

Science, Theology and the Holy Shroud

**Edited Papers from the
2019 International Conference
on the Turin Shroud**

Hosted by:
The Arthur Custance Centre
for
Science and Christianity

R. Gary Chiang and Evelyn M. White

Editors

Science, Theology and the Holy Shroud: Edited Papers from the 2019 International Conference on the Turin Shroud

R. Gary Chiang and Evelyn M. White, Editors

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Holy Face under Microscope:

R. Gary Chiang's modification of Arthur C. Custance's stylistic drawing of a microscope which appears in A.C. Custance, *Seed of the Woman*, 3rd Edition, Doorway Publications, 2014.

ACKNOWLEDGMENTS



Thanks to three individuals who made the conference a wonderful experience. Prof. Jennifer Chiang (above left), as conference coordinator, ensured each day went well, and the two moderators, Vanessa Chiang (middle) and Nichole Rosenberg (right), expertly facilitated the sessions helping with lecture room technology and keeping speakers comfortable and on time.

Thanks to Barrie Schwartz (to right) for providing an entertaining presentation on his experience with STURP, for serving as the official photographer for this conference, and for creating the web page for the conference.



Thanks to Joe Marino (far left) and Robert (Bob) Rucker (near left) for encouraging the Custance Centre to host this conference, and for providing valuable advice.

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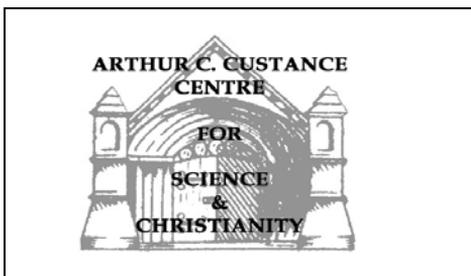
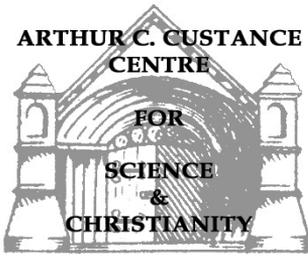


TABLE OF CONTENTS

| | |
|--|-------|
| Preface. | vi |
| Paper Presenters..... | vii |
| Author Biographies. | vii |
| Basic Holy Shroud Facts. | xiv |
| The Unique Photographic Property of the Image. | xv |
| Gospel Account of the Crucifixion and Resurrection. | xvi |
| Formation of the Image..... | xvii |
| What to Expect in this Book. | xviii |
| Categories—Loosely Defined. | xix |
| 1. The Medieval Shroud. | 1 |
| 2. Radiocarbon: Raw Data to Calendar Dates..... | 8 |
| 3. The Vignon Markings Myth..... | 12 |
| 4. The Shroud of Turin and Oxford University. | 25 |
| 5. Three Treasures of Constantinople..... | 40 |
| 6. Comparing "Christ the Teacher" Statue at Chartres Cathedral with the Turin Shroud. | 58 |
| 7. Holistic Solution to the Mysteries of the Shroud of Turin. | 73 |
| 8. The Radiocarbon Dating of the Shroud is Explained by Neutron Absorption. | 87 |
| 9. Testing the Shroud and the Sudarium at the Molecular and Atomic Levels. | 101 |
| 10. Image Processing Applied to UV Photographs of the Holy Shroud which Includes the Radiocarbon Test Area..... | 124 |
| 11. The Holy Shroud and Nuclear Physics: Why Radiocarbon Dating Results Prove the Resurrection of Jesus. | 136 |

| | |
|---|-----|
| 12. The Quantum Properties of the DNA Molecule and the Formation of the Superficial Body Image on the Turin Shroud..... | 153 |
| 13. Strange Quark Matter in the Holy Shroud. | 164 |
| 14. The photographic film and processing techniques of the Enrie Images..... | 179 |
| 15. Blood clotting, Serum Halo Rings, and Bloodstains on the Holy Shroud..... | 186 |
| 16. Hemolysis, Bilirubin, and the Colour of Bloodstains on the Holy Shroud..... | 201 |
| 17. 3D Information in the Fields of Bioenergetics and Quantum Theory..... | 215 |
| 18. Empirical Findings Suggest Comparability Amongst the Turin Shroud (TS), QuantaGraphy®, and Magnetic Resonance Imaging (MRI)..... | 224 |
| 19. Unveiling the Holy Shroud Through Photographic Imagery..... | 230 |
| 20. The Holy Shroud and the Holy Fire of Jerusalem. | 242 |
| 21. A Response to John Calvin’s Treatise on the Holy Shroud. | 250 |
| 22. A Contextual Analysis of Pope Innocent III Letters of the Fourth Crusade..... | 260 |
| 23. The Beirut Icon and the Holy Shroud. | 273 |
| 24. The Veil of Veronica: From Concealment to Revelation..... | 293 |
| 25. Possible References to the Holy Shroud in the New Testament..... | 301 |
| 26. The Divine Light and the Shroud of Turin. | 317 |
| 27. Spirituality and the Shroud. | 323 |
| 28. Walking a Fine Line Between Science and Faith..... | 331 |
| 29. A Peculiar Number and Sign..... | 339 |
| 30. My Personal Experience..... | 347 |
| 31. Fresh Insights into His Wounds. | 353 |

Preface

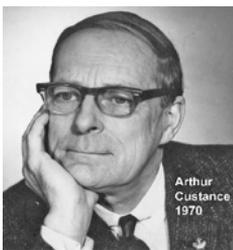


The Arthur Custance Centre for Science and Christianity (www.custance.org) was founded in 2002 to promote the works of A.C. Custance (1910-1985) and his insights into the relationship between the established facts of science, and the truths revealed in Scripture. Seventeen years later, the Custance Centre held its first international conference on Faith and Science focused, not on the well-known evolution/creation debate, but on the science and theology of the Holy Shroud, the burial cloth that wrapped Jesus as he lay dead in the tomb.

This cloth, also known as the Turin Shroud or the Shroud of Turin, is the most studied object in human history, but its full potential to integrate faith and science has never been explored until this conference. Interestingly, the Shroud tends to be marginalised by the academic community, with academics believing that it may have been created in the Middle Ages as an icon to focus religious devotions, or as a forgery to dupe pilgrims into paying homage. Yet it is far more significant than most people can ever imagine. As the chapters in this book exemplify, the Shroud does have its skeptics, but it continues to mystify us as it bridges the gap between the natural and the supernatural.

The one single fact about the Shroud, which catapults it from an object of passing interest to the fantastically unique key that enables science to unlock the door into another world, is the image it bears. No amount of wishful thinking, reality denial, misrepresentation of facts, nor religious discrimination can erase the significance of this image. It is the image, not the cloth, which is the key. One day this ancient linen cloth may be destroyed, or fall prey to the natural processes of decomposition, but its image will live on in countless forms from the millions of printed photographs to the enormous reservoir of digital files.

As several chapters in this book report, copies of the image imprinted on the Shroud can be examined to reveal a number of unexplainable facts. If one has the courage to put aside their bias and look, these facts give us a glimpse into eternity. Some scientific evidence may challenge the authenticity of the cloth itself, but to date, nothing challenges the authenticity of the image. It is truly a remarkable thing to behold, and a joy to study, even for the skeptic!



Arthur Custance (1910-1985) published several works relating biblical knowledge to the established facts of science. All his works can be read at www.custance.org



Evelyn White was Arthur's long-time administrative assistant and colleague. She wrote his biography which is available at www.custance.org



Paper Presenters

Conference Speakers (l to r): Giorgio Bracaglia, Hugh Farey, Janis Winchester, Larry Stalley, John Loken, Cathy Jarrett, Bob Rucker, Jeffrey Skurka, Joe Marino, Cathy Osborn, Thomas McAvoy, Kristy Moore, Tristan Casabianca, Patrick Lublink, Mark Antonacci, Tom Devins, Harry Hill (Guest), Cheryl White, Kelly Kearse, Russ Breault, Jean-Pierre Laude, Teresa Newman, Pam Moon, Mary-Catharine Carroll (the papers of those who could not attend were read by other attendees). Picture by Barrie Schwartz.

Author Biographies

(PAPERS: chapter number at page number)

Antonacci, Mark [chapter 9, p. 101]

Juris Doctorate, John Marshall Law School, 1977

Founder and President, Test The Shroud Foundation, St. Louis, Missouri.

Attorney at Law, Author of *Test The Shroud* and *The Resurrection of the Shroud*

antonaccilaw@aol.com; www.testtheshroud.org

For two decades, Mark has proposed that new, non-destructive or minimally-invasive tests be adapted and applied to the Shroud because they could prove its age, and explain what caused the unique features throughout its body images and blood marks. These techniques could even prove whether a radiating event occurred to the multiply-wounded, crucified corpse in this cloth, which not only encoded all of these features, but left unforgeable evidence of when, where, and to whom all of these events occurred.

Barta, César [chapter 23, p. 273]

Physicist, University Complutense, Madrid, 1981, MBA Executive, University Virtual Barcelona, 2005, Test engineer in the space industry for more than 25 years.

cbartagi@cofis.es

César is a professional in the nuclear and electronic fields, and works as a test engineer in space science for data analysis. He devotes his free time to researching and disseminating information on the Holy Shroud, and has taught courses and attended conferences both in Spain and in other countries in Europe and America. He collaborates with national and international specialized magazines. He has been involved in Shroud research following its 1988 carbon dating, and is a member of the Centro Español de Sindonología (CES).

Benford, M. Sue (deceased 2009) [chapter 17, p. 215; chapter 18, p. 224]

B.S.N. (Nursing), U. of Tennessee, 1979

Master of Arts degree in Health Education, Ohio State University, 1981

<http://www.homestead.com/newvistas>

Sue read a book on the Shroud in 1997. She was drawn to the Shroud and contacted Joseph Marino, who at the time was a Benedictine monk in St. Louis. Marino left the monastery and eventually married Benford. They partnered on Shroud research, and authored several papers on the theory that the Shroud sample used for radiocarbon dating in the 1988 was flawed because new material was added to reinforce and/or repair the Shroud during its history. Sue wrote her autobiography in 2002 and wanted people to understand their spiritual heritage and divine destiny.

Bolettieri, Stephen & Nancy [chapter 29, p. 339]

agnusdeipresents@msn.com

Steve was a journalist, editor and ghostwriter. While interviewing Dr. John Heller in 1983, it sparked a renewed interest in the Shroud. Nancy graduated from Cal State Long Beach, worked in public relations, and met Steve at Boeing Aerospace. Both are now retired. In 1996, Nancy became the first volunteer at Dr. August Accetta's Shroud Center of Southern California. Steve joined her and the two have hosted sindonologists, have given presentations and have done research on the cloth. During the Great Jubilee Exhibition in 2000, they led a pilgrimage to Turin to venerate the Shroud. Their research focuses on the spiritual message of the cloth.

Bracaglia, Giorgio [chapter 14, p. 179]

DSS Printing Group, Primary Colour Inc.,

Bachelor of Business Administration, Organizational Business Management, Robert Wesleyan College, 2015, G7 Certification, Rochester Institute of Technology

giorgiob@twc.com

Giorgio has 46 years of image related services and technical research in providing quantifiable data to meet ISO standards, and has been the lead colour specialist for many international artists. In 1999, Giorgio became the material director of the Holy Shroud Guild, and has made materials available for the scientific community, the Shroud Science group, international sindonologists, and the media for television, reproduction, and study. In 2019, he published the book, *Uncovering the paradox within the archives of the Holy Shroud Guild* which is a historical account of more than 60 years of the Shroud studies from the original correspondence of the Holy Shroud Guild. Led by two ecclesiastical greats, Father Otterbein and Father Rinaldi, the Guild made it possible for STURP to study the Holy Shroud in 1978.

Carroll, Mary-Catharine [chapter 24, p. 293]

MA (English Literature), Carleton University, 1999 MA (Theology) Saint Paul University, 2017

Third year PhD Theology, Saint Paul University

mcarr013@uottawa.ca; friendsofthefresco@gmail.com

Like the Shroud, the Veil of Veronica is an *acheiropoieta* (an image made without hands), that was created when Veronica used her cloth to wipe Jesus' face as he struggled along the road to Calvary. Mary-Catharine's interest in this legend stems from its literary and visual representations, especially in the Stations of the Cross, the popular devotion that charts Jesus' journey from trial to crucifixion. On one level, the legend contains truths about courage, fidelity and kindness. Her research indicates that, on deeper reflection, this seemingly straightforward story proposes a theology of the Incarnation.

Casabianca, Tristan [presentation found at www.custance.org, click on '2019 conference']
M.A., LL.M., Universities of Hamburg/Rotterdam/Aix-Marseille, 2011.
Research analyst, Agence d'Aménagement durable, d'Urbanisme et d'Energie de la Corse,
Corsica.
tristancasabianca@yahoo.fr

Tristan graduated in Modern History, Public Law, and Law and Economics. He works as a research analyst for French regional administration. Since 2010, he has been interested in Turin Shroud studies. In his research, Tristan has focussed on history and on philosophy of science. In 2017, he discovered in the British Museum new data about the radiocarbon dating of the Turin Shroud.

Devins, J. Thomas [presentation is found at www.custance.org, click on '2019 conference']
BS Chemical Engineer, University of Kentucky, 1963
Author of *The Illusion of Death*, 2017
tomdevins@jthomasdevins.com; www.jthomasdevins.com

After a thirty-two-year career in the energy industry, Tom took early retirement to care for his terminally ill wife. Following her death eight years later, mystical experiences directed him to Tibetan meditation practices and the study of Eastern mystical death traditions and the Turin Shroud. His studies led him to correlate Jesus's resurrection, as understood through Shroud radiation theory, with a Tibetan Buddhist phenomenon known as Rainbow body. A frequent traveller to the Himalayan countries, in 2012 he founded Himalayan Hands, a nonprofit organization dedicated to helping the impoverished in Tibet and Nepal.

Farey, Hugh [chapter 1, p. 1; chapter 2, p. 8; chapter 3, p. 12]
B.A., Open University, UK, 1992
Post-Graduate Certificate in Shroud Studies, UPRA, Rome, Italy, 2019 (pending)
Head of Science, St Richard's School, Herefordshire, UK, Retired.
hughfarey@hotmail.com

Hugh was born a Roman Catholic, and has been teaching general science continuously since 1974, first as a school-teacher, now as a private tutor. He became aware of the Shroud in 1972, and wrote his first article for the British Society for the Turin Shroud (BSTS) newsletter in 1995, of which he was the editor from 2013-2017. He became persuaded of the medieval origin of the Shroud about ten years ago, and is now one of the most prominent advocates for this.

Godínez, José Carlos Espriella [chapter 13, p. 164]
Calle Z Edificio #26 interior 12, Unidad Habitacional Fovissste Alianza Popular
Revolucionaria, Delegación Coyoacán C.P. 04800, México City
jcespriella@hotmail.com

José studied chemistry at the Universidad Nacional Autónoma de México (UNAM) and obtained a Master's degree at Universidad Autónoma Metropolitana. He is a chemistry professor at Escuela Nacional Preparatoria. He has been a member of the Centro Mexicano de Sindonología (CMS) since 2000 and a member of the Instituto Superior de Estudios Guadalupeños (ISEG) since 2010.

Hernandez, Kristy Moore [chapter 30, p. 347]
B.A. University of Central Florida, 1977
Graduate, International Medical University of Natural Education
Costumer, Independent Film Maker, Costume Coordinator Florida Grand Opera, 2000-2005.
Author: *Alive with Tomorrow's Medicine*
Kristylove@hushmail.com; www.QuantumBiofeedbackSpecialist.com

Kristy describes herself as a spiritually motivated and intuitively guided individual. She was forced to leave a successful 33-year-long career in the film industry due to a life threatening medical diagnosis of chemical intolerance, and this health setback led her to a passion for studying medicine

based in quantum physics, coupled with a desire for more knowledge of the Holy Shroud. She believes that science will prove the existence and resurrection of Jesus Christ.

Jarrett, Cathy [chapter 31, p. 353]

M.A., University of Colorado, 1979

Special Education Teacher, St. Vrain Valley School District, Longmont, Colorado

crjrtt@msn.com

Cathy worked at various jobs before, during and after earning a Bachelor's degree in Elementary Education. She began teaching special education students after earning the Master's degree and continued to do so until her retirement. She was instrumental in starting the first Charter school in her school district, and also ran for political office. Cathy first read *A Doctor at Calvary* in the late 1960's, and has been studying the Shroud ever since. It helps her to understand the depths of Jesus' love for us.

Kearse, Kelly [chapter 15, p. 186; chapter 16, p. 201]

Ph.D., Immunology, University of Kentucky, 1988

Science Instructor, Knoxville Catholic High School, Knoxville, TN

kelly.kearse@knoxvillecatholic.com

Following completion of postdoctoral fellowships at Johns Hopkins and NIH, Kelly became a Principal Investigator at NIH. After several years, he transferred to the ECU School of Medicine to have the opportunity to do both research and teaching. In 2000, he semi-retired from laboratory research to relocate to his original hometown and teach high school science, something that he had always wanted to do. He has been a science instructor at KCHS for the past 20 years. Kelly studies the Shroud as a subject important to both faith and science, with a specific interest in the properties of the bloodstains.

Kiszti, Eva [chapter 19, p. 230]

Bachelor of Science, University of Windsor, 1975

Bachelor of Arts, University of Windsor, 1976

ekiszti@gmail.com

Eva spent the majority of her life living and working in multiple countries abroad, including Hungary, South Africa, Sudan, and the Philippines. Although she had little interest in the Turin Shroud prior to embarking on this particular project, her interest arises from having detected the existence of a strong connection between the image on the cloth and light, and what this connection implies.

Latendresse, Mario [paper read by Tristan Casabianca at the conference; presentation found at www.custance.org, click on '2019 conference']

Ph.D., Université de Montréal, 2000,

Computer Science Senior Computer Scientist, SRI International

latendre@gmail.com; sindonology.org; linceul.org

Mario taught computer science for fifteen years at the college level, University of Quebec at Montreal, and University of Montreal. Then for five years, he was a computer scientist at a computational facility to predict oceanic weather. He joined SRI International in 2006 as a computer scientist to work on computational biology and computational chemistry as a member of the Artificial Intelligence Center. His interest in the Turin Shroud sprang from the lack of explanations for its provenance and its unique characteristics. Lately he focussed on the history of the Shroud after discovering that most hypotheses proposed for its origin can be shown to be false, and that only one thesis can fully answer the provenance of the Shroud.

Laude, Jean-Pierre [chapter 6, p. 58]

Engineer from Ecole Supérieure d'Optique de Paris 1963

PhD Spectrometry, Orsay University France, 1966

Research Director of Horiba Jobin-Yvon, retired

laude_jean-pierre@orange.fr

Jean-Pierre was involved in Research Management and Expertise in Scientific Programmes, with a practical experience in optics and spectrometry. He taught graduate courses in universities and engineering schools. His interest in the Turin Shroud began in 1980 with reading STURP papers. Since 2014, he has published papers on the spectroscopy of blood or image formation on the Shroud and is also interested in the iconography of Christ.

Loken, John [presentation found at www.custance.org, click on 2019 conference]

M.A., University of Michigan, 1988

johnlok123@yahoo.com

John studied history, religion, and languages in the 1980s. He also became an agnostic then, which he remains today. He has held many jobs over the years, enjoying variety in life. In 2004 he finally became convinced that the Shroud covered the body of Jesus. His 2006 book *The Shroud was the Resurrection* presents a position of compromise in which the Shroud covered Jesus, but there was no resurrection and the image formed naturally. He suggests that the serene and mysterious image of Jesus inspired the resurrection belief.

Lublink, Patrick [chapter 20, p. 242; chapter, 21, p. 250]

M.Div., Tyndale Seminary Toronto, 2002

Postgraduate Certificate in Shroud Studies, Rome, 2019

prlublink@gmail.com

Patrick served in the Canadian Forces for 22 years before entering a full-time ministry with The Salvation Army in Toronto. He was then seconded as a Salvation Army officer to the Canadian Armed Forces, this time as a military chaplain, where he served for an additional 12 years. He has had a keen interest in the Holy Shroud since 1978 and believes that the Shroud is an important element of Christian apologetics for defending the Christian faith in a post-modern world.

Mangum, the Very Rev. Peter B. [chapter 22, p. 260]

Pontifical Gregorian University, Rome.

fathermangum@yahoo.com; Website: sjbcathedral.org

Fr. Mangum is currently Diocesan Administrator and rector of the Cathedral of St. John Berchmans and chaplain to two schools (Pre-K, 3-12). He is also the Judicial Vicar, and a member of numerous ecclesial organizations, including the American Confraternity of the Holy Shroud, and the Equestrian Order of the Holy Sepulchre of Jerusalem, in which he holds the rank of Knight Commander. He is the Director of the Museum of the Holy Shroud, Shreveport, Louisiana.

Marino, Joseph [chapter 17, p. 215; chapter 18, p. 224]

B.A., Theological Studies, St. Louis University, 1985

JMarino240@aol.com

Joseph was a library associate at The Ohio State University for 20 years. He read a book on the Shroud in 1977, and was intrigued immediately with the evidence for authenticity, and has accumulated this evidence in subsequent years. He has amassed one of the largest personal English-language collections of Shroud materials in the world. He has done a significant amount of research into the background, execution and aftermath of the 1988 C-14 dating of the Shroud in order to expose questionable methods and data related to the entire process.

McAvoy, Thomas [chapter 10, p. 124]

Ph.D, Princeton University, Chemical Engineering, 1964

Professor Emeritus University of Maryland College Park, Department of Chemical and Biomolecular Engineering and Institute for Systems Research

mcavoy@umd.edu; Research website: <http://blog.umd.edu/pseudomyxoma>

Tom taught chemical engineering for 40 years, first at the University of Massachusetts (1964-1980) and then at the University of Maryland (1980-2004). Since his retirement in 2004, Tom has conducted research on two biomedical engineering projects. He became interested in the Shroud in 2014 and attended the St. Louis Shroud Conference that year. He is currently looking into the application of signal processing techniques to photos of the Shroud.

Moon, Pam [chapter 4, p. 25; chapter 5, p. 40]

BA Bristol University, English and History 1979; MSc Coventry University, Health Studies 1993

SRN Nurse registration, St Mary's Hospital, London 1983

Oxford Diploma in Ministry (Anglican ordination training). Wycliffe Hall, Oxford, 2001
familyofmoon@aol.com; www.shroudofturinexhibition.com

In 2008 Pam bought life-sized replicas of the Shroud and created an exhibition. She has taken the exhibition to many venues in the UK and Ireland, including Westminster Cathedral, Dublin Pro-Cathedral and the Ahmadiyya Muslim event, the Jalsa Salana. Pam learned about the Shroud from her mother Margaret and she is interested in the profound impact the image can have on visitors.

Newman, Teresa [presentation found at www.custance.org, click on '2019 conference']

Self-taught artist, award-winning author. Retired.

Author of, *Follow the Light, the Shroud's Revelations*, Outskirts Press, Denver, CO. 2013.

followtheshroudslight@gmail.com

Teresa's book earned awards and/or honourable mentions in 2013, 2015 and 2017. She attributes her artistic abilities to her mother, who was an accomplished artist, and her father who held a Master of Physics. She questioned all mysteries ranging from Religion to Quantum Physics. Her first sight of the Shroud image in 1980 began her lifelong quest to understand the image on the Turin Shroud.

Osborn, Cathy [chapter 11, p. 136; chapter 12, p. 153]

B.S., Information Systems with a Minor in Accounting, 2017

Junior Accountant, Ellicottville, NY. Learning Coach and independent informal editor.

contact@shroudmysteryexplained.com

Accepted into the University at Buffalo School of Architecture, Cathy moved to the Western New York in 1989. Marriage and babies changed her course and she dove into homeschooling for more than 12 years. As a single mom, she earned her degree and is currently in the accounting field. In 2018, she connected with Jeffrey Skurka. Impressed by his research on the Turin Shroud, she captured his vision, and assists in editing his work and helping to facilitate presentations, marketing, and creating a website. Cathy has begun her own research pertaining to Sacred Geometry and the Shroud.

Oxley, Mark (papers read by Joe Marino) [chapter 26, p. 317; chapter 27, p. 323; chapter 28, p. 331]

MA, Dublin University, 1976; MBA, University of Zimbabwe, 1991

Fellow of the Institute of Directors, 1991, Honorary Life Member, Inst. of Directors Zimbabwe, 2016

Consultant, Oxley Consulting

mark.oxley@latilla.co.zw

Mark imports wine from South Africa for distribution in Zimbabwe, and provides consultancy services in corporate governance, business planning and private sector development. His interest in the Shroud began when he was a schoolboy at a Jesuit college in Harare, where he saw a film about

the Shroud made by Leonard Cheshire. He was further influenced by Ian Wilson's book *The Turin Shroud*. In the early 2000s he wrote a book, still unpublished, about St. Luke, and having completed that he decided to pursue his interest in the Shroud by writing *The Challenge of the Shroud*, 2010. Recently he developed a particular interest in the spiritual aspects and significance of the Shroud.

Rucker, Robert A. [chapter 7, p. 73; chapter 8, p. 87]

M.S., Nuclear Engineering, University of Michigan, 1971
robertarucker@yahoo.com; <http://www.shroudresearch.net>

Bob has worked in the nuclear industry for 38 years in nuclear reactor design, nuclear criticality safety, and statistical analysis of measurements for nuclear material inventories. He holds Professional Engineering (PE) certificates in nuclear engineering and in mechanical engineering. He has conducted independent research and has promoted the Shroud since 2014. He organized the International Conference on the Shroud of Turin (ICST-2017) held July 19-22, 2017, in Pasco, Washington. His several papers on the Shroud can be downloaded from his website at <http://www.shroudresearch.net/research.html>.

Skurka, Jeffrey [chapter 11, p. 136; chapter 12, p. 153]

B.S., Civil Engineering, Rutgers University, 1994
contact@shroudmysteryexplained.com

Jeffrey's professional engineering experience includes working on several nuclear projects in the USA. As a staunch skeptic Jeffrey was first introduced to the Turin Shroud when he was 17 years old. Many years later as he worked through calculations in nuclear physics when preparing for the National Fundamentals of Engineering Exam in 1994, he had several dreams which illuminated why the 1988 radiocarbon dating performed on the Turin Shroud was evidence of Christ's resurrection.

Stalley, Larry [chapter 25, p. 301]

B.A. in Biblical Languages, Greek and Hebrew, Harding University.
M.A. in Religion, Church History, Harding Graduate School of Theology, 1979.
Ordained, Church of Christ; Pastor for the Independent Christian Church in Spokane WA.
larrystalley@yahoo.com

Larry once thought that the Turin Shroud was a hoax, a fake relic. Something he read twelve to fifteen years ago changed his mind, and he has been fascinated by the Shroud ever since. He is convinced that the Shroud is God's gracious gift, the silent but powerful witness to the truthfulness of the Resurrection.

White, Cheryl [chapter 22, p. 260]

Ph.D. Northwest University (UK), 2000
Prof. of History, Louisiana State University, Hubert Humphreys Endowed Professor of History
Cheryl.white@lsus.edu; Website: cherylhwhitephd.com

Cheryl has taught medieval and early modern European history at LSU-Shreveport for 22 years. Her research interest in the Turin Shroud began nearly 30 years ago, with a primary focus on Shroud historicity and epistemology. She is an Ambassador for the American Confraternity of the Holy Shroud, and Curator of the Museum of the Holy Shroud, Shreveport, Louisiana.

Winchester, Janis [her paper was presented at the conference, but is not available]

BA University of Florida, 1969

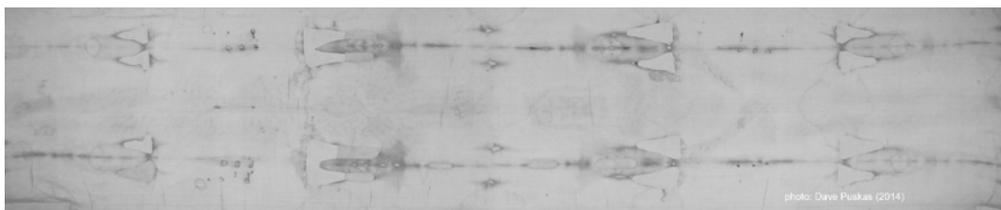
MSPA, The Florida State University, 1973

Forensic Scientist, Retired Fellow American Academy of Forensic Sciences, Life Member
American Society of Questioned Document Examiners, International Association for
Identification.

travelsandresearch@gmail.com

Janis studied the VP-8 Image Analyzer with Optical Engineer, Kevin Moran (1934-2019), and Pete Schumacher of Interpretation Systems, Inc, inventors of the VP-8 Image Analyzer. She also met with Shroud Researchers in Europe and the USA. She retired from the Florida Department of Law Enforcement after working 38 years as an Analyst in the Crime Laboratory and Training. Janis has viewed the Holy Shroud on display in Turin, the Sudarium in Oviedo, Spain, and the Holy Sepulcher. Although the VP-8 Analyzer has been replaced with digital technology, Janis is interested in how this device functions, and the unique 3D image it can create from a 2D photo of the image imprinted on the Holy Shroud.

Basic Holy Shroud Facts



Black and white digital photograph of the Holy Shroud life-sized replica that was purchased from Barrie Schwartz by Gary Chiang. Picture was taken by Dave Puskas, Ancaster, ON, Canada.

What it is:

- an ancient burial cloth (a shroud) approximately 4.4 by 1.1 metres (14 ft 5 in × 3 ft 7 in).
- a cloth made of flax fibrils woven in a three-to-one herringbone twill, a common weave that is used in fabrics such as jeans, chinos, furniture coverings, and bags.

Where it is:

- it is presently housed in St. John the Baptist Cathedral in Turin (a.k.a., Torino), Italy.
- until 2002, it was kept folded in a reliquary in the cathedral, and was unfolded for display on very few occasions.

- in 2002 it underwent cleaning and restoration and remains in the cathedral stored unfolded and lying flat under laminated bulletproof glass in an airtight case. The case remains covered and cannot be viewed unless permission is granted by the Pope.

Who owns it:

- the Savoy family, the previous Royal family of Italy until the Italian monarchy was dissolved after WWII, first obtained the Holy Shroud in 1464 when Duke Louis I of Savoy purchased it from Margaret de Charny. Historians continue to investigate how the Shroud came into her possession.
- in 1983, the exiled ex-King of Italy, Umberto II, died, and he willed the Holy Shroud to the Pope and the Pope's successors with the proviso that the Holy Shroud stays in Turin.

What does it look like:

- as seen in the photograph, the most visible feature on this cloth is a set of symmetrical burn marks and holes caused by fire damage in 1532.
- imprinted on the cloth is the faint ghostly image of the front and back of a man who displays the wounds that reflect, in every detail, the injuries that were inflicted on Jesus during his scourging and crucifixion.
- in 2002, the Holy Shroud underwent restoration and preservation, and appears essentially the same, but whiter with some of the marks and folds removed.

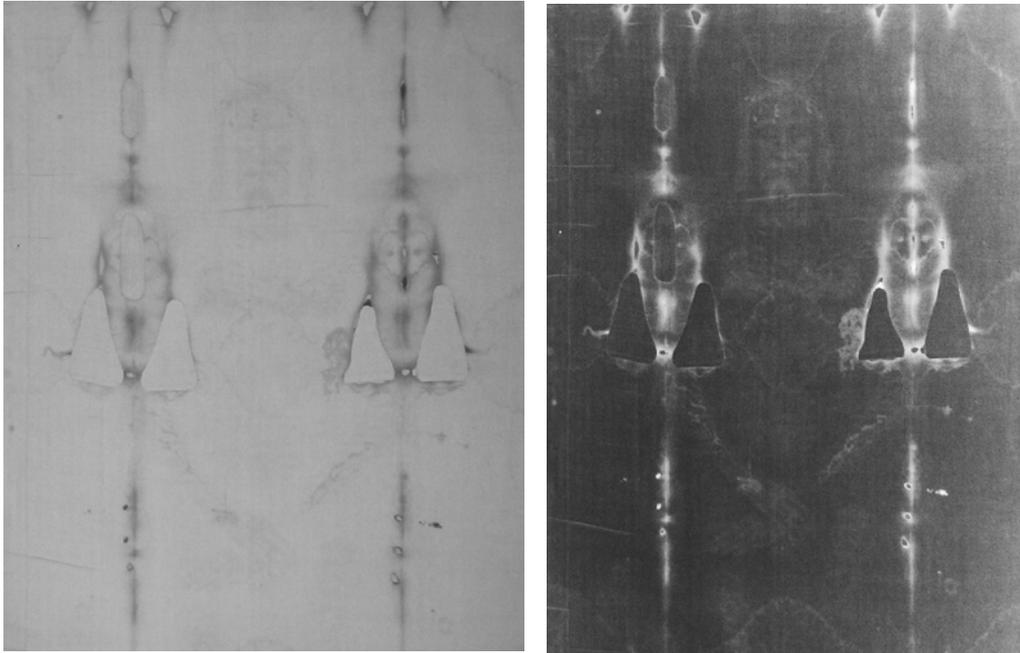
The Unique Photographic Property of the Image

Two photographs of the face and torso of the Man on the Shroud are presented below. The photograph on the left was captured by a digital camera, and shows the image as it appears on the Holy Shroud. If this image were created by film photography, this image would be referred to as the positive, or the real-life appearance of the object.

The right image is the result of using digital software to convert the left image into a dark image in which blacks and whites are inverted. It reveals a distinct picture of the man, a picture which even has 3D properties. This mysterious inverted image was captured in 1898 by Secondo Pia when he took the first photograph of the Shroud. With the film photography he used, the inverted image is known as the negative, and was captured by the film in his camera.

It is this unique, well-established, irrefutable fact that challenges the theory that the image is a medieval forgery. Anyone can verify this same fact by taking a

digital photograph of the left photograph below and inverting the image using photographic software. To be created by a medieval forger or counterfeiter that person would have had knowledge of film photography centuries before it was invented.



Gospel Account of the Crucifixion and Resurrection

The four gospels, Matthew, Mark, Luke and John, provide accounts of the crucifixion and resurrection of Jesus. Each describes events from their own perspective, and the accounts are not identical. Some Gospels may miss a point, but taken together, the following events occurred:

- Joseph goes to Pilate and boldly asks for the body of Jesus;
- Joseph, accompanied by Nicodemus and others, go to the cross;
- Joseph takes the body down from the cross;
- with the help of Nicodemus, Joseph wraps the body at the cross according to the tradition of the Jews. This tradition would include a cloth that covered the head before the body was wrapped for transport;
- the body was also wrapped with spices, and secured by strips of linen before being moved;
- the wrapped body was then taken to a nearby newly created tomb;
- the men's actions were observed by the women who saw what they did to the body.

At the point of placing the body in the tomb, the accounts stop only to pick up the story after the resurrection. There is no record of what happened in the tomb, but after the resurrection, the following occurred:

- the women who had witnessed what the men had done to the body, where it was laid, and the state in which it was left, returned as early as they could to treat the body with spices.
- they discovered the tomb empty and immediately went to tell the disciples.
- the disciples could not understand what the women were trying to tell them,
- but Peter and John raced to the tomb to see if the body was indeed missing.
- both discovered the tomb empty, and noted that they saw the strips of linen where the body had been, and that the cloth which had covered the head was folded and placed to one side.

The Gospels do not describe what happened in the tomb, but considering what the Gospels do say and what is presently known about the image on the Shroud, it is likely that the image was created in the tomb while the body was enveloped by the Shroud.

Formation of the Image

Of the numerous theories to explain the creation of the image on the cloth, the physical properties of the image itself indicate that it was created by some form of radiation, not by chemicals or vapours produced by a decomposing corpse. However, the moment when that radiation occurred is purely speculative. For many who believe in the resurrection, the burst coincides with the power which brought life back to the body. Several authors in this book accept the theory proposed by John Jackson that the burst of life also coincided with the body vanishing and the top of the cloth falling onto the stone slab. This theory explains some of the physical properties of the image, but it does not take into account biblical accounts of resurrections. For instance, when Lazarus rose from the dead, he was still covered by his grave wrappings [John 11:44] indicating that his body did not dematerialize with his resurrection. The resurrection of Jesus may have occurred in a similar fashion. The energy burst which imprinted the image on the Holy Shroud may be related to a transfiguration event, as described on the Mount of Transfiguration [Matt. 17:1; Mark 9:1; Luke 9:28]. Only this time, the transfiguration was permanent. In other words, it is possible that the image captured on the cloth was not that of a dead body, but one of a recently revived body just starting to rise from the stone slab on which it laid in the tomb.

It is also assumed that the energy burst involved a single release of energy. This, too, is an assumption. It may have involved a rapid discharge of several bursts of energy within a twinkling of an eye, each burst imprinting overlapping figures on the cloth as the body was in motion.

The physical facts of the image on the Holy Shroud eliminate various mechanisms for its creation, but since the mechanism remains unknown, it is important not to limit explanations to any particular theory. Our goal is not to promote a specific mechanism, but as A.C. Custance wrote, “We desire only, by opening up fresh views, to contribute light to minds of greater precision who may thus be enabled perhaps to hit upon the exact truth.”¹ Researchers who adhere to different theories are encouraged to dialogue openly in order to promote a continued investigation of the many wonders of this cloth.

What to Expect in this Book

Two years before this conference, I [Gary] approached Steven Studebaker, a professor of theology at McMaster University, to discuss how to encourage theologians to focus on the Holy Shroud as a way to integrate faith and science. He surprised me with two comments. First, he said he already believed in Jesus as his Lord and Saviour, so why would he be interested in the Holy Shroud. Second, he believed that by focusing on the Holy Shroud I was attempting to bring young-earth creationism into academia.

I was disappointed that a successful academic would hold such a bias, but I subsequently discovered that the Holy Shroud is, in fact, avoided by most academics, especially in North America. At the same time, I also applied for a government grant which encourages researchers to host academic conferences that would create new lines of enquiry. With the Custance Centre willing to cover more than half the costs, I felt confident in its success. However, that grant was unsuccessful with the only comment by a reviewer being “such a conference will never happen.”

In spite of this negativity, the conference did happen because the general interest in the Shroud far exceeds the lack of interest by academics. But it was not a typical academic conference. A few seasoned academics did attend, but most presentations were by those from various non-academic vocations who simply had a deep interest in sharing something about the Holy Shroud.

To encourage all lines of enquiry, the conference also welcomed skeptics. Interestingly, some Shroud researchers were concerned that the skeptics would sabotage the event. These concerns were alleviated once these researchers realized that interacting with a skeptic on neutral territory helps to hone their own ideas. Whether this honing occurred is not certain, but the anticipated battles with the skeptics never occurred, and rather than being confrontational, the interaction between participants of opposing views was very collegial.

Following each presentation, the Custance Centre collected anonymously written comments from the delegates. Each presenter was then asked to submit an

¹See p. 114, White, E.M., *The Biography of Arthur Custance*. Doorway Publications, Canada, 2007, www.custance.org

essay of their presentation taking into account the comments received. Not all papers submitted could be included in this book, and the reasons ranged from too little time to convert a slide presentation into an essay to the inability to meet the concerns of a reviewer. In total, 24 authors have contributed 31 chapters to this book. Some of the conference presentations and/or papers that are missing from the book can be found in electronic form on the conference web page (go to www.custance.org and click on '2019 conference').

What to expect? Almost anything ranging from a complicated statistical analysis of scientific data to personal accounts of how the image on the Holy Shroud can generate deep feelings. After editing all the chapters, they were then grouped into nine loosely-defined categories. Many of the chapters have content which falls into more than one category, so the reader should simply view the categories as a rough guide as to what to expect. As noted, the categories are 'loosely-defined.'

The chapters in this book cover a full range of thoughts. They give the novice an edited resource that offers a comprehensive account of the present state of knowledge regarding this most extensively studied object in human history.

Categories – Loosely Defined

I) SKEPTICS (chapters 1-3):

This book begins, as did the conference, with a skeptical view of the Holy Shroud, and we were privileged to be addressed by one of the world's leading skeptics Joe Nickell.² Joe graciously gave a presentation, but due to various constraints, his presentation did not become part of this book. Notwithstanding, Hugh Farey, a skeptic himself, has filled in this gap by providing what he considers to be the most updated data that refutes the Shroud's authenticity.



A special thanks to Giorgio Bracaglia (left), who carefully worked out the logistics, and during the conference drove between Canada and the US more than once to make it possible for Joe Nickell (right) to attend.

²Nickell is senior research fellow for the Committee for Skeptical Inquiry and writes regularly for their journal, the *Skeptical Inquirer*. He is also an associate dean of the Center for Inquiry Institute. He is the author or editor of over 30 books. We thank Giorgio Bracaglia for his efforts and generosity which made Joe's participation possible.

II) TRUE AGE OF THE SHROUD (chapters 4-6):

The radiocarbon dating results of 1988 deemed the Shroud to have originated sometime in the Middle Ages making it too young to have covered the body of Christ. Since this 1988 report, several issues have arisen to throw doubt on that date. The papers in this section challenge the radiocarbon dating on a number of levels. One suggests that the results on the sample received by the radiocarbon laboratory at Oxford University could have been misinterpreted and that the university has tried to avoid releasing incriminating information. Other papers provide evidence that the image of the Shroud was used as a template for creating icons long before its apparent medieval origin.

III) EXPLAINING EXCESS CARBON-14 (chapters 7-10):

Two popular theories to explain why the cloth contains enough C-14 to date it to the Middle Ages suggest that extraneous C-14 was added to it, either at the time of an energy burst in the tomb, or as a result of new material added during its history. In both cases, the amount of C-14 discovered by the three carbon-dating laboratories on the cloth is considered correct. The energy burst assumes that the samples used are a true representation of the cloth, and a miraculous event occurred which can be verified with new studies on the cloth. The added new material theory, which does not necessitate a miraculous event, assumes that the samples tested were not a true representation of the cloth. The last paper in this section cautions the use of uv photographs originally taken in 1973 as proof that the sample area was significantly different to the rest of the Shroud. It will be interesting to see if new insights will eventually resolve this difference in opinion among Shroud supporters.

IV) SUBATOMIC ASPECTS OF IMAGE FORMATION (chapters 11-13):

What do nuclear physics, the quantum properties of DNA, and Strange Quark Matter have to do with the formation of the image on the cloth? All explore the limits of physics and chemistry to provide some interesting clues.

V) EVALUATING OLD DATA WITH NEW TECHNIQUES (chapters 14-16):

The photographs taken by Enrie in 1931, and descriptions of the blood stains following the STURP 1978 investigation have been used to develop theories which support the authenticity of the Shroud. These papers re-examine this data and provide new insights into their significance.

VI) DIFFERENT APPROACHES TO EXPLORE THE IMAGE (chapters 17-20):

When it seems that every approach has been taken to study the image on the Shroud, new ideas still come to light. The image could be a form of a hologram as suggested by a medical imaging device that has been deemed pseudoscience; the image may have other images embedded within it. These images become visible

when the Face on the Shroud is photographed in a particular manner; the image could have been created by the source of energy that lights candles at the site of the tomb every Easter, an energy called the Holy Fire of Jerusalem. Since this image still puzzles science, these suggestions offer new ideas worth considering.

VII) THE SHROUD IN HISTORY (chapters 21-25):

The five papers here are quite diverse in nature, but each provides some form of historical perspective on the Shroud. For instance, the Shroud may not have been the Holy Mandylion, which is a popular theory suggested by Ian Wilson, and Paul's letter to the Galatians certainly suggests that he showed the Shroud to the Galatians. One paper also considers John Calvin's comments on the Shroud, which he may have confused with the Veronica cloth. Another describes the rise of the Veronica story which led to the Roman Catholic Church adding this story to the Stations of the Cross.

VIII) SCIENCE AND THEOLOGY (chapters 26-28):

This category includes three papers by Mark Oxley. He has attempted to bring Science and Theology together, and has suggested some guidelines that could help to promote interest in this particular facet of Shroud research.

IX) PERSONAL SPIRITUAL/SUPERNATURAL INSIGHTS (chapters 29-31):

What is usually overlooked at Shroud conferences is the effect that the Shroud has on the lives of individuals. Attention in Shroud research is focused primarily on the scientific and historical facts, and 'feelings' are considered a distraction. But the Shroud is more than an image on a cloth. It is a doorway into the spiritual world, and accounts of personal experiences should be encouraged. The three papers here are distinctly different, but each offers a view based on a personal, nonscientific experience.

