic or printing process. It is not a byproduct—it is the image's defining forensic characteristic.

---

5. The Radiocarbon Question: Assuming What Must Be Proved

Accetta's Position: Accetta treats the 1260-1390 CE radiocarbon date as foundational, stating that "the preponderance of existing evidence argues otherwise" regarding authenticity and that "a reasonable working hypothesis adopted for the purposes of this paper is that the Shroud image is of circa 14th century European origins."

The Forensic Evidence: Grasso's Chapter 19 ("The Radiocarbon Paradox") documents the extensive evidence that the 1988 radiocarbon sample was not representative of the main cloth [citation:Grasso, Chapter 19]. Raymond Rogers' 2005 *Thermochimica Acta* paper demonstrated that threads from the radiocarbon sample area are chemically distinct from the main cloth—containing cotton fibers, alizarin dye, and a gum coating characteristic of invisible medieval repairs. The main cloth shows none of these features.

The vanillin analysis is particularly telling: vanillin, a breakdown product of lignin, remains detectable in medieval textiles but is entirely absent from the Shroud's main body—indicating substantially greater age. Tristan Casabianca's 2019 *Archaeometry* study of previously unpublished raw data revealed statistically significant heterogeneity within the sample strip itself, with dates varying systematically by position.

Accetta's assertion that "there is no evidence that the actual fibers that were dated contained cotton" ignores Rogers' published findings and the subsequent debate. More fundamentally, his argument commits a logical error: even if the radiocarbon date were accepted, it would date the *linen's harvest*, not the image's formation. Grasso notes that "there could be a difference between the dates of linen production and the image imprinting process"—a distinction Accetta collapses without justification.

Conclusion on Dating: The radiocarbon date cannot bear the weight Accetta places upon it. The sampled material is demonstrably non-representative, and even if it were representative, it would not establish the image's 14th-century origin—only the flax's harvest date.

6. The Historical Evidence: Silence Does Not Equal Absence

Accetta's Position: Accetta relies on the "authenticated historical record of the cloth dat[ing] to circa 1350 ACE" as support for his medieval hypothesis.

The Forensic Evidence: Grasso's Chapter 16 ("The Hidden Thread") traces the Shroud's pre-1355 history through multiple independent lines of evidence [citation:Grasso, Chapter 16]. The Sudarium of Oviedo—a bloodstained face cloth preserved in Spain since the seventh century—exhibits over 120 points of proposed correspondence with the Shroud's facial bloodstains, including matching stain geometry, flow patterns, and folding deformations. The documented transfer of the Sudarium from Jerusalem to Spain in the seventh century predates any known history of the Shroud in medieval Europe, making coordinated fabrication impossible.

The Image of Edessa (Mandylion), documented from the sixth century, was described in the 10th-century *Narratio de Imagine Edessena* with the unique Greek term *tetradiplon*—"doubled-in-four"—precisely the folding configuration that would display only the face of a full-length shroud. Gregory Referendarius's 944 sermon, rediscovered in the Vatican Archives, explicitly states that the Edessa cloth contained not only the face but "the figure of the whole body" and bore bloodstains from a side wound.

The Pray Codex (1192-1195) depicts Christ's burial with four holes in an L-shaped configuration matching the Shroud's "poker holes" from the 1532 fire, a herringbone weave pattern, and crossed hands with thumbs not visible—features without parallel in medieval iconography.

Conclusion on History: Accetta's appeal to documentary silence ignores the positive evidence for the cloth's existence long before 1355. The Sudarium correspondence alone falsifies any hypothesis requiring independent medieval fabrication.

---

7. The Medieval Technology Barrier: What Accetta Cannot Explain

Accetta's Position: Accetta argues that woodblock printing was "extant in the early 14th century" and that "the craftsmanship required to print linen existed" in proximity to Lirey.

The Forensic Evidence: Grasso's Chapter 21 ("The Unforgeable Forgery") systematically demonstrates why no medieval technology can account for the Shroud's properties [citation:Grasso, Chapter 21].

The Scale Problem: A single woodblock 4.3 × 1.1 meters would be unprecedented in medieval printing. Surviving large prints used multiple blocks with registration problems—yet the Shroud shows perfect alignment between frontal and dorsal images across 4.3 meters.

The Resolution Problem: The image resolves anatomical details at approximately 5 millimeters—individual fingers, scourge marks, facial contours. Accetta acknowledges this but provides no mechanism for achieving such resolution on a curved bas-relief surface with a single inking.

The Pressure Problem: Contact printing requires uniform pressure across the entire surface. A carved wooden relief would inevitably produce variable pressure—stronger on raised features, weaker in recessed areas—yet the Shroud's image density correlates with *cloth-to-body distance*, not with relief height. Raised features (nose, cheekbones) should receive more pressure and darker ink in a printing process—they do on the Shroud, but this correlation is accidental to printing, not intrinsic.

The Negative Property: Accetta's assertion that "carving or painting in the negative is extremely difficult if not impossible" undermines his own hypothesis. A bas-relief printed on cloth produces a *positive* image—raised features transfer more ink and appear darker, recessed features transfer less and appear lighter. The Shroud's image is a *negative*—raised features (nose) appear *lighter* on the cloth, recessed features (eye sockets) appear *darker* when viewed directly. This is precisely opposite to what a contact print produces. Accetta's reference to "mirror image" confuses left-right reversal (which a stamp produces) with tonal reversal (which it does not).