Categories and their Chapters at-a-glance

| CATEGORY - loosely defined | Chapters | Chapter Page |
|---|----------|-------------------------|
| I) Skeptics | 1 to 3 | 1, 8, 12 |
| II) True age of the Shroud | 4 to 6 | 25, 40, 58 |
| III) Explaining excess carbon-14 | 7 to 10 | 73, 87, 101, 124 |
| IV) Subatomic aspects of image formation | 11 to 13 | 136, 153, 164 |
| V) Evaluating old data with new techniques | 14 to 16 | 179, 186, 201 |
| VI) Different approaches to exploring the image | 17 to 20 | 215, 224, 230, 242 |
| VII) The Holy Shroud in history | 21 to 25 | 250, 260, 273, 293, 301 |
| VIII) Science and Theology | 26 to 28 | 317, 323, 331 |
| IX) Personal spiritual/supernatural insights | 29 to 31 | 339, 347, 353 |



1. The Medieval Shroud

Hugh Farey

The 2019 International Conference on the Shroud was opened by Joe Nickell, who gave a detailed and entertaining resumé of his researches.¹ The present chapter was written at the request of the editors to cover some more recent research, such as that of Charles Freeman, Orit Shamir and myself. It explores the medieval context of the Shroud, support for a medieval provenance, and criticises some alleged 'authenticist' evidence. It is divided into five sections thus: What Was It For?, The Medieval Loom, Producing the Image, Recent Biblical Considerations and The Radiocarbon Dating.

1) What Was It For?

Assuming that the Shroud is medieval, one might also assume that it is a fake relic, designed entirely for the purpose of making money from credulous pilgrims. The dichotomy between sacred relic and profane falsification is a popular trope, but it does not stand up to any serious consideration. From its first appearance in the 1350s, the Shroud has been condemned by ardent Christians on the grounds that the image is not mentioned in the gospels, that it is the wrong shape and size, and, crucially, that it has no provenance. It simply appears out of nowhere, displayed by the canons of Lirey in the Geoffrey de Charny's Chapel of the Virgin Mary. No wonder Pope Clement VII repudiated it in such strong terms:

As long as an ostentation lasts, no capes, surplices, albs, copes or any other kind of ecclesiastical garments or accoutrements are to be worn, nor any of the solemnities usual to the ostentation of relics performed. Torches, candles and tapers must be kept to a minimum, and no other kind of illumination used instead. And throughout the display of the said image, whenever a large crowd of people has gathered, it is to be formally announced to them, in a loud, clear voice, with no obfuscation, that the image or representation before them is not the true Shroud of our Lord Jesus Christ, but a painting or canvas made in the form of or as a representation of the said Shroud, of our Lord Jesus Christ. (Pope Clement VII 'ad futuram rei memoriam', 6 January 1390, Bibliothèque Nationale, fonds Latin, ms. 10410)

But if it was not a "fake relic" originally, what was it? Walther Lipphardt, a German scholar of medieval Easter liturgy, may give us a clue. In his monumental, five-volume tome, *Lateinische Osterfeiern und Osterspiele*, he lists literally hundreds

¹Joe's report on his presentation is available at:
centerforinquiry.org/blog/yours-truly-didnt-disappear-khashoggi-like-at-turin-shroud-conference/

of versions of an extremely common quasi-dramatic liturgical interlude, during which three clerics dressed as holy women leave the high altar and approach a fourth, dressed as an angel, and sitting near an elaborately decorated niche in the North Transept containing a box representing the holy Sepulchre. The following dialogue ensues:

"Quem quaeritis in sepulchro, Christocolae?"

"Jesum Nazarenum crucifixum, O caelicolae."

"Non est hic. Surrexit sicut praedixerat. Ite, nuntiate quia surrexit de sepulchro."

"Whom do you seek in the tomb, Christians?"

"Jesus of Nazareth, who was crucified, O heavenly ones."

"He is not here. He has risen, as he foretold. Go, tell everyone he has risen from the tomb."

After this, the rubric specifies:

"Having said this, let him rise and lift the veil, and show them the place bare of the cross, and nothing but the shroud lying there, in which the cross had been wrapped. Seeing which, let them put down the thuribles they have brought to the Sepulchre, lift up the shroud and display it towards the clergy, and then, as if showing that the Lord was risen and no longer wrapped in it, they sing the antiphon: 'The Lord is risen from the tomb.' Then they place the cloth on the altar."

There must have been thousands of these shrouds, no doubt of different shapes, sizes, material and perhaps design, and it seems most likely that the Shroud of Turin was originally one of these. It is a great pity that as far as I know, it is the unique survivor of its genre.

2) The Medieval Loom

Gabriel Vial, Technical General Secretary of the Centre International d'Étude des Textiles Anciens (CIETA) examined the Shroud in 1988. He was certain that the Shroud had been woven on a four-shaft treadle loom, and slightly dismissive of those who had claimed to have found similar textiles from ancient times.

So far every example studied – and these have come from Pompeii, Antinoe, Palmyra, Cologne, Dura-Europos – has been radically different from the Shroud, both from the point of view of the structure (2/2 twill as opposed to 3/1) and the materials used (wool and silk rather than linen). We have to look to the 16th century to find the first example of linen chevron weaving with a 3/1 twill structure, found in the canvas of a painting in Herentals (Belgium).

Taking into account the constituent elements of any textile (material, structure, warp and weft density), the textile of which the Shroud is composed is unlike anything presently known to date prior to the 16th century.²

In an attempt to demonstrate that the Shroud could have been woven in the 1st century, numerous fragments of cloth have been adduced, with twill or damask weave, from various archaeological sites such as Masada and Mons Claudianus. However, it is clear that these were woven "line-by-line," either with each weft-thread being individually threaded through the warp "over two, under two, over one, under one" or whatever, or with the 'shed' set up on one or two shafts, which were lifted successively to create different sheds. However, the Shroud must have been woven on a loom with four shafts, and every warp thread set up on them in advance of weaving. The shafts were then lifted alternately in order, producing the correct sheds for herringbone to appear almost as fast as plain weave. These looms were wholly unknown to the 1st century Middle East, and only appeared west of India about a thousand years later. Although the possibility that the Shroud could have been made in the Roman Middle East has been supported by a couple of experts in modern and medieval textiles (such as John Tyrer and Mechthild Flury-Lemberg), those who have devoted their studies to the period and place in question, notably Hero Granger-Taylor and Orit Shamir, are in no doubt that such speculation is too remote to be tenable.

Particular evidence for the type of loom is in the weaving errors that appear on the Shroud. If, instead of attaching each warp thread to the shafts in the order 1-2-3-4 1-2-3-4 1-2-3-4, an inadvertent miscount such as 1-3-2-4 had occurred, a small kink would appear in the regular VVVV of the herringbone, and persist throughout the length of the cloth. This occurs several times in the Shroud, and is exactly what we would expect of a four-shaft loom, but not of a line-by-line set-up. Furthermore, while each 'rib' of the herringbone is nominally 40 threads wide, there are a few which are 44 or 36, exactly four threads more or less, suggesting a miscount of the number of 1-2-3-4s. Again, this speaks powerfully in evidence of a four-shaft loom.

Herringbone canvas was popular among late medieval and renaissance artists because of its dense, smooth surface and resistance to distortion. It would have been an ideal surface for imprinting the Shroud image.

3. Producing the Image

Whether you are a skeptic or believe that the Shroud is authentic, how the image was created remains the million-dollar question. Various explorations have been made into the possibilities of an artist's painting, printing, or imprinting in the 13th or 14th century, others into the possible effect a dead, tortured, crucified body

²Vial, Gabriel, 'Shrouded in Mystery', HALI (The International Magazine of Fine Carpets and Textiles), Issue 49, 1990.

might naturally have on its wrapping, and others to the possible effects of radiation from a miraculous resurrection in the 1st century. None have been wholly satisfactory in fulfilling conventional criteria for credibility.

One of the reasons for this lies in the vagueness of the conventional criteria. The most precise descriptions of the surface fibres of the Shroud are given by John Heller and Alan Adler, who were working largely from samples washed clean of any adherent particles – which is probably the reason they disagreed so much with Walter McCrone, who studied them at greater length in position in their tape matrix. In terms of whole threads, some insist that the image lies only on the very crests of the threads, and others that it extends into the crevices where one thread overlies another. Some insist that the Shroud "must have been" horizontal, others that it "must have been" loosely draped, and still others that it "must have been" wrapped around, and bound to, the body. Any attempt to achieve a similar image can easily be falsified by anybody who prefers a different explanation, artistic, natural or miraculous, or a different description of the image specification.

However, it does seem that the image is superficial, and at least primarily composed of a coloured chemical change to the linen itself, and not a particulate pigment. This could be achieved by imprinting rather than painting, in the style of a wood block, which was a relatively recent invention in the late thirteenth century, and using a dye or stain rather than a paint. Investigations using red ochre and vermilion have not met the 'no pigment' criterion, but little research has been carried out into dyes which chemically change the surface of the substrate. Oak-gall ink and similar tannins, Brazil wood and iron acetate would all be worth experimenting with. Garlaschelli achieved some degradation by using a 1% solution of sulphuric acid as the medium for some paint, although vinegar would be a more typical medieval acid. It may be relevant that some early liturgies prescribed the washing of the figure of Christ in wine before it was laid in the Easter Sepulchre. Experiments using these materials, and different methods, such as painting, powdering, stenciling or imprinting are ongoing, and achieving slow but encouraging progress towards a definitive method of production.

By contrast, attempts to produce the image by 'natural' means, using the physical and chemical properties of a dead body, perhaps smeared with ointments, and a linen cloth, sometimes itself prepared with chemicals such as starch, dextrin, myrrh and aloes, have proved so unsatisfactory that further experimentation has been abandoned. Only 'miraculous' methods are still being explored by those seeking a first century origin. These have largely alienated many adherents of authenticity.

4. Recent Biblical Considerations

In general, the Bible has largely been referred to in connection with the anomalous use of the word "othonia," in the Gospel of John. Some interpreters

insist that its meaning, essentially 'strips', definitely excludes a large sheet as a burial cloth, while others claim that it is compatible with the "sindon" used by the synoptic gospels. Some reference is often made to the resurrection of Lazarus, who also appears to have been wrapped with 'strips.'

However, there are other biblical considerations, which militate against the Shroud as a relic. Relics are of the dead, and for six weeks after his Resurrection, Jesus was, according to the New Testament and all subsequent Christian Tradition, very much alive. He had 'recovered' from death, just as one might recover from an illness. The trappings of his 'temporary indisposition' were of no significance, and there was no reason why anybody should preserve them. The cross, nails, the crown of thorns and seamless tunic and other mementoes of Jesus's suffering and death were all discarded (all to be 'rediscovered' hundreds of years later), so there is no reason why some unclean grave wrappings should have been, uniquely, preserved. There is nothing in the New Testament to suggest any interest in such mementos, let alone that they actually existed. A word in St. Paul's letter to the Galatians, *proegraphie*, has sometimes been seized upon possibly to refer to some kind of picture, but this is etymologically too far-fetched to be credible. [Editors' note: see chapter 25 for another opinion of what Paul means in Galatians 3:1]

Recently, 'radiation' hypotheses of image-formation have gained considerable popularity among believers in authenticity. Bursts of light, ultraviolet or infrared, or nuclear radiation of protons or electrons have all been suggested, the source of such emanation being unequivocally miraculous. The body of Christ is supposed to have moved from within the Shroud to the outside of the tomb by becoming 'mechanically transparent', or 'disintegrating', or being 'transported into a different dimension' or some other variation of teleportation.

Although at first sight it seems perfectly sensible to imagine this kind of resurrection, it is instructive to look at the other five resurrections described in the New Testament, not to mention the hundreds that have reputedly occurred to holy men and women since. In no case is any dematerialisation of any kind described. The son of the widow of Nain [Luke 7:15], the little girl 'Talitha' [Mark 5:41], and Lazarus [Mark 11:44] simply rose as if from sleep. Resurrection, it seems, does not require, nor was it manifested, in any more spectacular fashion than the event itself.

It has been argued that Jesus's resurrection, and complete triumph over death, had every reason to be more spectacular, but in fact the opposite is true. The whole point of a miracle was demonstration, and at Jesus's resurrection, there was no one to demonstrate anything to. There were witnesses to a dead Christ, and witnesses to a living one, but of the transition from one to the other, nothing was observed, and nothing is written.

5) The Radiocarbon Dating

This has been challenged on numerous grounds, mostly mutually incompatible, and they can't all be correct. Claims that the dating was skewed by surface contamination of one kind or another, such as a bio plastic film or simply the sebaceous secretions of sweaty clerics, have largely been discredited, on the grounds that there would need to be more contamination than there is cloth, and the conspiracy theories of Bruno Bonnet-Eymard and Stephen E. Jones have failed to attract noticeable support. The current front runners, invisible mending and subatomic radiation, are particularly incompatible, in that if the medieval date is explained by the interpolation of more modern material, then enrichment by atomic radiation would be unnecessary, and vice versa. However, it should be noted that both these hypotheses assume that the dates determined by the radiocarbon labs in 1988 are essentially reliable. After all, if those results were meaningless, then there would be no need to explain a medieval date at all.

Nevertheless, a recent paper by Tristan Casabianca has endeavoured to claim that since the various measurements by the laboratories showed inhomogeneity, it would be better to discard them altogether. This view has been taken up enthusiastically by journalist Myra Adams and widely disseminated on the internet.

However, in spite of some earnest statistical manipulation, the raw data from the radiocarbon tests has really only served to clarify some anomalies noticed by the British Museum, not to repudiate the results. The paper published in *Nature* notices that "The spread of the measurements for sample 1 [the Shroud] is somewhat greater than would be expected from the errors quoted" and decides that "it is unlikely that the errors quoted by the laboratories for sample 1 fully reflect the overall scatter." It is the opinion of several 'authenticist' statisticians that a fuller investigation into the anomaly should have been carried out, and even that it was 'criminally negligent' not to have done so, but the fact remains that twelve tiny pieces of the Shroud were tested several times, and all of them found to have between 90.5% and 93.5% of their 'original' radiocarbon content, corresponding to the 13th century, and not around 75%, which would demonstrate a 1st century provenance.

Even using the data from *Nature*, Marco Riani and Anthony Atkinson discovered a probable chronological gradient along the strip cut off for sampling, the part nearest the end of the Shroud being some years older than the part closer to the middle. It is this gradient which has been confirmed by Tristan Casabianca, and which fully explains the fact that "the spread of the measurements" is greater than might be expected from an entirely homogeneous cloth.

CONCLUSION

It has to be said that the correct justification for asserting the authenticity of the Shroud is the chief bone of contention among those who believe it to be the burial cloth of Jesus. Some Christians, of course, have no difficulty with the possibility of a miraculous origin for the image, but there are many adherents of authenticity, even Christians, who do not accept a miraculous origin. There are also, of course the Ahmadiyya Moslems, who believe that the Shroud is authentic, but that it shows the imprint of a living man. The repudiation of the radiocarbon dating is just as divisive. Those who think they detect interpolation (headed by Joe Marino) think that the area was a mixture of ancient and medieval material, while those who believe in enrichment by nuclear radiation (headed by Robert Rucker) think that the area is homogenous. Since both are explanations for a medieval date, they assume that the published findings are accurate for the samples tested, while Tristan Casabianca claims that the data recently released by the British Museum render them wholly unreliable.

The only points that authenticists all agree on is the suggestion that some of the pollen, and a few specks of dust on the Shroud come exclusively from Jerusalem. The first was comprehensively discredited by Avinoam Danin, Israel's foremost botanist, and the second is equally inconclusive in view of the fact that aragonite is common all over Europe, not least from Champagne to Chambéry.

In contrast to this muddle, the evidence for a medieval origin for the Shroud is remarkably consistent. The radiocarbon date, the pictorial evidence of the pilgrim badges, the letter from Bishop d'Arcis to the Pope, the introduction of the four-shaft loom, the proliferation of the *Quem Quaeritis* Easter liturgy, the popularity of wood-block printing, even the emergence of holy blood cults and the popularity of the Mass of St. Gregory – all these point squarely to the late middle ages.



2. Radiocarbon: Raw Data to Calendar Dates

Hugh Farey

Shortly after the WWII, Willard Libby recognised that the radioactive decay of an isotope of carbon (Carbon-14) could be used to date archaeological artifacts. Living things, by their continuous interaction with the atmosphere, maintain a more-or-less fixed proportion of the unstable Carbon-14 to the stable Carbon-12, but when they die, this proportion decreases with imperturbable regularity. The half-life of radiocarbon is 5730 years, so that a proportion of 50% of the original corresponds to an age of 5730 years, 25% to twice that, and so on. The equations for determining the remaining proportion of radiocarbon for a given date, and vice versa, are:

$$P = 2^{(-T/h)} \quad \text{and conversely} \quad T = -h \times \log_{10}(P) / \log_{10}(2)$$

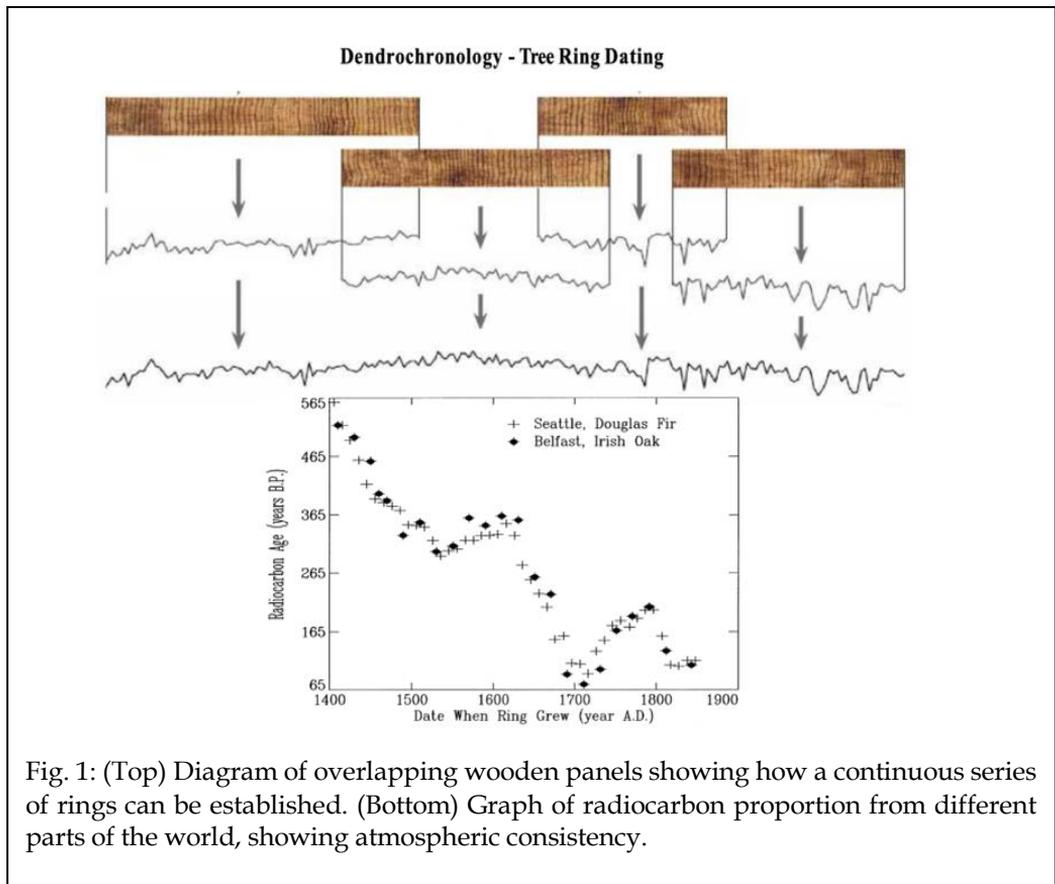
where P is the proportion of "old" to "current" radiocarbon, T is the time since the decay began (the death of the organism), and h is the C-14 half-life of 5730 years.

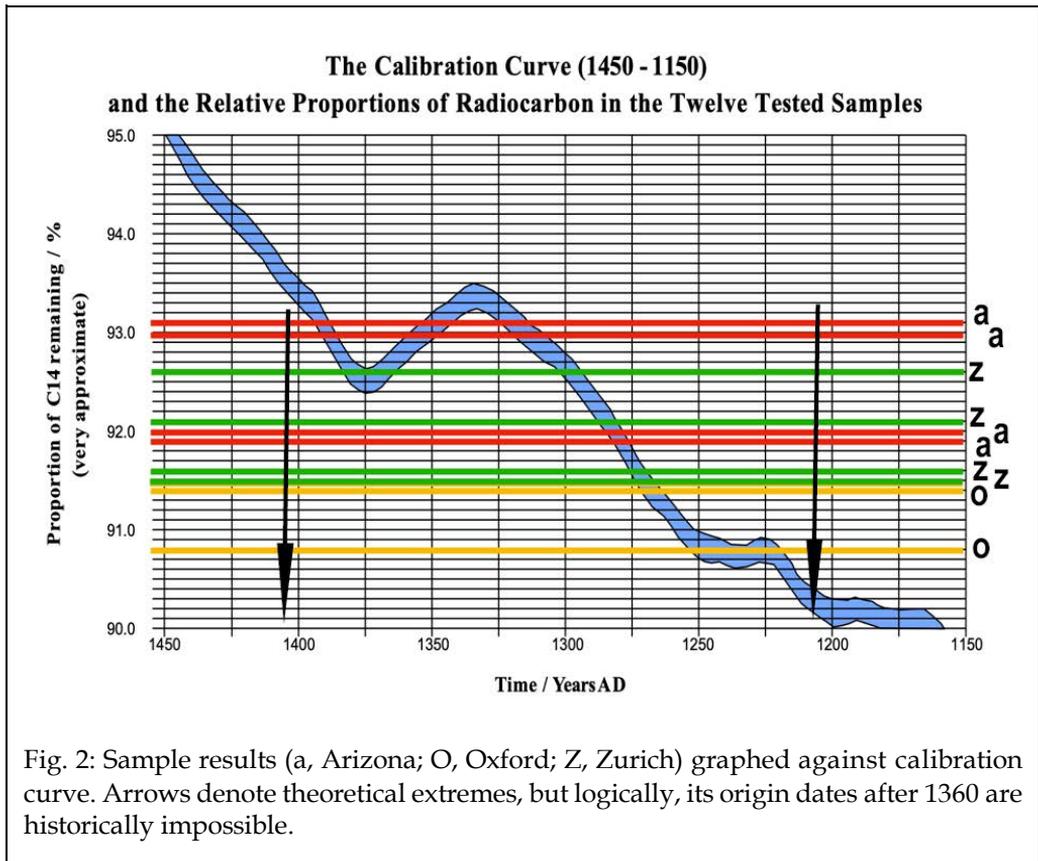
This 'clock' would work perfectly were it not that the concentration of radiocarbon in the atmosphere has varied over time (though at any given time, the proportions of the constituents of the atmosphere are very consistent all over the world). That being so, there is not an exact correspondence between the measured decay and the calendar age of the sample. During the atomic bomb tests of the 1950s, atmospheric radiocarbon rose so high that artifacts from that time sometimes appear to date far into the future, and fluctuations during the 14th century mean that a calculated proportion of, say, 92.5% old ratio/new ratio can indicate three different possible dates.

The conversion from the theoretical date based on measurement to an actual calendar date is achieved by dendrochronology, the technique of overlapping matching tree-ring patterns from wood samples of increasing antiquity. Beginning with a living tree, rings from every year to ancient history have been precisely identified, and the radiocarbon associated with them measured. While the pattern of the tree-rings, thanks to the vagaries of local weather, varies from place to place, experiments have shown that for any given year the radiocarbon proportion has been remarkably constant across the globe. Now that the radiocarbon proportions of hundreds of tree-ring samples of known age have been determined, an accurate calibration curve has been obtained (Figure 1). The part of the curve that covers the late middle ages has a prominent kink (Figure 2).

The sample removed from the Shroud in 1988 was divided and given to three radiocarbon dating laboratories. The Arizona laboratory cut their piece of the sample into six but only measured four of them. Zurich cut theirs into five and Oxford theirs into three. Their results illustrate a statistical conundrum. Two of the

Arizona pieces and one of the Zurich pieces all intercept the calibration chart at three different dates. Two of these dates can be discounted historically as the Shroud is known to have been exhibited before then, providing a *terminus ante quem*, which is usually ignored in statistical calculations. The sample with the greatest remaining proportion of radiocarbon, and the youngest age, is one from Arizona, corresponding to the years 1325, 1345 and 1395. The third of these, 1395, is of course historically impossible, as the Shroud is known to have existed in 1360, at least (Figure 2). Taking experimental error into account, the range is from 1310 to 1400, but since the Shroud first appears in 1354, the years from 1360 to 1400 that postdate the first appearance, should be excluded from a historical possibility (Figure 2).





The sample with the smallest remaining proportion of radiocarbon came from Oxford, corresponding to about 1240, with a range of 20 possible years either side.

Collating the dates achieved for the twelve individual samples was less simple than it might be supposed, and the process has been much criticised statistically. The final mean was the result of several 'averages of averages,' the calculation of which, especially their errors, is not explained sufficiently in the paper published in *Nature* so as to be free of accusations of incompetence or fraud, although neither can be sustained on the evidence. The final date 'Before Present' was 691, corresponding to the Calendar Year 1286. Unfortunately, when the error of plus or minus 31 is considered, the range is not simply 31 years earlier or later than 1286, i.e., 1255 to 1317, but technically includes another section of the calibration curve, namely 1357 to 1389. Although we know that this section is historically impossible, it was included in the final result, rounded to 1260 to 1390. However, the intervening years 1320 to 1350 cannot be included. A more sensible estimate of the radiocarbon findings would be from 1210 to 1320, or 1265 ± 45 .

The new data released by the British Museum to Tristan Casabianca does little to clarify the matter. The Oxford papers do not say how many times each sample was tested nor what the individual test results were. The Zurich papers say that each sample was tested forty times, but do not give individual results. The Arizona papers show that their samples were tested ten times each, and give measurements of 'Counts,' '14/13' and 'SPL/MOD,' for each one and for control samples, but how they relate is not explained and not easy to derive.

Suffice it to say that all twelve samples fall within the hundred years prior to the known appearance of the Shroud in Lirey. This can be compared with the alleged dates of the two radiocarbon tests of the Sudarium of Oviedo, which correspond closely to the documented arrival of its reliquary in Oviedo in 718, although the contents of this reliquary were not itemized until three hundred years later (Figure 3).

Attempts completely to discredit the radiocarbon date rely on outright fraud, surface contamination, reweaving with a more modern thread and C-14 enrichment by nuclear radiation, although none of these have found universal acceptance. Attempts to demonstrate that the results are statistically unsound are more credible, and there is reasonable evidence to suggest a chronological gradient along the sample strip, but I believe that they have minimal effect on the overall medieval conclusion.

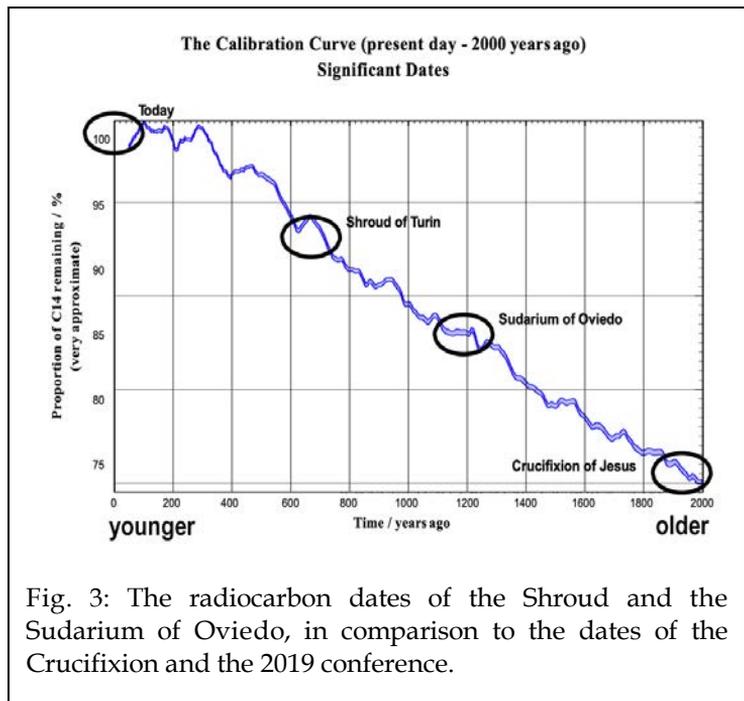


Fig. 3: The radiocarbon dates of the Shroud and the Sudarium of Oviedo, in comparison to the dates of the Crucifixion and the 2019 conference.



3. The Vignon Markings Myth

Hugh Farey

In 1939 Paul Vignon, Professor of the Catholic Institute in Paris, published his second book on the Shroud, *Le Saint Suaire de Turin, devant la Science, l'Archéologie, l'Histoire, l'Iconographie, la Logique*. A large format, greatly-expanded successor to his first book, *Le Linceul du Christ, Etude Scientifique*, from 1902, has never been published in English, which is no doubt why his research into the early artwork he thought was derived from the Shroud is so comprehensively misunderstood.

The book is divided into three parts, dealing with the image on the Shroud itself, its history, and finally Vignon's pictorial research. This part is entitled "*Iconography to the Aid of the Inconclusive Texts*," and "*A sketch of the iconography derived from the Shroud*." After a preamble discussing whether Christ had a beard or not (whose conclusion is, unsurprisingly, that he did), Chapter 1 looks at the Image of Edessa, concluding that it was derived from the Shroud, and how Vignon himself could produce a similar image, even reproducing small errors due to the imprecision of the marks on the Shroud itself:

It was necessary to remove the wounds and blood, to open the eyes, and to remodel the rather too prominent nose. For the rest, we could just copy: but although we would copy according to careful interpretation, we would actually make a whole series of errors. In my version, I make the same mistakes, as I am putting myself in their place, but the difference is that I know I'm making them.

The standard image of the Vignon markings, an interpretation by his friend and disciple Edward Wuenschel, includes some marks which Vignon himself does not mention, such as the detached threads of hair at the peak of the forehead and two extra, triangular, supranasal markings. Perhaps the most surprising thing about Vignon's observations is that he did not apply them to images of Christ alone. Quite the reverse. It was his contention that the whole of Byzantine religious art owed its facial iconography ultimately to the Shroud, via the Image of Edessa, and his illustrations demonstrating this include apostles, saints, bishops and even emperors. Thus he begins his defence of his thesis with the dome of the Neon Baptistry in Ravenna, from the mid 5th century, very shortly after the Image of Edessa was first known (Figures 1-3).

Around the centre of the dome, the Apostles process around Christ who is being baptised by the Forerunner. Neither Jesus nor John the Baptist here are of the lineage of the Shroud. But it is different for some of the Apostles: Andrew, James the Greater, Simon Peter and especially Paul. As I understand it, Christ and the Forerunner were placed here in about 458, at a time when no copy of the Mandylion, derived from the so-called picture painted by the envoy of Abgar had yet reached Ravenna. But soon

models arrived, and some of the Apostles were marked with the sign of Christ; not all, because one wouldn't want to overdo it.



Fig. 1: The Dome of the Neon Baptistry, Ravenna.

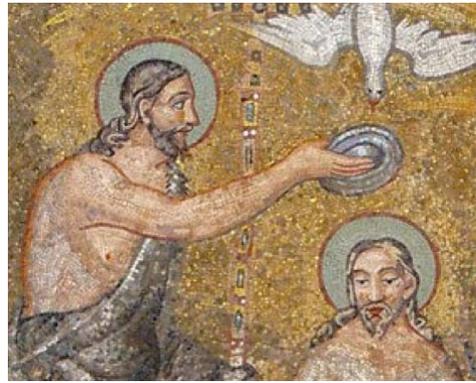


Fig. 2: Enlargement of John the Baptiste baptizing Christ as depicted in the Dome shown in Figure 1.



Fig. 3: Enlargements of the faces of St. Andrew, St. James the Greater, St. Peter and St. Paul as depicted in the Dome shown in Figure 1.

In Ravenna, things to look out for include the supranasal square, the moustaches (left and right) separated and a distinct 'nasolabial furrow' (what we would call a philtrum), eccentric marks on the forehead and cheeks, and a distinct clear area on the top of the chin. Where these are present, the image is clearly derived from the 'model,' where they are not, then they have been deliberately omitted for one reason or another. I do not find this type of assessment very convincing.

Vignon continues his survey, using figures from the Church of Saints Cosmas and Damian in Rome (St. Cosmas, St. Peter and St. Theodore), and the Euphrasian Basilica in Istria, Croatia (Bishop Euphrasius, Archdeacon Claudius and St. John the Baptist) as examples (Figures 4, 5). This is what he says of Sts Cosmas and Damien:

The most faithful to the Shroud is St. Cosmas, on the right. Although his supranasal square is rounded at the base, it is at least visible. The transverse shading across the forehead has lost definition, but broadly maintains its shape. The supra-orbital arches are clear and precise. The indentation below the nose is lost beneath insufficiently separated moustaches, but that's not serious. The top of the chin is a clear horseshoe, with a darker stain between its wings. [...] Now let's move onto St. Peter, on the left. See for yourself how, if the frontal arches are here less prominent, the supranasal square is firmer. The forehead wrinkles are a standard adaptation of the transverse shadow. Classic rings exist under the eyes. The nasolabial fold is obvious. In spite of the whiteness of this beard, the underside of the mouth and the chin still conform to the rule.



Fig. 4: The Church of St. Cosmas and St. Damian, Rome. On left are St. Peter and St. Cosmas. On right is Christ.



Fig. 5: The Euphrasian Basilica, Porec, Croatia.

Pictured here are St. Euphrasius (far left), and St. John.

Christ, in the Church of Saints Cosmas and Damian, is less satisfactory, but does have a representative chin.

As for the bright top of the chin, it is as hairless as if it had been deliberately shaved! Why, on this mosaic, does a special type of tessera ensure that an unquestionably hairless area dominates the centre of an otherwise abundant beard, unless the guidance of the Shroud was being slavishly followed?

In Croatia, in the Euphrasian Basilica, the brows of the bishop Euphrasius and his neighbour Archdeacon Claudius are similar to that of St. Peter; with an extra degree of stylisation for the bishop, for whom the supranasal square is now set as part of two lines. [...] In the same apse, St. John the Baptist ignores the Shroud as far as the forehead is concerned, but reverts to convention on the chin, the mouth and the moustache [...] Anything can be allowed along the lineage, provided that there is at least here or there an act of visible conformity.

Vignon's next section goes into more detail of one particular 'line of descent' from the Shroud, beginning with the Christ of the fresco of Christ in the Catacomb of St. Pontianus (Figure 6). In spite of its differences (which he considers trivial) Vignon considers it very close to a first generation copy of the Shroud. He is particularly interested in the 'supranasal square', in actuality a barely discernible three-sided irregularity in the cloth just between the eyebrows, which he considers has:

a deliberate lack of anatomical significance, the blatant futility of what would seem to us to be a bizarre ornament, if we didn't know that it shows one of the most significant of the 'accidents' found on the shroud itself.

The exaggerated confidence of this statement has echoed unchallenged through the annals of Shroud mythology, when a mere glimpse of a set of portraits will reveal that such a three-sided square is far more an obvious feature of elderly men with wrinkles than it is of the Shroud (Figure 7).

Apart from the distinctive 'supranasal square,' he pays particular attention to the curved band across the forehead, which he thinks derives from the Shroud, and is repeated, more or less accurately,



Fig. 6: Christ in Catacomb.



Fig. 7: British actor, Hugh Laurie, shows a prominent supranasal square.

in dozens of images derived from this one. Unfortunately, as we will see, he destroys his own argument by over generalization. Almost every forehead in every portrait has some variation in shading, even if it is a photograph, but according to Vignon, they are all derived from the vague discolouration on the Shroud.

In the church of Hagia Sophia in Thessalonica, another parade of apostles circles Christ in the centre of the dome. These two attracted Vignon's attention (Figure 8).

My figure shows the upper body of two of these apostles. Copying Christ, the transverse brow mark, shaped like a sabre-blade, ends in the shadow derived from the daylight shining from the left. The apostle on the right maintains a trace of supranasal square, but a hook-shaped shadow on his cheek is very marked. As for the philtrum, it is missing on one of the apostles [...] but very thick on the other. [...] This all goes to demonstrate the care artists took to vary the individual figures within the bounds of the overall canon.



Fig. 8: Church of Hagia Sophia, Thessalonika. Two apostles.

Having explored the lineage of the fresco of St. Pontianus, Vignon starts again with the mosaic of Christ Pantocrator in the Church of St. Ambrose in Milan (Figure 9). Although it is generally dated to the early 13th century, Vignon cannot believe it is so late, and he may be correct, although it has been extensively restored.

What strikes me is how faithful this Christ is to the Shroud in many respects, which cannot in general be claimed of mosaics of the twelfth century.

But characteristically, Vignon immediately points out all the differences this image has from the Shroud, such as the deeply indented curve across the brow, leaving almost no space for the eyebrows or the supranasal square. However these differences, he thinks, are completely outweighed by some

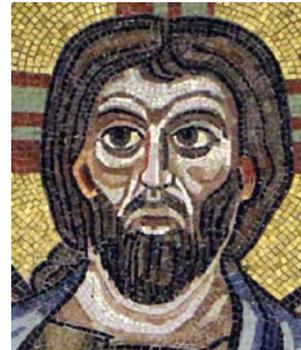


Fig. 9: Church of St. Ambrose, Milan.

astonishing similarities, such as the marks on the cheeks, which exactly reproduce the equivalent marks on the shroud—although one is a bit too low and each has been curled upwards to point at a corner of an eye. The angles at which the moustaches are cut off are exactly correct, but the shadow under the lip is too thick. But for the clear space on the top of the chin, well apart from the irregularity of its shape... :

... It would be absurd to imagine that this, with the beard, does not derive from a peculiarity of the Shroud.

The beard, it is true, is not properly forked, probably so to properly balance the weight of the hair, but the long tresses on either side are almost perfect, the one on the right being wavy compared to the one on the left, as well as being tucked behind the neck.

In short, the Christ of Milan must have been copied from a first class model.

Frankly, this conjecture is a little less than fantastical wish-fulfilment, but blithely ignoring all the contradictions he himself notices, Vignon doggedly pursues his theme. Any resemblance to the Shroud, in any image, is incontrovertible evidence that the latter must derive from the former, while any difference, however gross, is incidental.

For Vignon, even the Battle Flag of Ivan the Terrible, from the 16th century, was clearly derived from the Shroud, with its sharply truncated moustaches and shadow under the lower lip (Figure 10). So to was the Emperor Nicephorus III, as we can tell by the dark circles under the eyes. Christ himself, crowning the Emperor, is more subtly drawn, but they both have similar eyebrows, similar noses, and faint marks depicting the supranasal square (Figure 11).

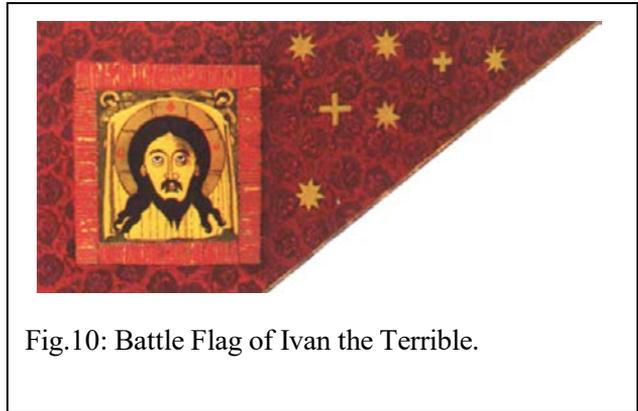


Fig.10: Battle Flag of Ivan the Terrible.

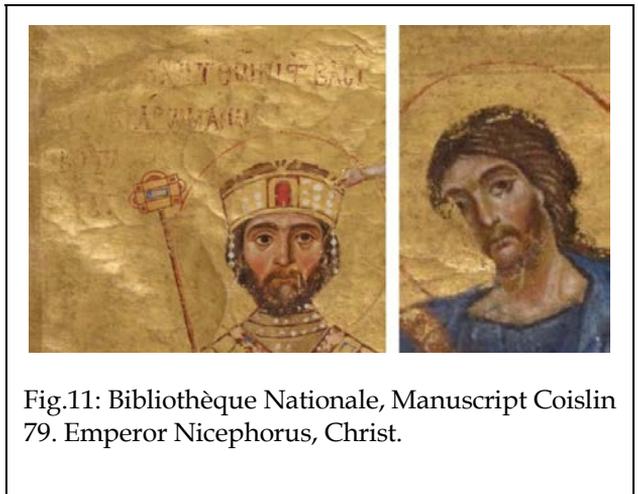


Fig.11: Bibliothèque Nationale, Manuscript Coislin 79. Emperor Nicephorus, Christ.

And so the Procession of Witnesses marches on. Every artist painting Christ or his associates for hundreds of years had a databank of characteristics to draw on, such that a forehead with a shadow that curves up, or down, or is indented in the middle; which reaches the hair on the left, or right, or not at all; distinct arches over the eyebrows, or not; bags under the eyes, shadows under the cheekbones, irregular, symmetrical or missing altogether; divided moustaches and beard, or one or the other, or neither, and especially a bare top of the chin; all these are clear indications that the image is derived from the Shroud. For page after page, Vignon comments on example after example in a very similar way, pointing out details which to him seem incontestable, but always, in all fairness, also pointing out aspects which it seems cannot. Less fairly, these digressions are all explained away to inconsequentiality. Nevertheless, his writing is enthusiastic, even exuberant, and quite colloquial, which makes his book an entertaining read. Here is the mosaic of Christ healing a sick woman:

Having already established the descent of all this iconography from the Shroud, it is no longer necessary for us to describe Christ, who, hardly surprisingly at the head of his apostles, is reaching out to heal the crippled woman. [Footnote: Except perhaps to observe that the split in his beard is slightly left of centre] What is important here is to show how the disciples also have some of the characteristics derived from their master's death mask. This will at first seem doubtful, especially as three of them are clean shaven, but look at their foreheads—there are traces of the classic model there; and the curves under their eyes, especially St. John's right eye; and on the cheek of the man on the extreme left, the mark on his cheek. Two of his neighbours just behind have similar marks.

Now for the ones with beards. The man on the left of the second row has a lower lip and chin very like Christ's, and the man in the middle of the third row has moustaches in exactly the same place as his neighbour would have them, if they hadn't been lost and replaced with shadows.

But it is St. Peter who interests me most. Although his beard reaches right up to his mouth, the two clear areas we see so often under the mouth are not obscured, but delineated by it. Compare this to Christ. And then St. Peter's beard defines the typical chin, eventually wrapping round it with an elegance the mosaicist should be proud of. Next



Fig.12: Monreale Cathedral, Palermo, Sicily. Christ healing the bleeding woman.

to him is a man whose chin is so narrow the lighter areas above it disappear and the beard just flows down freely (Figure 12).

And so Vignon continues. The method is always the same, the Shroud is always the model from which these unconscious departures are made, expressing the joy and creativity of the artist, without being constricted into icy immobility.

And at the end of the section, Vignon reviews two figures from the altar panel showing the Redeemer between the Virgin and Three Saints, painted in 1271, by Meliore di Jacopo "Toscano," in the Uffizi Gallery in Florence (Figure 13).

Finally, I shall look at two strong witnesses, neither well known, but both from one and the same work of art, by the curious 13th century Italian artist Meliore Toscano. [...] Original in

its composition and colours, this work is more important to us in the way in which Christ and Saint Paul derive from the Shroud, not only each one differently, but both differently from all the other mosaics, paintings, or miniatures studied by us so far.

Let's look at Christ first. On his forehead, I don't want to over stress the curious olive-shaped, or strangely evolved "supranasal square," which by echoing the garnet cabochons of the halo becomes an integral part of the design. No, what matters to me is the incredible furrow dug vertically into the brow, interpreting a dark shadow in the same place on the Shroud. Then leading to this furrow, the little white slanting lines are also not without justification in the Shroud, which has pale areas on either side of the dark shadow, slanting down towards the midline [...]

But I can't wait to come to the right cheek. To the right of a vertical patch, cut off from the shadow that surrounds the eye by a white line visible on the Shroud, the tone of the painting bulges into a kind of tumour that seems to inflate the top of the cheek. This swelling matches something similar on the cheek of the Shroud. On the left, the clear strip we have seen on the Shroud cuts off anything similar this side, so the artist has not accentuated it as much. [...]

And why these mere commas as ears, when all Meliore Toscano's predecessors tried to give us acceptable ears? Because, no doubt, these thin curved lines were inspired by the faint strip visible just inside the right



Fig. 13: Altar Panel by Meliore di Jacopo, Florence. Christ, St. Peter

truss of hair on the Shroud. [...] All this being said, I hardly need to notice the clarity of the strictly parallel edges between the points of the beard. On the Shroud, the division is not far from permitting a simplification of this kind. We have already noticed this on the Christ in the Codex Gertrudianus, although there the painter has made it less stylistic.

Then Vignon moves onto the gaunt figure of St. Paul, on the far right.

"But look at the ridge of this nose! Although it's a little too long, the bulge in the middle is cut off top and bottom by little constrictions, precisely truthful to the Shroud, and the same goes for the dark line down the middle, and the pale line running alongside it to the right."

After this exhaustive survey, and the conclusion of an argument that has grown from mere suggestion to such glaring obviousness that only a charlatan could possibly admit of a tremor of doubt, Vignon concludes:

"But what model inspired this painter in 1271? It could not have been the Shroud itself, which had vanished into obscurity from Byzantium sixty-seven years previously, from which it was not to emerge for a century and a half more, having finally been led to Lirey in 1355..."

No, the master models from which all Christian art derived had to be images of the face of the Mandylion, rather inelegantly termed "Saintes-Faces Byzantino-Slaves." And off we go again, although this time, Vignon is much more selective, describing only three before focusing primarily on the Holy Face of Laon, the master of the master copies, as it were.

Unfortunately, the 'Holy Faces' that are still extant are of quite a late date, and must be copies of copies, so it will not be surprising if they do not show the precise details of the Shroud. Their value, says Vignon, lies in their direct imitation of the face of the Shroud, and their overall appearance, with no neck or shoulders, like the Shroud, and the face framed by long tresses of hair.

Vignon begins with an icon he finds illustrated in André Grabar's 1931 work, *La Sainte-Face de Laon, le Mandylion dans l'Art orthodoxe*, which is sufficiently rarely reproduced for me to have to use the reproduction in Vignon's own book, although the Monastery in which it is apparently kept, the Andronikov Monastery in Moscow, is well known (Figure 14):

On the forehead, this somewhat heavy model highlights, at the same time, both a supranasal square quite similar [to others we have

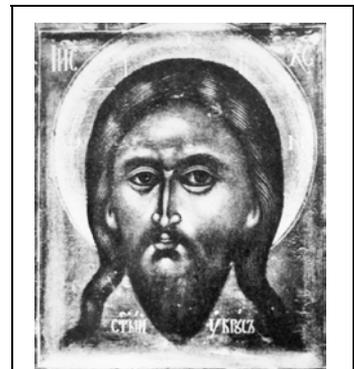


Fig. 14: Andronikov Monastery, Moscow. Mandelion.

met before], a lowered version of the transverse shadow, as we have also seen before in a whole series of works, and strongly emphasised frontal arches. The bar of the capital 'T' [across the eyebrows] is also emphasised, thick and black. The ridge of the nose includes the two constrictions which top and tail the swelling in the middle, also derived from the Shroud. From the shading of the right cheek, turned slightly too much, a diagonal stripe (a little faint in my illustration) rises: it is inspired by a similar one in the Codex Gertrudianus, derived from the 'hook shadow' we have seen before, itself a version of a stain quite clearly visible on the death-mask itself. Between this rising band and the right moustache, under the corners of the mouth, and at the top of the chin, the usual white patches are irreproachably bright. Near the left ear, the shape of the cheek bears witness to the shadows we have seen in various other works, all following the marks on the Shroud, and as for the hair, the rounded, sausage-like tresses remind us that, on the Shroud, the line is solid and relatively constant in thickness. The right one curls inwards at the bottom, as it should: the left one certainly shouldn't, but has been drawn this way for symmetry. In short, although the shape of the mould into which this wax is poured is rather inferior, the Holy Face of St. Andronik is the most faithful to the Shroud of any of those shown by Mr. Grabar: the Icon of Laon excepted.

After finding traces of the Shroud in a couple of other Mandyliions, Vignon gets his teeth into the Icon of Laon (Figure 15), which he has had the opportunity of studying first-hand:

Painted in greenish-brown tints, fading though halftones to a few places of white, overall the icon is dark. Why should it contrast this dark and light so starkly? Because, in my opinion, the painter was copying the death-mask imprinted on the Shroud: in a darker tone than the cloth it appears on. [...]

But was the painter really working in front of the Shroud? Considering the date, he could have been. Grabar gives us a history of the icon, suggesting that this Holy Face could have been painted while the Shroud was kept briefly in Sainte-Marie-des-Blachernes, between 1201, before when it was in the imperial chapel of Sainte-Marie-du-Phare, and 1204, and the sack of the city by Crusaders. Painted by a Slav, as evidenced by the perfect accuracy of the inscription, the image may have been made in Byzantium itself. In 1249, it was in Rome, from where the pontifical chaplain Jacques Pantaleon of Troyes, the former archdeacon of the Cathedral of Laon who would become Pope in 1260 under the name of Urban IV, sent it to his sister, the Abbess of the Convent of Montreuil-les-Dames, not far from Laon.

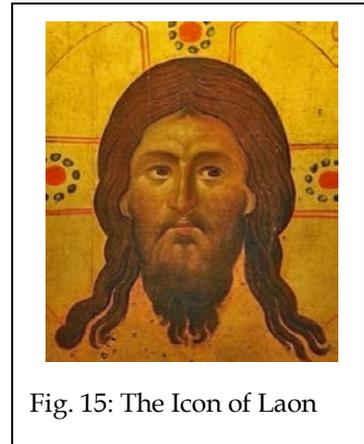


Fig. 15: The Icon of Laon

But we must now ask if what was possible from the historical point of view actually took place. Must the painter have seen the Shroud and been directly influenced by it?

It will not be enough just to examine the forehead. There is, it is true, an emphasised vertical furrow, first seen rather strangely depicted in the altar panel of Meliore Toscano, a rather unanatomical gutter, attempting to interpret the shadowy centre line visible on the Shroud. But it is insufficiently well developed to the sides for us to believe that he copied it directly. [...] And as for the way he had to remove the sides of the supranasal squares to accentuate the depth of the furrow, this is a clear deviation from the Shroud.

But we will change our mind.

I begin with the dark curves under the eyes of the Holy Face. The care that the artist has taken to model them underlines the difference he has observed between that of the right and the left, expressed so subtly that he must have actually observed the originals on the Shroud. So what he thought he observed as the pouch under the left eye (actually the bottom of the eyelid but that's not important here) very quickly gives way to a broad area of white space like that on the Shroud, [...]. while the curve under the right eye bends sharply horizontal, and then extends out to the side a little with its lower edge bordered by a narrow white strip which the painter has indicated by two little dabs of white. [...]

And so Vignon continues. The cheeks are not exactly like the Shroud, because the artist was trying to remove all traces of the brutality Christ has suffered, and the nose is a little less emphasised, in order to accentuate some of the tiny details on the Shroud. The mouth is clearly curtailed by the descending curves of the moustaches, as on the Shroud, and although the dark area beneath the mouth is far too big, this was probably deliberate in order better to separate the bright area of the top of the chin from the bright lower lip. And this area, as in several other examples, has well defined steeply curved sides, and a vertical strip in the middle like the top of a dimple.

On the basis of all these details, the accurate ones of which are, according to Vignon derived from the Shroud while the inaccurate ones are deliberate omissions, his conclusion is clear:

In short, the painter of this Holy Face saw the Shroud, in Byzantium, very shortly before the looting of the city by the Crusaders terminated the eastern history of the relic. The Icon of Laon is, in this respect, the last of the works from which we can learn that the cloth of Lirey – the present Shroud – and the Sindon of the emperors are one and the same.

But in this respect we know more: a whole line of mosaics, paintings and miniatures is there to affirm that the Byzantine cloth existed, long before the year 1204. According to our iconography, it already existed in the fifth century. It existed when the so-called Hannan of the "Doctrine of Addai, the Apostle" painted, directly from it, the Image of Edessa. It

existed as copies of the Image were dispersed, shortly after the year 458, from which were derived many of the apostles processing around Christ in the dome of the Baptistry of Neon in Ravenna.

And so we conclude our rather hasty tour of Paul Vignon's ideas about the heritage of the Holy Shroud. For him, some anatomical traits which to anybody glancing at portraits of almost anybody at all, appear quite normal, are unequivocal evidence, where they are depicted in Byzantine Art, of an origin in the Shroud. And where they don't, they are evidence of deliberate or accidental omission. He concentrates particularly on differences in patterns of moustaches and beards, common to men with facial hair, to creases at the top of the nose, common to old men generally, and to shades of difference in the forehead and cheeks, common to everybody.

It must have been obvious to Edward Wuenschel that this overenthusiastic scatter-gun Catholicism of iconographical derivation is too general to be at all meaningful, which is perhaps why he makes almost no mention of it in his own, Vignon-inspired, book, *Self-Portrait of Christ*. His list includes the absence of a neck and shoulders, which we have seen for that Vignon applies only to copies of the Image of Edessa; and more peculiarly the absence of ears, although almost none of Vignon's examples omit ears, he is actually taking some pains to account for their presence rather than their absence. Significantly, although he does not specifically deny it, Wuenschel carefully omits Vignon's application of his observations to the whole of Byzantine art. He also makes a couple of somewhat contradictory statements, suggesting that his own view was less than sufficiently critical:

There is no single art work in which all these peculiarities of the imprint of the face are to be seen together. Different details appear in different works, some more frequently than others. Many of these works were not derived from the Shroud, but indirectly through an earlier copy. Some of them are particularly notable for the minute exactness with which they reproduce some of the anomalies of the Shroud—an exactness which would have been impossible unless the artists had the imprint of the face before their eyes.

I believe that this is carrying Vignon's idea further than it will really stretch. Vignon himself only admits to the Holy Face of Laon as being directly copied from the Shroud, and even then finds himself explaining away some of its discrepancies. Almost every other example, he believes, is derived from either a copy, or a copy of a copy, more or less distorted. There are no images which can unequivocally be declared to have been derived from direct observation.

Nevertheless, a myth has been increasingly perpetuated, based on a rather redacted translation rather than actual reference to Vignon, that he thought Byzantine artists must have been copying more or less directly from the Shroud,

and a few extra marks have been added to the canon which he did not mention, such as the supranasal Vs, "an enlarged left nostril," "heavily accented, owlish eyes," and "two loose strands of hair falling from the apex of the forehead." All these would have been news to Vignon, although no doubt he would have been delighted to add them to his list. We note that the enlarged left nostril, like the "raised right eyebrow" could occur on either side of the face, conveniently being explained by differing interpretations of the imprint on the Shroud. Vignon never notices this, invariably referring to left and right as they are to the observer, not to the image.

More recently, there has been a suggestion that the "two [or three] loose strands of hair" must refer to the epsilon blood-mark, which, I believe, is a wildly unjustified guess. Finally, "the transverse line across the throat," which is often assumed to account for a double line describing the top of a tunic, especially on coins, is attributable to a crease in the Shroud which was clearly not present in Secondo Pia's 1896 photograph, and only arrived on the Shroud between his photo and that of Giuseppe Enrie, thirty-five years later (Figure 16).

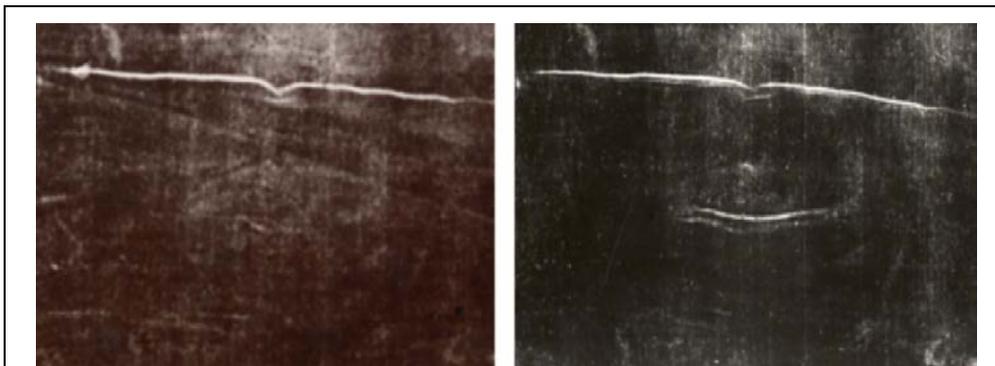


Fig.16: Shroud of Turin, negative of neck. Left: Secondo Pia's photograph (1898). Right: Giuseppe Enrie's photograph (1931).

[Editors' note: Advances in photographic techniques between 1898 and 1931, explain why some features in the later 1931 photograph were not seen in the earlier 1898 photograph. See Chapter 14 by Giorgio Bracaglia for more details.]



4. The Shroud of Turin and Oxford University

Pam Moon

Abstract

This paper reexamines the 1988 radiocarbon dating of the Holy Shroud by Oxford University, and describes how Oxford University academics have responded to my questions about this dating process. Using C-14 as an isolated, single test, the Shroud was determined to be medieval, 1260-1390 AD. However, that result created a historical vacuum for the Shroud which cannot be filled by authentic medieval sources and provenance. It does not compare with the strength of historical evidence that the Holy Shroud was the burial cloth of Jesus of Nazareth. Using Oxford University's own photographs of the samples, this paper identifies the most probable reasons why the sample chosen for radiocarbon dating was flawed. There is strong evidence that, following the fire of 1532 AD, the region that was sampled was disinfected, stitched, repaired (on at least three occasions) and dyed. Although the Head of Archeology at Oxford University, when asked about the radiocarbon dating, considers the case closed, the Oxford journal, *Archaeometry*, has recently published a paper that concludes: 'A statistical analysis of the *Nature* article and the raw data strongly suggests that homogeneity is lacking in the data and that the procedure should be reconsidered.'

Oxford University is one of the finest Universities in the world. It has the beautiful motto, *Dominus illuminatio mea*: The Lord is my Light. This stems from its Catholic foundations in the Middle Ages. In 1988 the University was involved in the radiocarbon dating of the Holy Shroud.³ Two other laboratories, at Zurich and Arizona, were involved, but the focus of this paper is Oxford University.

Before turning to the Shroud, it is important to assess the basis of all knowledge. This poem from Rudyard Kipling sums it up:

I keep six honest serving-men
 (They taught me all I knew);
 Their names are What and Why and When
 And How and Where and Who.⁴

³P. E. Damon, D. J. Donahue, B. H. Gore, A. L. Hatheway, A. J. T. Jull, T. W. Linick, P. J. Sercel, L. J. Toolin, C.R. Bronk, E. T. Hall, R. E. M. Hedges, R. Housley, I. A. Law, C. Perry, G. Bonani, S. Trumbore, W. Woelfli, J. C. Ambers, S. G. E., Bowman, M. N. Leese & M. S. Tite. Radiocarbon Dating of the Shroud of Turin Reprinted from *Nature*, Vol. 337, No. 6208, pp. 611-615, 16th February, 1989.

⁴Rudyard Kipling, Available at Kipling Society:
http://www.kiplingsociety.co.uk/poems_serving.htm

This understanding of knowledge is also referred to as the 5Ws: What, Who, When, Where and Why. All historical study is based on sources: scholars cannot make a historical statement without sources and provenance. The task of history is to assess how reliable the texts are and the motives of the writer.

If we assume, as most people did until 1988, that the Shroud wrapped Jesus of Nazareth, then there are simple answers to the 5 Ws:

| | |
|-------|---|
| What | Burial Shroud |
| Who | Jesus of Nazareth |
| When | 30-33 AD |
| Where | Jerusalem |
| Why | is too complex for this short paper. ⁵ |

There were multiple sources by 300 AD including Greek and Latin copies of New Testament. For example, the stunningly beautiful *Codex Sinaiticus*, is a complete New Testament kept at the British Library. It dates to the middle of the 4th Century. There are multiple points of congruence between the biblical text and the Shroud of Turin. The Shroud is a Visual Gospel.

However, since the C-14 dating of the corner of the Shroud in 1988, it has been difficult to argue for its authenticity. When the announcement was made, three Oxford professors were pictured; Professor Edward Hall, Professor Michael Tite who had coordinated the dating from the British Museum and went on to become Professor of Archaeology at Oxford, and Dr. Hedges, also of Oxford. Two of the academics from Oxford have offered explanations for the Shroud and its creation. Professor Edward Hall said: (Someone) "just got a bit of linen, faked it up and flogged it."⁶ There are problems with this hypothesis, notably: there is no who, where, why or how. 'Faking it up' suggests a paint technique but STURP in 1978 showed that the image was not painted. Michael Tite backed this up in a 2016 BBC interview when he said: "There is no real evidence for paint." Professor Michael Tite's own explanation was given in the same BBC Radio interview:

"I don't believe it's the Shroud but I think it is highly probable there was a body in there. It was the time of the Crusades. A very appropriate way of humiliating a Christian would be to crucify him, like Christ. I think that is a very real possibility. And then the cloth is put over the body, and some sort of bodily fluid resulting from the stress of a crucifixion reacted and caused this discolouration and ultimately a certain degree of decay in the Shroud."⁷

⁵Editors' note: A comprehensive answer to 'Why' can be found in A.C. Custance, *Seed of the Woman*, 3rd Edition, E.M. White and R.G. Chiang, Eds, 2014, Doorway Publications at www.custance.org. In this book Custance provides the physiological reasons for the incarnation and why Jesus could serve as the redeemer for all humankind.

⁶Professor Hall quote: <https://www.independent.co.uk/news/obituaries/professor-edward-hall-9260740.html>

⁷Michael Tite BBC radio interview: <https://www.bbc.co.uk/programmes/p031qvkb>

There is a major problem with this hypothesis. There is no historical record. Professor Tite, like Professor Hall, does not supply information for who, when, where, or why. There are no historical sources or provenance for the crucifixion of any Crusader. Equally, there is no evidence that bodily fluids create an image, even under duress. If this happened there would be millions of examples. Also, it is important to note that the Shroud is not a contact image. If it were created by contact with a body, the image would be distorted. For example, the contours of the face would create a greater distance between the ears than in normal anatomy.

In 2012 the notable Shroud film maker David Rolfe said: "The radiocarbon date is like a 'dead hand' on people's interest in the Shroud." As a result of that comment, I started to examine the folding patterns evident from the damage to the cloth (see Figure 1; Figures found at end of chapter). There are two major water stain patterns. The one above the head and on the centre of the chest was created when the cloth was folded and then stored vertically and water came from the bottom up. The water stains surrounding the burn marks were created when the cloth was stored horizontally in Chambéry in 1532 AD. Douse water came from the top to extinguish the fire. The sample for carbon dating was taken from material adjacent to the missing corner on the top left-hand side of Figure 1. On the Shroud two corners are missing. Both missing corners are part of the strip of linen that was sewn onto the cloth. It is important to understand why the corners are missing, particularly given the proximity to the C-14 sample. First, it cannot be fire damage. The fire burnt through all the layers of cloth so it would have destroyed all four corners. The explanations for the missing corners, given to date, are not convincing. It was unlikely to be wind damage from an exposition. Similarly, the corners were probably not taken as relics. A true relic would come from the real Shroud not the attached strip.

It is very likely that, following the fire of 1532, douse water and then subsequent bacterial damage to the cloth led to the cut corners. In Figure 2, it is noticeable that the water stain patterns at the ends of the cloth match the height of the missing corners. Chambéry, where the fire occurred in December 1532, was swampy, with very high humidity levels, raising the likelihood of bacteria. The Lier Shroud, created in 1516 AD, shows feet very clearly drawn. They are not visible today on the Shroud. This further points to water and bacterial damage as the causal factors for the missing corners. Water damage, and the removal of the damaged corners also implies that areas which were not cut away were disinfected. This would be necessary to protect the main cloth. If this was the case, the C-14 sample area was disinfected. It is impossible to unravel the impact on radiocarbon dating of a heavy-duty disinfectant, such as pine oil, that was soaked into the fibres of the Shroud in the 16th century.

In 2013, I began an email correspondence with Professor Christopher Bronk Ramsey, Head of Oxford University's Radiocarbon Accelerator Unit. The Unit has an international reputation for excellence and its results are usually extremely

accurate. It must be noted that Professor Ramsey and his current department inherited the problems with the dating of the Shroud of Turin and his responses show a resolve to be honest with hard science and a loyalty to the University and the results of the tests.

The first question was: In the light of water damage, why wasn't the Shroud sample autoclaved to remove endospores? Endospores are dormant, tough, non-reproductive structures produced by some bacteria to allow them to withstand extreme environments. They are extremely resilient and have been found on Mummy linen. A paper "A problematic source of organic contamination on linen" was published by H.E. Gove, S.J. Mattingley, A.R. David and L.A. Garza-Valdez, in 1975. Harry Gove, one of the inventors of radiocarbon dating with his coauthors, acknowledged that individual fibres of an ibis mummy linen were 'surrounded by a coating produced by bacteria.'

Endospores have a very hard calcium carbonate exterior and can regenerate from a state of hibernation. In hospitals, all linens are autoclaved or heat treated at very high temperatures before a surgical procedure as it is the only way to ensure the removal of endospores. No one would willingly have an operation without the autoclaving of the theatre linens. Professor Ramsey's response was 'this would be removed by the processes used for routine dating.' However, the processes of 1988 fall short of medical standards in terms of heat and humidity, and could not have guaranteed removal of endospores.

It became clear in the correspondence that Oxford University had photographs. I submitted a Freedom of Information (FOI) request for data and photographs on May 1, 2014. I heard back from the compliance officer Max Todd: 'I am writing to confirm that we are processing your request for information under the Freedom of Information Act and that we shall reply no later than the statutory deadline of 30 May.'

On 30 May I had the following e-mail:

'The Oxford Radiocarbon Accelerator Unit has started to publish this data on their website. The unit has not had time to scan all the photographs. We will let you know when the remaining data is published.'

In British law organizations must comply with FOI requests, so this noncompliance was unusual. I was informed that the problem was the responsibility of the photographer. Two images were published, the image and a control. With Max Todd, I arranged a week-long extension until June 6, 2014. On 7th June, the images appeared. There were 24 photographs giving eight images each of the Shroud and two controls, Thebes and Nubia. A third control, the medieval fibres of the cope of Louis of Anjou, had been given to the laboratories by Professor Michael Tite at the last moment without the permission of the Catholic Church. There were not enough sealed containers, so these fibres were

sent in paper bags. A fourth sample was not photographed by Oxford University and the fibres were tested non-sequentially with the three main samples. This irregularity puts a question mark over the results.

One of the images of great significance is shown in Figure 3. It was originally mis-classified in the FOI as a control, but as this is a herringbone weave, it must be the Shroud. It is now p2575_9 with _8 being the highest classification for the controls. Professor Ramsey said that he classified it as a control because that is what it said on the back of the photo, but he readily acknowledged that it was a Shroud image and quickly changed the classification.

I sent the link of all the photos to Donna Campbell, a textile expert, who works for one of the oldest linen manufacturers and weavers, Thomas Ferguson Irish Linen. Donna Campbell's first question to Professor Ramsey in the course of her research was 'what did the Shroud measure?' In the reply, it became clear the Shroud sample was weighed but not measured. There did not appear to be any detailed analysis on the Shroud material published by Oxford University, i.e., chemical or bacterial reports. No samples were retained to examine retrospectively. Donna Campbell wrote a long report entitled: 'Consideration to the Uniformity and Effects of the Fabric in the Shroud of Turin.'⁸

The report concluded: 'There are signs in the Shroud sample that direct the notion of mending or reweaving of the actual woven fabric.' In the days when we would mend a sock, stitches would go in and out of the material, often under the surface, to repair and stabilise the fabric. Donna Campbell went on in her conclusions: 'Consideration to the black thread and its function. The suggestion that the thread could have been used to reinforce the fabric. No such thread is obvious in the control samples.'" Figure 4 (left) is an example of one of the black threads. There is a larger black thread in the centre of the full sample image, Figure 4 (right).

Black threads were known to be stitched onto the Shroud by Blessed Sebastian Valfrè in 1694 AD. He had a great devotion to the Shroud and he wept as he worked while in a kneeling position. He wrote:

"The Cross received the living Jesus and gave Him back to us dead;
the Shroud received the dead Jesus and restored Him to us alive."⁹

⁸*Consideration to the Uniformity and Effects of the Fabric in the Shroud of Turin.* By © Donna Campbell MA Technical Design, Thomas Ferguson Irish Linen
http://www.shroudofturinexhibition.com/Shroud_of_Turin_exhibition/Thomas_Ferguson.html?LMCL=UGhhWk

p2575_9:
<https://archdams.arch.ox.ac.uk/pages/search.php?search=%21collection1203&k=1bcde90a8b>

⁹Quote Blessed Sebastian:

<http://communio.stblogs.org/index.php/2013/01/blessed-sebastian-valfre/>

p2575_2:
<https://archdams.arch.ox.ac.uk/pages/search.php?search=%21collection1203&k=1bcde90a8b>

There is evidence of Blessed Sebastian's black stitching in Barrie Schwartz's photographs of the Shroud, taken in 1978. The large corner area that is missing, Figure 5 (upper), was stitched to the Holland cloth, the Shroud's backing cloth, with black stitching. Also, the area by the chest wound, Figure 5 (lower), shows two patches, one on top of the other sewn with a neat, white stitching. Alongside those patches is Blessed Sebastian's black handiwork. He was not good at sewing. It is believed that the nuns were very embarrassed by his workmanship, thinking people might assume they were responsible. It is logical to assume, given the Oxford photographic evidence of black threads, that Blessed Sebastian had also attempted to mend the Shroud sample corner.

However, other than a few threads, there is very little evidence of Blessed Sebastian's handwork in the corner taken for radiocarbon dating, so this corner was probably re-repaired at a date later than 1694 AD. In fact, the Oxford University photos show evidence of a much less visible type of stitching, for example, a long off-white thread, Figure 6, which runs across the surface of the sample. Its course is traced in Figure 6 with the dark line. This stitch cannot be original to the cloth. Barrie Schwartz's photographs of the Arizona sample¹⁰ identify the same type of thread, as seen in Figure 7 (left). It is too thin to be part of the natural yarn. As seen in Figure 7 (right), one thread rotated when Barrie moved the sample as he photographed it.

Joe Marino and Sue Benford discovered evidence of invisible reweave in the radiocarbon corner of the Shroud in 2000 AD.¹¹ The Oxford photographs certainly suggest mending. However, if there are stitches visible on the surface, there are probably many more underneath the surface. The careful stitching of the patches, which is visible near the chest wound, suggest that very skilled workers repaired the Shroud. Their work may have had the intention of stabilising a damaged corner.

Returning to the image p2575_9, Figure 3, a black thread is visible, but there are also a lot of gluey looking contaminants. I researched this further and was helped by some notable Shroud scholars: Joe Marino, Barrie Schwartz, William Meacham, the archaeologist who helped devise the protocols for the radiocarbon date, and Paul Maloney.¹² There is strong evidence that the gluey substance visible on p2575_9 is dye and gum. The close-up image is unlike other close-up images of the Shroud fibres taken by Mark Evans in the STURP examination.

The original photographs of the removal of the Shroud sample are illuminating. Figure 8, photographed by Lino Salatino, shows Professor Riggi cutting the sample from the Shroud in 1988. Notice that the sample is not the same

¹⁰Barrie Schwartz, Arizona images: <https://www.shroud.com/pdfs/arizona.pdf>

¹¹Benford M. S; Marino G.J; *Discrepancies in the radiocarbon dating area of the Turin Shroud* Joseph © 2000. Available online: <https://www.shroud.com/pdfs/marben.pdf>

<http://www.shroud.com/pdfs/benfordmarino2008.pdf>

¹²See [shroud.com](http://www.shroud.com) for information on STURP

colour (or shade in black and white photographs) as the cloth near his ear. It is much nearer to the colour (or shade) around the burn marks, seen to his right. Fire and water damage stained the areas surrounding the burns. However, the Shroud C-14 corner was not burnt because only two corners are missing. The fire cannot be the explanation for the colour of the corner being cut.

Figure 9 shows the cloth after the removal of the sample. The image reveals an indent where Gilbert Raes, a textile expert, took a sample in 1973. What is significant is that the backing cloth is two colours; one the colour of undyed material, the other a more orangey stain. This can only be dye. It is significant that the Shroud, seen above the cut, is the same colour as the dye on the backing cloth. So that corner was dyed too. Perhaps the purpose of the dye was to make this area match the colour created by fire and douse water damage. This would create a consistent colour around all the patches and missing areas of the Shroud.

Dye was reported scientifically on the corner fibres of the Shroud by Ray Rogers. Following the work of Joe Marino and Sue Benford, Ray Rogers discovered dye in the radiocarbon date corner and the Raes' sample threads. He widely published his results before he sadly died in 2005. The dye he discovered in the fibres was madder root which could be removed using 6 N HCl.¹³ The laboratories preparing the Shroud samples in 1988 did not know that dye was present and used a far less concentrated solution of HCl, around 1 M.

Thread 1, from Gilbert Raes' sample (Figure 10), also shows a splice of linen and cotton. The cotton (the more orangey left end) has absorbed the dye better than the linen on the right. Robert Villarreal discovered conclusively that the two ends of Thread 1 were different materials, linen and cotton bound together by a gum.¹⁴ The cotton additions absorbed the dye much better than the original linen.

Rogers also suggested several alternative gums, which may have been used in conjunction with madder root dye, to stick the dye to the linen fibres. I visited Teresinha Roberts, a worldwide expert on natural plant dyes, and she explained that linen is very hard to dye. First, it needs to have a mordant of alum to make the fibres receptive to dye. Then the dye binds to the mordant on the linen fibres only when it is mixed with the adhesive gum tragacanth. Other, less adherent gums, such as gum Arabic, the main constituent of chewing gum, do not work with linen very effectively. Rogers had suggested tragacanth.¹⁵

¹³Rogers R.N., Arnoldi A. *Scientific Method applied to the Shroud of Turin A Review* © 2002. Available online: <https://www.shroud.com/pdfs/rogers2.pdf>

¹⁴Villarreal R., Schwartz B, Benford M. S., *Analytical Results On Thread Samples Taken From The Raes Sampling Area (Corner) Of The Shroud Cloth 2008 Abstract*.

Available online <http://www.ohioshroudconference.com/a17.htm>

Splice: Schwartz, B; "Rogers, Raymond. N., A Chemist's Perspective on the Shroud of Turin, www.shroud.com, [July, 2008]. Available online:

<http://www.lulu.com/us/en/shop/raymond-n-rogers/a-chemists-perspective-on-theshroud-of-turin/paperback/product-3278016.html>"

¹⁵see Ray Rogers private notes curated by Barrie M Schwartz in *The presence of dye in the 1988 carbon date samples of the Shroud of Turin* © Pam Moon December 8th 2015:

Gum Tragacanth is made up of two different chemical components. The first is tragacanthin which is soluble in water. Rogers noted that some of the gum was water soluble. However, it also contains bassorin which is insoluble in water and swells to form a gel. This could be the gel that is so clearly visible on the surface of the Oxford University photograph of the Shroud sample. Gum tragacanth is only removed from material with concentrated HCl, so it remained *in situ* for the C-14 testing. Oxford University photographs appear to endorse Rogers' findings. This means the sample of original Shroud material was tested alongside mending repairs done in 1532, 1694 and later. Thus, the spliced cotton fibres, and a stiffening concoction of dye and gum which had not been identified, were not removed before testing.

Rogers' conclusions said 'If the Raes/radiocarbon sample was stained with a well-known colouring composition (and no other part of the Shroud is), the radiocarbon sample cannot be valid for dating the time at which the cloth was produced.'¹⁶ David Rolfe and I made a film on the matter entitled *A Grave Injustice*. Rolfe wrote to Professor Tite sending a link to the film and received a reply along the lines: There are not enough contaminants to make a 1,000-year difference. This is hugely questionable.

Returning to the basis of historical knowledge and the poem of Rudyard Kipling, I had a letter printed in the *Catholic Herald* in August 2017. It asked the question: Where are the sources and provenance for a Medieval Shroud? Referring to the letter, I wrote to the head of Archaeology at Oxford, Professor Julia Lee-Thorp. She is the Head of one of the top-ranking Schools of Archaeology in the world. I asked the following: 'If you continue to endorse the carbon-14 results for the Shroud perhaps your department could supply me with the historical sources which underpin a medieval date for this extraordinary cloth. Similarly, as Professor Tite argues, the image on the Shroud was created by "bodily fluids," please could you tell me if you are aware of any other archaeological examples of this process?'

This was the reply:

'Radiocarbon dating is based on radioactive decay of C-14 as you probably know; it's based on a pure physics phenomenon. The amount of C-14 decays over time and we measure the remaining C-14 by accelerator mass spectrometry to calculate age. I should also add that samples undergo rigorous cleaning to eliminate any carbon-containing contaminants, nothing else matters. There is no ambiguity about this particular result and it is not a "position" as you suggest in your letter.

If you are unhappy with the radiocarbon date, you should consider commissioning another dating programme; there are several excellent

http://www.shroudofturinexhibition.com/Shroud_of_Turin_exhibition/Dye_and_radiocarbon_date_files/Dye%208th%20Dec.pdf

¹⁶Ray Rogers: Studies on the Radiocarbon Sample from the Shroud of Turin. In *Thermochimica Acta* 425(1):189-194. 2005:

https://www.researchgate.net/publication/245207955_Studies_on_the_Radiocarbon_Sample_from_the_Shroud_of_Turin

radiocarbon units in this country and round the world. We have never pretended to be resolving all the possible problems related to the shroud; we have merely analysed it for C-14 and provided the result. I consider the matter closed.'

Oxford academics are clearly frustrated that people sincerely believe in authenticity in the face of what they perceive to be accurate science. However, she did not answer any of the five W's nor provide any sources of provenance to underpin a medieval Shroud. This poses an important dichotomy. Has historical study been completely overtaken by science? I tried again and wrote to the Office of the Vice-Chancellor, Professor Louise Richardson, asking the following: 'If the Shroud is medieval as the University claims, what is it? Where is the history? Where are your reliable sources? Secondly, how trustworthy is your methodology and physics? How can you claim to understand the sample tested when no textile, chemical, microscopic or bacterial reports were undertaken?' I received an answer from the Senior Executive officer, Dr. Bethan Williams:

'I am writing in response to your recent letter to the Vice-Chancellor.... As Professor Lee-Thorp made clear in her letter, we do not claim to have answers to all the questions which the Shroud and its study may raise.

However, the results of the radiocarbon dating undertaken by the Oxford Accelerator Radiocarbon Unit are not ones we can refute. This being the case we have no further comments to make at this time, and consider our correspondence in this matter closed.'

Oxford University is one of the finest academic institutions in the world but this lack of answers does not appear to do justice to its reputation. So there remains only one hypothesis given by Oxford University staff, and it is from Michael Tite. He said "it wrapped a medieval Crusader" and "bodily fluids resulting from the stress of a crucifixion react and cause this discolouration and ultimately a certain degree of decay in the Shroud." This paper has already looked at some of the problems with this hypothesis but there is another major problem. The hypothesis is very similar to Freemasonry teaching about the Shroud. Professor Tite denied he is a Freemason in the BBC interview in 2016 but the similarities deserve some examination. The Freemasonry understanding of the Shroud is explained in two books, *The Hiram Key* and *The Second Messiah*, written by Robert Lomas, a physicist at Bradford University and Christopher Knight. A brief synopsis of the argument given by Lomas was reported in *The New Scotsman*:

"The cloth was used to wrap Jacques de Molay, the leader of a monastic order known as the Knights Templar. [...] The image on the Shroud was created through a process known as the Volckringer effect, where heat, sweat, acids and oxygen-free radicals scorch the cloth."¹⁷

¹⁷Jesus or Jacques? <https://www.scotsman.com/lifestyle-2-15039/jesus-or-jacques-1-501180>. Jacques de Molay burnt at the stake: https://en.wikipedia.org/wiki/History_of_the_Knights_Templar

Jacques de Molay was a Crusader, Head of the Knights Templar, an organization believed to have been the custodian of the Shroud of Jesus. He was arrested on 13th October 1307 AD in France and tortured about the secrets of the Knights Templar. Freemasons teach that he was crucified on the night of his arrest and, surviving the crucifixion, created the Shroud of Turin with sweat and other bodily fluids. He was then burnt at the stake in 1314. The problems with this interpretation are numerous. There is no historical evidence or reliable source that Jacques de Molay was crucified. The image was not created by bodily contact. Also, de Molay looked nothing like the Man on the Shroud. A contemporary picture of his death, as he was burnt at the stake, shows him with short hair and a tonsure. This is not a plausible hypothesis for the creation of the Shroud of Turin.

However, since the correspondence with academics at Oxford University there has been an important development. There is now a huge cause for hope for those who seek to authenticate the Shroud as the burial cloth of Jesus. In 2019, the very eminent Oxford University journal, *Archaeometry*, published the article which found that "The statistical analysis of the raw data shows the Shroud sample was not homogenous" and "The radiocarbon dating needs to be redone."¹⁸

It seems highly significant that it was Oxford University's own Archaeology Department who chose to publish this research. A new dawn may be opening for Shroud research.

However, a few questions remain. The logical next step would be to entrust the Shroud to another radiocarbon dating. But is it wise to rush headlong into a second test? The leader of STURP John Jackson said at the St. Louis Shroud conference in 2014 that if we had another erroneous test on the Shroud no one would take it seriously again. If we do not understand the mechanism that created the image how can we be sure if it had an impact? Radiation and light, the most plausible hypotheses for image formation are so unique it is not possible to replicate them. There is no other artifact to which the Shroud can be compared. Similarly, we do not know all the cloth's other secrets. If the corner was disinfected following douse water damage in 1532, then the same disinfectant could have been soaked into all the areas that were burnt, which would add modern carbon to the fibres. The same repairs involving an invisible re-weave could have happened. So the burnt fibres, removed in the restoration of 2002, may be as contaminated as the corner which was tested in 1988.

In my opinion, there are a few other points to consider. The involvement of Freemasonry in the events of 1988 was raised by Cardinal Ballestrero, the former Archbishop of Turin, in a newspaper article: "At this point, Father Cavaglia asked Cardinal Ballestrero whether Freemasonry had not played a certain role in all this

¹⁸*Radiocarbon Dating of the Turin Shroud: New Evidence from Raw Data*. T. Casabianca; E. Marinelli; G. Pernagallo; B. Torrisi; First published: 22 March 2019; <https://onlinelibrary.wiley.com/doi/abs/10.1111/arc.12467>

campaign. 'Without question,' came the Cardinal's reply."¹⁹ Freemasonry is less powerful than it was in 1988, but it has not yet disappeared and could play a part in future testing. Second, there may not be a level playing field for its examination in academia. Any future test would depend on the neutrality of the scientists involved. Many university departments are increasingly liberal and some are apparently anti-Christian. It is hard to imagine that a modern university would want to validate the resurrection of Jesus Christ.

Finally, turning the whole debate on its head, there is a final question: If the Shroud is genuine why did God allow the radiocarbon date results? In other words, were there any benefits to the Shroud from the results? There are a few advantages. Ultimately many people see radiocarbon dating as the means to authenticate the Shroud, but Christians tend to reject the need for proof and their beliefs are based on faith more than evidence. Having an erroneous radiocarbon dating result only serves to reinforce a Christian's dependency on faith. Second, the results allowed restoration of the cloth to take place in 2002 AD. This restoration was controversial, but it had the advantage that the old backing cloth, which was darkening, was removed. This has helped to make the image clearer to see. Finally, the results allow the Shroud to hide in plain sight. Jesus said "Seek and you will find." Anyone can find this image today with a quick internet search. At the same time, the Shroud is, to some extent, protected from those who might wish to destroy it. My following paper, *Three Treasures of Constantinople*, which is chapter 5 in the present book, considers the history of the Shroud in Constantinople where it was often in danger of destruction and armies were used to protect it.

To conclude, Oxford University continues to be an outstanding university on the world stage. This paper does not challenge the excellence of the results of the Oxford University's Radiocarbon Accelerator Unit, except for the date given to the Shroud. The Shroud of Turin is a very complex cloth. This paper argues that the sample area tested was contaminated by a multiple of different factors; water damage; bacteria; disinfectant; repairs, including invisible reweave; additional cotton; madder root dye and gum tragacanth. It is impossible to get a reliable date for the origins of the cloth from such a sample.

The publication of the paper *Radiocarbon dating of the Turin Shroud: New Evidence from Raw Data* in the Oxford journal *Archaeometry*, points to a shift in attitudes within the University to the Shroud of Turin. This is significantly different to the 'matter is closed' replies that I received. However, a larger question remains. In the search for truth, history and science need to go hand in hand. Science should not lead us into a historical vacuum. I hope, at some point, that Oxford University will completely distance itself from the events of 1988 in relationship to the Shroud. The most plausible explanation for the Holy Shroud is that it covered the historic Jesus of Nazareth.

¹⁹Reproduced from the CIELT journal *Revue Internationale Du Linceul de Turin* which published this article on page 28 of its issue no 6, Autumn 1997.

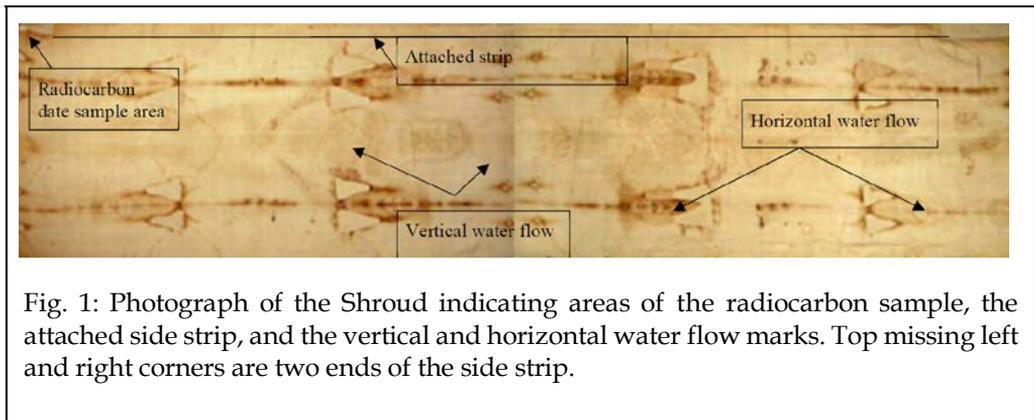


Fig. 1: Photograph of the Shroud indicating areas of the radiocarbon sample, the attached side strip, and the vertical and horizontal water flow marks. Top missing left and right corners are two ends of the side strip.

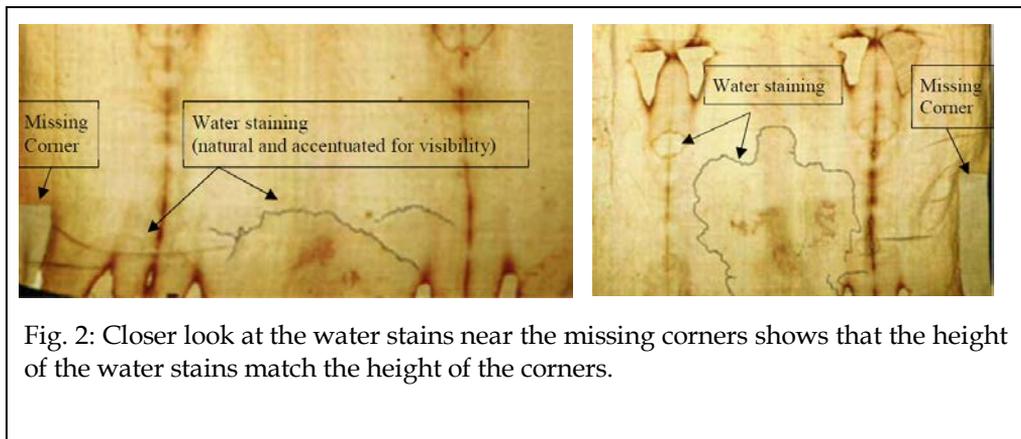
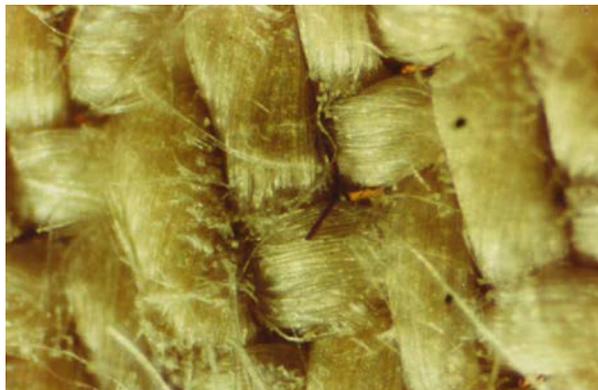


Fig. 2: Closer look at the water stains near the missing corners shows that the height of the water stains match the height of the corners.