The 200-Nanometer Problem: Even if Accetta could solve all other problems, he cannot explain how a 14th-century artisan confined coloration to 200 nanometers—one five-thousandth of a millimeter—on individual fibrils using liquid ink. This is not a matter of "skill" or "craftsmanship." It is physically impossible for liquid applied to a surface to stop at 200 nanometers without penetrating deeper. The required precision operates at a scale invisible to the unaided human eye—the compound microscope would not be invented for another 250 years.

---

8. The ENEA Experiments: Science Speaks

Accetta's Position: Not addressed in his paper, but relevant as the most advanced experimental work on image formation.

The Forensic Evidence: Grasso's Chapter 20 cites the ENEA research (Di Lazzaro et al. 2010), which demonstrated that deep ultraviolet laser pulses can produce Shroud-like coloration on linen [citation:Grasso, Chapter 20]. The required parameters are precise: 193-248 nanometer wavelength, 10-50 nanosecond pulse duration, 100-200 millijoules per square centimeter energy density.

The ENEA team's conclusion is devastating to any medieval hypothesis: "The total power of VUV radiations required to instantly color the surface of linen that corresponds to a human of average height... makes it impractical today to reproduce the entire Shroud image using a single laser excimer, since this power cannot be produced by any VUV light source built to date." If modern lasers cannot replicate the full image, no 14th-century technology could.

Accetta's woodblock hypothesis requires us to believe that medieval artisans achieved—with carved wood and iron gallate ink—what 21st-century physicists cannot replicate with billion-dollar technology.

---

9. The Cumulative Case: Why Accetta's Hypothesis Fails

Grasso's investigation establishes that any valid hypothesis must account for:

1. **Blood-first sequence** with serum halos and bilirubin elevation
2. **Extreme superficiality** (200-nanometer penetration) with binary fibril switching
3. **Three-dimensional encoding** correlating image intensity with cloth-to-body distance
4. **Photographic negative properties** requiring tonal reversal
5. **Absence of pigments, dyes, or binding media** above detection limits
6. **Anatomical precision** contradicting medieval artistic conventions
7. **Independent corroboration** from the Sudarium of Oviedo
8. **Pollen and limestone evidence** pointing to Jerusalem
9. **Textile characteristics** consistent with first-century luxury linen
10. **The folded configuration** matching the Edessa Mandylion

Accetta's hypothesis fails every one of these requirements. It explains nothing about the blood's biochemistry, cannot account for the superficiality, dismisses the 3D encoding without understanding it, ignores the chemical evidence, assumes medieval

artisans possessed knowledge contradicting their own artistic traditions, and treats the pre-1355 evidence as nonexistent rather than engaging it.

---

10. Conclusion: A Hypothesis That Cannot Be Sustained

Joseph Accetta's woodblock hypothesis is a testament to the ingenuity of those who seek natural explanations for the Shroud. But ingenuity cannot substitute for evidence. The hypothesis fails not on a single point but across the entire spectrum of forensic, chemical, physical, and historical evidence.

The Shroud of Turin may ultimately resist complete explanation—Grasso acknowledges this throughout his investigation. But the medieval forgery hypothesis, in all its variants including Accetta's, has been tested against the evidence and found wanting. The woodblock theory explains nothing that requires explanation and contradicts nearly everything that has been measured.

As Grasso concludes in Chapter 21: "The Shroud of Turin may be many things. But a simple medieval forgery is not among them. It is not the default, skeptical, parsimonious position. It is the most extravagant hypothesis on the table—one that requires a greater suspension of disbelief than any miracle."

Accetta's hypothesis asks us to believe in a forger more miraculous than the miracle he is accused of inventing. The evidence compels no such credulity.

References

Grasso, O. (2026). *The Shroud of Turin: A Forensic Summary of the Evidence*. Aracaju, Brazil.

Accetta, J.S. (2014). Probable Origins of a 14th Century Turin Shroud Image.

Adler, A.D. (1999). The nature of the body images on the Shroud of Turin. *Shroud Spectrum International*.

Casabianca, T., Marinelli, E., Pernagallo, G., & Torrisi, B. (2019). Radiocarbon dating of the Turin Shroud: New evidence from raw data. *Archaeometry*.

Di Lazzaro, P., Murra, D., Santoni, A., & Nichelatti, E. (2010). Deep ultraviolet radiation simulates the Turin Shroud image. *Journal of Imaging Science and Technology*.

Fanti, G., & Maggiolo, R. (2004). Double superficiality of the frontal image of the Turin Shroud. *Journal of Optics A*.

Heller, J.H., & Adler, A.D. (1981). A chemical investigation of the Shroud of Turin. *Canadian Society of Forensic Science Journal*.

Jackson, J.P., Jumper, E.J., & Ercoline, W.R. (1984). Correlation of image intensity on the Turin Shroud with the 3-D structure of a human body shape. *Applied Optics*.

Rogers, R.N. (2005). Studies on the radiocarbon sample from the Shroud of Turin. *Thermochimica Acta*.

Schwalbe, L.A., & Rogers, R.N. (1982). Physics and chemistry of the Shroud of Turin. *Analytica Chimica Acta*.