Fig. 3: This image from Oxford University was originally classified as a control, but its herringbone weave identifies it as a sample from the Shroud. The writing on the back of the photo identified it as a control, but it has now been reclassified as a picture of the Shroud sample.



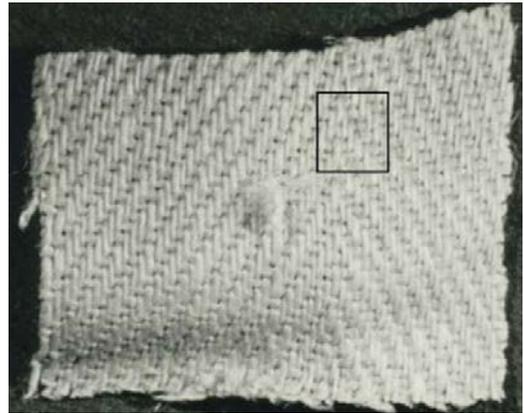
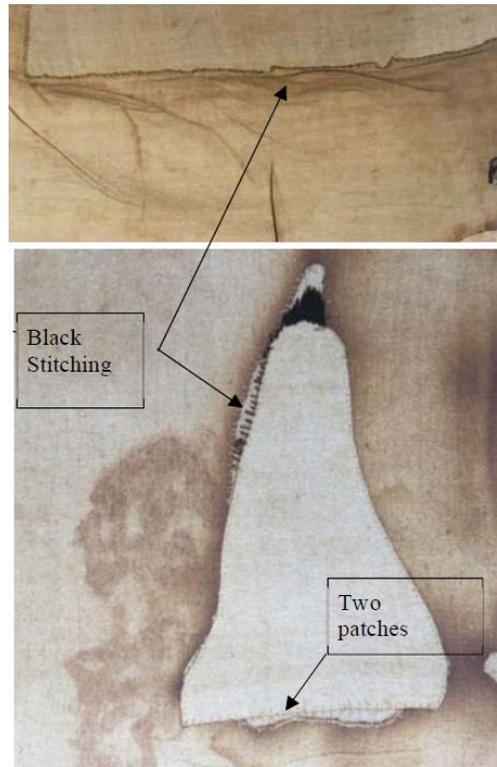


Fig. 4: Left, black threads are present on the sample from the Shroud. These threads, which are not found in the control samples, were likely used to reinforce the Shroud to the backing cloth. Right, full sample with square showing region where a larger black thread is located.

Fig. 5: Areas of stitching as seen on the pictures taken by Barrie Schwartz of STURP. Upper, the large corner area where the end of the side strip is missing showing the black stitching used to attach the Shroud to the backing cloth. Lower, the area of the chest wound which was severely damaged by the 1532 fire. The hole is covered by two patches sewn neatly with white stitching. Blessed Sebastian's black thread shows that he was not experienced at sewing.



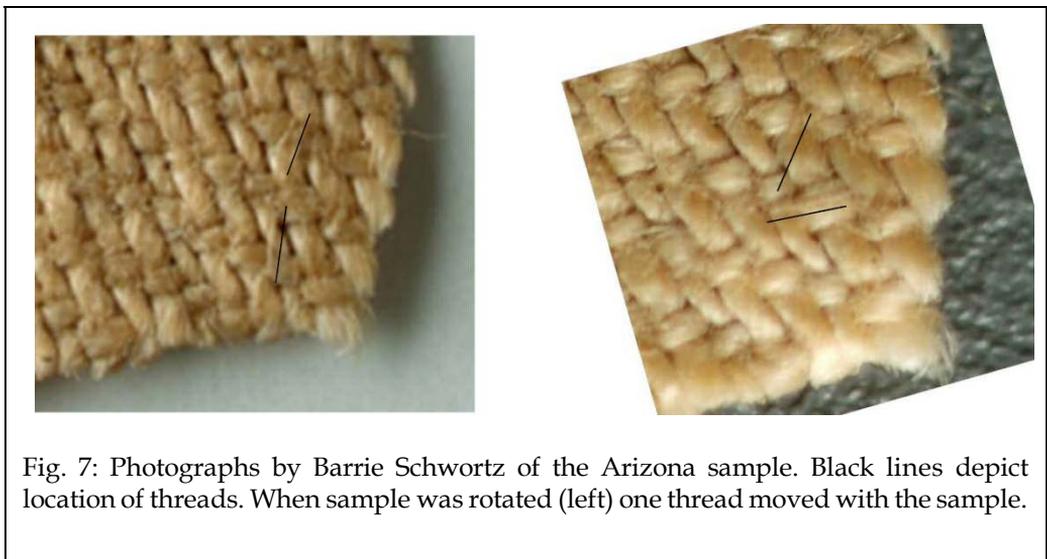
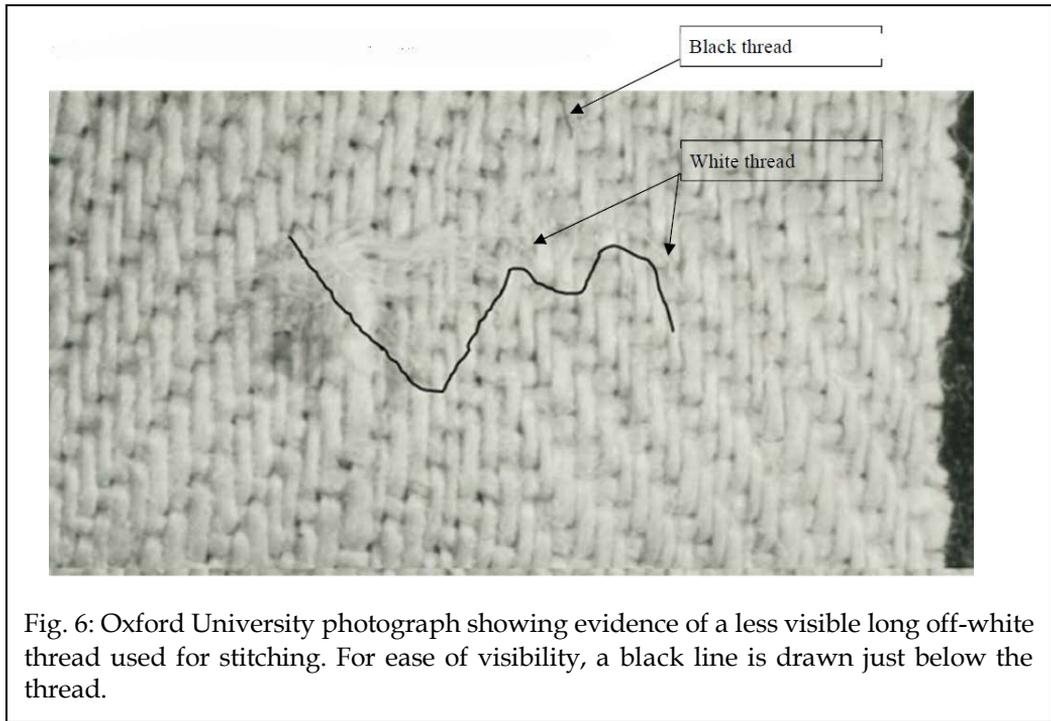


Fig. 8: Prof. Giovanni Riggi removing the sample from the Shroud. The colour of the cloth where the sample was removed is much darker than the rest of the Shroud.

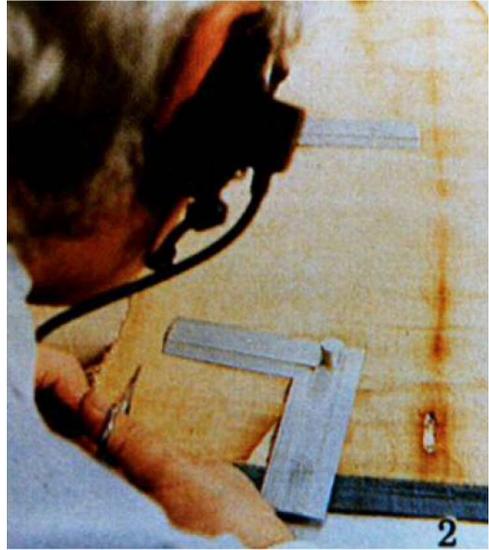
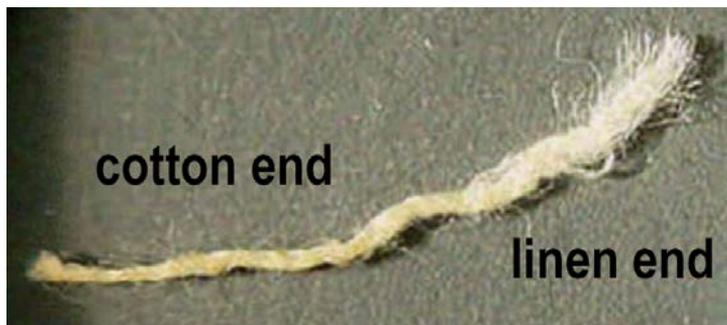


Fig. 9: A photograph of the Shroud and backing cloth after the sample was removed. Note that both the remaining Shroud material and the backing cloth have the same evidence that both were dyed.



Fig. 10: Thread 1 from the sample removed by Raes in 1973 was discovered by Villarreal to be composed of linen and cotton bound by gum.



5. Three Treasures of Constantinople

Pam Moon

Abstract

The Holy Blood of Bruges, a relic; the Limburg Staurotheke, a reliquary, and the Madrid Skylitzes, an illustrated manuscript, are three treasures of Constantinople that provide historical evidence that the Shroud of Turin is much older than the 1988 radiocarbon dating suggests. This paper is primarily a historical exploration of these artifacts as they relate to the Holy Shroud in Constantinople. The Holy Blood of Bruges is a cloth of blood, and I suggest that this relic was used as a binding mentioned in the Gospel of John. The Limburg Staurotheke and the Madrid Skylitzes follow the central premise that the Shroud arrived in Constantinople in 944 AD. They reference similar information. The Limburg Staurotheke contains relics of the cross of Jesus, known as the Holy Woods, while the Madrid Skylitzes reveals that the Holy Mandylion, an image 'not-made-by-hands' was stored with the Holy Woods in a golden case. In 1036 AD the Holy Shroud was carried in a procession from the Palace of the Emperor to the church of St. Mary, Blachernae. Two images from the Skylitzes, which possibly show that procession, may explain that the holes in the Shroud were caused by burning incense that spilt unto the Shroud during this procession.

For the last 30 years many have argued that the Shroud of Turin has been proven to be medieval, 1260-1390 AD, by radiocarbon dating. This has led mainstream academia to ignore any possibility of its existence before those dates. As confidence in the result of the radiocarbon date wanes, this area of study will hopefully attract more academic interest.

In this paper, three major treasures, which possibly relate to the Holy Shroud, are examined. They were all believed to have been in Constantinople, the capital of the Byzantine Empire, before Crusaders sacked it in 1204 AD. The three treasures are first, the Holy Blood of Bruges which is a glass cylinder relic containing a blood-soaked bandage (see Figure 1). It has strong historical provenance that it contains the blood of Christ. The second artifact, the Limburg Staurotheke, is a reliquary with inscriptions on its outside and inside covers (see Figure 2). It was created by the Byzantine Emperors of the 10th century. The third, the Madrid Skylitzes, is the only illuminated manuscript from Constantinople in the 10th and 11th centuries to survive. The original is lost but a copy, which is kept in Madrid, survives. It has been dated to the 12th century (a page from this manuscript is shown in Figure 3).

Fig. 1: Picture from wikipedia of the Holy Blood of Bruges, a glass cylinder containing a rolled up bandage which is supposed to hold the blood of Christ.

By Matt Hopkins - originally posted to Flickr as The Blood Relic, CC BY-SA 2.0, <https://commons.wikimedia.org/w/index.php?curid=6866646>



Fig. 2: The Limburg Staurotheke is a reliquary that was supposed to have held a number of precious relics including pieces of the true cross. It is 48 cm x 35 cm and 6 cm deep, and is housed in Limburg, Germany. It has a double lid, and the top lid can be moved to expose the inside lid (see figure). This allows the individual compartments of the reliquary to be opened.



Fig. 3: A page from the Madrid Skylitzes, an illustrated manuscript by John Skylitzes. This page describes Leon VI with a Bulgarian delegation (top), and the Bulgarians routing the Byzantine forces at Bulgarophygon (bottom). There are 574 images. It is the only surviving illustrated manuscript of a Greek chronicle. By from the Middle Ages, unknown-Madrid Skylitzes, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=3357982>

The Holy Blood

The Holy Blood is stored in a glass vial decorated with gold and precious stones (Figure 1). The relative size can be established by the hands of the member of the Confraternity. It is kept in the Basilica of the Holy Blood in Bruges, Belgium, and pilgrims come every day to venerate it.

The Holy Blood is a rolled-up bandage soaked in blood which is believed to be the blood of Jesus. The blood on the bandage is red and is known to change colour and consistency.

The latest historical thinking is that the Holy Blood came out of the Sack of Constantinople in 1204 AD. It has been in Bruges for more than eight hundred years. The beautiful gold casing, which surrounds the relic, is typical of the fine work of Constantinople. Historically, the Holy Blood is strongly associated with Joseph of Arimathea, who buried Jesus. The current thinking is that Joseph wiped the body of Jesus with this cloth at the time of burial. However, this scenario does not fit with Jewish burial practices since the blood of a victim of violence is not removed from the body. However, the cloth could have been used by Joseph of Arimathea to prepare the body of Jesus at his burial.

The synoptic biblical sources, Matthew, Mark and Luke describe Joseph of Arimathea's role in Jesus' burial: 'Joseph bought some linen cloth, took down the body, wrapped it in the linen, and placed it in a tomb cut out of rock' [Mark 15: 46]. John adds more detail: 'Taking Jesus' body, the two of them (Joseph and Nicodemus) wrapped it, with the spices, in strips of linen. This was in accordance with Jewish burial customs' [John 19: 40]. After the resurrection John enlarged his eyewitness account: 'He (John) bent over and looked in at the strips of linen lying there but did not go in. Then Simon Peter came along behind him and went straight into the tomb. He saw the strips of linen lying there, as well as the cloth that had been wrapped around Jesus' head' [John 20:5-7]. The 'strips of linen' raise the possibility that, together with the Shroud and the Sudarium, the cloth that wrapped Jesus' head, there was more than one strip of linen used in the laying out of the body of Jesus.

To further build on this hypothesis, it is important to examine the burial position of the Man on the Shroud. The hands cover the nakedness of the body and there are no visible thumbs. The French surgeon Pierre Barbet in the 1930s increased our understanding of the nature of crucifixion. He confirmed for the first time that the palms would not hold the weight of a body on a cross. Working on recently amputated limbs he suggested that median nerve damage caused the thumbs of the victim to retract. However, that hypothesis has been challenged medically by Dr. Andrew Husselbee. Seeing the explanation for missing thumbs, he wrote this:

'If the median nerve is cut or transected at the wrist there is weakness in the flexion of the thumb, index and middle fingers and weakness in

abduction and opposition of the thumb. This will lead to an ape hand deformity with the thumb lying next to the index finger. If an attempt is made to make a fist the benediction sign can appear due to lack of flexion of the thumb, index or middle finger.¹

Dr. Husselbee argues that median nerve damage does not cause thumbs to retract, so that cannot be the explanation for the lack of thumbs on the Shroud. As funeral directors work with burials on a daily basis, I sought the advice of Edward Poole at A. J. Sellmans.² He pointed out that the arms of the dead are always positioned carefully. Robert Smith, workshop manager and mortician, showed me how he often places hands of a corpse with one thumb under the other as shown in Figure 4. In a Western burial, the wood of the coffin holds the arms in place. In a shroud burial, the hands of the deceased do not stay in place naturally because of the action of gravity on the weight of the arms. After death, the body enters a period of primary flaccidity where the muscles relax. About four to six hours later rigor mortis starts, which stiffens the muscles. Jesus would not have been in a state of rigor mortis at his burial, because he was buried within three to four hours of his death. Without intervention by those who buried him, the muscles of his arms would have relaxed. The weight of his arms would have pulled them away from the body, leaving his body exposed. It is highly likely his hands were bound together by Joseph of Arimathea.

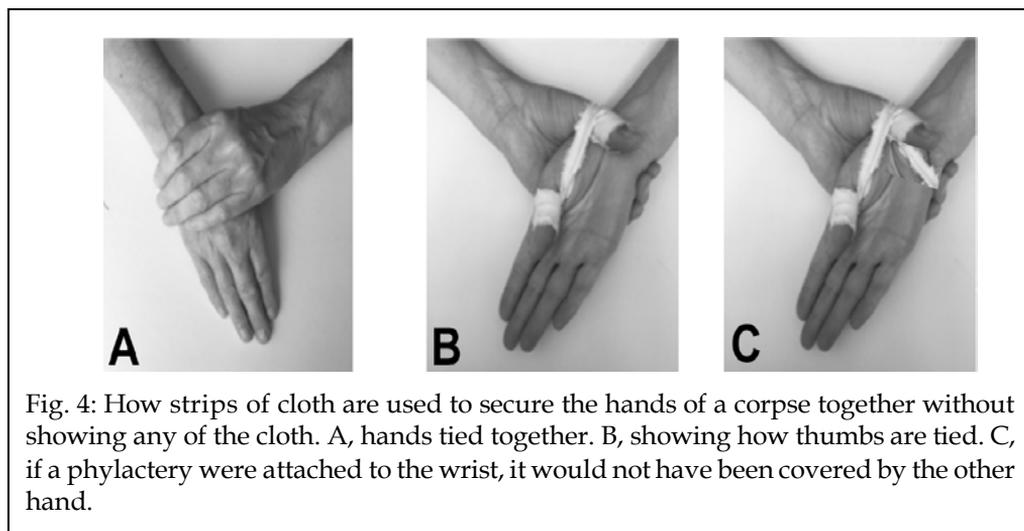


Fig. 4: How strips of cloth are used to secure the hands of a corpse together without showing any of the cloth. A, hands tied together. B, showing how thumbs are tied. C, if a phylactery were attached to the wrist, it would not have been covered by the other hand.

If you tie the thumbs or the wrists together using a tie or a bandage, the arms will stay in position. Tying the wrists or thumbs is consistent with Jewish and Arab burial in the Middle East. The aim is to keep a single line for the body. The

¹Dr. Andrew Husselbee, BA, BM, BCh (1986 Oxford) DA, MRCG, Brewood Medical practice

²Edward Poole; A J Sellman Funeral Director, Cannock, UK

description of the resurrection of Lazarus, recorded in John's gospel, references ties to the hands and feet: 'Jesus called in a loud voice, "Lazarus, come out!" The dead man came out, his hands and feet wrapped with strips of linen [John 11:43-44]. Finally, as John emphasizes that Jesus had a Jewish burial, it is possible that a phylactery containing the words of the Shema was bound to his wrist. If applied to the wrist as shown in Figure 4C, it would not be visible on Man on the Shroud.

At present the Confraternity of the Holy Blood does not want any scientific examination of the cloth.³ The vial has not been opened for 800 years and they consider the relic too sacred to open it now. The question remains: Is the Holy Blood of Bruges one of the strips of linen described by St. John, which has survived the centuries? If so, it may contain part of an image of the thumbs or wrist, just as the Shroud contains the body image.

The Limburg Staurotheke

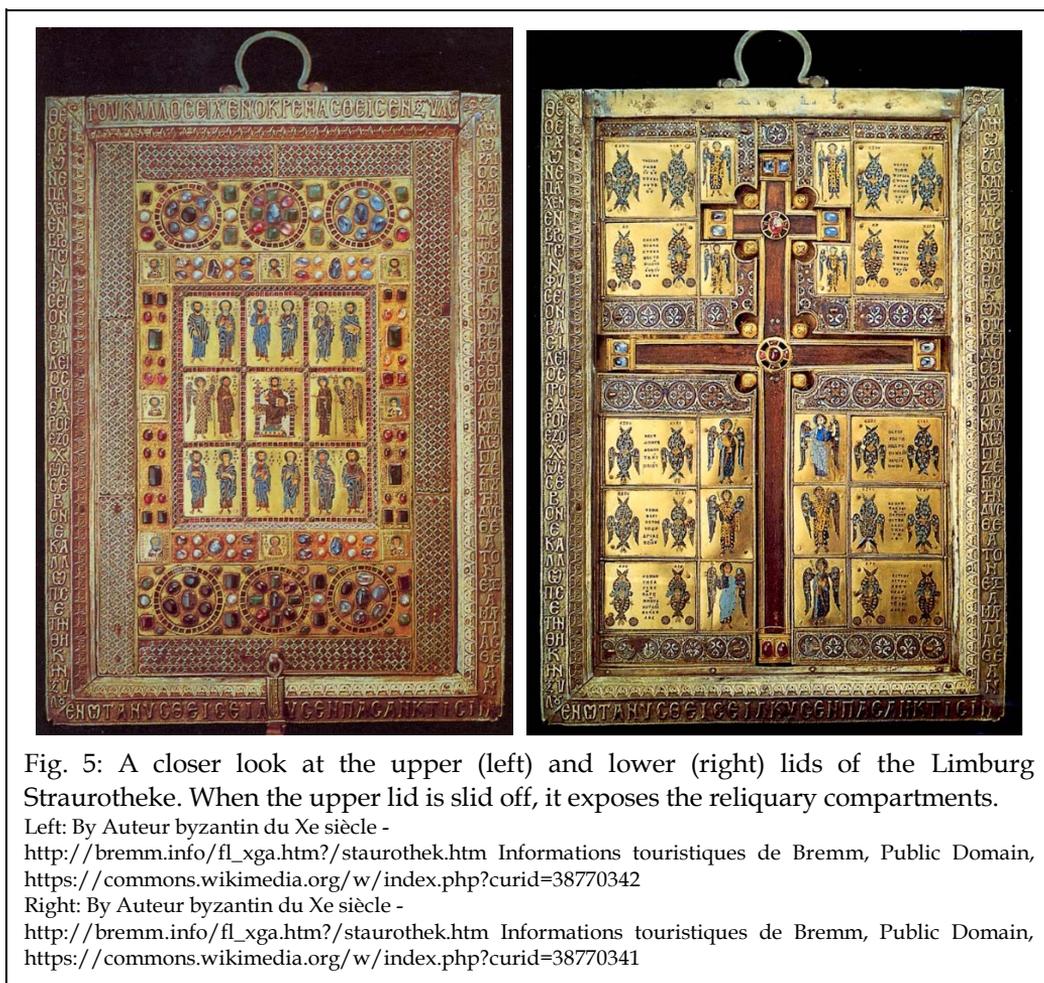
The second treasure, the Limburg Staurotheke, is a double lidded, beautifully embellished artifact. It is currently in Limburg an der Lahn, Limburg, Germany. It is made of gold and decorated with precious stones and pearls. Its dimensions are 48 cm by 35 cm, with a depth of 6 cm. The Staurotheke has two heavily decorated and inscribed lids (see Figure 5). To understand its history, a brief look at the Emperors of Constantinople is required. Romanos I, Lekapenos ruled as Byzantine Emperor from 920 to 944 AD. He sent a large army to besiege Edessa, now modern Urfa in southern Turkey. The army's purpose was to bring the Cloth of Edessa, also known as the Holy Mandyllion, from Edessa to Romanos I's capital, Constantinople. The transfer happened in 944 AD at the end of his reign.

Before looking at the importance of the Holy Mandyllion for the Limburg Staurotheke and the Madrid Skylitzes, a brief history of the Cloth of Edessa is required. The Holy Mandyllion was the most revered artifact in the Byzantine world. It contained an image of Jesus 'not-made-by-hands' or 'acheiropoeta.' The argument that the Holy Mandyllion was the Shroud of Turin has been widely researched by the historian Ian Wilson. According to what he found the Holy Mandyllion was described to be doubled into four, or folded eight times along its length.⁴ Only the Face was visible when it was displayed. The description of it being an image not-made-by-hands fits the mystery of the creation of the image on the Shroud. Wilson's premise that the Mandyllion was the Holy Shroud has been challenged in recent years [for example, see chapter 23 by Barta *et al.*, in this book], but Wilson's theory appears to be supported by the Limburg Staurotheke and the Madrid Skylitzes.

Romanos I was not the legitimate blood Emperor. Soon after the arrival of the Holy Mandyllion in 944 AD, he was deposed, took the tonsure and became a monk.

³Email correspondence with Confraternity officials, Holy Blood of Bruges

⁴Wilson, Ian. 1998 *The Blood and the Shroud*, Weidenfeld and Nicolson.



Power was taken by his son-in-law Constantine VII and his grandson Romanos II, who jointly created one side of the Staurotheke (left picture in Figure 5). Constantine VII had a very distinctive chin, and he may well have been the artist's model for the 10th Century image of Abgar V holding the Holy Mandylion. Constantine VII was Co-Regent with his son, 945-959 AD. Given the involvement of Constantine VII and Romanos II, the Staurotheke must have been created in the mid 10th century, soon after the arrival of the Holy Mandylion in Constantinople.

The reliquary was richly embellished with gold enamel and jewels by the emperors. The lid created by Constantine VII and Romanos II was adorned with images of Jesus Christ, crowned in glory, surrounded by Mary, John, the Archangels, the apostles and the patriarchs of Constantinople (left, Figure 5).

Romanos I's illegitimate son, Basil Lekapenos, also known as Basil the Proedros, created the other lid of the Staurotheke. Basil had the title

parakoimomenos, meaning "the one who sleeps beside" the emperor's chamber, so he was obviously trusted by his half-brother, Constantine VII. He contributed numerous relics of saints to his design. Most important, he added the Holy Woods, which were large fragments of the True Cross. They were beautifully presented in a Byzantine cross shape, within the reliquary (right picture in Figure 5).

Around the edges of both sides are inscribed poems. They describe the nature of the treasure kept in the reliquary and they reference Constantine VII, Romanos II and Basil by name. The inscriptions are believed by scholars to describe the Holy Woods, but the text points to something greater; a thing 'full of wonder.' The inscription of Constantine VII and Romanos II reads:

on the one hand, God stretched out his hands
upon the wood
gushing forth through it the energies of life,
On the other hand, Constantine and Romanos the despots
with the synthesis of radiant stones and pearls
displayed this same thing full of wonder.
And on the one hand, Christ with this formerly
smashed the gates of Hades
giving new life to the dead.
On the other hand, the crown-wearers
having now adorned this
crush with it the temerities of the barbarians⁵

In the inscription, the emperors brought a 'synthesis of radiant stones and pearls' to adorn their treasured item. Precious stones and pearls are clearly visible. However, this inscription is not just about the Holy Woods. The text speaks of the death of Jesus: 'He stretched out his hands upon the wood.' It also says, with this He gave 'new life to the dead.' That is a reference to the resurrection, not the cross. It is important to try and unravel the nature of the object the crown-wearers are adorning. Basil's inscription reads:

He did not have beauty, the one suspended on wood,
yet Christ was complete with beauty;
and in dying he did not have form,
but he beautified my appearance deformed by sin.
Although being God, he suffered in mortal nature;
eminently venerating,
Basileios the proedros
beautified the theke of wood,
on which having been stretched,
he (Christ) rescued all creation.⁶

⁵Hostetler, Brad *The Limburg Staurotheke - A Reassessment*
https://www.academia.edu/879337/_The_Limburg_Staurotheke_A_Reassessment_Atha_nor_vol_30_2012_7_13

⁶Hostetler, Brad *The Limburg Staurotheke - A Reassessment*

Basil's text, like that of his half-brother and nephew, references both the crucifixion and the resurrection of Jesus. The text suggests something more mysterious than a relic of the cross, the Holy Woods, which Basil Lekapenos added to the reliquary. It speaks about Jesus being 'complete with beauty.' The wood of the cross does not contain any image of Christ. Similarly, the image is described as 'not having form,' which is an unusual phrase. It could be a possible description of the Holy Mandylion, known to be an image 'not-made-by-hands.' 'Not having form' would also fit the mystery of the Shroud of Turin.

This spectacular artifact could have been the sliding lid for a golden box for the Holy Mandylion/Holy Shroud. Its dimensions, 48 cm by 35 cm, would allow for the Shroud to be folded lengthways into four, 27 cm, and then folded multiple times. A ten-times fold for the Shroud would be 44 cm, which would create a pattern of folding similar to that seen in the fire damage of 1532 AD. It is certainly likely that these Emperors of Constantinople created something beautiful for the Holy Mandylion, the most important cloth in Christendom.

The Madrid Skylitzes

The Madrid Skylitzes, the third treasure of Constantinople, further illuminates the mysteries of the inscriptions on the Limburg Stauratheke. The following research is based on *The Illustrated Chronicle of the Ioannes Skylitzes in Madrid*, a detailed reference book, by Vasiliki Tsamakda from the Alexandros Press.⁷ The illustrated manuscript contains an extraordinary and currently inexplicable image, which may be the earliest depiction of the Shroud of Turin as a long cloth.

The Madrid Skylitzes, kept in the National Library in Madrid, Spain, is a copy of the original document, which has been lost. 'The dating proposals range from the first to the last quarter of the 12th Century,'⁸ so the surviving copy predates the Hungarian Pray Manuscript dated 1192-1195AD. The Skylitzes manuscript is described as a Synopsis of Histories, and it is essentially an illustrated manuscript, which tells the history of the most important events in Constantinople from 811 to 1057 AD. The Greek historian, John Skylitzes (1081-1118) wrote and illustrated the manuscript. The events it covers include political intrigue, the reigns, marriages and deaths of all the Emperors, cultural ideas like circus acts and wars with many different nations. It is a beautiful manuscript and it has much to say about religious practice in this time, for example the iconoclasm debate of the 9th century. Because it is the only surviving illustrated manuscript of the period it is of great historical importance and is generally considered reliable historically.

⁷Tsamakda, Vasiliki. 2002: *The illustrated chronicle of Ioannes Skylitzes in Madrid*. Alexandros Press, Leiden

⁸Tsamakda, Vasiliki. 2002: *The illustrated chronicle of Ioannes Skylitzes in Madrid*.

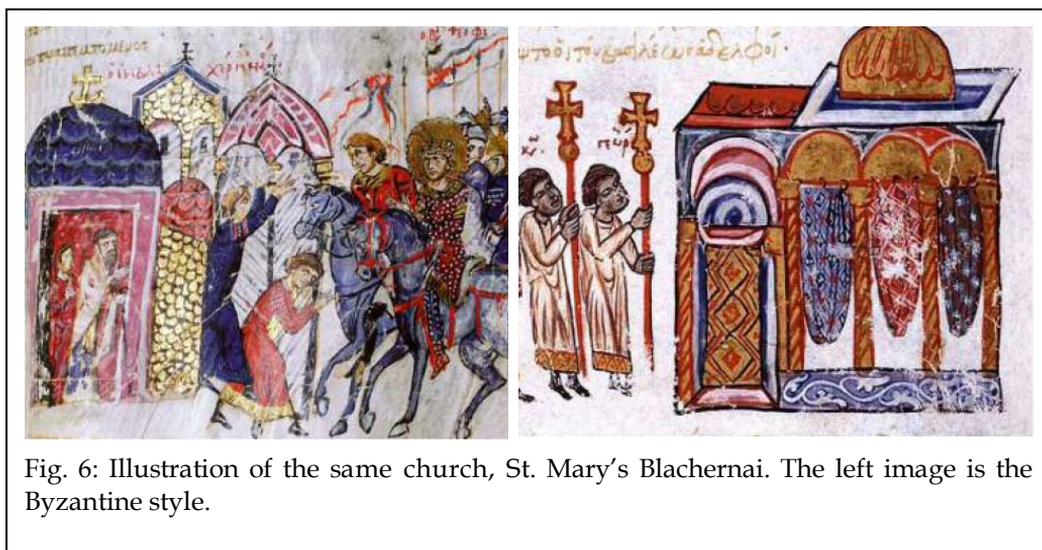


Fig. 6: Illustration of the same church, St. Mary's Blachernai. The left image is the Byzantine style.

Before examining the text and images, it is important to note that the Madrid Skylitzes was copied by different scribes and artists who were working in both the Byzantine style of art and the Western. To illustrate this, the two images in Figure 6 are of the same church, St. Mary's Blachernai. The left image is the Byzantine style version, so the truest to Skylitzes' original document. The significance of the church of St. Mary's Blachernai is that it is where the crusader Robert de Cleri described seeing the Shroud. Wilson wrote: "in 1203, a French Crusader, named Robert de Cleri, wrote about the sydoines in which our Lord had been wrapped, which he had seen at the church of St. Mary at Blachernai. He described how every Friday this 'raised itself upright so that one could see the figure of our Lord on it.'"⁹

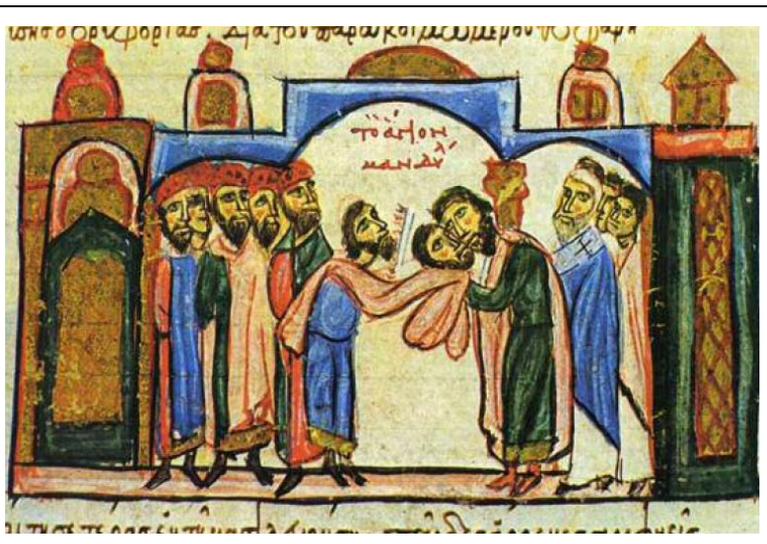
As noted with the Limburg Stauratheke information, in 944 AD, the Emperor Romanos I Lekapenos sent an army to Edessa to retrieve the Holy Mandylion. The arrival of the Holy Mandylion into Constantinople from Edessa was illustrated and described by John Skylitzes, as seen in Figure 7. The text speaks of its 'arrival and veneration,'¹⁰ and continues: 'the likeness of our God was brought to our capital where the emperor had it ceremonially received by the parakoimomenos Theophanes with impressive and fitting pomp.'¹¹ In the image, painted by a copyist in the Western style, the head of Jesus is presented three-dimensionally.

⁹Wilson, Ian. 1998 *The Blood and the Shroud*, Weidenfeld and Nicolson page 272

¹⁰Tsamakda, Vasiliki. 2002: *The illustrated chronicle of Ioannes Skylitzes in Madrid*. Alexandros Press, Leiden page 168

¹¹John Skylitzes, *A Synopsis of Byzantine History, 811-1057*/ Chapter 10:37: John Skylitzes; Translated Wortley, John. 2010 with introduction by John-Claude Cheynet and Bernard Flusin and Notes by Jean-Claude Cheynet, Cambridge University Press

Fig. 7:
Arrival of the Holy
Mandylion into
Constantinople
from Edessa as
illustrated by John
Skylitzes.



When the Holy Mandylion was discovered in Edessa in 525 AD, there was also a tile alongside it, which was known as the *Keramion*. The tile was an artist's depiction of what was visible on the Holy Mandylion, probably created when it was folded to display only the face image. Figure 8 shows the Holy Mandylion (which is portrayed with a fringe), alongside the tile. There is no image of the *Keramion* in the Skylitzes, but the text refers to its historical transfer from Hierapolis to Constantinople in 966 AD by Emperor Nikephoros II Phokas. The text reads: 'along with him (Nikephoros) came the tile which bore an imprint not-made-with-hands of the features of Christ our God.'¹² It is significant that the miraculous 'not-made-by-hands' understanding of the Holy Mandylion is reiterated in the Skylitzes text.

Fig. 8: Holy Mandylion,
portrayed with a fringe (left),
with the tile, the *Keramion*, an
artist's depiction of what was
visible on the Holy Mandylion.
There is no image of the
Keramion in the Skylitzes, but
the text refers to its transfer
from Hierapolis to Constantinople
in 966.



¹² John Skylitzes, *A Synopsis of Byzantine History*, 811-1057/ Chapter 14:15

The story of the Holy Mandylion in Edessa is associated with the miraculous healing of King Abgar V and a correspondence between the Abgar V and Jesus. The Letter of Jesus to Abgar was highly prized in Constantinople. In it Jesus, via a scribe wrote:

'Blessed are you who have believed in me without having seen me.... But in regard to what you have written me that I should come to you, it is necessary for me to fulfil all things here for which I have been sent, and after I have fulfilled them thus to be taken up again to him that sent me. But after I have been taken up, I will send to you one of my disciples, that he may heal your disease and give life to you and yours.'¹³

There are ancient references to the letter in Eusebius,¹⁴ and it is mentioned in the Pilgrimage of Egeria. Egeria was an intrepid female pilgrim who traveled to Jerusalem in the 380s AD. She visited Edessa and wrote:

'Our God Jesus promised in a letter that he sent to King Abgar by the messenger Ananias that he would send him there after he had ascended into heaven. This letter is kept in great reverence in the city of Edessa.'¹⁵

There is both a description of the letter of Jesus to Abgar in the Madrid Skylitzes and two images (see Figure 9). These paintings belong together and the top image shows the seizure of Edessa by a Byzantine army in 1031 AD. The artwork below shows the transfer of the letter, protected by veiled hands, to Constantinople. The text reads: 'Maniakes sending Christ's letter to Romanos III.' The Skylitzes texts and images validate the story of Abgar V and the letter of Jesus. Sadly, however, the original letter of Jesus to Abgar V is currently lost.

After the Holy Mandylion arrived in Constantinople in 944 AD, it was not displayed, but that does not mean its importance was diminished. It was kept in a golden case and it is possible that the sliding lid of the golden case survives as the top lid to the Limburg Staurotheke. Mark Guscini has established the history of the golden case. He describes an anonymous Latin text from the eleventh century, which reports:

'This wonderful linen cloth with the face of the Lord Jesus, marked by direct contact, is kept in greater veneration than the other relics in the palace, and held in such high esteem that it is always kept in a golden case and very carefully locked up. It was not opened for anyone except the emperor of Constantinople.'¹⁶

¹³Letter of Jesus to Abgar; Appendix page 205-206: *The Pilgrimage of Egeria. A New Translation of the Itinerarium Egeriae with Introduction and Commentary*; Anne McGowan and Paul F. Bradshaw 2018

¹⁴https://www.newworldencyclopedia.org/entry/Image_of_Edessa

¹⁵Egeria; page 133-134: *The Pilgrimage of Egeria. A New Translation of the Itinerarium Egeriae with Introduction and Commentary*; Anne McGowan and Paul F. Bradshaw 2018

With thanks to Jo Bywater for finding this source.

¹⁶Guscini, Mark 2009, *The Image of Edessa*, Brill, page 182



Fig. 9: The top painting shows the seizure of Edessa by a Byzantine army in 1031 AD. The bottom painting shows the transfer to Constantinople of the letter written by Jesus, and protected by veiled hands.

Shortly after the arrival of the letter of Jesus in Constantinople in 1031 AD, Romanos III died and a power battle over who should succeed him broke out. Michael IV Paphlagon (1034-42 AD) was an unpopular choice as emperor. A powerful official refused to serve under him so a golden box containing the Holy Mandyllion was sent to him. After seeing it he pledged his support to Michael IV. The text reads: 'Konstantinos Dalassenos was unwilling to proclaim Michael IV as emperor. Konstantinos Phagitzes was now sent to Dalassenos, bearing the Holy Woods, the Holy Mandyllion, Christ's autographed letter to Abgar, and an icon of the Mother of God.'¹⁷ It is important to note, in the light of the Limburg Staurotheke, that the Holy Mandyllion and the Holy Woods were in the same

¹⁷Tsamakda, Vasiliki Fig. 492, page 240.

golden case. Figure 10 shows the transfer of the golden box containing the Holy Mandylion. It seems likely from the text that the letter of Jesus to Abgar was also stored in the golden case.

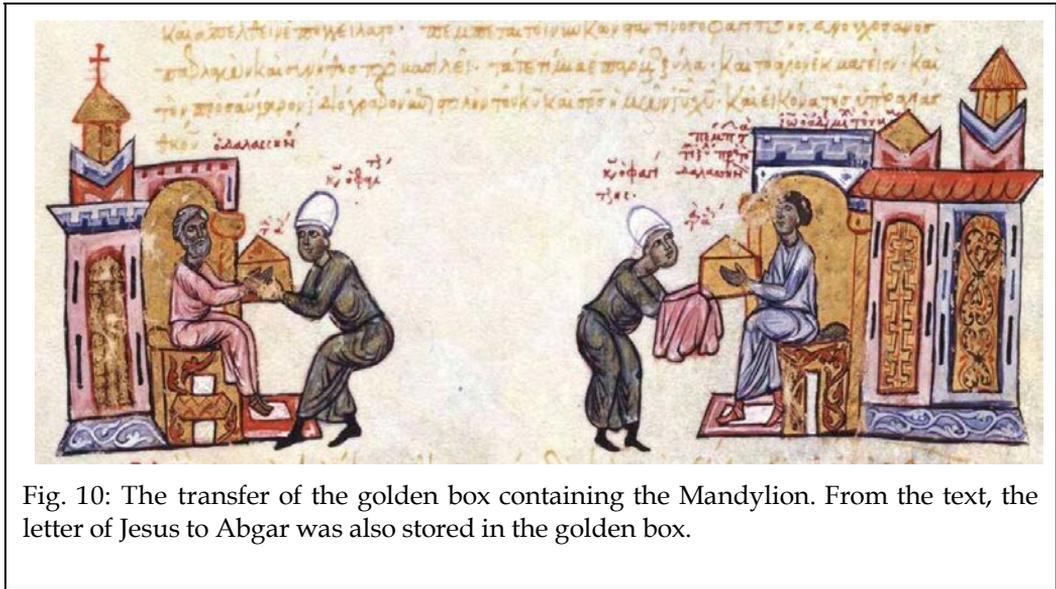


Fig. 10: The transfer of the golden box containing the Mandylion. From the text, the letter of Jesus to Abgar was also stored in the golden box.

Clearly the Byzantine Emperors were using the Holy Mandylion to help them politically. This is exemplified in one of the most fascinating texts of the Skylitzes, which for the first time, names the Holy Shroud specifically. It concerns an important and unusual event, a litany. Skylitzes describes the movement of the Holy Mandylion in 1036 AD. The text reads:

'Because there was a drought and no rain had fallen for six months, the brothers of the emperor held a litany. Ioannes Orphanotrophos carried the Mandylion, Konstantinos carried Christ's letter to Abgar, and the protobestiarios Georgios the Holy Shroud. The procession advanced from the palace to the Blachernai church.'¹⁸

John Wortley's translation adds the additional

'they traveled on foot from the Great Palace to the church of the exceeding holy Mother of God at Blachernai. The patriarch and the clergy made another procession'¹⁹

So in this text the Mandylion is no longer called Holy and the Holy Shroud is mentioned specifically. Perhaps the Mandylion was now an artist's impression.

¹⁸Vasiliki Tsamakda Fig 497, p. 325, 326.

¹⁹Wortley, John: *John Skylitzes, A Synopsis of Byzantine History, 811-1057*/ Chapter 19:10

Certainly, there is no Holy Mandylion image existing today which could be described as an image 'not-made-by-hands.' It is significant that the most important treasure in Constantinople was moving from the palace where it had been kept 'in greater veneration than the other relics' in a 'golden case,' to St. Mary Blachernai, the church in which the Crusaders saw the Shroud.

However, the image describing this event only shows the procession of the patriarchs and priests. It is arguably one of the most significant events in Constantinople since the arrival of the Holy Mandylion and John Skylitzes omits it. This does not seem plausible. There is a possibility that the image, Figure 11, was John Skylitzes' original painting of the Holy Mandylion/Holy Shroud. Perhaps, when the copy was made, partly because it is a very difficult image to read, it was mis-classified. Mis-classification is a common scribal error. Indeed, Vasiliki Tsamakda notes that the two deacons leading the procession in Figure 6 (right image) are 'erroneously identified.'²⁰

The image in Figure 11 is certainly one of the finest images in the entire manuscript. What it shows is a flat figure with a three-dimensional head being carried in a procession. The three-dimensional head is similar to the three-dimensional head of the Holy Mandylion seen earlier. The text attributed to this fine image reads:

'The assassins of Leon V pitilessly dragged his body to the Hippodrome through the Skyla Gate. Their own soldiers surround the palace.'²¹

The Hippodrome and the Skyla gate were part of the Great Palace complex in Constantinople, which suggests an association with an Emperor. However, there are huge problems with associating the painting of Figure 11 with text with Leon V's assassination. Leon V was beheaded in 820 AD. If this is Leon V, he still has his head. The Skylitzes is quite graphic in its portrayal of other beheaded emperors, clearly showing the detached head. It is also very detailed in its depiction of numerous attacking armies all of whom have different uniforms. The text is usually specific in its description of armies, so 'their own soldiers' is unusual. It suggests the compiler of the copy could not place the army. Most significantly, the army in the image is not that of 'their own soldiers' but a clear depiction of the Varangian Guard. A Varangian army of 6,000 men arrived in Constantinople in 988 AD, following a treaty between Vladimir the Great and Basil II. They were not in Constantinople at the death of Leon V, 160 years earlier.

²⁰Vasiliki Tsamakda Fig 497. page. 325/6

²¹. Tsamakda, Vasiliki, page 65. Image FOL. 26v top

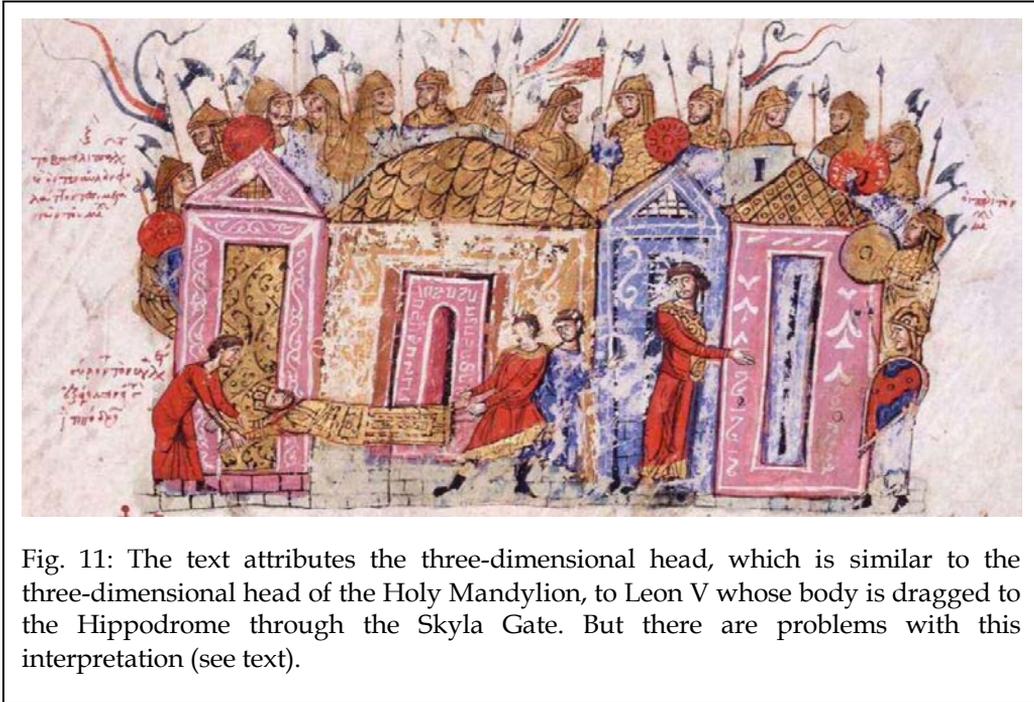


Fig. 11: The text attributes the three-dimensional head, which is similar to the three-dimensional head of the Holy Mandylion, to Leon V whose body is dragged to the Hippodrome through the Skyla Gate. But there are problems with this interpretation (see text).

From the appearance of the uniforms and weaponry, this image shows the Varangian Guard.²² Like the image of the officials of Constantinople, the uniforms and weapons are accurately drawn. The Varangian was originally a Viking army from Scandinavia. In the 11th century Viking armies were known in the West as the Normans and they formed the Crusader armies. In the East, the Vikings had come from Scandinavia and had travelled into Russia and were known as the 'Kievan Rus.' They were some of the finest soldiers in the world. The soldiers in this image are Varangian because of their uniforms, protective shields and axes. The image places them at the Royal palace and they are on duty, heavily guarding something. However, the atmosphere is that of a festival, with flags flying and the sun shining. It is certainly not an assassination picture.

The Skylitzes also verifies the Varangian Guard in Constantinople during the short reign of Michael IV, which started two years before the procession. Figure 12 illustrates a Thracian woman who killed a Varangian because he attempted to rape her. She was compensated by his comrades by the receipt of her attacker's possessions.²³

²²https://en.wikipedia.org/wiki/Varangian_Guard

²³ John Skylitzes, *A Synopsis of Byzantine History*, 811-1057/ Chapter 19:4

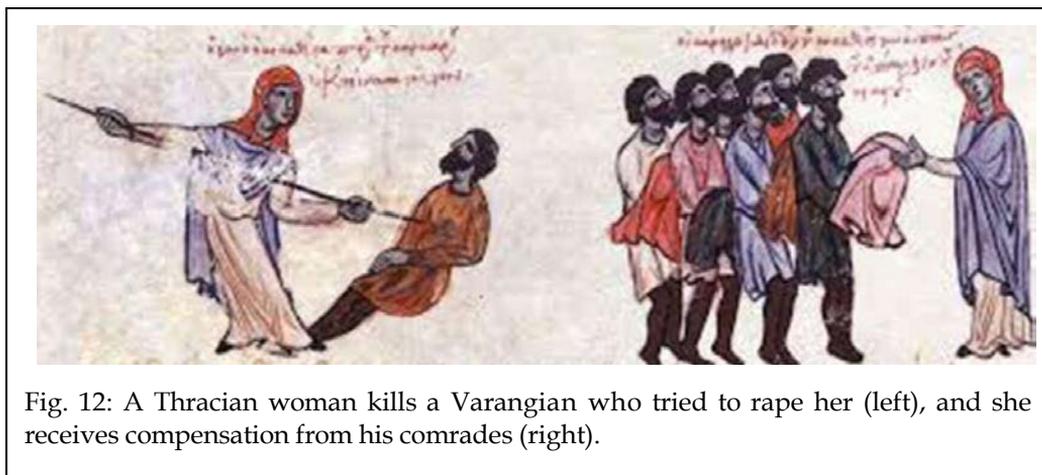


Fig. 12: A Thracian woman kills a Varangian who tried to rape her (left), and she receives compensation from his comrades (right).

It is possible that the top picture in Figure 13 showing the procession, and the bottom picture in Figure 13 showing the Varangian Guard, once belonged together. If so, these two images form two ends of the litany procession of the Holy Mandylion, led by patriarchs, priests and all the people. The Holy Mandylion/Holy Shroud was going from the Grand Palace where it had once been kept in a golden case, through the Skyla Gate to the Hippodrome and then on to the church of St. Mary Blachernai where it was displayed for the Crusaders. Its journey was protected by the greatest fighting force in Constantinople, the Varangian Guard.

To conclude, tying the Limburg Staurotheke and the Skylitzes together, it is likely that the Limburg Staurotheke was part of the beautiful golden case carried to Konstantinos Dalassenos in 1034 AD at the start of the reign of Michael IV Paphlagon. The golden case, known to be stored in the palace, contained the Holy Mandylion, the Holy Woods, the letter of Jesus to Abgar V (obtained by Maniakes and sent to Romanos III in 1031 AD), and the Icon of Mary. The contents of the golden case were moved in 1036 AD to the church of St. Mary's Blachernai and the Skylitzes described and illustrated the transfer of the Holy Shroud, formally known as the Holy Mandylion.

This hypothesis may bear a direct explanation for the four patterns of small burn holes, which were created when the Shroud was folded into four (see Figure 14). Folded in this way, the Shroud would be 2.2 metres (7.2 feet) by 55 cm (1.8 feet), which would be compatible with the Skylitzes illustration. The most likely explanation for the holes is hot incense resin falling onto the cloth, illustrated by multiple small holes causing less and less damage as they passed through the cloth. I burnt linen with a myrrh resin, and created a similar pattern of holes to

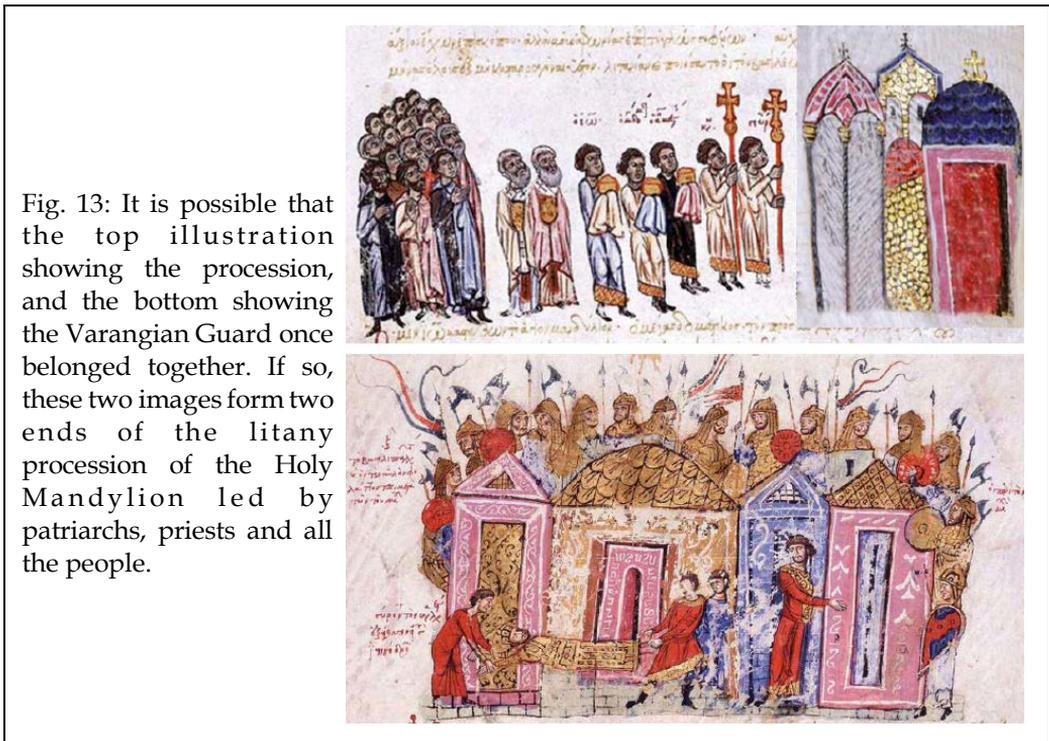


Fig. 13: It is possible that the top illustration showing the procession, and the bottom showing the Varangian Guard once belonged together. If so, these two images form two ends of the litany procession of the Holy Mandylion led by patriarchs, priests and all the people.

those seen on the Shroud. Like the Shroud damage the holes are graduated in size through the folded layers. As an aside, when Nicodemus brought myrrh and aloes to the tomb of Jesus, he probably brought a resin, not liquid: 'Nicodemus brought a mixture of myrrh and aloes, about seventy-five pounds' [John: 19:39].

A Byzantine thurible which holds the incense is open at the top and hot incense could easily spill out. There is a strong possibility that the flat cloth in the beautiful Skylitzes image (Figure 14 bottom) is the Shroud which is folded into four, with a three-dimensional head. As it was carried in procession, venerated by the use of incense, drops of a molten resin could have fallen from the open thurible and damaged the Shroud. The use of myrrh may be verified by a visitor to St. Mary Blachernai who described "the burial sindon of Christ: this is of linen . . . of cheap and easily obtainable material, still smelling fragrant of myrrh and defying destruction, since they wrapped the uncircumscribed, naked body after the Passion."²⁴

Perhaps the presence of the aroma was because of the incense practices in Constantinople, rather than the use of myrrh in the tomb of Jesus. The man who caused the burns to the Shroud could have paid for it with his life. To conclude, this beautiful illumination could be showing the Shroud, on its way from the palace where it had been stored in a gold case. Surrounded by the Varangian guard

²⁴Wilson, Ian. 1998 *The Blood and the Shroud*, Weidenfeld and Nicolson page. 145.

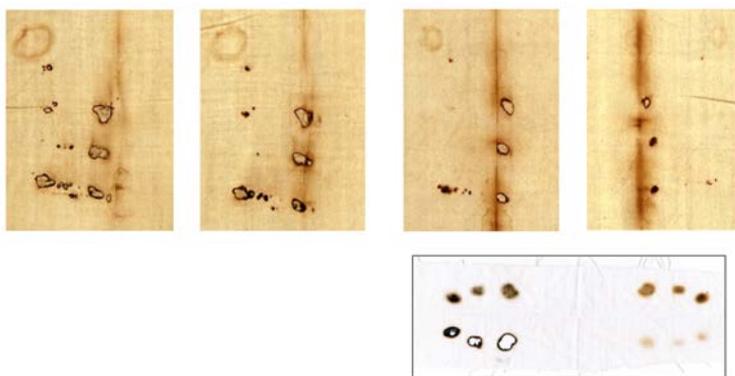
and carried by Byzantine notables, wearing gold trimmed clothes, it travelled through the Skyla Gate to the Hippodrome. It then went on, through the city, in a great procession to the church of St. Mary Blachernai, where it was displayed as the Man of Sorrows and viewed by Crusaders.

If that is so, it is possible, this moment, captured so beautifully by John Skylitzes, was the time in history where the reliquary, the Limburg Staurotheke, no longer served the purpose for which it was designed. If it had been part of the beautiful golden case carried to Konstantinos Dalassenos in 1034 AD at the start of the reign of Michael IV Paphlagon, the removal of the Shroud made it a reliquary primarily for the Holy Woods. To reiterate, the golden case, known to be stored in the palace, had contained the Holy Mandylion, the Holy Woods (added by Basil II), the letter of Jesus to Abgar V (obtained by Maniakes and sent to Romanos III in 1031 AD), and the Icon of Mary. If it actually contained the Shroud of Turin, this is the moment when this role ended.

Finally, the text says the icon of Mary, Theotokos, was also in the golden box painted by John Skylitzes. It is more difficult to trace. It is believed that St. Luke was an artist who painted Mary. The Theotokos of Vladimir (around 1130 AD), made in Constantinople, may be similar to the icon contained in the golden case.

Further research may establish the importance of these three treasures of Constantinople in increasing our knowledge of the burial of Jesus and in illuminating the history of the Holy Shroud in Constantinople. The radiocarbon date has led many people to believe the Holy Shroud was a medieval creation. These three artifacts all predate the C-14 results of 1260-1390. The Limburg Staurotheke and the Madrid Skylitzes point, in their different ways, to a rich and fascinating history for the Shroud in Constantinople between 944-1204 AD—a history which involves emperors, armies, clergy and ordinary people.

Fig. 14: I burnt linen with myrrh resin (bottom right), and created a pattern of holes similar to those seen on the Shroud (top four pictures). Like the damage on the Shroud, the holes I created are graduated in size through the folded layers.



6. Comparing "Christ the Teacher" Statue at Chartres Cathedral with the Turin Shroud provides clues to the Shroud's history

Jean-Pierre Laude

Abstract

The comparison between the Shroud of Turin and Christ-the-Teacher statue of the south portal of the Chartres Cathedral reveals common characteristics that are unlikely due to chance. These similarities support the belief that the Shroud existed prior to the radiocarbon date of 1260–1390. The cathedral was built partly from 1145, rebuilt after the fire of 1194, and the Christ-the-Teacher statue was carved between 1205 and 1215. Othon de La Roche was accused of taking the Shroud to Athens in 1204. He may have been secretly summoned by Innocent III to give the Shroud to the Templars which Innocent III once wanted to be affiliated with. Othon de La Roche, who was excommunicated by Innocent III in 1213 for theft of ecclesiastic goods, was dis-excommunicated later. It is possible that he restored the Shroud to Baudoin IX, who retro ceded it to Louis IX. Or he sent it to his family, or to the Archbishop of Besançon, or to the Bellevaux Abbey. Then the Shroud was likely entrusted to the Templars based on some of the testimony at their trials (e.g., Arnaut Sabbatier, 1287). The Templars played an important role in rebuilding the Chartres Cathedral after the fire of 1194. Guillaume de Chartres was also the Templar Master from 1210-1218, and the similarity between the Shroud and Christ-the-Teacher statue could indicate the knowledge of the Shroud in Chartres at the time.

INTRODUCTION

This paper examines the amazing statue of Christ-the-Teacher (CT) at Chartres Cathedral sculpted at the beginning of the 13th century, and by way of comparison, some similar statues carved not far from Chartres (in Paris and Amiens) later throughout the 13th century. These statues could tell us something about the history of the Shroud during the “missing years,” which extended from its disappearance in Constantinople in 1204, until its reappearance in Lirey (close to Troyes in France) in 1356.

It is well known that Othon de La Roche, baron of Ray-sur-Saône near Besançon, a leading figure of the Fourth Crusade, who became Lord of Athens in 1204 after the sack of Constantinople, was accused of taking the Shroud to Athens. If that is the case, then it could have been sent to Besançon by Othon.

In such a case, these following people may have had a role: the Cistercians, the Templars, Amédé Archbishop of Besançon, the Papacy especially Innocent III, Guillaume de Chartres who was the Grand Master of the Templars, and Marguerite of Blois and of Chartres (~1170-1230). After the death of her first husband, Marguerite married Otto von Hohenstaufen, Count Palatine of Burgundy. She was regent in Burgundy during the few years after the death of Otto (1200), and married a third time to Gautier II d'Avesnes. She lived many years, and would probably have died in Besançon.

Another hypothesis, initially stated by André-Marie Dubarle, then extensively studied by Mario Latendresse, is that the Shroud remained in Constantinople after 1204 and was acquired from Baldwin II, Emperor of the Latin Empire of Constantinople, by Louis IX, King of France in 1241-1242. Louis IX also acquired twenty-one other relics, the most famous of which being the Christ's Crown of Thorns. These relics were stored in the Sainte-Chapelle in Paris built by the king especially for them. About a hundred years later, King Philippe de Valois, not knowing the immense value of this relic, could have donated it to Geoffroy de Charny for his church of Lirey, in 1343, according to Hilda Leynen.

Other hypotheses exist, sometimes linked to the hypothesis above. These include passing through Cyprus, Achaia (L. Bouzoud), to being secretly kept by the Templars (I. Wilson, B. Frale). In any case, we do not hear much about the Shroud from 1204 to 1356. Possibly this period of silence could have resulted from the voluntary silence decreed by Innocent III or one of his successors well before 1390, in accordance with the Medieval Canon law of "Perpetual silence," a silence which the Cistercians and the Templars at least knew how to keep.

Chartres Cathedral

The town of Chartres (38,752 inhabitants in 2019) is located 50 miles south-west of Paris. It takes its name from the Gallic tribe of Carnutes, and became its capital in the 2nd century BC. The present cathedral is said to have been built on the very spot where, in the first century AD, the city's first Christians were martyred and thrown into a well. The oral tradition reports that once their bodies left the well, the water became miraculous, making the place a place of pilgrimage. In addition to these legends, it is historically known that a bishop has been present in Chartres since 343 AD, and Christians gathered around him. Thus, Christianity was established in this region in the fourth century. Chartres became one of the greatest centres of medieval learning, long before universities were created, and also an important place of pilgrimage. Present there is a fragment of the reputed veil of the Virgin Mary, which was donated to the Cathedral in 876 AD by Charles the Bald. Most of the kings of France came to Chartres, especially Louis IX who made the pilgrimage several times. Henri IV was crowned king in the cathedral in 1594.

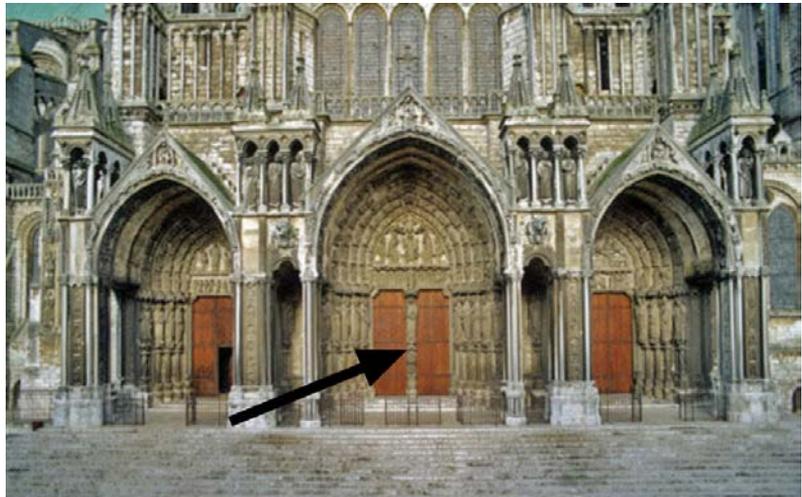
The current cathedral was built on the ruins of a previous Romanesque cathedral, destroyed during a fire in 1194. Mostly constructed between 1194 and 1220, the cathedral is well-preserved, and the majority of the original stained glass windows have survived. The architecture has seen only minor changes since the early 13th century.

Chartres, The Last Judgement Portal, 13th Century

In the south portal of Chartres Cathedral (see Figure 1) there is a scene inspired by St. Matthew's Gospel, and the commentaries of the doctors of the Middle Ages. In the central part of the archway above the doorway is the main scene of The Last Judgement which represents Jesus, surrounded by Mary and St. John interceding for humanity, six angels carrying the instruments of the Passion (the whip, the spear, on linens the crown of thorns, as well as the nails), and two angels holding the Shroud and the Cross (see Figure 2).

Below this archway, is the Christ-the-Teacher statue (arrow in Figure 1, two views in Figure 3) carved early in the 13th century, approximately 1210. For the date of carving and more information see monographs of E. Houvet and J. Villette¹. The Face of Christ on this statue is very reminiscent of the one who appears on the Shroud. This similarity suggests that Shroud could have inspired the carving of the statue if it was in France near Chartres in the 13th century.

Fig. 1:
Southern portal
of Chartres
Cathedral. Arrow
points to the
Christ-the-
Teacher statue
that is located
between the two
doors. Above this
statue is the main
scene of the Last
Judgement seen
in more detail in
Figure 2.



¹ *Monographie de la cathédrale de Chartres*, Etienne Houvet, Jean Villette : *La Cathédrale de Chartres dans l'histoire de l'architecture*, (1984).

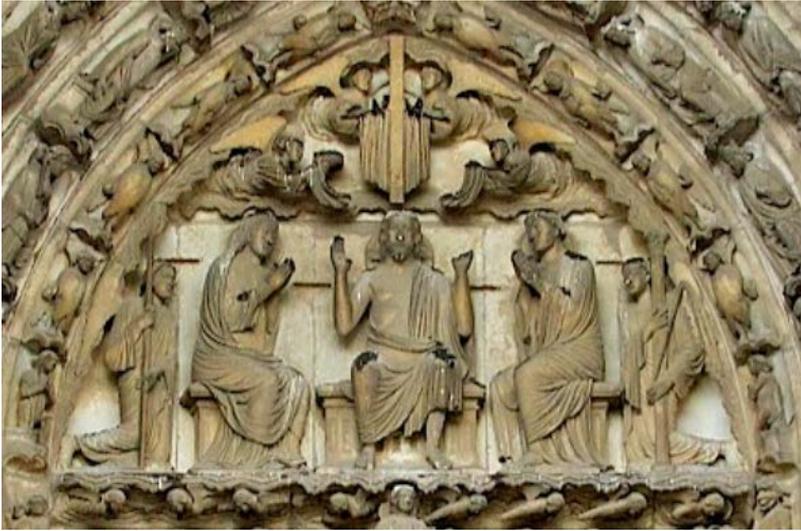


Fig. 2: The Last Judgement main theme above the Christ-the-Teacher statue.



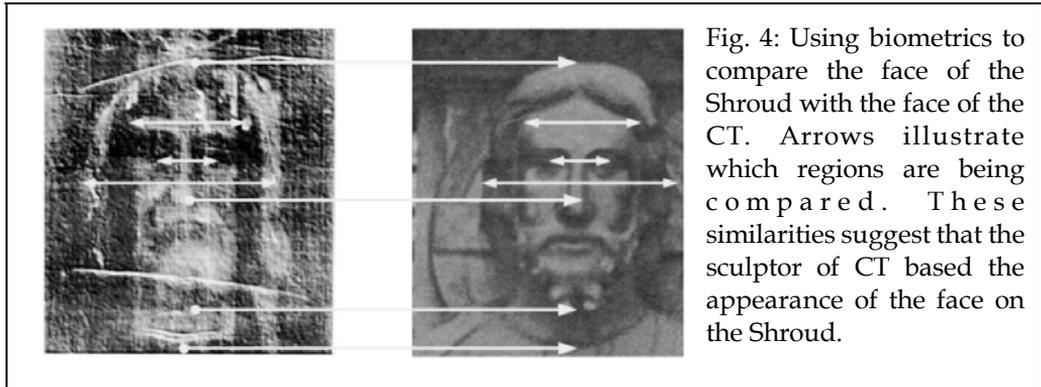
Fig. 3: Two views of Christ-the-Teacher statue at Chartres Cathedral.

Turin Shroud and Christ-the-Teacher

The astonishing resemblance between the Shroud and the CT statue (Figure 4) suggests that the Shroud could have influenced the carving of the face on the statue.² If so, this along with several other proofs such as the Shroud being

²J. P. Laude, *Le Visage du Linceul reproduit à la Cathédrale de Chartres?*, Cahiers MNTV, (déc. 2014).

convincingly represented in the Codex Pray dated 1192–1195, and in the windows of Passion and Resurrection in Chartres Cathedral dated 1150, bring to question the 1988 C14 dating which places the Shroud no earlier than 1260 AD.



Listed below are the similarities which support the hypothesis that the sculptor used the image of the Shroud as a model for the CT at the very beginning of the thirteenth century (1205-1215):

- 1) general appearance,
- 2) long hair,
- 3) double tip of the beard,
- 4) trace under the neck.
- 5) horizontal and vertical dimensions (forehead width, nose height, eyes gap),
- 6) hairstyle,
- 7) distance from trace under the neck to top of the head.

These elements are identical to within 5% with regard to dimensions, without any anamorphosis.

There are also similar carvings of the Last Judgment scene near Chartres made later in the 13th century. They may have been inspired by those of Chartres Cathedral. These include Our Lady of Paris Royal Portal (Notre Dame de Paris, 1220-1230), Our Lady of Amiens Last Judgment Portal (Notre Dame d'Amiens, 1230-1240), "Le Beau Dieu" Christ-the-Teacher of the Amiens, Sainte Chapelle of Paris Front Portal of Upper Chapel (1241-1248).

There are some features of resemblance between the Shroud image, and the Face of Christ of Le Beau Dieu of Our Lady Cathedral of Amiens, the Face of Christ of the statues of Our Lady Cathedral and of St. Chapelle of Paris. This is specially true for the one called Le Beau Dieu of Amiens. It is not surprising knowing that these statues of Paris and Amiens were sculpted after that of Chartres. However there is much less resemblance than what is seen between the CT in Chartres and

the Shroud considering general aspect and biometrics. Their pictures are not included here but can be found on the internet site for the 2019 International Shroud Conference by going to www.custance.org and clicking on the '2019 conference.'

Presence and Route of the Holy Shroud in 13th Century

The similarities between the Shroud and the CT, along with some other clues, favour the presence of the Shroud in early thirteenth century in Besançon and/or Chartres, and Paris. As noted in this section, there are clues which locate the Shroud in Athens after 1204 and suggest that Othon de La Roche played a major role in the Shroud's journey to Europe.

A hypothesis that the Shroud was in Athens after 1204

Considering the following documents whose authenticity seems very likely for many researchers, the presence of the Shroud in Athens, at least until 1209, is considered a historical fact. This is supported by the existence of three documents, and a parchment of 1209 of which there is, in my opinion, no serious reason to discuss authenticity, and maybe by a lapsus (i.e. a verbal/written mistake) of the Pope:

1. 1205 Letter of Theodore Ange Comnenus to Pope Innocent III. He complains about the looting of 1204 in Constantinople "...to the French what was most sacred...the Shroud where he was wrapped up after his death and before his resurrection, Our Lord Jesus Christ. These sacred things are kept in Venice, France, and other countries of looters, the sacred Shroud being in Athens ...³,"
2. 1204-1205 Letter attributed to the emperor Alexius V Mourtzouphlos (Alexius Ducas, nicknamed "Mourtzouphlos"), who complains to Pope Innocent III that in 1204, he was dethroned by the crusaders, then exiled, and that the treasures of his empire were stolen, of which "his" Holy Shroud which is now in Athens, at the hands of Othon de La Roche⁴,
3. 1206 *Treatise on Theology* in 1207 of Nicholas of Otranto Abbot of Casole who saw the relics of cloths, "Spargana," which would designate the Shroud in Athens in 1206 "with his own eyes⁵." J. Michelet quotes Montaner in 1300, "E parlaven axi bellfrances, com dins en Paris" in Catalan. That means that at that time in Morea and Athens, people spoke French as well as in Paris⁶.

³P. Rinaldi, *Un documento probante sulla localizzazione in Atene della Santa Sindone dopo il saccheggio de Costantinopoli* in Coppini (supra n. 30) 109-113, (1981).

⁴A. Legrand, *Du Nouveau pour le Suaire de Turin: Une Lettre de l'Emperor Alexis V*, Notre Histoire, Ed Taillandier, Paris, (1982).

⁵A M Dubarle, Hilda Leynen, *Histoire ancienne du linceul de Turin*, 944-1356, Tome 2, p68-69, F.-X. de Guibert,1(999).

⁶J. Michelet *Histoire de France* Tome 3, VII p 58 Pilon, Le Vasseur Ed Paris (1876).

Othon de La Roche. What did he do with the Shroud?

Othon de La Roche, son of Pons de La Roche, spent his youth in the Château de La Roche in Rigney, which was a fortress above the Ognon Valley near Besançon owned by his family⁷. From there, Othon left in 1202 to participate in the 4th crusade initiated by Pope Innocent III. His involvement would have earned him a reward for the Shroud. After the looting of Constantinople in 1204, Othon de La Roche was awarded the duchy of Athens. He reigned there until 1225 when he leaves the power to his son Guy. Why does he surrender power at the height of his glory and power? One hypothesis put forward by Gérald Barbet is based on the idea that Othon de La Roche died in 1234 after having spent the last few years at Bellevaux Abbey in Haute Saône. However, this could never be demonstrated and, on the contrary, several facts argue against this thesis.

In his article of 1973, *Les premiers ducs d'Athènes et leur famille*, Jean Longnon⁸ reports that a dozen letters from Pope Innocent III, dated 1208 to 1213, were addressed to *Otho, nobili viro Ottoni de Roca, domino Athenarum* [Othon de La Roche]. They almost all relate to the detention of ecclesiastical property or to other extortions of which the Frankish prelates of Greece complained. It was to satisfy these claims that a collective agreement was reached on May 2-12, 1210, at Ravenique, by the barons of the kingdom of Salonika. Among these barons was Othon and in this agreement they renounced any claim to the property, income and rights of the Church. The last documents related to Othon de La Roche consist of a series of letters from Pope Honorius III, the cardinal-legate having excommunicated Othon following complaints from certain prelates that the clauses of the Ravenique convention were not observed. The pope confirmed this sentence on January 21, 1219. But the conflict subsided in September 1223, when a new convention was established. In the last known document concerning Othon, Honorius III lavishes comfort on him, on February 12, 1225.

The following is also considered to be historically valid: In 1209, the Shroud was presented to the Emperor Henri de Hainaut in Athens (A parchment in old French indicates that during his visit, he will be presented with "the linen of the Christ," "the largest relic"⁹). I do not have a copy of this parchment, but the truth of this information can probably be easily verified. Did Henri ask for it to be returned to Constantinople? Was it "sold" to Louis IX to be kept among the other relics of the St. Chapelle as hypothesized by Werner Bulst (1987), Hilda Leynen (1991), André Marie Dubarle (1998), and Mario Latendresse? César Barta wrote that this hypothesis should be rejected since the relics acquired did not come from

⁷J. Gauthier *Othon de La Roche...* Académie des Sciences, Belles-Lettres et Arts de Besançon, pp. 141-142 and planche III, (1880).

⁸J Longnon, *J. des Savants*,

https://www.persee.fr/doc/jds_0021-8103_1973_num_1_1_1278 (January-March 1973)

⁹Prof. Michaëlidès Doc. CCCXIIa library of Athens cited by Gérald Barbet, *Othon de La Roche*, ed Fortis (2012).

the Church of the Blachernae where the Shroud was located, but from the Boucoléon¹⁰. It is also difficult to imagine that Louis IX could possess this precious asset without mentioning it. More likely the Shroud was in Athens since 1205, then probably transferred to Besançon (Holy Roman Empire) to the Cathedral, or to the Cistercian Abbey of Bellevaux Mother of Daphni.¹¹ Du Cange *et al.* make the assumption that Othon returned to Ray-Sur-Saône in 1225, with the Shroud¹². Othon died around 1234 (April 1235 at the latest). He would have passed the end of his life in a Cistercian abbey, likely Bellevaux, not Daphni where his descendants were themselves buried.¹³

Othon de La Roche, Pope Innocent III, Daphni and Cistercians

In 1201, Othon de La Roche "takes the cross" for the 4th crusade in the Abbey of Cîteaux. In 1207, after his conquest of Athens, Othon offers the Abbey of Daphni to the Cistercians Abbey of Bellevaux in Franche Comté founded by one of his parents Pons de La Roche in 1119. In Figure 5, a Mosaic dated 1080-1100 from the Church of Dormition in Daphni, we see an amazing Face of Christ-the-Teacher recalling to us the Face on the Shroud¹⁴. Othon donated to Bellevaux Abbey all his life, even from Athens. For example, according to an authentic charter document from the Haute-Saône department he donated, "touz les poissons de totes mes pacheries en queque leu que ales soient" (written in old French on the authentic act, meaning, all the fish of all my fisheries in any place¹⁵). As for me, born there, who fished a lot as a child in these places that says a lot. I know it was a huge gift!

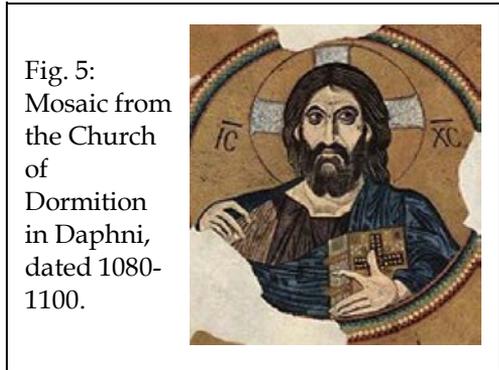


Fig. 5:
Mosaic from
the Church
of
Dormition
in Daphni,
dated 1080-
1100.

In 1209, a lapsus of the Pope Innocent III might indicate that he knew that the Shroud was in Daphni. In a letter, he uses the term "Church of Blachernae" for the church of Daphni¹⁶. On the other hand, it is well known that the Cistercians loved

¹⁰C. Barta, MNTV [8b], (June 2019).

¹¹G. Barbet, *Othon de La Roche*, Fortis ed, ISBN: 978-2-9539227-1-4, (2012).

¹²According to Du Cange, Buchon and Hopf.

¹³G. Barbet, *Othon de La Roche*, Fortis ed, ISBN: 978-2-9539227-1-4, (2012); According to Du Cange, Buchon and Hopf; J Vignès, *Décade historique du diocèse de Langres* t III f 16, from A. Piana, (2010).

¹⁴https://commons.wikimedia.org/wiki/File:Final_pictures_Christ_in_the_Apse.jpg#/media/File:Final_pictures_Christ_in_the_Apse.jpg

¹⁵Martin-D. Glessgen Claire Muller D. Kihai, *Corpus : chartes de la Haute-Saône chHS083*/

¹⁶Barbara Frale *The Templars and the Shroud of Christ* p.241, (2011).

to have relics. For example, Gauthier de Rosières brought to Franche Comté the skull of Saint Akindynos from Constantinople to Rosières Abbey. "The contemplation of Christ incarnate and of his mother" was and still is fundamental to the Cistercians. The Shroud is somehow the proof of the incarnation that the Cathars refused to believe in. In 1203, Innocent sent a vast Cistercian mission to Languedoc, naming the Cistercian, Pierre de Castelnau, as legate to stem the heresy of catharism. In 1206, the contingent was increased to 12 abbots and 30 monks. In 1208, Pierre de Castelnau was assassinated, and replaced by Arnaud Amaury, Abbot of Cîteaux.

Pope Innocent III and the Relics

In a letter to Thomas Maurocenus, patriarch of Constantinople, Pope Innocent III (b. 1161, d. 1216, Pope from 1198-1216), condemns the taking of icons and other holy objects during the looting of 1204¹⁷. Innocent III was very devoted to the relics of the Passion. For example, he instituted, in 1208, the solemn procession of the Holy Face on the Veronica Veil. On a scene of the "Omnis Terra" procession of Pope Innocent III, the Pope is represented carrying "the Veronica" Face of Christ¹⁸. A Hymn was especially composed by him in 1216: "Hail Holy, Face of Our Redeemer on which shines the appearance of divine splendor impressed upon a little cloth of snowy radiance and given to Veronica as a standard of love...."

Was The Holy Face on a long cloth in Rome in 1208? Alexandro Tomei¹⁹ uses the miniature from the 13th century that represents The Holy Face illuminated by the moon which terrifies a group of armed men, to suggest it represents the Mandyllion that was in Constantinople before the looting, and came to Rome in 1208²⁰. On this miniature, there is "a long cloth that falls down out of its frame" according to E. Marinelli²¹. But it is difficult to affirm that the relic was in Rome at that time even if it was the Shroud.

Speculations: Cistercians, Templars, Pope, and Shroud

Pope Innocent III likely knew what happened to the Shroud, and if so, he might have been faced with a dilemma: (1) To ask Othon de La Roche to return the

¹⁷Riant, *Exuviae*, 2: 76–8 (no. 26), Geneva, (1876).

¹⁸*Liber Regulae Sancti Spiritus in Saxia* manuscript 1350
<https://illuminadomine.com/tag/theveronica/>

¹⁹Alexandro Tomei Istituto Storico Italiano per il Medioevo ISBN 978-88-98076-46-9
Roma,. https://www.academia.edu/31516135/Pittori_per_la_miniaturation , (2016)

²⁰Mark Guscini, *The Tradition of the Image of Edessa*. Cambridge Scholars Publishing.
p. 137. ISBN 9781443888752. (2016).

²¹Emanuela Marinelli *The Shroud and the iconography of Christ*, St. Louis October
(2014).

relic to its previous owners to avoid increasing the East-West schism. This was impossible since the Byzantines were no longer in power. (2) To decree a "Silentium perpetuum et absolutio ab impetitione" according to the canon law²². (3) If the relic was authentic, to plan returning it to Jerusalem through the Templars "that could pass freely through all borders, and were exempt from all authority except that of the pope" or to the Cistercians also under his direct and unique authority.

From 1208 to 1213, Pope Innocent III sent several protest letters to Othon de La Roche regarding the theft of ecclesiastic goods, incomes and rights. In 1210, as noted above, a convention was signed in Ravenique about a waiver of this by the Frankish barons²³. In 1215, during the Lateran Council the ban on exhibiting relics without authorization of the Church was adopted. In 1219, Pope Honorius III (1216-1229) confirmed the excommunication of Othon de La Roche, by his legate. In 1223, an appeasement between Honorius and Othon de La Roche happened, and a new convention was signed. Did they come to an agreement concerning the Shroud? Anyway in 1390, Pope Clement VII imposes on Pierre d'Arcis a strange "perpetual silence" on the Shroud of Lirey. Is he following a previous decree of the canon law, for example, from Innocent III? In any case, Innocent never talked or responded to complaints from either Theodore Ange Comnenus or Mourtzouphlos about stealing of "their" Holy Shroud. If these facts are proven, that could be a silence that speaks volumes.

Amédée de Dramelay, Archbishop of Besançon

René Locatelli gave as dates 1193 to 1220 for the duration of the Amédée archiepiscopacy in Besançon²⁴. It is incompatible with the date of his death in Holy Land (d. 1218) according to J.J. Chifflet²⁵. But we rather tend to give our preference to the dates given by Locatelli. Amédée was from the family of Bernard de Tramelay, or Dramelay, 4th Grand Master of the Knights Templar who died in Ascalon in 1153. Mainly for this reason Babinet hypothesized that Othon de La Roche sent the Shroud to Amédée who gave it to the Templars²⁶. But Amédée was

²²Roumy, Franck. Silentium perpetuum et absolutio ab impetitione: L'expression de la sentence définitive et de la requête irrecevable dans la procédure canonique des XIIe et XIIIe siècles. *Bulletin of Medieval Canon Law*, vol. 31, 2014, pp. 125-145. Project MUSE, doi:10.1353/bmc.2014.0008, (2014)

²³Longnon Jean, Les premiers ducs d'Athènes et leur famille, *Journal des savants*, n°1. pp. 6180, (1973).

²⁴René Locatelli, *Sur les chemins de la perfection, moines et chanoines dans le diocèse de Besançon vers 1060-1220* CERCOR, Université de Saint-Etienne, 1992, ISBN 2-86272-024-0

²⁵J.J. Chifflet (1588-1673) *Vesonvio*, Traduction of J Girardot, Ed. Cêtre, Besançon pp 565-567, (1988).

²⁶Robert Babinet, "La Profession de Foi en Jésus-Christ des Derniers Templiers," *La Pensée Catholique* 281, pp.49-74. Rev. by D. Scavone B, (March-April 1996).

a convinced partisan of the Staufen, a German dynasty that ruled the Holy Roman Empire from 1138 to 1208 and from 1212 to 1254, that was abandoned by Innocent III. Moreover, Amédée was denounced to Celestin III and Innocent III, for "numerous and infamous" excesses, for living in a disordered manner, for simony, and even for incest. René Locatelli wrote that there are no less than 90 pontifical interventions in the diocese of Besançon from 1193 to 1220. So it is unlikely that the Pope, if he knew Othon de La Roche had the Shroud, or Othon himself, or his family who was very pious, would have entrusted their precious relic to Amédée.²⁷ Pons de La Roche (d. 1203) founded Bellevaux, 1st Cistercian Abbey of Franche Comté in 1119. Othon de La Roche was his great grandson.

If not to Amédée, to whom did Othon de La Roche entrust the Shroud?

If Othon de La Roche had the Shroud, he could have given or sold it, with or without knowledge and consent of the Pope. Being in Athens, he could have passed it onto the Emperor Henri de Hainaut who could have given it to Louis IX or to the Templars, or to his own son or to the Cistercians in Daphni. Or he could have returned to Burgundy and given it to his own wife Elisabeth de Chappes who died two years after him. Jeanne de Vergy wife of Geoffroy I de Charny (1300-1358), first known owner of the Shroud, was the great granddaughter of Isabelle de Ray, herself the granddaughter of Othon de La Roche (1170-1234)²⁸. On the other hand, real family links existed between de Chappes family and Guillaume de Chartres, son of Milon Count of Bar-sur-Seine 7 miles away from Chappes. Or he could have given the Shroud to Marguerite of Blois (and Chartres), widow of Othon I count of Burgundy, regent of Burgundy until the wedding of their daughter Béatrice in 1208. She was recognized by Innocent III for her faith and her donations. Her third husband, Gautier II d'Avesnes, one of the main leaders in the 5th crusade, was notably associated with the Knights Templar and the Teutonic Knights. Gauthier was liberated by the Templars and helped them build Castle Pilgrim, in 1218. Or Othon de La Roche could have given "his Shroud" to the Cistercians from Bellevaux or from another Franche-Comté abbey where Othon spent his last days (d. 1234), and/or to the Templars.

Guillaume de Chartres and Templars 1210-1219

Around 1191, a very young Guillaume de Chartres joined the order of the Temple. He was received by the brothers of the very important Commandery of

²⁷Lemesle, *Gouvernants en procès*, Bulletin du centre d'études médiévales d'Auxerre | BUCEMA, 15 | pp 241-243 (2011); J. Théry, "Sexual Misbehaviour of Prelates, Mid-12th to Mid-14th Centuries: Evidence from Papal Judicial Inquiries", Intern. Medieval Congress, Leeds, (2013)

²⁸Alessandro Piana, *Missing years of the Holy Shroud*, ENEA Workshop Frascati, May (2010).

Sours next to Chartres. There are some controversies, but for me there is no doubt for reasons beyond the scope of this article that Guillaume de Chartres was a son of Milon IV Seigneur du Puiset, Vicomte de Chartres, and Count of Bar-sur-Seine (1189-1219). He assisted as Grand Master in 1210 at the coronation of John of Brienne, new king of Jerusalem, appointed by Philip Augustus. Guillaume de Chartres, 14th Grand Master of the Knights Templar, 1210-1219, Commander of the 5th Crusade, died in Damietta (Guillaume died in the beginning of July 1219), soon after died his brother Gaucher (d. July 29, 1219), and his father Milon IV (d. Aug. 17, 1219)²⁹.

Here is how J. Michelet describes a Templar: The Templars always had to accept the fight, even one against three, never to ask for mercy, not to give ransom, not a section of wall, not an inch of earth. They had no rest to hope for³⁰.

At the moment of his death, Milon granted a legacy of 30 silver marks to Notre Dame de Chartres, a relatively considerable amount, and property to different people including de Chappes family. I do not know if Elisabeth de Chappes (d. 1236), a daughter of Clerebaud IV de Chappes and the last wife of Othon de La Roche, was designated in the will.

Chartres, Relics, 2nd, 3th, 4th Crusades

Louis VII (1137-1180), the grandfather of Marguerite de Blois (Chartres) viewed the Shroud in Constantinople in 1147 on his way to the 2nd crusade. Prof. Falcinelli discovered that in Chartres Cathedral, three stained glass windows (dated 1150 according to him) depict convincingly Shroud-like scenes probably related to what Louis VII saw in Constantinople³¹. On one of the windows of Passion and Resurrection we can see the reversed '3' bloodstain on Jesus' forehead, no thumbs, and long fingers³².

Louis de Blois-Chartres, Count of Blois, of Chartres, of Châteaudun and of Clermont from 1191 to 1205, died in Adrianople in 1205. He played a major role in the 4th crusade as one of its four leaders and at the head of one of the main contingents. The bishop of Chartres Renaud de Mouçon (1183-1217), participated in the 3th crusade, but not in the 4th. He was a first cousin of Philippe Auguste King of France (1180-1223), of Count Louis de Blois-Chartres and of his two sisters Marguerite Countess of Blois (1170-1230) for several years regent in Besançon, and Isabelle Countess of Chartres (d.1248³³).

²⁹*Martyrologue de l'abbaye de Molême* cited by L. Coutant, Société Acad. de L'Aube, Histoire de Bar-sur Seine, Ed du Bastion Tome II p. 393, (1984).

³⁰J. Michelet, *Histoire de France* t. IV, p. 20, (1837).

³¹R. Falcinelli, *Testimonianze sindoniche a Chartres*, Academia.edu, (1998) .

³²Stefen. E. Jones, *Shroud-like Jesus in a stained glass widows (c.1150) in Chartres Cathedral, France*, 11-29-2018 Blog.

³³Michelle Armstrong-Partida, *Mothers and Daughters as Lords: The Countesses of Blois and Chartres Medieval Prosopography*, Vol. 26 (2005).

You will find in an article by Claudine Lautier³⁴, valuable information and relics of Chartres Cathedral, and many images of its stained glass windows, for example, an image of one of the most famous, that of St. Anne carrying the Virgin Mary in her arms.

In Chartres Cathedral everybody was very attached to relics in addition to the Chief of St. Anne sent by Louis de Blois-Chartres in 1205 before his death and that of St. Matthew sent by Gervais de Chateauneuf. Many other relics were brought back to Chartres by the companions of Louis, but not the Shroud, then likely still in the hands of Othon de La Roche in Athens.

Marguerite of Blois, Pope, Cistercians and Templars

Marguerite (1170-1230), the widow of Hugues d'Oisy, married Othon 1st of Hohenstaufen, Count of Burgundy (1170-1200). After the assassination of Othon in Besançon, she married Walter of Avesnes (1180-1244). Taken a prisoner during the 5th crusade, Walter was released by the Templars. He helps them and the Teutonic Knights build Castle Pilgrim (1218). Marguerite, as an example by Innocent III was exceedingly generous with the Cistercians, the Templars, and the Church, (e.g., land donation for the order of Holy Trinity for the Redemption of Captives, or a large donation for the nave of the church of Acey Abbey³⁵). As well, her sister Isabelle of Chartres much favoured Cistercians and Templars.

We have the confirmation of an important bequest of 3000 pounds of Blois from Marguerite to the Cistercians' Abbey of Acey in 1220³⁶. The "Archives Départementales du Jura" have kept the original record in medieval Latin writing. Concerning the amount and date: (1) from the end of third line to the four first words of the fourth line we translate: amount 3000 pounds of guaranteed free Blois currency, (2) end of last line: year of grace 1220. The amount is relatively high, and we know she made many other donations to Acey and other places (i.e., she granted 20 acres to the Trinitarians of Cerfroid, and she made many other donations to the Cistercians and Templars).

DISCUSSION

I have noted the existence of several convincing clues for the presence of the Shroud in Athens, in the hands Othon de La Roche, after the sack of Constantinople in 1204. I hypothesized that the Shroud was probably given by Othon de La Roche to the Cistercians, and was sent to France probably through Besançon. I believe that it was later passed on to the Templars, maybe through

³⁴Lautier Claudine. Les vitraux de la cathédrale de Chartres. Reliques et images. In: *Bulletin Monumental*, tome 161, n°1, pp. 3-1, (2003).

³⁵Abbaye Cistercienne d'Acey : document of Bibliothèque Nationale de France <https://www.decitre.fr/media/pdf/feuillestage/9/7/8/2/0/1/1/2/9782011279224.pdf>

³⁶Copy of doc. 15H14 Archives départementales du Jura.

Chartres with the objective of returning it back to Jerusalem, with or without the agreement and silence of Pope Innocent III. When Guillaume of Chartres (c. 1178–1219) was the Grand Master of the Templars, it would not be surprising that the Shroud passed through Chartres. When regent in Burgundy, Margaret of Blois, a great donor of the Cistercians and of the Templars and particularly praised by Innocent III, may have been an accomplice in the transfer of Shroud to the Templars. Possibly her husband Walter of Avesnes being allied to the Templars in the 5th Crusade commanded by Guillaume de Chartres, could have had a role in this matter, as well as Elisabeth de Chappes, the wife of Othon de La Roche, who had ties to the family of Guillaume de Chartres-Milon IV.

CONCLUSION

I show an amazing similarity, highlighting common characteristics, between the Face of CT, a Chartres Cathedral statue dated 1210, and the Face imprinted on the Turin Shroud. It is very possible that the sculptor used the Shroud as a model. Moreover stained glass windows dated 1150 in this cathedral also depict Shroud-like scenes. These new observations can be added to previous observations on the Codex Pray dated 1192-1195, as evidence for the existence of the Shroud prior to 1260 AD, which is the earliest date given by the carbon-14 dating of 1988.

I can see that the similarities between the CT statue and the Shroud is a clue that the Shroud was in France and even in Chartres or not far from Chartres at the beginning of the 13th century.

I also highlighted, for the first time, many personal links between Rome, Constantinople, Athens, Besançon, Paris, and Chartres. These relationships open up new avenues for future research. I apologize for not having an answer to every question, but as is often the case, “We wish the truth, and find in us only uncertainty.”

Dedication

I dedicate this article to Col. Welborn B. Griffith, an American military officer among the many allied soldiers who died for France. Through his incomparable personal heroism he saved Chartres Cathedral from shelling in World War II, thereby preserving its incomparable historical treasures³⁷.

The Holy Shroud “is like a spring that murmurs in the silence, and we can hear it” Benedict XVI (2010).

³⁷<https://www.washingtonexaminer.com/the-american-hero-who-saved-chartres-cathedral>

Acknowledgments: A particular thanks to:

- Patricia Guyard Director of “Archives Départementales du Jura” who agreed to give me a copy of the original document proving the bequest from Marguerite to the Cistercians’ Abbey of Acey (Vitreux, Franche-Comté)³⁸.
- Dr. R Gary Chiang, Custance Centre, for having excellently organized the 2019 Holy Shroud Conference in Ancaster in which this work was first presented.³⁹



³⁸<https://francearchives.fr/fr/annuaire/departements?dpt=39>

³⁹J. P. Laude, STATS-2019 Redeemer Aug.17, (2019).
<http://dx.doi.org/10.13140/RG.2.2.33626.70081>

7. Holistic Solution to the Mysteries of the Shroud of Turin

Robert A. Rucker

Abstract

The Shroud of Turin has been researched more than any other ancient artifact to solve its mysteries, which include the image on the cloth, the radiocarbon date, and the blood. It would be attractive if, by following the evidence where it leads, a single concept, referred to as a "holistic solution," could be developed to explain these mysteries. This paper presents such a solution. Based on the scientific evidence, I hypothesize that an extremely rapid intense burst of radiation was emitted from within the body enveloped by the Shroud. Charged particles and/or electromagnetic radiation such as infrared, visible light, and ultraviolet in this burst can explain why we see the image and how the image was formed. Neutrons in this burst can explain why radiocarbon dating produced a date of 1260-1390 AD instead of the time of Jesus (30 to 33 AD). Neutrons might also explain why the blood on the cloth has remained a reddish colour. The extremely rapid outward pressure produced by this burst can also explain how the blood was transferred from the body onto the cloth and why the fibers under the blood are not discoloured. Methods to test this hypothesis include measuring the distribution of radiocarbon dates across the Shroud and the detection of long half-life isotopes, Cl-36 and Ca-41, on the threads and blood on the Shroud and in the proposed limestone tombs. Background for the information discussed here is found in my previous papers¹ which are available at www.shroudresearch.net.

INTRODUCTION

It is essential to use the proper methodology in researching the Shroud. To the extent possible, the researcher should recognize his own biases and presuppositions, so these will not affect his judgment and objectivity can be maintained. In other words, research should be performed with a neutral mindset, i.e., it should be assumed that the Shroud of Turin may or may not be Jesus' burial cloth, God may or may not exist, Jesus' resurrection may or may not be a real historical event, and the Shroud may or may not have experienced a unique event that is outside or beyond our current understanding of the laws of physics. This last point is the issue of naturalism. As used here, naturalism is defined as the assumption that the only explanations allowed are those consistent with the known laws of science, so nothing outside of science, as we now understand it, is

¹Robert A. Rucker: "Summary of Scientific Research on the Shroud of Turin", Rev. 3, Nov. 14, 2018, "Explaining the Mysteries of the Shroud", Rev. 5, Nov. 14, 2018, "Status of Research on the Shroud of Turin", Rev. 1, June 21, 2019.

possible. Naturalism has been discussed more fully elsewhere.² The methodology for researching the Shroud advocated here could be called forensic science or reverse engineering. In simple terms, it is following the evidence where it leads, without the restrictions of presuppositions, either religious or naturalistic.

In following the evidence where it leads, we are led to the hypothesis that there was an extremely rapid intense burst of radiation from the body that caused the image. If neutrons were included in this burst of radiation, they would have shifted the radiocarbon date to more recent years, potentially explaining the 1988 radiocarbon dating of the Shroud. If this radiation burst was sufficiently brief and intense, it could have thrust the dried blood off the body onto the cloth, caused the blood to retain a reddish colour without discolouring fibers below the blood, and might have even elevated the upper cloth above the body, as will be discussed below. Thus, the hypothesis of an extremely rapid intense burst of radiation from the body is proposed to explain the mysteries of the Shroud related to the image, the radiocarbon dating, and the blood on the cloth. This single hypothesis explains all these mysteries.

The Shroud Wrapped the Body of a Crucified Man

The history of research on the Shroud began in 1898 when Secondo Pia took its first photograph. When he developed the glass plate from his camera, what he expected to see was a low-resolution negative image which, to his shock, turned out to be a high-resolution positive image. This revealed that the image on the Shroud was like a negative image, with the dark and light areas reversed or inverted. Thus, the image could not be a painting, which contradicted what many people believed in 1898. An artist could never have painted a negative image because that artist would have never seen an negative image, and had absolutely no concept of the technology. If the image was not produced by an artist, and there appeared to be no other realistic option to form it, then the image had to be produced by the body wrapped in the Shroud. The fact that it wrapped a crucified body was confirmed over the next seven decades as researchers studied primarily the nature of the blood on the cloth. The main researchers in this period were:

- Dr. Yves Delage, Prof. of Comparative Anatomy, Paris 1900-1902
- Dr. Paul Vignon, Professor of Biology, Paris 1900-1943
- Dr. Pierre Barbet, Prof. of Anatomy, Paris 1932-1961
- Dr. Robert Bucklin, M.D., Forensic Examiner, LA 1941-1993
- Dr. Frederick Zugibe, Chief Medical Examiner, NY 1953-2002

These researchers had doctorate degrees, many with specialties in anatomy, wounds, and blood. Many of them researched the Shroud for several decades. They concluded that the blood came from a real crucified body that was wrapped

²Robert A. Rucker: "Status of Research on the Shroud of Turin", Rev. 1, June 21, 2019, Section 3

in the Shroud, based on the pristine nature of the blood, the shape of solidified blood components, and the presence of halo rings around these components that are only visible under ultraviolet light.

Dr. John Jackson was a professor of physics at the Air Force Academy in Colorado Springs, Colorado. In the early 1970s, when he placed a photograph of the face on the Shroud under an electronic device called a VP8 Image Analyzer, it was discovered that the image on the Shroud contains 3D information. This 3D information that is recorded on the Shroud represents the vertical distance from the body to the cloth which enveloped the body. No other painting or photograph contains 3D information. This amazing discovery led to the establishment of the Shroud of Turin Research Project (STURP). In 1978, the Vatican allowed STURP to perform experiments on the Shroud of Turin in the Cathedral of St. John the Baptist in Turin, Italy, for five days, 24 hours a day. The only restriction was that the Shroud should not be damaged in the process.

STURP's main goal was to explain how the image was created. STURP concluded that they found no evidence of pigment causing the image. They also found no carrier, no capillarity (soaking up of a liquid), nothing clumping fibers or threads together, no cracking of the image along fold lines, no brush strokes, and no stiffening of the cloth. This evidence indicates that the image was not due to paint, dye, or stain. The lack of capillarity indicates that the image could not be due to an acid or any organic or inorganic chemical in liquid form. Under UV light, the scorches on the Shroud from the fire in 1532 fluoresced, but the body image did not. This indicated that the image is not a scorch from a hot object. The evidence also argues against the possibility that the image was a photograph:

- There are full-size front and back images of a crucified man on the Shroud. The photographic negative shows these as positive images with good resolution. These images contain 3D information related to the vertical distance from the body to the cloth. No photographs of any other objects contain 3D information.
- There is extreme superficiality of the discolouration in the fibers. Only the top two or three fiber layers in a thread are discoloured, and the discolouration in a fiber is less than 0.4 microns thick around the circumference of the fiber, which has a diameter of about 15 microns. The inside of the fiber is not discoloured. These characteristics are contrary to a photograph.
- The discolouration in this very thin layer is caused by a change from single electron bonds to double electron bonds in the carbon atoms in the cellulose. This is contrary to a photograph. A change from single to double electron bonds can result from the process of oxidation and dehydration associated with aging of linen, though normal aging of linen does not produce the image of a crucified man.
- There is no evidence of capillarity in the fibers or threads, so no liquids were used in the process of forming the discolouration in the fibers. The photographic process uses liquids to develop an image on film and on photographic paper.
- The discolouration of the fibers is mottled, and fibers under the blood are not discoloured. Again, these are not characteristics of a photograph.
- No residual material was found on the Shroud from a photographic process.

- For such a hypothetical photographic process to be correct, it had to form the image prior to about 1355, when the Shroud was displayed in Lirey, France. Evidence on the Hungarian Pray Manuscript indicates this date should be pushed back to at least 1192-1195. Evidence on coins and paintings indicates this date should be pushed back to about 550 AD. It was not until 1898 that the first photograph was produced.
- If a photographic process was used to produce the image on the Shroud prior to these dates, it is strange that it was not used to produce any other image in the many centuries since.
- No hypothesis has been suggested that is consistent with both the macroscopic evidence (how the image looks) and all the above microscopic evidence (the very small-scale characteristics) of the image. If a hypothesis is not consistent with all the above evidence, it cannot be correct.

The absence of body decay products on the cloth indicates that the image was not caused by decay products interacting with ointments. So after five days, 24 hours a day of experiments, researchers could not explain how the image was formed. STURP's conclusion in 1981 was, "We can conclude for now that the Shroud image is that of a real human form of a scourged, crucified man. It is not the product of an artist." Based on the above evidence, the most reasonable conclusion is that the image was formed by the body of the scourged crucified man as it was wrapped in the Shroud. This agrees with the first seven decades of research which concluded that the blood on the Shroud came from a dead human body wrapped in the cloth. There is no realistic alternative. A forger or counterfeiter could not have created such an image.

Why can we see the Image?

Regarding the mystery of the image on the Shroud, it is important to break this into two sub-issues. *Why* we can see the image should be distinguished from *how* the image was formed. Answering the first question will help us answer the second question.

Information is the key to understanding why we see the image.³ Both how information is stored and how it is transported from one location to another.⁴ As an example, how is it possible for one person to see another person? The smallest packet of energy that makes up light is called a photon. Photons can carry, transfer, or communicate information in three ways. A photon's energy communicates colour. Its intensity (number of photons) communicates shade (light vs. dark). The position and angle the photon enters the lens of a person's eye communicate the position of the colour and shade of the point being seen. Thus, person A can see

³Robert A. Rucker, "Why we Can See the Image on the Shroud", Rev. 0, Dec. 26, 2019

⁴Robert A. Rucker, "Information Content on the Shroud of Turin", Rev. 0, Oct. 11, 2016

person B because the colour, shade, and position of every point on person B is communicated to the eyes of person A by photons that reflect off person B. In fact, every image that a person sees is based on information. For example, the person in a photograph can be recognized because the information that defines the person's appearance has been encoded into the location of the pixels/dots on the photograph. This information is communicated by reflected photons to the person looking at the photograph.

This principle can be applied to the image on the Shroud. The pixels that make the image of the crucified man consist of the top fibers in certain linen threads that have been discoloured into a straw-yellow or sepia colour. We recognize this image because the information that defines the appearance of a crucified man has been encoded into the pattern of the discoloured fibers on the cloth. This information had to be deposited on the Shroud to be encoded into the image. It had to be transported or communicated to the cloth from somewhere else. Since the content of this information is that which defines the appearance of a naked crucified man, it could only come from one place. It could not have come from the air or limestone in the tomb since this information was not inherent to those locations. It could only have come from the body because this information was only inherent to that body. Thus, this information had to be transported from the body to the cloth and deposited there.

Photons of infrared, visible, and ultraviolet light can transport such information by their energy, intensity, and direction. Charged particles, such as protons or electrons, have the same capability. In fact, of the various means of transporting information from one location to another, such as sound waves, electron flow in wires, diffusion of molecules, etc., only radiation could have transported the focused information from the body to the cloth that is needed to form the good resolution image.⁵ This radiation could have consisted of charged particles, such as protons or electrons, and/or photons of electromagnetic radiation such as infrared, visible, or ultraviolet light.

How was the Image Formed?

The above evidence indicates that the dead body of a crucified man was wrapped in the Shroud. This body in some way produced the image. Its formation required the transfer of information from the body to the cloth. This information had to define the appearance of a naked crucified man because that is what the image is. This information could only have come from the body and could only have been transported from the body to the cloth by radiation. We next look at the details of the process to establish the requirements that must be met.

⁵Robert A. Rucker, "Role of Radiation in Image Formation on the Shroud of Turin", Rev. 0, October 11, 2016

The Shroud is a 3-to-1 Herringbone weave of linen threads, with each thread composed of about 200 fibers, with the discoloured fibers in only the top two or three layers of fibers in a thread. It is these discoloured fibers that form the image of a crucified man. With the Shroud, a person must be several feet back from the cloth to see the image, whereas in most paintings or photographs, the details are sharper at a close distance. The discoloured fibers appear in groups with some areas of the threads discoloured and other areas not. This mottling effect of the discoloured fibers is an aspect of the image that needs to be explained.

Research by STURP determined that: (1) of the fibers on the side of the thread facing the body, only the top two or three layers of fibers are discoloured, (2) there is nothing clumping the fibers together so the image could not be due to paint, dye, or stain, and (3) there is no evidence of capillarity from one fiber to another, which means that a liquid was not involved in making the image. How could only the top two layers of fibers in a thread have been discoloured without clumping or use of a liquid?

The extreme superficiality of the discolouration is also indicated by the location of the discolouration. A linen fiber is about 15 microns in diameter, about one-fifth the diameter of a human hair. The straw-yellow to sepia colour is located only in the outer 0.4 micron thick surface layer around the circumference of the fiber with the inside of the fiber not discoloured. The thickness of this discoloured layer is probably more accurately described as 0.2 ± 0.2 microns.

The discolouration in this thin layer is caused by a change in the arrangement of the atoms that were already in the cellulose, rather than by the addition of new atoms. Carbon atoms have two electrons in their inner orbit and four electrons in their outer orbit. Each of these four outer orbit electrons is normally bound to one other atom in cellulose, which causes the carbon atom to vibrate in a certain way. But in the thin discoloured layer, some of the carbon atoms are only surrounded by three other atoms. This means that of the four outer orbit electrons, one electron is bound to one adjacent atom, another electron is bound to a second adjacent atom, but two electrons are bound to the third adjacent atom. This change from single electron bonds to a double electron bond causes the carbon atoms to vibrate differently so that we see a different colour reflected from them. What could cause such a change from single electron bonds to double electron bonds in a very thin layer in a fiber to produce the image of a crucified man?

It is the pattern of these discoloured fibers that form the good resolution image of the face, with characteristics of a negative image that contains 3D information. The pattern of discoloured fibers also formed the entire front and back images of the body. How could the fibers have been discoloured in the precise pattern to create these images? The mechanism that formed the front and back images did not encode the sides of the body or the top of the head onto the cloth.

Three things are required to form the image. (1) There must be a process or mechanism to discolour the fibers. (2) Energy must be provided to drive the

discolouration mechanism to change carbon atoms from single to double electron bonds. (3) Information must be provided to the discolouration mechanism to control which fibers are discoloured and the length of that discolouration so that the image could be formed. No image could have been formed without the proper information to control the discolouration mechanism. A burst of radiation from the body could have transported both the energy and the information to the cloth.⁵ Thus the image was formed by radiation controlled by information.

Donnet *et al.* (2019)⁶ was able to create an image of the face on the Shroud that is significantly better than any previous attempt to fake the image. It was produced by radiation controlled by information, as advocated above. In this research, a laser was used to emit a femtosecond pulse of infrared light. A femtosecond is an extremely small fraction of a second: one femtosecond = 10^{-15} second = a millionth of a billionth of a second. Previous experiments⁷ with an ultraviolet laser indicate that the laser pulse must be extremely rapid to produce the degree of superficiality that exists on the Shroud with only the top two or three layers of fibers discoloured.

I assembled above evidence into a proposed hypothesis to explain how the image was formed by the dead body of a crucified man wrapped in the Shroud.⁸ This body caused both the blood and the image on the cloth. The image was formed by something that flowed from the body to the cloth across the air gap between the two. Here are the main points:

1. As the body was wrapped in the Shroud, the cloth would have been touching the tip of the nose but not the side of the nose at the nostrils, yet there is a smooth gradation of discolouration down the nostrils. This means that the discolouration could not be the result of contact with the cloth. It had to be caused by something that flowed across the air gap between the body and the cloth.
2. Upper fibers and threads in the image shield lower ones from discolouration. This again implies that something flowed from the body to the cloth, with the upper fibers and threads preventing it from getting to the lower ones.
3. We can see the image because the information that defines the appearance of a crucified man has been encoded into the pattern of discoloured fibers in the image. This information had to be transported from the body to the cloth to control the discolouration mechanism that formed the image. Radiation is the only realistic option to transport this information.⁵ Radiation of both particles such as protons and electrons and electromagnetic radiation such as infrared, visible, and ultraviolet light, can transport information by their energy, intensity, and direction.

⁶C. Donnet, J. Granier, G. Verge, Y. Bleu, S. Reynaud, and F. Vocanson, "2D Reproduction of the Face on the Turin Shroud by Infrared Femtosecond Pulse Laser Processing", *Applied Optics*, March 20, 2019

⁷Paolo Di Lazzaro, *et al.*, "Superficial and Shroud-like Colouration of Linen by Short Laser Pulses in the Vacuum Ultraviolet", January 2013

⁸Robert A. Rucker, "Image Formation on the Shroud of Turin", Rev. 1, June 20, 2019

4. There is 3D information in the image. This 3D information is related to the vertical distance from the body to the cloth across the air gap, with no discolouration of the fibers if the air gap is over about three or four centimeters. This 3D information effect would naturally result if whatever flowed from the body to the cloth diminished as it traveled across the air gap. Radiation emitted in the body would naturally diminish as it went across the air gap due to absorption and scattering in the air. Particle radiation could also decrease due to decay.

Based on the above evidence, the image formed when an extremely rapid intense burst of radiation was emitted from the body. This radiation transported the energy and information to the cloth that was required to form the image. It had to be an extremely rapid burst to produce the superficiality of the image. This radiation probably consisted primarily of charged particles such as protons and electrons, although electromagnetic radiation such as infrared, visible, and ultraviolet light could also have been involved. Highly penetrating radiation such as neutrons, X-rays, and gamma rays were not significant contributors to the image formation. If they had been, then there would be an image with a similar intensity on the side of the cloth away from the body, which is not true for the Shroud.

Since there would have been no lens between the body and the cloth to focus the radiation to form the good resolution image, the radiation had to be vertically collimated as the body lay horizontal in the tomb. "Vertically collimated" refers to the radiation being emitted exactly vertically up and vertically down from the horizontal body. This is necessary so that each point on the front and back images received radiation, and hence information, from only one point on the body. If the radiation was not vertically collimated relative to the horizontal body, then each point on the cloth would have received radiation, and hence information, from multiple points on the body. This might have caused random discolouration on the cloth but no image. The vertical collimation of the radiation also explains why there are no images on the Shroud of the sides of the body or the top of the head.

How the fibers were discoloured can be explained by an extremely rapid intense burst of charged particles that created a high electrical charge on the cloth in a small fraction of a second. If the radiation burst was rapid and intense enough, it would have caused an electrical discharge from the high points of the fibers facing the body. This electrical discharge from the fibers would have involved an extremely high electrical current in the fibers, with the electrons flowing primarily near the outer circumference of the fibers as a high electrical current normally does in a conductor. This would have produced extreme heating around the outer circumference of the fibers, which could have damaged the atomic structure of the cellulose in this region, exactly where the fibers are discoloured. The static discharge could also have formed ozone, which could also have damaged the cellulose around the circumference of the fibers.

The mottled appearance of the discoloured fibers, with some areas of the threads discoloured and others not, can be explained as a "lightning rod" effect.

When a thunder cloud passes over an area of level ground containing many lightning rods, lightning will strike where the distance between the cloud and a lightning rod is a minimum. The lightning between the cloud and the tip of the lightning rod will produce a significant electrical flow in the ground and in the clouds so the surrounding area in the ground and in the clouds is discharged. As a result, lightning will probably not strike in the immediate area again. The same principle holds for the electrical discharge from the top fibers of the threads in the Shroud, resulting in areas of the threads that are discoloured and others not. This effect, as well as scattering of the radiation by the air between the body and the cloth, would cause some loss in the resolution of the image, as seen on the Shroud.

Both the electrical heating and the possible ozone could damage the atomic structure of the cellulose in the outer circumference of the fibers. It is believed, with the passage of time possibly combined with exposure to ultraviolet light in sunlight, this region of damaged cellulose in the outer circumference of the fibers gradually became discoloured by an oxidation-dehydration process that caused some of the single electron bonds of the carbon atoms in the cellulose to be changed to double electron bonds. This change in the electron bonding of the carbon atoms causes the appearance of the straw-yellow or sepia colour in the image. This process was very selective in that it created the image of a crucified man, based on the information deposited on the cloth. If this scenario is correct, then the image may not have formed immediately after the burst of radiation from the body but could have perhaps taken weeks, months, or years to form. The attractiveness of this proposal for image formation is that it can explain all the characteristics of the image such as a negative image on the inside of the wrapped configuration that contains 3D information, extreme superficiality of the image, colour due to a change in the electron bonding of carbon atoms in the cellulose, mottling of the threads, and the upper fibers and threads shielding lower ones from discolouration.

What is the Date of the Shroud?

The radiocarbon dating of the Shroud is a common objection to its authenticity. It is often said that the Shroud only dates to about 1355 AD. But a correct understanding is that the *continuous history* of the Shroud only goes back to about 1355 or 1356 when Pierre d'Arcis wrote that such a cloth was shown as the burial cloth of Jesus in Lirey, France. However, when it is realized that the 1260-1390 date obtained by radiocarbon dating should be rejected (see the next section), there is no reason the Shroud could not date to the first century. This is based on historical evidence especially the Codex Pray, traditions, physical evidence, and the many other date indicators for the Shroud.⁹ It was evidently well known and revered in Constantinople for hundreds of years before 1204. It was probably also

⁹Robert A. Rucker, "Date of the Shroud of Turin", June 10, 2020

in Edessa and Jerusalem before that. Thus, the Shroud could go back to the time of Jesus, about 30 AD.

What About the 1988 Radiocarbon Dating?

In 1988, samples were cut from the lower corner of the Shroud for radiocarbon dating. The result of this process was a date range of 1260 to 1390 AD, with a 95% probability that the true date falls within this range.¹⁰ This is considered the strongest evidence that the Shroud dates to the 13th or 14th century and could not be the burial cloth of Jesus. However, there are many reasons this date should be rejected.¹¹ Radiocarbon dating involves a two-step process. The carbon-14 to carbon-12 (C^{14}/C^{12}) ratio of a sample is first measured. This measured ratio is then used to calculate a date for the sample assuming the C^{14}/C^{12} ratio has only changed due to decay of the C^{14} . Proper statistical analysis of the data resulting from the carbon dating indicates there was probably an unexpected factor that altered the C^{14}/C^{12} ratio in the samples. This means the C^{14}/C^{12} ratio for the samples was correctly measured, but because this ratio had been altered by an unexpected factor, the calculated date was not the true date for the Shroud. This difference between the calculated date and the true date is called a systematic error or bias. Since the magnitude of this error cannot be determined, the conclusion of the 1988 carbon dating of the Shroud should be rejected, i.e., the date of 1260-1390 AD should be given no credibility. Two recent statistical analyses of the data agree with this conclusion.¹²

Several options have been proposed for the cause that altered the C^{14}/C^{12} ratio of the samples, including heat and smoke from the fire in 1532, contamination, bioplastic film, an invisible reweave, and carbon monoxide. All these options have significant problems. Another option which would cause the radiocarbon date to be different from the true date is neutron absorption. This was one of the earliest documented proposals¹³ to explain how the C^{14}/C^{12} ratio of the samples was altered. This explanation nicely correlates with the above concept that the image on the Shroud was produced by a burst of radiation from the body.

¹⁰P.E. Damon and 20 others, "Radiocarbon Dating of the Shroud of Turin", *Nature*, February 16, 1989.

¹¹Robert A. Rucker, "Carbon Dating of the Shroud is Explained by Neutron Absorption", June 10, 2020.

¹²T. Casabianca, E. Marinelli, G. Pernagallo, and B. Torrisi, "Radiocarbon Dating of the Turin Shroud: New Evidence from Raw Data", (2019), *Archaeometry*, 61(5), 1223-1231, and Bryan Walsh and Larry Schwalbe, "An Instructive Inter-Laboratory Comparison: The 1988 Radiocarbon Dating of the Shroud of Turin", *Journal of Archaeological Science: Reports*, 29, February 2020.

¹³Thomas J. Phillips, "Shroud Irradiated with Neutrons?", *Nature*, Vol. 337, No. 6208, page 594, February 16, 1989, published in the same edition of *Nature* as Damon.

Experiments have shown protons can cause discolouration on linen similar to what is seen on the Shroud.¹⁴ If charged particles, such as protons, were emitted from the body to form the image, then it is possible neutrons were also emitted in this burst of radiation because there are a similar number of neutrons and protons in the body. For example, about 10% by weight of a human body is hydrogen. About 99.98% of hydrogen atoms have only a proton in the nucleus of the atom (H^1), and about 0.02% of hydrogen atoms have both a proton and a neutron in the nucleus. The form of hydrogen that contains both a proton and a neutron is called deuterium or heavy hydrogen (H^2). Therefore, if protons in the radiation burst resulted from splitting of deuterium nuclei, then an equal number of neutrons and protons would be emitted. Deuterium is of special interest because it requires the minimum energy to split its nucleus into separate neutrons and protons.

The human body is made of organs, which are made of proteins. These proteins are composed of molecules containing atoms, which contain neutrons, protons, and electrons. An average human body contains about 2×10^{28} neutrons. To analyze the possibility of neutron emission from the body, nuclear analysis calculations were performed using the MCNP (Monte Carlo N-Particle) computer software. These MCNP calculations determined if 2×10^{18} neutrons were emitted homogeneously in the body, it would cause a 16% increase in the C^{14} content at the 1988 sample location by the $[N^{14} + \text{neutron} \rightarrow C^{14} + \text{proton}]$ reaction. This 16% increase would cause the radiocarbon date to shift from 30 AD to 1260 AD, thus explaining the 1988 carbon dating of the Shroud. The 2×10^{18} neutrons would be produced by splitting only 0.0004% of the deuterium nuclei in the body. Emission of 2×10^{18} neutrons is only one neutron for every ten billion neutrons in the body ($2 \times 10^{18} / 2 \times 10^{28} = 1 \times 10^{-10}$).

The Blood on the Shroud

The first seven decades of Shroud research were concerned primarily with issues related to the blood. Much of the blood would have dried on the body before it was wrapped in the Shroud, so why is it now on the cloth? This is a mystery because dried blood does not soak into cloth.

The hypothesis of an extremely rapid intense burst of radiation emitted in the body raises an interesting possibility. Particles that have mass also have momentum as they move. Electromagnetic radiations such as infrared, visible, and ultraviolet light also have momentum. When this momentum from either particles or electromagnetic radiation is absorbed and transferred to an object, it can cause the object to move. This is referred to as radiation pressure and has multiple applications from a Crookes radiometer (also known as a light mill) to a solar sail for propelling a spacecraft. Thus, it is possible that a burst of radiation emitted from within the body, if sufficiently rapid and intense, and if vertically collimated

¹⁴Arthur C Lind, "Image Formation by Protons", available at <https://www.testtheshroud.org/articles>

both up and down, could force the dried blood off the body, and accelerate it vertically away from the body without scattering it, thrusting it onto the cloth. The result would be the blood as we now find it on the Shroud.

Other mysteries related to the blood are the following. Why is the blood still a reddish colour when blood exposed to air quickly turns dark brown to black? Within the area of the image, why are fibers under the blood not discoloured? Lastly, why does the image of the face appear to have been encoded onto a flat surface instead of a curved surface as the cloth wrapped around the face?

Based on recent experiments by Kelly Kearse, high quantities of bilirubin in the blood will not cause it to retain a reddish colour, as is often believed (see Chapter 16). Previous experiments by Carlo Goldoni¹⁵ indicate neutron absorption in blood followed by exposure to ultraviolet in sunlight can cause blood to retain a reddish colour. This evidence was not well documented and should be confirmed. If neutrons were included in the hypothesized burst of radiation from the body, as in the neutron absorption hypothesis, then some of them would have been absorbed in the blood, which may have caused it to retain its reddish colour. If momentum and thus energy in the radiation was deposited in the blood to force it off the body and onto the Shroud, there may have been insufficient energy remaining in the radiation to discolour the fibers under the blood, thus possibly explaining why the fibers are not discoloured in those locations. Electrostatic forces involved in this process may also explain why the image looks as if it was encoded while the cloth was flat above the body, with no distortion of the image due to the cloth enveloping the body.

CONCLUSION

By following the evidence where it leads, apart from religious or naturalistic presuppositions, a hypothesis was developed to explain the mysteries of the Shroud including the image, date, and blood. This hypothesis proposes that an extremely rapid intense burst of radiation was emitted within the body of a crucified man as it was wrapped within the Shroud. This radiation traveled from the body to the cloth where it deposited the energy and information required to form the image. The energy was required to change the electron bonds in the cellulose to discolour the fibers. The information was required to control where fibers had to be discoloured to form the image. To form the good resolution images of the front and back of the body, without lenses between the body and the cloth, the radiation had to be collimated both vertically up and vertically down from the horizontal body as it lay in the tomb. This would also explain why there are no side images of the body on the Shroud.

¹⁵Carlo Goldoni, "The Shroud of Turin and the bilirubin blood stains", International Conference on The Shroud of Turin: Perspectives on a Multifaceted Enigma", Columbus, Ohio, August 14-17, 2008

The radiation that caused the image was probably charged particles, such as protons and electrons, and/or electromagnetic radiation such as infrared, visible, and ultraviolet light, but not highly penetrating radiation such as neutrons, X-rays, or gamma rays. It is proposed the charged particle radiation very rapidly produced an extremely high electrical charge buildup on the cloth, which produced an electrical discharge from the top fibers facing the body. This produced an extremely high electrical current flow, which produced extreme heating that damaged the thin outer layer on the circumference of the fibers. This led to discolouration of the fibers that formed the image. The possible production of ozone might also have led to a chemical attack on this thin outer region of the fibers.

If neutrons were also present in the burst of radiation, some of them would have been absorbed in the trace amount of N^{14} in the cloth to produce new C^{14} in the Shroud. This would have shifted the radiocarbon date forward up to thousands of years, depending on the location on the cloth. This would explain the 1988 carbon dating of the Shroud. This neutron absorption hypothesis can be tested using the predicted distribution of the radiocarbon dates on the Shroud¹⁶, and possibly by detecting long half-life isotopes (Cl-36, Ca-41) in threads from the Shroud and in limestone from the tomb. The neutrons would have also been absorbed in the blood, which may have caused the blood on the Shroud to retain a reddish colour. The burst of collimated radiation, if sufficiently brief and intense, could have thrust the dried blood off the body onto the cloth. In transferring momentum and energy to the blood to move it, the remaining energy in the radiation might have been insufficient to discolour fibers. This is consistent with the fibers under the blood not being discoloured. The electrostatic forces involved in this process may be helpful to understand why the top cloth appears to have been flat above the body since there appears to be no distortion effects on the image from the cloth wrapping around the body.

Thus, the hypothesis of an extremely brief intense burst of vertically collimated radiation emitted within the body is attractive because it explains the mysteries of the Shroud regarding the image, the carbon dating, and the blood. Specifically, it can explain why:

1. The image is on the side of the cloth that was facing the body.
2. The image has a good resolution, without images of the sides of the body or the top of the head.
3. There is part of the image where the cloth would not have been touching the body.
4. The front and back images are of equal intensity.
5. The image is a negative image.
6. The image contains 3D information related to the vertical distance from the cloth to the body.
7. Only the top two or three layers of fibers are discoloured in a thread.

¹⁶Robert A. Rucker, "Proposal for C^{14} Dating of Charred Material Removed from the Shroud", October 15, 2018, Figure 1.

8. Only a very thin outer region less than 0.4 microns thick on any fiber is discoloured.
9. Discolouration in the fibers is caused by carbon atoms in the cellulose being changed from single to double electron bonds.
10. Upper threads and fibers shield lower ones.
11. The discolouration is mottled on the threads.
12. The 1988 carbon dating produced a 1260-1390 date for cloth from the first century.
13. The blood on the Shroud has a reddish colour.
14. The blood that would have dried on the body is now on the cloth.
15. Fibers are not discoloured under the blood.
16. The image of the face does not show distortion due to the Shroud wrapping around his head.



8. The Radiocarbon Dating of the Shroud is Explained by Neutron Absorption

Robert A. Rucker

Abstract

This paper argues that the 1988 radiocarbon dating of the Shroud should be rejected due to a number of problems: (1) two of the three laboratories obtained statistically different dates, (2) the radiocarbon date is different for different locations on the cloth decreasing about 36 years per cm (91 years per inch) as the sample location moves from the bottom of the cloth towards the image, and (3) the probability of obtaining a variation of the dates for the 1988 Shroud samples at least as large as was obtained is only 1.4%, which is below the usual acceptance criteria of 5.0%. The variation of measured dates is likely due to an unexpected factor that caused a consistent or systematic error in all the measurements. In keeping with the neutron absorption hypothesis, I propose that this unexpected factor is the absorption of neutrons which created new C14 on the cloth. These neutrons were evidently included in the burst of radiation from the body that formed the image of the crucified man on the Shroud, so that the two effects, image formation and the shift in the radiocarbon date, are related. To change the radiocarbon date from the time of Jesus' death, about 30 AD, to 1260 AD requires neutron absorption to increase the amount of C14 on the samples by only 16%.

1. INTRODUCTION AND NONTECHNICAL EXPLANATION

To determine the best explanations for the Shroud's mysteries, including its image, date, and blood, the Shroud has been researched more than any other ancient artifact. Scientific data collected in 1978 by the Shroud of Turin Research Project (STURP) convinced many that the Shroud was the burial cloth of Jesus, and this conclusion led to calls for its radiocarbon dating. Radiocarbon dating is done by measuring the ratio of carbon-14 to carbon-12 (C14/C12) in samples removed from the material of interest. The date is then calculated by assuming this ratio has only changed by the decay of the C14, which has a half-life of about 5730 years. Like sand running down in an hourglass, with the amount of sand in the top half decreasing with time, the amount of C14 remaining in the sample indicates how long ago the plant was cut down to make the linen cloth. In 1988, samples were cut from the corner of the Shroud and radiocarbon dated at three laboratories in Tucson, Zurich, and Oxford. This resulted in an uncorrected average value of 1260 ± 31 AD. (In statistical analysis terminology, an average value is called a mean

value.) This value, when corrected for variations in the C14 in the atmosphere, produced a range of 1260 to 1390 AD with a 95% probability that the true date falls within this range.¹ But multiple issues have convinced most Shroud researchers that this conclusion (1260-1390 AD) should be rejected, i.e., given no credibility.

The main objective of the 1988 effort was not the correct dating of the Shroud but was the validation of the small-sample dating technique for Accelerator Mass Spectroscopy (AMS). This was expected to be a significant and lucrative improvement over the older dating technique. Dating the Shroud was probably chosen as the means toward validation of the AMS small-sample dating technique because many people were very interested in the Shroud so that its dating should produce much publicity.

To validate the small sample dating technique, the Shroud had to be dated to what was believed to be the correct date. Two basic assumptions are apparent: (1) the Shroud likely originated in the 13th or 14th century since many argued that it was first shown in Lirey, France, about 1355, and therefore, (2) the Shroud was an ordinary piece of linen cloth that could be radiocarbon dated as any other piece of cloth, so nothing unusual could have altered the C14/C12 ratio of the samples. This means that the possibility that the Shroud could have encountered a unique phenomena as it wrapped the dead body of Jesus at the time of his resurrection was assumed to be not credible. This is a common assumption for scientists, i.e., an event cannot have happened if it is contrary to our current understanding of science. For example, Harry Gove, one of the leaders in the 1988 radiocarbon dating of the Shroud, rejected this possibility calling it "fanciful" in the range of "highly improbable to the ludicrous²." As a result of this assumption, when the variation of the measured dates was recognized as probably inconsistent with the original measurement uncertainties stated in Damon *et al.*, the possibility that a unique phenomenon had altered the C14/C12 ratio of the samples was not seriously considered. Rather, to avoid this inconsistency, it was assumed that the original measurement uncertainties in Damon *et al.*, resulting from the usual measurement and calculation sequence for the C14/C12 ratio measurement process, were under-predicted, i.e., less than the true measurement uncertainties. However, the evidence is against this assumption because the variation of the measured dates for the three controls or standards (three samples of cloth other than the Shroud) that were run at the same time as the Shroud samples were in good agreement with their measurement uncertainties, with these uncertainties also determined from the usual measurement and calculation sequence for the C14/C12 ratio measurement process. Why should the usual methodology for determining the measurement uncertainties work for the three standards but not

¹P.E. Damon, and 20 others, "Radiocarbon Dating of the Shroud of Turin", *Nature*, February 16, 1989.

²Harry E. Gove, "From Hiroshima to the Iceman, The Development and Applications of Accelerator Mass Spectrometry", 1999, Institute of Physics Publishing, Bristol and Philadelphia, ISBN 0 7503 0558 4, pages 183-185.

for the Shroud samples? Thus, it is believed that a wrong assumption (the Shroud is an ordinary piece of linen cloth) produced a wrong conclusion (the Shroud dates to 1260-1390 AD).

To assure the accuracy of measurement data, a statistical analysis of the data is always necessary to prove that an unexpected factor has not affected the measured values by either affecting the measurement process or affecting the samples. This is because such a factor could alter the measured values by an unknown amount. The above assumption that the measurement uncertainties were under-predicted allowed Damon *et al.* to proceed without performing this aspect of the statistical analysis. But if the measurement uncertainties are not assumed away but instead are used to analyze whether the measured dates are consistent with their uncertainties³, the conclusion is that they are likely not consistent. This indicates an unexpected factor had likely altered the measured dates.

The dates could have been altered in two general ways based on radiocarbon dating being a two-step process. In step 1, the C14/C12 ratios of the samples are measured. In step 2, these measured C14/C12 ratios are used to calculate the date assuming the C14/C12 ratios have only changed due to the decay of C14. It is believed that the C14/C12 ratios were measured accurately but something other than the decay of C14 had altered the C14/C12 ratios of the samples. Evidence indicates that a burst of radiation from the body formed the image⁴. The neutron absorption hypothesis assumes neutrons were included in this radiation, though they were not involved in forming the image. Absorption of these neutrons in the trace amount of N14 in the threads could shift the radiocarbon date by thousands of years, depending on the location on the Shroud. To shift the radiocarbon date from about 30 to 1260 AD requires the C14 in the samples to be increased by only 16%.

2. Analysis of Measurement Data

An important concept in the analysis of measurement data is the difference between random errors and systematic errors. Due to these errors, the measured value of a quantity is usually different from the true value. The "true" value of a quantity is its inherent value, even though we may not be able to know the true

³Robert A. Rucker, "The Carbon Dating Problem for the Shroud of Turin, Part 2: Statistical Analysis", Rev. 1, August 7, 2018, T. Casabianca, E. Marinelli, G. Pernagallo, and B. Torrisi, "Radiocarbon Dating of the Turin Shroud: New Evidence from Raw Data", (2019), *Archaeometry*, 61(5), 1223-1231, and Bryan Walsh and Larry Schwalbe, "An Instructive Inter-Laboratory Comparison: The 1988 Radiocarbon Dating of the Shroud of Turin", *Journal of Archaeological Science: Reports*, Volume 29, February 2020.

⁴Robert A. Rucker, "Holistic Solution to the Mysteries of the Shroud of Turin", Rev. 0, December 18, 2019, and Robert A. Rucker, "Image Formation on the Shroud of Turin", Rev. 1, July 14, 2019.

value by use of measurements. The difference between a measured value and the true value is called an error or bias. These errors can be either random or systematic. The term "random error" means that the measured value can be a little higher than the true value one time and a little lower than the true value another time. Since random measurement errors can cause the measured values to be randomly higher or lower than the true value, the effect of these random errors can be minimized by taking many measurements. This is because the randomly positive or negative changes from the true value will tend to cancel each other out.

Measurements may sometimes also be affected by a systematic error, which is often called a systematic bias. A systematic error is the opposite of a random error because it can, and usually does, change the measured value from the true value in only one direction. Thus, an equation for the measured value can be written as follows:

The measured value = the true value \pm the random error + the systematic error

A systematic error is not random because it is a function of (depends on) something such as temperature, pressure, humidity, voltage, materials, gravity, electrical field, magnetic field, etc. As a result, a systematic error can cause a measured value to be in error in only a positive direction or only a negative direction. This means that the effect of a systematic error cannot be minimized by taking many measurements. A systematic error in the measured value of a sample can result from a problem in the measurement process or because the sample has been altered in some way. If measurements are affected by a systematic error, and if the magnitude of this error cannot be determined, as is usually the case, then the only option is to reject the measured values from necessarily being the true value because they could be in error by an unknown amount.

It should never be assumed that the measurement uncertainties are under-predicted to allow them to be ignored, as was done in the statistical analysis of the 1988 radiocarbon dating. Doing this could easily hide the presence of a systematic error that could significantly change the measured values from the true value. This is the root cause of why the 1988 radiocarbon dating of the Shroud produced a date (1260-1390 AD) that is inconsistent with so much other information about the Shroud. Assuming the measurement uncertainties to be under-predicted allowed them to be ignored. This caused those doing the analysis to avoid the evidence within the measured values that a systematic error, caused by an unexpected factor, had probably altered the measured values.

3. The 1988 Radiocarbon Dating of the Shroud

An erroneous radiocarbon date could either be caused by a problem with the measurement procedure or a problem with the samples. Since the 1988 radiocarbon

dating utilized three different laboratories, and three standards or controls were run at the same time as the Shroud samples and these standards were dated with reasonable accuracy, it is appropriate to believe that the accelerator mass spectroscopy (AMS) procedure would have accurately measured the C14/C12 ratios for the Shroud samples within the stated measurement uncertainties. The only other option for the 1260-1390 date to not be the true date for the Shroud, as is generally believed by Shroud researchers, is for there to be a problem with the samples. This requires the C14/C12 ratios for the samples to have been altered by something other than decay of C14. For the radiocarbon date to be shifted from about 30 to 1260 AD, the amount of C14 in the sample would have to be increased by 16%. This change is too large for it to be the result of normal contamination⁵. The first documented hypothesis to explain why the Shroud could have been dated incorrectly was neutron absorption⁶. The neutron absorption hypothesis assumes neutrons were included in a burst of radiation from within the body. A small fraction of these neutrons would have been absorbed in the trace amount of N14 in the threads to produce new C14 by the $[N14 + \text{neutron} \rightarrow C14 + \text{proton}]$ reaction. New C14 would have been produced in various amounts across the entire Shroud, including the samples cut from the cloth in 1988. This new C14 would have shifted the radiocarbon date in the forward direction by up to thousands of years depending on the location on the Shroud.

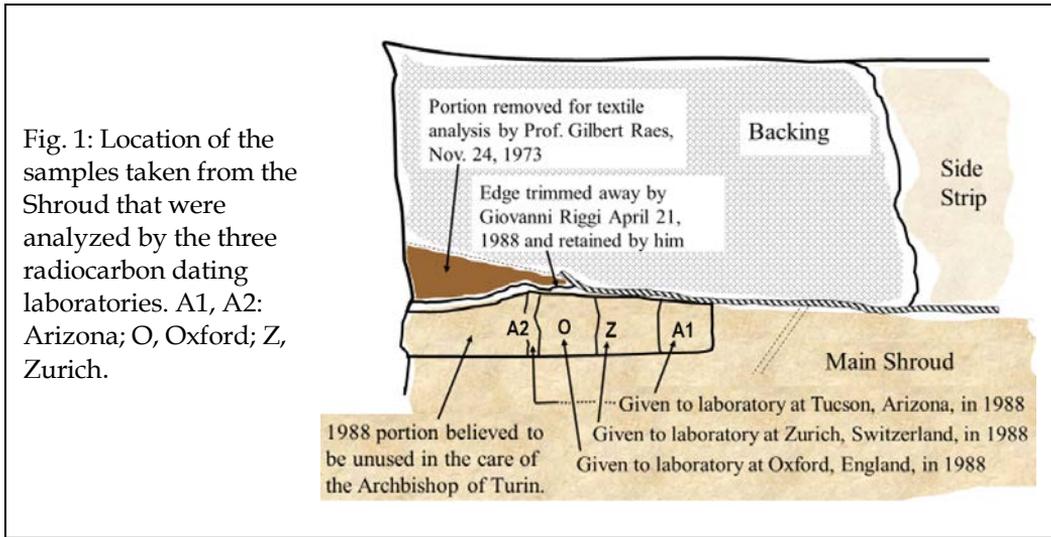
For radiocarbon dating, a strip of linen about 1.2 x 8.0 cm was cut from the bottom corner of the cloth next to the front image by Giovanni Riggi on April 21, 1988. Samples for three laboratories were cut from this linen strip (see in Figure 1). To assure proper measurement results, three controls were dated at the same time as the Shroud samples. These controls came from cloths of known dates based on their history. The measured dates, the measurement uncertainties, and the analysis of data from both the Shroud samples and the standards were reported in the British journal *Nature* in 1989. Twenty-one authors are listed for this paper with the first author being P. E. Damon, so this paper is commonly called "Damon *et al.*"¹

Radiocarbon dating of a sample does not measure the date directly. It measures the ratio of C14 to C12 in the sample and then a date is calculated from this ratio. This calculation assumes that the C14/C12 ratio has only changed due to the C14 atoms in the sample decaying with a half-life of 5730 years whereas C12 atoms do not decay. According to Damon *et al.*, the average date for the Shroud samples from the three laboratories (Tucson, Zurich, and Oxford) was determined to be 1260 ± 31 AD. This is the raw or uncorrected value. When this value was corrected for the changing concentration of C14 in the atmosphere, a date range of

⁵Robert A. Rucker, "Carbon Dating of the Shroud of Turin to 1260-1390 AD is not Explained by Normal Contamination", Rev. 0, August 9, 2019

⁶Thomas J. Phillips, "Shroud Irradiated with Neutrons?", *Nature*, Vol. 337, No. 6208, page 594, February 16, 1989, published in the same edition of *Nature* as Damon *et al.*

1260 to 1390 was obtained. This is claimed to be a two sigma (σ) or 95% range. This means there should be a 95% probability the true date for the Shroud is between 1260 and 1390 AD.



Based on this, Damon *et al.* stated in both the abstract and the conclusion that, "These results provide conclusive evidence that the linen of the Shroud of Turin is mediaeval." When the raw data for the 1988 radiocarbon dating was finally obtained⁷ from the British Museum in 2017, it was learned that one of the peer reviewers of this paper (Professor Anthos Bray) recommended this concluding statement be removed from the paper, presumably because it was not justified by the analysis of the data. However, *Nature* published this paper without removing this concluding statement, thus ignoring the recommendation of Professor Bray.

The dates obtained by each laboratory are given in Table 1. The three values obtained by the Oxford laboratory and the five

Table 1. Carbon Dates (AD) from Each Laboratory

| Subsample | Oxford | Zurich | Arizona |
|---------------|---------------|---------------|---------------|
| 1 | 1155 ± 65 | 1217 ± 61 | 1344 ± 41 |
| 2 | 1205 ± 55 | 1228 ± 56 | 1376 ± 45 |
| 3 | 1220 ± 45 | 1315 ± 57 | 1197 ± 51 |
| 4 | | 1311 ± 45 | 1318 ± 49 |
| 5 | | 1271 ± 51 | 1274 ± 40 |
| 6 | | | 1410 ± 37 |
| 7 | | | 1249 ± 47 |
| 8 | | | 1249 ± 47 |
| Weighted Mean | 1200.8 ± 30.7 | 1273.9 ± 23.7 | 1303.5 ± 17.2 |

⁷T. Casabianca, E. Marinelli, G. Pernagallo, and B. Torrisi, "Radiocarbon Dating of the Turin Shroud: New Evidence from Raw Data", (2019), *Archaeometry*, 61(5), 1223-1231.

values obtained by the Zurich laboratory are from Damon *et al.* The eight values obtained by the laboratory in Tucson, Arizona, are from Casabianca *et al.*

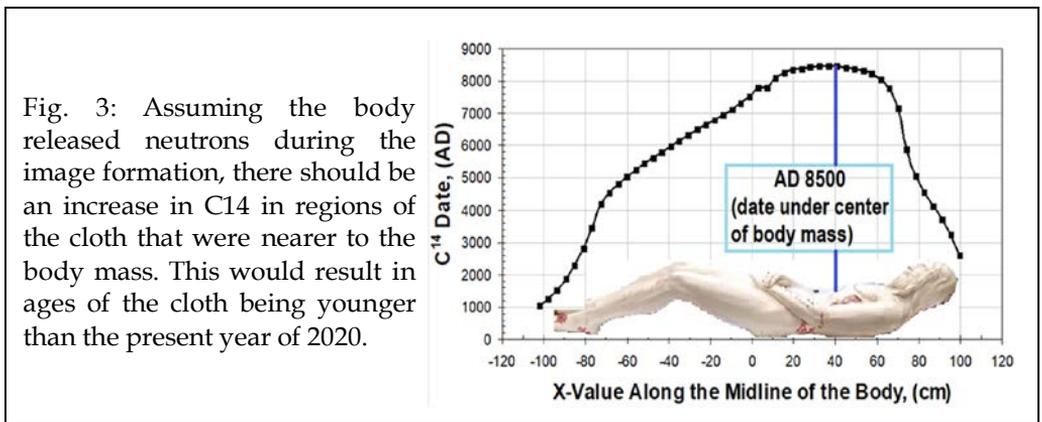
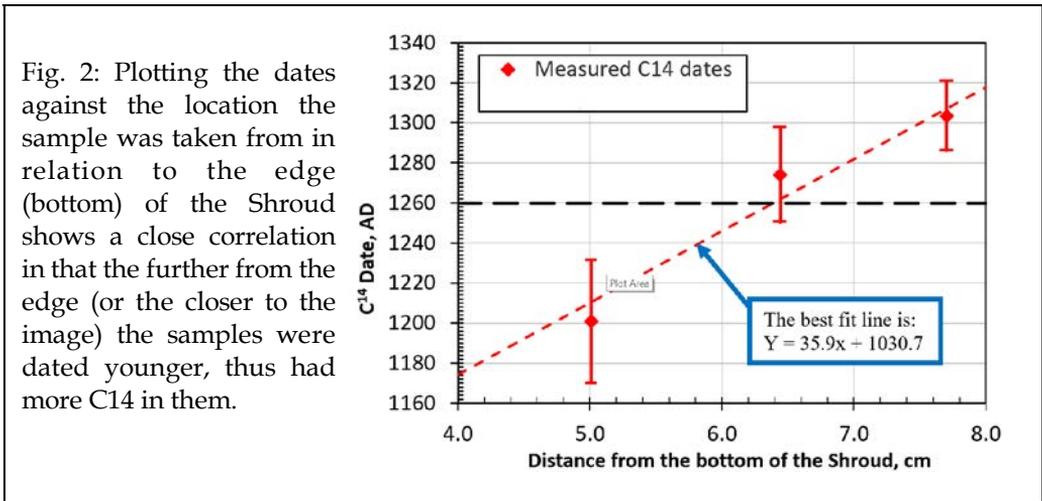
4. Objections to the 1260-1390 AD Date for the Shroud

The main objections to a date of 1260-1390 AD for the Shroud are summarized below:

- The characteristics of the image are so unique it seems impossible for the image to have been made in 1260-1390 because the technology to make the image did not exist, and still does not exist.
- There are at least 14 other date indicators that are consistent with the first century and contradict the 1260-1390 date.⁸
- Two of the laboratories that did the 1988 radiocarbon dating obtained statistically different dates. The difference between the dates from Arizona (1303.5 ± 17.2) and Oxford (1200.8 ± 30.7) is $1303.5 - 1200.8 = 102.7$ years. The uncertainty of this difference is obtained from the square root of the sum of the squares of the individual uncertainties = square root of (17.2 squared + 30.7 squared) = 35.2 . The difference between the dates from Arizona and Oxford is thus 102.7 ± 35.2 . But $102.7/35.2 = 2.9$, which means the dates from Arizona and Oxford are statistically different at the 2.9-sigma level because 2.9 exceeds the normal acceptance level of less than or equal to 2.0 sigma. This indicates the radiocarbon dates were statistically different for the samples sent to Arizona and Oxford, as though the samples came from different pieces of cloth. This should not be true since both samples were cut from the same cloth close to one another. This suggests that an unexpected factor had altered the C14/C12 ratios of the samples.
- The average dates from the three laboratories show an increase of about 36 years per cm (91 years per inch) of distance from the bottom of the cloth (Figure 2). This means that the dates are a function of (depend on) the location on the cloth. This slope or gradient in the experimental results agree with the results of nuclear analysis computer calculations that were based on the neutron absorption hypothesis (Figure 3).
- The statistical analysis in Damon *et al.* used a chi-squared statistical test to determine whether the variation in the dates exceeded the variation allowed by the measurement uncertainties. This process found that for the three standards (labeled samples 2, 3, and 4 in Damon *et al.*), the variation in the dates was reasonably consistent with their uncertainties (significance level $p = 0.9, 0.5, \text{ and } 0.3$), but this was not true for the samples from the Shroud (labeled sample 1 in Damon *et al.*). Why would this be? In paragraph 23 of Damon *et al.*, which begins, "More quantitatively," it is stated that since "it is unlikely that the errors quoted by the laboratories for sample 1 fully reflect the overall scatter" they decided to use "the scatter of results" to estimate the uncertainties. This is the key mistake in the analysis of the data because it fails to allow for the possibility that the measured dates had been affected by an unexpected factor that produced a systematic error in the evaluation. When the original measurement uncertainties produced by the normal

⁸Robert A. Rucker, "Summary of Scientific Research on the Shroud of Turin", Rev. 3, Nov. 14, 2018, Section 6C

experimental and calculational process are used, instead of those calculated from the scatter of results, the chi-squared statistical analysis indicates that the variation in the measured dates likely exceeds the variation allowed by the measurement uncertainties. There is only a 1.4% chance they are consistent⁹, if the analysis is performed as in Damon *et al.* for the three standards that were run at the same time as the Shroud samples. The 1.4% is below the usual acceptance level of 5.0%, and thus indicates an unexpected factor probably caused the measured dates to be different from the true date, which in statistical analysis terminology is called a systematic error. Since the magnitude of this systematic error cannot be known, the credibility of the 1260-1390 date range should be rejected.



⁹Significance level $p = 0.014$ in Table 6 in Rucker, “The Carbon Dating Problem for the Shroud of Turin, Part 2: Statistical Analysis” and Table 4 in Walsh and Schwalbe, “An Instructive Inter-Laboratory Comparison: The 1988 Radiocarbon Dating of the Shroud of Turin”.

In other words, in the statistical analysis of the data in Damon *et al.*, a decision was made to assume that the original measurement uncertainties were under-predicted, i.e., less than the true values, and thus could be ignored. But in ignoring the original measurement uncertainties, they ignored the crucial item in the decision process as to whether the 1260 ± 31 AD date should be accepted or rejected. This was probably done because there were problems in the statistical analysis that should have caused them to question the 1260 date for the Shroud and because their main goal was to validate the accuracy of their small sample dating technique. Dating the Shroud was merely a means to that end. But when they ignored the original measurement uncertainties in Damon *et al.*, they could no longer perform a statistical analysis to prove the variation in the measured dates was within that allowed by the measurement uncertainties, without the presence of some unexpected factor that had significantly altered the measurement results. Thus, they could not assure that an unexpected factor had not altered the measurement process or the samples. It is believed the C14/C12 ratios of the samples were accurately measured within the stated measurement uncertainties in Damon *et al.*, but the dates calculated from these C14/C12 ratios could have been very different from the true date for the Shroud because something had altered the C14/C12 ratios in the samples, such as neutron absorption creating new C14 in the samples.

5. Should All the Data in Damon *et al.* be Rejected?

In summary, the conclusion in Damon *et al.* (1260-1390 AD) should not be trusted for dating the Shroud. This is because an unexpected factor, which is believed to be neutron absorption, likely caused a systematic error in the measurement values. This is proven by the data being heterogeneous (statistically different from each other), based on the calculated significance level ($p = 0.014$) being below the 5.0% acceptance limit. But in rejecting the 1260-1390 AD radiocarbon dating for the Shroud, it is important to understand what should be rejected and what should not.

Radiocarbon dating does not produce a date directly, but is a two-step process. Step 1 is to measure the C14/C12 ratio of the samples. Step 2 is to use this measured C14/C12 ratio to calculate the date assuming that the C14/C12 ratio has only changed due to decay of C14. This means there are two types of errors. A type 1 error occurs if the C14/C12 ratios of the samples are measured incorrectly. A type 2 error occurs if the C14/C12 ratios in the samples are altered by something other than C14 decay. Regarding a type 1 error; sources of error in the C14/C12 ratio measurements are carefully monitored in the measurement process so that the uncertainty of each measurement can be determined with reasonable accuracy. This accuracy is confirmed by running standards in the measurement process. This means that measurement of the C14/C12 ratios should be accurate within the

stated measurement uncertainty. Thus, for the Shroud, it is most reasonable to believe that the C14/C12 ratios were measured accurately within their stated uncertainties, so that both the C14/C12 ratio measurements and their uncertainties should be regarded as accurate. This allows a statistical analysis to be performed on the data in Damon *et al.* for the Shroud. The resulting significance level $p = 1.4\%$ indicates that the measured dates are heterogeneous (nonhomogeneous) due to the likely presence of an unexpected factor which altered the C14/C12 ratios in the samples, so that the 1260-1390 date for the Shroud should be rejected. But since the C14/C12 ratios were accurately measured, the dates stated in Damon *et al.* for the samples and the subsamples should not be totally ignored but should be used to better understand the nature of the unexpected factor that altered the C14/C12 ratios in the samples to cause the systematic error in the measurements. These considerations lead to four requirements that should be met for a hypothesis to explain the results of the 1988 radiocarbon dating of the Shroud.

1. To be true, the hypothesis should explain why a date of 1260 ± 31 was obtained for the 1988 sample location. It is believed that this value was produced by correct measurements of the C14/C12 ratios for the samples, but that the C14/C12 ratios had been altered, so this is not the true date of the Shroud. But this value is important to help us understand what altered the C14/C12 ratios of the samples.
2. To be true, the hypothesis should explain why there was a slope or gradient of about 36 years per cm as the sample location is moved away from the bottom of the cloth. This slope in the experimental data in Figure 2 is consistent with the slope in the results of nuclear analysis computer calculations at the second point from the left in Figure 3.
3. To be true, the hypothesis should explain why the variation or distribution of the subsample dates that were obtained in the 1988 radiocarbon dating of the Shroud exceeded the variation allowed by the measurement uncertainties. The variation of the subsample dates obtained in the 1988 experiments is consistent with the nuclear analysis computer calculations that were based on the neutron absorption hypothesis¹⁰.
4. To be true, the hypothesis should explain why the Sudarium of Oviedo radiocarbon dated to 700 AD, since it is believed to be related to the Shroud. This date is also consistent with nuclear analysis computer calculations based on the neutron absorption hypothesis, assuming that the Sudarium was placed at a reasonable location on the side bench in the tomb.

6. Nuclear Analysis Computer Calculations

Evidence indicates that the image on the Shroud was formed by a burst of radiation from the body. The neutron absorption hypothesis assumes that neutrons were included in this burst of radiation. Based on this hypothesis, nuclear analysis

¹⁰Table 11 and 12 of Rucker, "The Carbon Dating Problem for the Shroud of Turin, Part 2: Statistical Analysis".

computer calculations¹¹ were performed to understand the 1988 radiocarbon dating of the Shroud. The MCNP (Monte Carlo N-Particle) software, developed over many decades at the Los Alamos National Laboratory (LANL), was used to model a human body with simple geometrical volumes. The body was surrounded by a linen cloth on the back bench in a limestone tomb as it would have been constructed in first-century Jerusalem. MCNP was used to calculate the distribution of neutron absorption in the trace amount of N14 in the Shroud, which would have produced new C14 in the fibers of the Shroud by the [N14 + neutron → C14 + proton] reaction. This new C14 would have shifted the radiocarbon date forward. This is because radiocarbon dating is based on a measurement of the C14 to C12 ratio. If the C14 concentration in the threads of the Shroud was increased by only 16% by this process, then the radiocarbon date would have been shifted forward from 30 to 1260 AD.

The distribution of the radiocarbon dates calculated by MCNP is shown in Figure 3. This curve is for locations on the dorsal (back) image along the centerline of the body, i.e., along the backbone, from the feet at the left to the head at the right. On the x-axis, the zero point is at the mid-height of the body. This curve is normalized to the laboratory's average value of 1260 AD at the second point from the left. The curve shows that according to the hypothesis of neutrons being emitted homogeneously in the body, the calculated radiocarbon dates are predicted to be quite variable by position with a maximum value of about 8500 AD on the back image below the center of the body mass. About 75% of locations on the cloth are predicted to date to the future. Such dates to the future result when the usual equations are used to calculate a date from the C14/C12 ratio and there is more C14 present in the sample than ought to be present in a living plant. The most important point is that MCNP predicts a significant slope in the radiocarbon date at the second point from the left, which is about where the samples were removed from the cloth in 1988. This MCNP calculated slope in the radiocarbon date is about the same as the slope measured by the three laboratories shown in Figure 2. This agreement between the calculated slope (Figure 3) and the slope experimentally determined by the three laboratories (Figure 2) supports the validity of the neutron absorption hypothesis. The radiocarbon date also slopes in the direction perpendicular to the direction in Figure 3.

According to the neutron absorption hypothesis, the neutron distribution in the tomb calculated by MCNP at the 1988 sample location caused different amounts of new C14 to be produced on each of the samples sent to the three laboratories. These different increases in the C14 content caused different radiocarbon dates to be obtained by the three laboratories. Thus, it was the neutron distribution in the tomb that caused the radiocarbon date at the 1988 sample

¹¹Robert A. Rucker, "The Carbon Dating Problem for the Shroud of Turin, Part 3: The Neutron Absorption Hypothesis", Rev. 0, July 7, 2018.

location to increase by about 36 years per cm (91 years per inch) of distance from the bottom of the cloth.

7. Evidence for the Neutron Absorption Hypothesis

In using the scientific method to explain a phenomenon, the first step is to develop a hypothesis that is consistent with what is known to be true about the phenomenon. As discussed above, there are four things that are true for radiocarbon dating as it relates to the Shroud:

1. For the 1988 sample location, the uncorrected average date is calculated to be 1260 \pm 31, based on what is believed to be correct measurements of the C14/C12 ratios in the samples, though this is not the true date due to the C14/C12 ratio in the samples being altered by the addition of C14.
2. For the 1988 sample location, the radiocarbon date increases by about 36 years per cm (Figure 2) as the sample location is moved away from the bottom of the cloth.
3. For the 1988 sample location, the variation in the subsample dates results in a range of 1155 to 1410 AD¹².
4. For the Sudarium of Oviedo, the radiocarbon date was measured to be 700 AD.

A hypothesis to explain the radiocarbon dating of the Shroud must be consistent with these four requirements to be true. The neutron absorption hypothesis is consistent with all four of these requirements. The invisible reweave hypothesis could be consistent with requirements #1 and #2 if it is assumed to have the correct ratio of new to old fabric as a function of location on the Shroud, but it appears to be inconsistent with requirement #3. This is because cutting the subsamples from the samples provided to the three laboratories probably would have been a random process. This means that at least some and most likely four of the 16 subsamples should have dated only old material, which should date to about 30 AD, and at least some and most likely four of the 16 subsamples should have dated only new material. According to the main proponents of the invisible reweave hypothesis, this new material should probably have dated to the early 1500s. Yet none of the subsamples were dated to about 30 AD or to the early 1500s. Also, regarding requirement #4, an invisible reweave on the Shroud would not have altered the radiocarbon dating of the Sudarium. There are also several other common objections to the invisible reweave hypothesis¹³.

There are two ways to test the neutron absorption hypothesis: (1) the predicted distribution of radiocarbon dates on the cloth and (2) the predicted production of long half-life isotopes in the Shroud and limestone of the tomb.

¹²Table 6 of Rucker, “The Carbon Dating Problem for the Shroud of Turin, Part 2: Statistical Analysis”.

¹³Section 2 of Rucker, “The Carbon Dating Problem for the Shroud of Turin, Part 3: The Neutron Absorption Hypothesis” and Ch. 9, Antonacci, M., ‘Test the Shroud’, 2015, LE Press, LLC, ISBN 978-0-9964300-1-2.

8. CONCLUSION

Radiocarbon dating is performed by measuring the ratio of C14/C12 in samples, from which the date is calculated assuming that the C14/C12 ratio has only changed due to decay of the C14. It is believed that the C14/C12 ratios of the Shroud samples were accurately measured, but the C14/C12 ratio for each sample had been altered by neutron absorption, which caused a systematic error in the measured dates. There are four reasons why the 1988 radiocarbon dating of the Shroud to 1260-1390 AD should be rejected, i.e., given no credibility:

1. In the 1988 radiocarbon dating of the Shroud, each measurement produced two values: (1) the measured C14/C12 ratio from which the date was calculated, and (2) the uncertainty in the measured C14/C12 ratio. But in the original statistical analysis of the data in Damon *et al.*, when it was realized that the variation in the measured values exceeded what was allowed by the measurement uncertainties, it was assumed that the measurement uncertainties were under-predicted, i.e., smaller than their true values. This assumption is unjustified because the measurement uncertainties would have been obtained from the same measurement process as produced the dates. Also, the variation in the measured dates for the three standards that were run at the same time as the Shroud samples were within the variation allowed by their uncertainties. Assuming all the measurement uncertainties to be under-predicted allowed them to be ignored. Since each measurement produced two values, the value itself and its uncertainty, this means that half the data, i.e., all the measurement uncertainties, was ignored. Thus, the 1260-1390 AD date for the Shroud should be rejected because it is based on only half the data.
2. By assuming that the measurement uncertainties were under predicted, the statistical analysis of the 1988 radiocarbon dating in Damon *et al.* failed to prove that the random measurement errors alone could account for the variation of the measured values without the presence of a systematic error. If a systematic error were present in the measurements, it could change the measured values by an unknown amount. Since they did not prove that a systematic error could not be present, the conclusion of the radiocarbon dating for the Shroud (1260-1390 AD) cannot be claimed to be true.
3. There are various anomalies in the results of the 1988 radiocarbon dating of the Shroud. These anomalies indicate that the 1260-1390 date is not reliable.
 - Two of the three laboratories obtained different dates, with the difference (102.7 ± 35.2) being statistically significant at the $102.7/35.2 = 2.9$ sigma level. This exceeds the normal acceptance level of 2.0 sigma.
 - The average dates from the three laboratories indicate the radiocarbon date is a function of (depends on) the distance from the bottom of the cloth with a change of about 36 years per cm (91 years per inch). This slope or gradient in the experimental data is consistent with the results of nuclear analysis computer calculations (Figure 3) based on the neutron absorption hypothesis.
4. A chi-squared statistical analysis of the 1988 measurement values and uncertainties indicates the probability of obtaining a variation of the dates at least as large as that

which was obtained is only 1.4%, if the analysis is conducted as in Damon *et al.* for the three standards that were run at the same time as the Shroud samples. This value is below the usual acceptance limit of 5.0%, so the possibility that the radiocarbon date is the same at every location on the Shroud should be rejected. This implies the probable presence of a systematic error in the dates, which indicates that the 1260-1390 AD date probably differs from the true date by an unknown amount. The presence of a systematic error would cause the measured dates to be heterogeneous (statistically different from each other) rather than homogeneous (statistically the same). The most recent statistical analysis by Casabianca and by Walsh and Schwalbe¹⁴ concluded that the three samples were heterogeneous, i.e., nonhomogeneous. This means that an unexpected factor had likely caused a systematic error in the measurements so that the conclusion in Damon *et al.* that the Shroud dates to 1260-1390 AD should be given no credibility.

According to the neutron absorption hypothesis, the unexpected factor that caused the systematic error in the measured dates is neutron absorption. If the burst of radiation from the body that is believed to have formed the image also included neutrons, then capture of a small fraction of these neutrons in the trace amount of N14 in the linen would have produced new C14 on the samples that were cut from the cloth in 1988. This new C14 would cause a systematic error in the radiocarbon date measurements since radiocarbon dating is based on measurement of the C14/C12 ratio in the samples. This could have shifted the measured date forward by up to thousands of years, depending on the location on the Shroud. To shift the radiocarbon date from 30 to 1260 AD requires only a 16% increase in the C14 concentration. Based on MCNP nuclear analysis calculations, to cause this date shift at the 1988 sample location would require 2×10^{18} neutrons be emitted from the body. This is a very small fraction, only one in ten billion, compared to the number of neutrons in an average human body (2×10^{28}). The required number of neutrons (2×10^{18}) would be emitted if the neutrons and protons were to separate in only 0.0004% of the deuterium (heavy hydrogen, H₂) nuclei in the body. At 2.23 Mev per nuclei, the total energy required to split 2×10^{18} deuterium nuclei is 7.2×10^5 Joules = 7.2×10^5 watt-seconds.

This paper is an abridgment of my paper titled "Understanding the 1988 Carbon Dating of the Shroud of Turin," which is paper 25 on www.shroudresearch.net/research.



¹⁴Bryan Walsh and Larry Schwalbe, "An Instructive Inter-Laboratory Comparison: The 1988 Radiocarbon Dating of the Shroud of Turin", *Journal of Archaeological Science: Reports*, Volume 29, February 2020.

9. Testing the Shroud and the Sudarium at the Molecular and Atomic Levels

Mark Antonacci

Abstract:

This chapter summarizes how testing the Shroud of Turin at the molecular and atomic levels could prove that a miraculous radiating event occurred to the body of Jesus as it was wrapped in his burial Shroud. It proposes that two new and promising areas of scientific research and testing be initially conducted on a variety of control samples, and if successful, then applied to the Shroud itself and the various materials on it. The purpose of this research is to try to find a better answer to some of the most important and outstanding questions that have never been answered 122 years after science was first applied to this unique burial cloth. This research could prove that a radiating event not only affected the radiocarbon date of this cloth, but had an impact on its blood marks, postmortem watery fluids, sewing threads, and charred material, showing when and where this miraculous radiating event occurred, and the identity of the victim. There is also the Sudarium of Oviedo, a linen cloth alleged to have been initially wrapped around Jesus' face and over the top of his head after his death on the cross, and while his body laid face down temporarily in the horizontal position at the foot of the cross. This cloth purportedly acquired bloodstains from the front and back of Jesus' head, along with even more pulmonary edema fluid that came out of his mouth and nose. A number of profound events could be corroborated by applying molecular and atomic testing techniques on control samples, and then on the Sudarium of Oviedo and the various materials on it.

Testing at the Molecular Level

Among other projects, the Test the Shroud Foundation, and the scientists affiliated with it, are supporting research at the molecular and atomic levels on linen, blood, watery fluids, limestone, and pollen located on the Shroud of Turin and on the Sudarium of Oviedo, and on charred material and sewing threads also present on the Shroud. Neither of these cloths nor the various materials on them has ever been tested at these levels. *Non-destructive* testing at the molecular level by hyper-spectral and multi-spectral imaging would allow both cloths and all of the materials on them, or already removed from them, to be examined, for the first time, at their chemical and elemental levels.

When humans see objects, we perceive *only* the colours reflected from them in the visible spectrum ranging from red to violet, or the basic colours of the

rainbow. We cannot see what lies below red (the infrared part of the spectrum) nor above violet (the ultraviolet). These invisible parts of the spectrum also consist of electromagnetic waves, but with wavelengths that are higher and lower than visible light. Although infrared and ultraviolet radiation are invisible to the human eye, they can be measured to determine the chemical composition of unknown materials that irradiate. Every chemical compound reflects, absorbs or emits infrared or ultraviolet radiation in its own unique spectrum that is routinely used to determine the composition of unknown materials.

In the past, the various frequencies, waves and spectra of infrared, visible and ultraviolet radiation could not be utilized and viewed at the same time. However, with the development of multi-spectral imaging, objects can now be viewed under the entire visible, ultraviolet and infrared light spectra simultaneously, allowing their composite images to become detectable from all spectra at the same time. Hyper-spectral imaging is considered even better. These non-destructive techniques are part of the new general field of what is sometimes called molecular microscopy, which holds great promise for investigating the Shroud of Turin and the Sudarium of Oviedo.

These new techniques could allow scientists to identify the chemical composition of every *fiber* of every *thread*, and also the elemental composition of anything that is *on or between* every fiber and thread on both cloths. The individual chemical or elemental compounds can also be identified on every blood mark, their serum borders, all watery fluids, grains of limestone and pollen and all charred materials, sewing threads, and any other material from these cloths (or that were on these materials).

Materials removed from the cloth

Pollen:

Pollen experts have identified 91 pollens on the Shroud of Turin of the *Gundelia tournefortii* species, which derive from a thorn plant that grows only in Jerusalem and the surrounding vicinity.¹ Although far fewer pollens were found on the sticky tape samples taken from the Sudarium of Oviedo by Dr. Max Frei,

¹A. Danin, A. Whanger, U. Baruch, M. Whanger, *Flora on the Shroud of Turin*, (St. Louis: Missouri Botanical Garden Press, 1999). Although Dr. Uri Baruch, an expert on Israeli pollen from the Israel Antiquities Authority, was able to identify 91 *Gundelia tournefortii* and other Jerusalem-linked pollens from Dr. Frei's collection, he noted the poor optical quality of most of the samples that were caused by the covering sticky tape. He also noted the deterioration of the pollen that in many cases prevented identification of the grains or limited their determination to the most basic family or genus level. He further noted that because of a very restrictive protocol in treating Frei's samples, conventional acetolysis (the breakdown of an organic compound using acetic acid or anhydride) and destructive examination of them were impossible. He was also not allowed to use immersion oil necessary for high magnification in a light microscope on the samples for fear it might damage the sticky tapes.

two pollens of the *Gundelia tournefortii* species were also identified from a very limited study of the sticky tape samples removed from the Sudarium.² Since this plant species grows only in a narrow range of soils and locations, blooms only in the spring, is insect pollinated, and the classifications of pollen into their species or genus wouldn't be known until hundreds of years after these cloths permanently arrived in Europe, their presence on these linens, especially their extensive presence on the Shroud, indicates that these cloths were once situated in Jerusalem or the surrounding vicinity.³

Pollen grains can last years, and even though they are very small, they all have distinct shapes and features that represent the plant species or genus they come from.

Dr. Frei identified 58 species of pollen grains on the Shroud, 45 of which are not even found in Europe where the Shroud has spent its last 670 years.⁴ All but three of the non-European pollens are found in Jerusalem.⁵ At first glance, this appears a little odd because the Shroud has resided in Europe since the 1350s, and such a distribution of pollens could not have been caused by winds.⁶ However, this assemblage of Jerusalem pollens could be explained by the simple process of pollination. When plants are pollinated, the pollen falls on land or water as it is being transported to other plants. The Shroud linen was made from the stalks of flax plants that would have been soaked in a stream, pond, or lake as it was retted. When the stalks were subsequently bleached, they would have been laid on the grass in the sun for extended periods of time, and intermittently sprinkled with water. The sticky pollens that had been deposited in the water and on the grass would have adhered to the stalks that were woven into the linen. In ancient times, if a whiter linen was desired, its stalks would be exposed to the water and grass for a longer period of time. According to the Gospels, if the Shroud was indeed the burial garment of Jesus, it would have been purchased locally by Joseph of Arimathea.

This assemblage of Jerusalem pollens could also possibly be supported or explained by local flowers being placed on or around the victim's body at his burial. This is consistent with the faint images of Jerusalem flowers and plants first seen in the 1980s by Oswald Scheuerman and by Dr. Alan Whanger, and then by Israeli botanist Dr. Avinoam Danin in the 1990s⁷. Pollens from most of these

²*Ibid.*

³M. Frei, "Nine Years of Palynological Studies on the Shroud," *Shroud Spectrum International*, 3 (June 1982): 3-7; W. Bulst, "The Pollen Grains on the Shroud of Turin," *Shroud Spectrum International*, 10 (March 1984): 20-28; Danin *et al.*, *Flora of the Shroud*.

⁴Bulst, "The Pollen Grains."

⁵*Ibid.*

⁶Danin *et al.*, *Flora on the Shroud*.

⁷M. Whanger and A. Wanger, *The Shroud of Turin: An Adventure of Discovery*, (Franklin, Tenn.: Providence House Publishers, 1998); CBS Evening News, Interview of Dr. Danin, April 12, 1997; Danin *et al.*, *Flora of the Shroud*.

flowers or plants have also been identified on the Shroud. As a note, however, like many Shroud researchers, I cannot readily visualize these flowers. According to Dr. Wanger, they are best seen by enhancing the off-image areas of the Shroud making them appear darker and, therefore, allowing more detail to be revealed. Dr. Whanger could cause this effect by underexposing photographs of the Shroud. In 1998, I stood in front of the Shroud next to Dr. Danin who pointed a couple of flower images out to me that were visible with the naked eye. I freely acknowledge that there is a certain amount of subjectivity involved with this and that I would not have known what plant or flower images to look for, or where they were located on the cloth, without Dr. Danin showing me.

If non-destructive hyper-spectral imaging was performed on both sides of the entire Shroud, it could help clarify several matters related to the presence of pollen on this cloth, or perhaps tell if images of the flowers or plants from which these pollens derive, are also on the Shroud. Dr. Frei collected the pollen from approximately 39 locations on the inner side of the Shroud by pressing and massaging transparent sticky tape onto the cloth. He also identified some pollen grains from within dust that was vacuumed from a limited area between the backing cloth and the outer side of the Shroud. Hyper-spectral imaging could locate far more pollen grains throughout the inner and outer sides of the entire Shroud than the above methods.

Unfortunately, it has been difficult to examine Dr. Frei's pollen samples following his death in 1983, but hyper-spectral imaging performed on both sides of the Shroud with its backing cloth removed could also allow for easier removal and subsequent individual examination by molecular microscopy of all pollen grains and other materials on the Shroud. Molecular microscopy would eliminate the problem of poor optical quality of the earlier acquired pollen grains due to the sticky tape. (The sticky tape may also have caused or contributed to the deterioration of Frei's pollen grains, since pollen grains can last for years.) High-powered direct examination under visible, infrared and ultraviolet lighting, in which full rotation of all sides of the pollen can be acquired, along with identifying the chemical composition of the sample, could help in the identification of the pollens. This technique might also minimize or eliminate the need for acetolysis and destructive examination, or the use of immersion oil on these pollens. Rather than depending on the sticky tape samples from the 1970s, palynologists could also better photograph new pollens that were initially found, removed and analyzed by hyper-spectral imaging.

Charred Material:

The Shroud also contained an extensive amount of charred material that was removed by vacuum in 2002. This charred material was located behind a number of triangular-shaped patches that were placed on the Shroud to cover burn holes that were caused by a fire in 1532. This charred material is now kept in 42 vials in Turin, as seen in Figure 1.⁸



Fig. 1: Some of the 42 small vials of charred material have been kept in Turin since they were removed from the Shroud in 2002.

The scorch marks, burn holes, and water stains remaining on the Shroud itself should also be examined by hyper or multi-spectral imaging. The charred materials (and any materials that were on or vacuumed with them) should be *initially* examined at the molecular level. It would be interesting to see if and to what extent chlorine disappeared from the linen when it became charred.

Threads:

The Shroud also has approximately 13 feet of sewing threads that run parallel with and about 3 inches from the edge of one long side of the Shroud, as seen near the bottom of Figure 2.

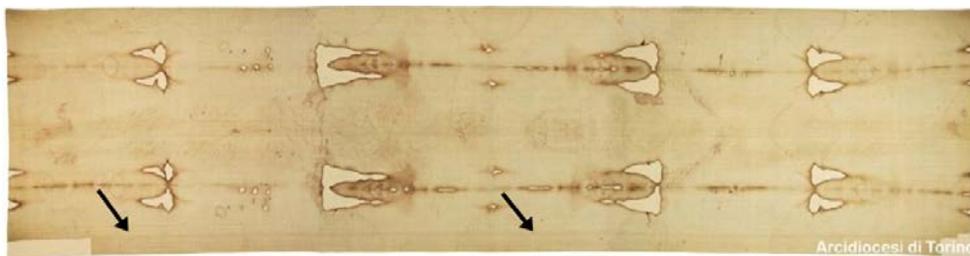


Fig. 2: The line of sewing threads can be seen near the bottom of the horizontal Shroud (arrows point to the single line).

As seen in Figures 3 and 4, this long seam has been carefully folded onto and sewn from the reverse side of the Shroud so it appears flat and hardly noticeable on the front side. This also causes the reverse side to have a raised or rolled effect

⁸M. Flury-Lemberg, *Sindone 2002* (Torino: Editrice ODPF, 2003), English translation: Rosamund Bandi and Susie Clavarino Phillips.

that is noticeably similar to the hems of cloths found in the tombs of the Jewish fortress of Masada destroyed in 73 A.D.⁹

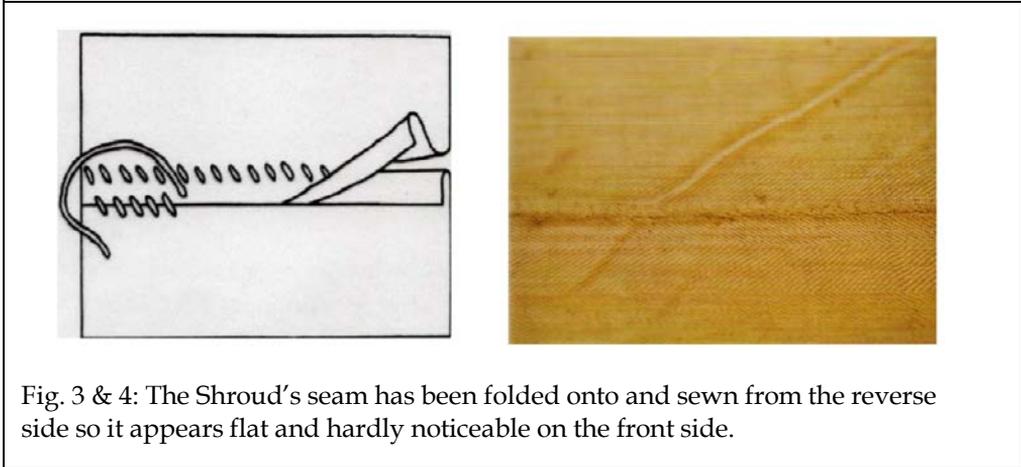


Fig. 3 & 4: The Shroud's seam has been folded onto and sewn from the reverse side so it appears flat and hardly noticeable on the front side.

The part of the Shroud linen that is between the sewing threads and the long edge of the Shroud is called the side strip. Because hyper-spectral imaging reveals the chemical composition of objects, the Shroud's backing cloth should be removed and both sides of the entire side strip, the sewing threads, and the main portion of the Shroud should be examined at the molecular level. This examination could definitively tell us whether the linen in the side strip came from the same bolt of fabric as the main part of the Shroud or is added material. The chemical composition of the sewing threads, side strip and main part of the linen will also play important roles in determining whether these parts of the Shroud were irradiated with a unique form of radiation, whether the body was the source of the radiation, the age of the linen and sewing threads, and whether all were attached to the Shroud when this unique radiating event occurred.

Examination of entire Shroud

In addition to examining material already removed from the Shroud, direct examination of the Shroud will also provide important facts that will help to resolve a number of issues. With respect to pollen and plant material, hyper-spectral imaging over the entire inner side of the Shroud might also allow us to see if there is actual *discolouration* at the locations where flora expert, Dr. Avinoam Danin, and others have identified numerous parts of flowers and plants that reside exclusively or are found primarily in Jerusalem and the surrounding area.¹⁰

⁹M. Flury-Lemberg, "The Linen Cloth of the Turin Shroud: Some Observations of its Technical Aspects," *Sindon*, No. 16, December 2001, pp. 55-76.

¹⁰Danin *et al.*, *Flora on the Shroud*.

Hyper-spectral imaging could also detect grains of limestone or dirt especially on the outer side of the Shroud which has not been comprehensively examined as was the inner side of the cloth. The outer or reverse side of the dorsal image would have laid directly on the limestone bench (or possibly the floor) of the man's burial tomb. These additional grains of limestone could be compared to measurements from an earlier sample removed in 1978 from the man's foot. That limestone sample matched the same type of limestone that is found in the rock shelf that comprises the Holy Sepulcher and the Garden Tomb, which are considered to be the most likely burial tombs of Jesus in existence.¹¹

Examining both sides of the entire Shroud (and the side strip) at the molecular level would also *definitively* tell us whether the Shroud was invisibly rewoven at or near the site that was radiocarbon dated in 1988. Photomicrographs, x-ray fluorescence, and radiographs of the Shroud from 1978, as well as visual inspections of both sides of the cloth at or near the radiocarbon site by many experts and observers in 2002, indicate that it was not rewoven at or near this location.¹²

Examining the Shroud at the molecular level could also identify any natural or artificial products or their residue on the Shroud and whether they have affected or caused the cloth's unique full-length frontal and dorsal body images, its controversial and unreliable radiocarbon date, or affected the appearance or composition of the blood marks. In other words, every naturalistic and artistic hypothesis that attempts to explain the appearance, composition, and cause of the Shroud's body images, its bloody marks, or its aberrant radiocarbon dating can be simultaneously tested by examining the entire cloth at the molecular level.

Among other outstanding questions that molecular microscopy could shed new light on or definitively resolve are:

- whether the body images are comprised of oxidized, dehydrated cellulose (cellulose is the main component of linen);
- whether this consists of double-bonded carbon or oxygen atoms that were originally single-bonded together (along with carbon) within the Shroud linen;
- whether only the very outer layer(s) comprising less than 0.1 micrometers of depth are discoloured on the Shroud's body image fibers.¹³

¹¹J. Kohlbeck and E. Nitowski, "New Evidence May Explain Image on Shroud of Turin", *Biblical Archeology Review*, 12.4 (July/August 1986); Sister Damian of the Cross, OCD (Dr. Eugenia L. Nitowski), *The Field and Laboratory Report of the Environmental Study of the Shroud in Jerusalem*, (Salt Lake City; Carmelite Monastery, 1986).

¹²These and many other reasons are all found in Chapter 9 of M. Antonacci, *Test The Shroud* (St. Louis, Forefront Publishing Co., 2015).

¹³G. Fanti, J.A. Botella, P. DiLazzaro, T. Heimburger, T. Schneider, N. Svensson, "Microscopic and Macroscopic Characteristics of the Shroud of Turin Image Superficiality," *J. Imaging Sci. Technol.*, 54 No. 4, p. 040201-18, (2010); Personal communication with Dr. Fanti on May 29, 2020.

- whether some of the molecular bonds in the non-crystalline regions of the Shroud's cellulose have broken and reformed, which could help explain the flexibility and excellent condition of the Shroud.
- whether powder or other materials are located between the threads on the body images or other parts of the Shroud.
- whether there are two separate sets of water stains on the Shroud from two different events that occurred centuries apart.¹⁴
- whether discolouration is found on the Shroud linen where coin features have been identified.
- whether discolouration is found on the outer or reverse side of the Shroud linen at the hands and face.¹⁵
- the extent of the striping effect on the Shroud's body images.
- whether the bloodstains consist of human blood.
- whether human serum surrounds the bloodstains.
- whether the bloodstains on the Shroud consist of or were touched up with paint.

Molecular microscopy should also be applied to the experimental results from naturalistic and artistic Shroud image forming hypotheses to see whether, and in what manner, the Shroud's features in the above bullet list and elsewhere are produced. Part of the experiments should include artificially aging the linen used in the naturalistic and artistic experiments in order to better duplicate the Shroud's centuries-old body image or other features. All such results could be subsequently compared to those acquired from the naturally-aged Shroud after it was examined by hyper-spectral imaging. Irradiating control linen (and other materials on the cloth) with a variety of low-energy radiation should also be undertaken. These findings at the molecular and other levels should be compared to those on the list and those on the Shroud, both before and after they have been artificially aged. These comparisons could also possibly indicate if the Shroud's body images and/or other image regions (or various materials on the cloth) were irradiated.

Other remarkable Shroud body image shading features relating to its superficiality, its number of laterally encoded fibers in relation to their distance from the body (three dimensionality), its striping effect, and other intricate body image features seen under molecular microscopy should be compared to those produced by artistic, naturalistic, and radiation-based techniques. You could even possibly compare the oxidation and dehydration and/or conjugated carbonyl results that were produced by various forms of radiation, or by any naturalistic or

¹⁴A. Geureschi and M. Salcito, "Photographic and Computer Studies Concerning the Burn and Water Stains Visible on the Shroud and Their Historical Consequences." *IV Symposium Scientifique International*, Paris, April 25-26, 2002; A. Guerreschi and M. Salcito, "Further Studies on the scorches and the water stains," *Third International Dallas Conference*, September 5-6, 2005.

¹⁵G. Fanti, R. Maggiolo, "The double superficiality of the frontal image of the Turin Shroud," *J. Opt. A, Pure Appl. Opt.* 6 (2004): 491-503.

artistic materials or methods to those on the Shroud. (Scientists affiliated with the Test the Shroud Foundation are also investigating other modern techniques that nondestructively examine surface effects on linen or other materials.)

Two other areas of interest should be briefly explained which could be examined by hyper or multi-spectral imaging that could yield interesting results. Mark 14:3 mentions that two days before Jesus was crucified, a woman poured a flask of expensive nard (or ointment) over Jesus' head to prepare him for burial. Part of this large amount of nard could have still been in Jesus' hair two days later at his death and burial. If the Sudarium is the napkin mentioned in John 20:7, or if the Shroud is Jesus' burial cloth, perhaps small amounts or traces of this nard could have seeped into either cloth and still be detectable by hyper-spectral imaging today. If so, further specific information might also be learned by examining a small amount of this nard at the atomic level.¹⁶

The second area of interest involves 12-15 distortions, blurs, or lines on the frontal body image that could be explained by the downward collapse of the draped cloth into a radiant region of a disappearing body. Two of the popular image forming hypotheses allege that radiation was emitted from the body as the body simultaneously dematerialized.¹⁷ Two of the largest distortions can be seen by examining the man's narrow left thigh above his left knee and his much wider right thigh above his right knee, both below his hands. (See Figure 5)

A quick look at the man's legs on the dorsal images in Fig. 6, however, shows that the man's legs are actually the same size. These distortions of the thighs on the frontal images are partially explained by the man's body being in rigor mortis, with his left leg remaining somewhat upraised from having been lifted up and the left foot rotated and nailed over the right foot during the crucifixion. The upraised left leg can be seen on both the frontal and dorsal images in Fig. 6. At burial, the upraised left leg would have caused a small tent-like effect at the frontal side of the draped cloth by the left knee. This would cause a small flattening of the cloth over the right thigh, which could increase as the cloth continued to fall through the momentarily radiant body. The tent-like effect at the left knee could also cause the cloth to fall away from the sides of the upraised left thigh, and thus, encode a narrow left thigh, but *only* on the frontal and not the dorsal side of the cloth.

¹⁶The possible presence of nard on the Shroud or the Sudarium from Jesus' head was first mentioned to me by Chuck Hampton in the 1980s.

¹⁷M. Antonacci, "Evidence for Image Formation by a Cloth-Collapse Model," *International Conference on the Shroud of Turin*, Pasco, Washington, July 19-22, 2017; and Antonacci, "Particle radiation from the body"; Jackson, J. P. "Is the image on the Shroud due to a process heretofore unknown to modern science?" copyright Turin Center of Colorado. 2014," and "An Unconventional Hypothesis to Explain all Image Characteristics Found on the Shroud Image," <http://theshroudofurin.blogspot.com/2012/01/john-p-jackson-unconventional.html>

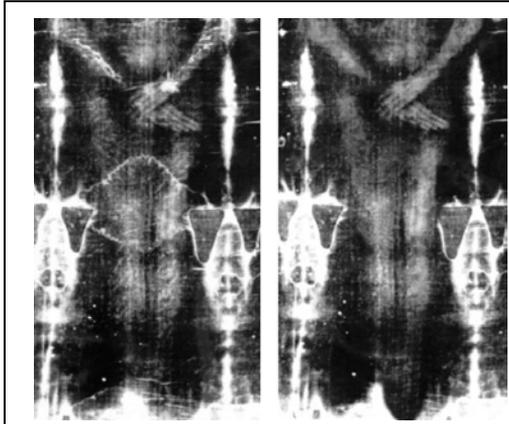


Fig. 5. A slightly reconstructed image of the man's thighs without the water stain appears at right, next to the Shroud image, better clarifying the distortions seen at both of the man's thighs, but only on the frontal image.

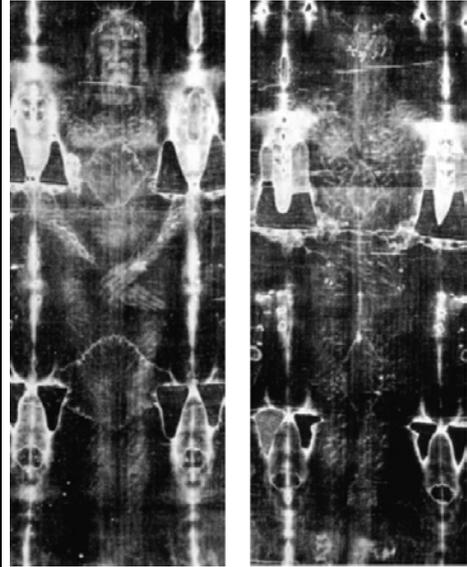


Fig. 6: The upraised left leg can be seen on both the frontal and dorsal images, as well as the elongated fingers. These characteristics may have been created if the radiation came from a reclined and disappearing body.

If a cloth drapes over and around, and then falls through the curved fingers of a radiant disappearing hand, the fingers will also disproportionately appear longer when the cloth is flattened and observed. A simple experiment with a cloth tape measure bears this out. If the radiation is coming from the outer surfaces of a reclined and disappearing body, not only will the bones in the fingers be encoded, but so will the bones running over the palms, as seen in the frontal image in Figure 6. This, too, makes the fingers look abnormally long.

Observe two or three vertical lines in Figure 7 below the side of the man's right chin and upturned beard, which appear to have been at one of the highest points on the reclined body. These



Fig. 7: Characteristics of the image considering the lay of the cloth. See text for details.

could have been left by a cloth falling vertically at the edge of the radiant chin. The part of the cloth draping over the recessed neck region below the chin could also have fallen or sagged momentarily into this radiant body region and acquired the unusual rectangular feature seen at the region of the neck in Fig. 7. Similarly, the round discoloured region below the length of the stiffened hair on the man's left side could also have possibly resulted from the cloth falling or collapsing at this location.

Two radiant cloth collapse hypotheses will also account for possible superficial imaging on the outer or reverse side of the Shroud at the man's face and hands.¹⁸ These areas are at the highest points on a reclined body and would be caused by non-penetrating protons or UV radiation hitting the reverse or outer sides of the cloth as it continues to fall through the high points of a radiant body. (This discolouration would not be three-dimensional, vertically directional, or highly resolved.)

Hyper-spectral imaging could examine all of these awkward, distorted features that no forger would have encoded or that ever would have occurred naturally. Perhaps hyper-spectral imaging could determine if these markings consist of the same types of discolouration found in the regular parts of the body images, including their oxidation and dehydration or their conjugated carbonyls. Hyper-spectral imaging could also determine whether these markings were caused by the same type of radiation that caused or irradiated the body images. While many other unique and outstanding body image features are encoded on the Shroud, these odd ones have been mentioned in this informal discussion of locations and substances to examine on the Shroud. These distortions, blurs, and oddities are all found on the top or frontal side of the collapsing cloth and are consistent with an unprecedented radiating event occurring as this body was disappearing.

TECHNOLOGY FOR STUDYING THE SHROUD

The above matters comprise the primary or initial data to look for by examining the Shroud at the molecular (or other very intricate or superficial) level. This technology could *non-destructively* scan the entire Shroud in a matter of hours and provide so much information that it could take years for scientists to collate and analyze all of its data. It could provide many many *times* more information than has been acquired since 1898, when scientific technology was first applied to the Shroud. However, a great amount of information from the molecular level will necessarily be routine. Hyper-spectral imaging should also be applied to a variety of control linen and other materials on the Shroud which have been subjected to a variety of conditions that the Shroud has or could have been exposed to. All of

¹⁸*Ibid.*

this information could help microscopists prioritize their study and the resulting data from this large burial cloth.

I last wrote at length about molecular microscopy in my 2015 book, *Test the Shroud*, when multi-spectral imaging viewed through a desk-top size FTIR microscope (in Figure 8) was the best available equipment that I was aware of. However, it would have been quite difficult to examine a cloth over 14' long and over 3 ½' wide (4.34 m x 1.10 m) with

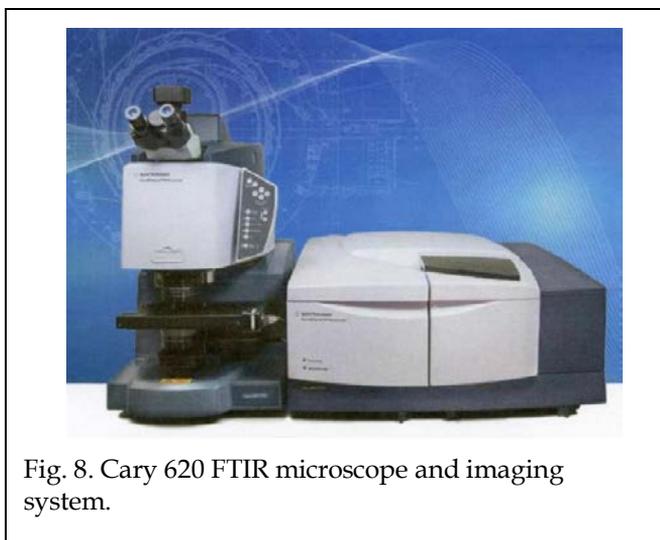


Fig. 8. Cary 620 FTIR microscope and imaging system.

such a small viewing mechanism as found with the FTIR microscope above. This problem has now been completely resolved with a version of hyper-spectral imaging seen in Figure 9. Hand-held devices are also available to gather information from large objects such as the Shroud.

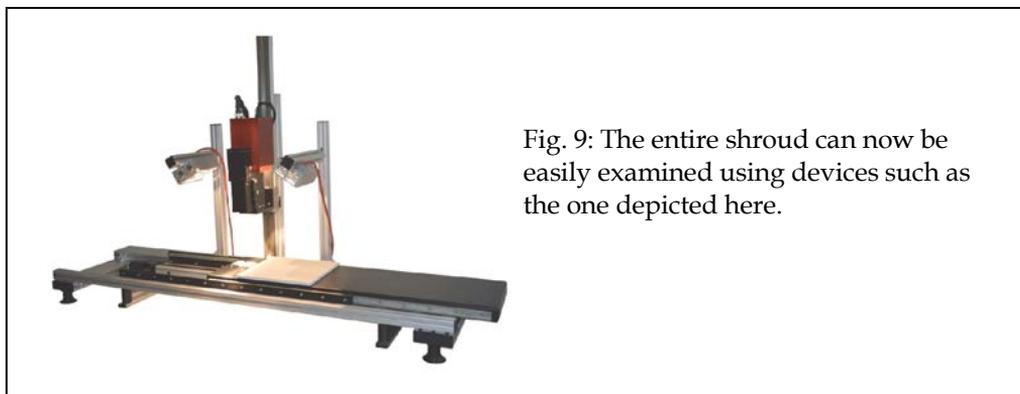


Fig. 9: The entire shroud can now be easily examined using devices such as the one depicted here.

As I have argued, the entire Shroud must be examined. Its pollen and limestone appear to be distributed throughout on both sides. Its body images comprise most of the length and much of the width on the inner side of the cloth. Its still-red, 150 or more human blood¹⁹ are found from the top of the man's head

¹⁹ Dr. P. Scotti, as cited by Dr. Alan Adler in "The Turin Shroud Lecture," Department of Chemistry, Queen Mary College, London, July 20, 1984; Adler, "Chemical Investigation on the Shroud of Turin in *The Mystery of the Shroud of Turin*

to his feet on the frontal and dorsal images, and at two off-image locations. Like the pollen, limestone, side seam and sewing threads, scorch marks, burn holes, charred and other minute material, the blood marks are also present on the inner and outer sides of the cloth.

Dirt that was found on the part of the Sudarium that supposedly covered Jesus' nose appears to resemble the calcium found in the limestone in Jerusalem.²⁰ Microscopic study revealed that scratches and dirt are also on the nose of the man in the Shroud.²¹ Recall that a piece of limestone from the foot of the man in the Shroud was found to match the same rock shelf that comprises the two most likely extant tombs in which Jesus was buried. However, that sample had to be destroyed in order to make a precise identification.

Fortunately, there are dust and other particles vacuumed during an earlier partial vacuuming of the Shroud that could contain additional limestone, dirt or even pollens within them. Dr. Frei also removed 46 sticky tape samples from the Sudarium in 1979 that would have pollen and maybe other dirt or limestone particles within them. (Only one of these sticky tape samples has been examined, and at least 43 sticky tape samples still remain in the Frei collection.) The vacuumed dust materials (and possibly some sticky tape materials) could also be examined by molecular microscopy. Hyper-spectral imaging or molecular

Interdisciplinary Symposium video, Elizabethtown, Penn.: Elizabethtown College, February 15, 1986; S. F. Pellicori, "Spectral Properties of the Shroud of Turin," *Applied Optics* 19.12 (1980): 1913-20; J. H. Heller, *Report on the Shroud of Turin* (New York: Houghton Mifflin, 1983); P. L. B. Bollone & A. Gaglio "Technical Immune-Enzymatic Application of the Shroud Drawings," presented at Third National Meeting of Studies on the Shroud, October 13-14, 1984; P. L. B. Bollone, M. Jorio, and A. L. Massaro, "Defining the Blood Group Identified on the Shroud," in *La Sindone Scienza E. Fede*, p. 178; P. L. B. Bollone, M. Jorio, and A. L. Massaro, "Identification of the Traces of Human Blood on the Shroud," *Shroud Spectrum International* 6 (March 1983): 3-6; and P. L. B. Bollone and A. Gaglio, "Demonstration of Blood, Aloes and Myrrh on the Holy Shroud with Immunofluorescence Techniques," *Shroud Spectrum International* 13 (December 1984). See also Adler, "Lecture" and "Chemical Investigations"; *The Mysterious Man of the Shroud*, directed by Terry Landeau, CBS documentary, aired April 1, 1997; L. A. Garza-Valdes, *The DNA of God?* (London: Hodder & Stoughton, 1998), pp. 41-42. Numerous physicians, pathologists, and anatomists discussed in Chapter Two of Antonacci, *The Resurrection of the Shroud* (2000) and Chapters Two and Three of *Test the Shroud* (2015) have concluded from the highly resolved, full-length body images that they are of a human male who incurred multiple wounds from which his blood flowed and coagulated, and which culminated in his death by crucifixion.

²⁰ C. Barta, R. Alvarez, A. Ordonez, A. Sanchez, J. Garcia, "New Discoveries on the Sudarium of Oviedo," *Shroud of Turin: The Controversial Intersection of Faith and Science, International Conference*, St. Louis, MO, October 9-12, 2014, <http://www.shroud.com/pdfs/stlbartapaper.pdf>.

²¹ R. Bucklin, "Viewpoint of a Forensic Pathologist," *Shroud Spectrum International* 1.5 (December 1982); Heller, *Report*; See also S. F. Pellicori and M. Evans, "The Shroud of Turin Through the Microscope," *Archaeology* (January/February 1981): 32-43.

microscopy would discover the locations of many other pollen, limestone or dirt specimens on both sides of both the Shroud and the Sudarium. Perhaps, *Gundelia tournefortii* and other pollen, limestone or dirt that is distinctive to Jerusalem and the surrounding vicinity, or the rock shelf or tomb in which Jesus was buried, can be identified by molecular microscopy on both sides of the Shroud and the Sudarium, or the 43 or more unexamined sticky tapes from the Sudarium, and the dust and other particles from an earlier partial vacuuming of the Shroud.

The pollen grains, limestone and dirt particles on the Shroud and Sudarium are extremely small, centuries old, and may not be very chemically rich. Yet, hyper-spectral imaging might *possibly* indicate enough similarity in the chemical contents of the pollen acquired from the Shroud and the Sudarium as to conclude the *Gundelia tournefortii* samples are not only ancient pollens, but from the same thorn plant. Perhaps the centuries-old limestone or dirt from either cloth match each other, and in addition, match the extant original limestone from where Jesus was purportedly buried at the Holy Sepulcher (or other locations purported to contain Jesus extant burial site). Since testing at the molecular levels by hyper or multi-spectral imaging is non-destructive, it certainly wouldn't hurt the samples to see how definitive those techniques might be with these tiny materials.

Like the blood on the Shroud of Turin, human blood of the group AB has been reported on the Sudarium of Oviedo.²² Clear, postmortem watery fluids from the interior chest of Jesus and/or the man in the Shroud are also thought to be on both of these linen cloths. Both the blood and interior watery fluids are far richer in chemicals than the linen cloths or the other materials on them. While most of the blood on the Shroud is premortem, its largest blood flow is postmortem. This blood and clear watery fluid on the Shroud flowed from a postmortem piercing at the man's right side. Both of these fluids ran down the man's right side and across the small of his back.

While the blood on the Sudarium presumably came from the man's head and face, its clear watery fluid was more extensive and purportedly escaped from the man's mouth and nose. This watery fluid would have thinned or watered down the original bloodstains on the Sudarium from the head and face. This watery fluid is considered to be pulmonary edema fluid that originated in the man's lungs. The blood from the side wound of the man in the Shroud came from the right auricle, which is filled with blood at death. The clear watery fluid on the Shroud is thought to have come from the pleural space outside of the lung, and perhaps to some extent, from the pericardial sac surrounding the heart.²³

Hyper and multi-spectral imaging performed on these more chemically-rich blood marks could possibly yield such detailed and copious amounts of

²² Guscini, *The Oviedo Cloth*, pg. 56; A. D. Adler, "The Shroud of Turin Blood Tests," interview by Linda Moulton Howe, May 23, 1999, <http://earthfiles.com/earth026.html>; A. Danin, A. Whanger, U. Barach, M. Whanger, *Flora of the Shroud of Turin* (St. Louis: Missouri Botanical Garden Press, 1999) pp. 23-24.

²³ Bucklin, "Viewpoint."

information at the chemical and molecular levels of the blood (and possibly the watery fluids) on *both* the Shroud and the Sudarium as to possibly constitute a virtual “fingerprint” of the man’s blood marks. This detailed information could even indicate whether the blood (and possibly watery fluids) on these cloths were from the same or from different individuals!²⁴

Testing at the Atomic Level

All matter consists of atoms including all the materials associated with the Shroud and Sudarium, and these atoms link together to make up the molecules which, in turn, make up the materials. These atoms can be stable, meaning that they remain as they are, or they can be radioactive, meaning that they are unstable and emit radioactivity to change to a stable atom. The vast majority of the atoms in nature are stable whereas radioactive atoms are infinitesimally rare. Almost all of these extremely rare atoms are created by some form of neutron radiation. Once made radioactive, the atom will cease to exist within minutes or seconds, or even fractions of a second after their creation.

However, there are three distinct radioactive atoms that are of critical interest to us for a number of reasons. One of the reasons is that, unlike most new and distinct radioactive atoms, these three radioactive atoms remain for tens or hundreds of thousands of years after they are created. If the Shroud of Turin or Sudarium of Oviedo were actually irradiated by neutrons two thousand years ago, the vast majority of these three newly-created radioactive atoms would still be present today within these cloths, and within all the materials that were on the cloths during the neutron radiating event.

It is hard to fathom, but *billions* of these long-lived radioactive atoms would still be present in just a small part of the materials associated with, or removed from, the Shroud or Sudarium. Therefore, these materials could be tested at the atomic level to demonstrate: (1) whether they were irradiated by neutrons; (2) the number of neutrons they received at every location from which they were removed; (3) whether the multiply-wounded, crucified corpse wrapped in the Shroud was the source of the radiation; (4) the actual ages of the cloths and the materials upon them; (5) when this miraculous radiating event occurred; (6) where it happened, and (7) the identity of the victim in the Shroud.

The presence of these radioactive atoms within various materials on the cloth(s) could only have been created by a *stream* of neutron particles (neutron radiation). This stream of neutrons would have hit common stable atoms just right so that some of these atoms could capture neutrons in their nuclei. For example, the most common calcium, chlorine, and nitrogen atoms are calcium-40 (Ca-40), chlorine-35 (Cl-35), and nitrogen-14 (N-14).²⁵ If a single neutron particle is captured

²⁴Personal communications with Dr. James Duncan.

²⁵Ca-40 comprises 97% of all calcium atoms, while Cl-35 comprises 75.78% of all

within the nuclei of these common stable atoms, they become new, distinct radioactive atoms called calcium-41 (Ca-41), chlorine-36 (Cl-36), and carbon-14 (C-14).

It is very important to understand that these new radioactive atoms are *created* at known rates. While only a very small fraction of neutrons within the stream will be captured inside the nuclei of these common atoms, the rates at which they are captured and new radioactive atoms thus created are known for every type of atom. If scientists know the number of neutrons within the stream of neutrons and the amounts of common calcium, chlorine, and nitrogen chemicals within the irradiated materials, they could estimate how many *new* radioactive Ca-41, Cl-36 or C-14 atoms would be created within these materials by this neutron radiating event.

As in their creations, these radioactive atoms also decay or *disappear* at *known* rates. Life spans for radioactive atoms are expressed in terms of half-lives, the length of time required for a quantity of radioactive atoms to decay to half its amount. Fortunately, two of the three long-lived radioactive atoms have extremely long lives. The half-life of Ca-41 is 102,000 years and the half-life of Cl-36 is 301,000 years. If radioactive Ca-41 and Cl-36 atoms were created within the materials associated with the Shroud or the Sudarium by neutron radiation two thousand years ago, 99% of these distinct radioactive atoms would still be present on the cloth(s) today! These extremely rare radioactive atoms can be identified and measured with instruments called accelerator mass spectrometers (AMS).

For instance, scientists could take a woven linen cloth sample from any location on the Shroud or Sudarium, or a linen sewing thread sample from anywhere on the side seam of the Shroud, and clean all of the inorganic material from these samples. They could then non-destructively measure their organic (or indigenous) Ca-40, Cl-35, and N-14 contents. They could then submit the samples to an AMS to measure the Ca-41 to Ca-40 and Cl-36 to Cl-35 ratios in these samples. Since these radioactive atoms are created (and decay) at known rates, these measurements and ratios could be used to determine whether these samples were irradiated with neutrons and the number of radioactive Ca-41 and Cl-36 atoms that were created within each particular sample by the neutron radiating event. This would tell scientists the number of neutrons that irradiated each sample regardless of which location it was removed from on each cloth.

Most of these measurements and calculations could also be performed on other materials such as charred linen, dried blood, or dried internal watery fluids from either of these cloths. (The number of radioactive atoms in pollen and limestone grains from the Shroud or Sudarium would probably be too small to measure by AMS analysis; however, another form of analysis could indicate if they

chlorine atoms, and N-14 comprises 75.78% of all chlorine atoms, and N-14 comprises 99.63% of all nitrogen atoms.

were irradiated with neutrons.) Larger samples of limestone from Jesus' reputed original burial tomb(s) could *also* be tested by AMS.

Of course, these and other procedures should first be perfected and demonstrated with new and old control neutron radiated samples before ever requesting any samples from either cloth or Jesus' reputed burial tomb(s) for such testing.

How neutron radiation could affect C-14 dating of the Shroud and the Sudarium

Neutrons radiating from the body of the man in the Shroud were first proposed by Thomas Phillips of the High Energy Physics Laboratory at Harvard University in 1989. His proposal was published in a letter in the same issue of *Nature* in which the carbon-dating report on the Shroud appeared.²⁶ Phillips asserted that, if the body of the man in the Shroud gave off radiation during the image-encoding process, it could have radiated neutrons. This would have created Ca-41 and Cl-36 in extravagant quantities on the cloth, proving that the Shroud had been irradiated with neutrons. If the Shroud was irradiated with neutrons, radioactive C-14 atoms would *also* have been created in the linen, which was the only material from the Shroud that was radiocarbon dated in 1988. Even key scientists who radiocarbon dated the Shroud agreed that, if this linen cloth had been irradiated with a sufficient amount of neutrons, this would have invalidated the radiocarbon dating of the Shroud.²⁷ This invalidation is a key aspect of the neutron flux hypothesis first stated by Phillips. Since then, physicist Art Lind, myself, biophysicist Jean-Baptiste Rinaudo, nuclear engineer Robert Rucker, and others have proposed or demonstrated that a rather modest amount of neutrons from the body could have easily caused the radiocarbon site on the Shroud to appear 1200 years younger by conventional C-14 dating.²⁸

Robert Rucker has scientifically refined and advanced the neutron flux hypothesis with a computer code called Monte Carlo Neutron Particle (MCNP).

²⁶T. Phillips "Shroud Irradiated with Neutrons?" *Nature* 337 (1989): 594; P. E. Damon, *et al.* "Radiocarbon Dating of the Shroud of Turin," *Nature* 337 (1989): 611-615.

²⁷P. Jennings, "Still Shrouded in Mystery," 30 Days in the Church and in the World 1.7 (1988): 70-71.

²⁸A. Lind, M. Antonacci, D. Elmore, G. Fanti, and J. Guthrie, "Production of Radiocarbon by Neutron Radiation on Linen," International Workshop on the Scientific Approach to the Archeiropoietos Images, Frascati, Italy, May 4-6, 2010, pp. 255-262; J. Rinaudo, "Protonic Model of Image Formation on the Shroud of Turin," Third International Congress on the Shroud of Turin, Turin, Italy, June 5-7, 1998; M. Antonacci, "Can Contamination Be Detected on the Turin Shroud to Explain its 1988 Dating?," Keynote Address, International Workshop on the Scientific Approach to the Archeiropoietos Images, Frascati, Italy, May 4-6, 239-247; . R. Rucker, "MCNP Analysis of Neutrons Released From Jesus' Body In The Resurrection," Shroud of Turin: The Controversial Intersection of Faith and Science, International Conference, St. Louis, MO, October 9-12, 2014, <http://www.shroud.com/pdfs/stlruckerppt.pdf>.

This code, developed at the Los Alamos National Laboratory, is used in extremely complex geometries involved in fissile material operations. In 2012, Rucker began adapting this sophisticated code to perform nuclear calculations that could model the uniform release of neutrons from a body with the conventional C-14 dating data from the Shroud of Turin.²⁹ This and other efforts could not only help scientists prove whether the Shroud was irradiated with neutrons, but the number of neutrons, and thus the number of long-lived radioactive atoms created by the neutron flux at every part of the cloth. In these ways, we will see how the MCNP code also aids in confirming that the source of the neutrons was the body wrapped in the cloth and the actual age of the Shroud linen and the various materials on it.

If the Sudarium was in the tomb when the neutron radiating event occurred, and if structural remains of Jesus' burial tomb are extant, this critical radiating event and its surrounding circumstances could also be corroborated by atomic evidence from these sources. If the Sudarium was placed on the right side of the u-shaped bench in the tomb, the MCNP code also indicates that the number of neutrons it would have received would have caused it to date about 670 years younger than its actual age. This is in excellent agreement with its two radiocarbon dates of approximately 679 and 710 A.D.³⁰

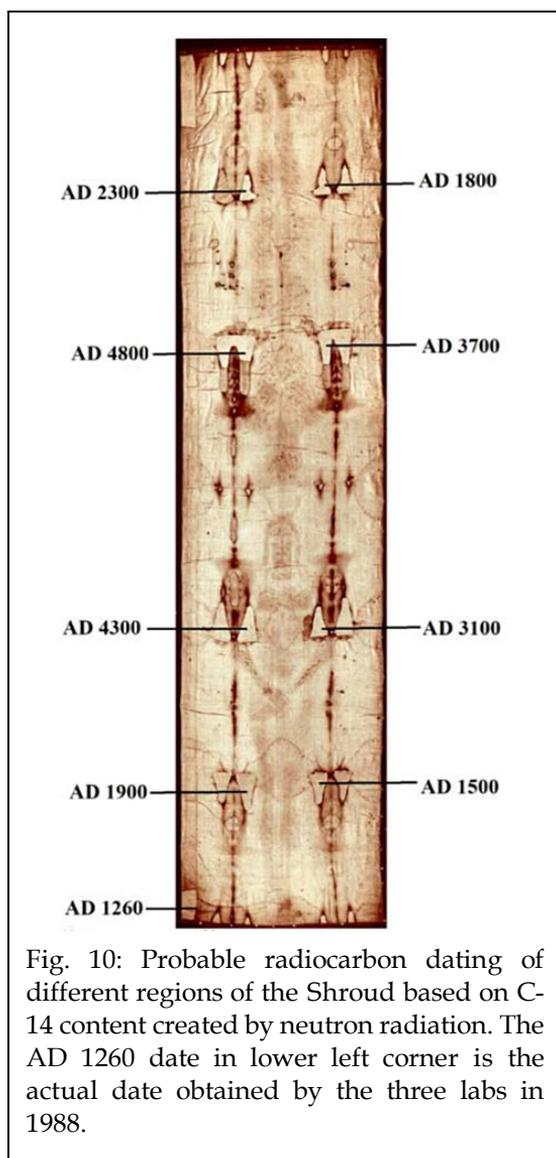
Preliminary Testing:

In 1534, eight pairs of patches were sewn onto both sides of the Shroud by the Poor Clare nuns to cover burn holes the cloth incurred from the fire two years earlier. Over the intervening centuries, charred material flaked off of the portions of the linen surrounding the burn holes and collected under the patches. In 2002, the patches were removed from the cloth and their underlying charred material were stored in 42 glass vials seen earlier in Figure 1. Robert Rucker has made two proposals regarding this charred material to the scientific committee that advises the Pope on testing the Shroud. These proposals are designed to initially support the neutron flux hypothesis by conventionally radiocarbon dating some of the charred material from the frontal and dorsal sides of the Shroud that were removed from: a) underneath the patches near the man's chest and elbows and from b) under the patches near his knees.³¹

²⁹Rucker, "MCNP Analysis of Neutrons Released."

³⁰Rucker, "MCNP Analysis of Neutrons Released;" R. Rucker, "The Carbon Dating of the Shroud is Explained by Neutron Absorption," <http://www.shroudresearch.net/research.html>; Guscini, *The Oviedo Cloth*, pg. 56; I. Wilson, "Controversy Over Oviedo Cloth Radiocarbon Dating," *British Society for the Turin Shroud Newsletter* 50 (November 1999): 12.

³¹The longer version of this proposal was submitted in 2016 and a shorter version was submitted in 2018. The committee has yet to respond to Mr. Rucker.



As seen in Figure 10, the MCNP code predicts that there would have been approximately a 2,500 year C-14 dating difference and a 1,900 year C-14 dating difference between the charred material located near (a) the chest and elbow area, and the charred material located near (b) the knee area on both the man's left and right sides of his dorsal images. The MCNP code also predicts 2,400 and 1,600 year C-14 dating differences at these respective locations on the frontal image. Furthermore, the MCNP codes project that all the charred material removed from the chest and elbow regions date from one millennium to almost three millennia in the future, which are *impossible* dates. Such dates into the future and the wide range of dates from 1500-4800 A.D. could *only* be explained by neutrons emanating from the body wrapped in the Shroud.³²

Even though the charred material behind each of the fairly large 1534 patches has mixed together over the centuries, and their predicted dates are not as precise as other materials at more specific locations on the Shroud,

radiocarbon dating charred samples from the proposed areas would provide an excellent initial test of the neutron flux hypothesis. Moreover, it would strongly indicate the conventional radiocarbon dating of 1988, as well as all other conventional radiocarbon dates *by themselves*, will not only vary, but will *all* be incorrect due to a systematic influence. Testing charred material already removed from the cloth and sitting in 42 glass vials will not harm the Shroud in any way. Such testing could begin to illuminate the profound information contained within

³²R. Rucker, "Proposal for C-14 Dating of Charred Material Removed from the Shroud," <http://www.shroudresearch.net>.

this burial garment. Rucker's proposed testing by C-14 dating would simply be utilizing a known technique and would not be dependent upon the subsequent development or perfection of Ca-41 to Ca-40 and Cl-36 to Cl-35 testing. However, radiocarbon dating charred samples as proposed could spur the perfection of these latter techniques on a variety of materials comprising or found on the Shroud, the Sudarium, and the Tomb of Christ.

Where Neutron Radiating Event Occurred

If a miraculous radiating event occurred to the man in the Shroud, we may be able to prove precisely where it occurred, and corroborate when it occurred, from another line of testing. In 2016 and 2017, renovations were performed at the Holy Edicule, a relatively small structure that sits over the Tomb of Christ within the larger well-known Church of the Holy Sepulcher in Jerusalem. The Church of the Holy Sepulcher was originally constructed in 325 A.D. after the site of Jesus' crucifixion (Golgotha) was located, as well as the nearby intact tomb where Jesus was buried after his death on the cross. Both locations are contained within the Holy Sepulcher. This tomb easily has the strongest claim of all to be the actual burial tomb of Jesus.

During the recent renovations of the Edicule, some excavations were performed at the opening above the Tomb of Christ. Ground-penetrating radar was also used to detect the walls of the original tomb behind the marble façade that has covered the tomb since at least 1555, and probably centuries earlier. After the brief excavations, the opening of the Tomb of Christ was resealed again with marble lading. Although most of the Tomb of Christ was destroyed by the Fatimids in 1009, it appears that part of the limestone structure of the tomb could still remain intact, which could include a limestone wall or slab that may have been near the burial bed where the man's head or feet may have rested.³³

If this is the extant site of Jesus' burial tomb, and if any original part of the limestone structure from this tomb is still in existence, science could not only prove both of these points, but possibly even more significant points.

According to the Gospels, no one was inside Jesus' tomb when his body disappeared during his resurrection. If a miraculous neutron radiating event occurred at this time, then evidence of this event could not only be present within

³³"The Tomb of Christ" Special Issue, *National Geographic*, 2020; "Under Jerusalem" *National Geographic*, December, 2019; "The Real Jesus," *National Geographic*, December, 2017; A. Moropoulou *et al.* of the National Technical University of Athens Interdisciplinary Team for the Protection of Monuments, "Faithful Rehabilitations" Civil Engineering, November, 2017; K. Romey, "Unsealing of Christ's Reputed Tomb Turns Up New Revelations" *National Geographic*, October 31, 2016, <https://www.nationalgeographic.com/news/2016/10/jesus-christ-tomb-burial-church-holy-sepulchre.html>; M. Biddle, *The Tomb of Christ* (Phoenix Mill, Sutton Publishing Limited, 1999).

the Shroud and the Sudarium linen cloths and the various materials on them, but *also* in the original limestone remains of Jesus' burial tomb.

As we saw earlier, neutrons are very penetrating, and some may have penetrated as much as a meter into the limestone remains of the tomb.³⁴ Although chlorine is absent in limestone, calcium is fairly abundant in limestone. The Ca-41 to Ca-40 ratio within the indigenous limestone structure of the tomb would not only confirm whether a neutron radiating event occurred centuries earlier, but the amount of neutrons it received. This number of neutrons might also indicate how close this limestone structure could have been to Jesus' body when the neutrons were released.

At minimum, the presence of Ca-41 well-above its infinitesimally small background levels could prove that a neutron radiating event occurred within this limestone tomb. This could not only indicate *where* this radiating event occurred, but whether this is the site of Jesus' burial tomb. In addition, there could be other evidence from the limestone wall or slab that could also possibly indicate *when* this neutron radiating event occurred.

Although nitrogen is not found in limestone, carbon is found in limestone. And while some organisms could have been part of the original formation of some types of limestone, any C-14 that was present from the time the organisms lived, would have long ago decayed and disappeared from a million or billion-year-old limestone. However, if a neutron radiating event occurred at this tomb two thousand years ago, one particular stable carbon atom would have been present in the limestone and would have converted to radioactive C-14 atoms. This is the stable atom C-13, which we discussed earlier. This atom has 6 protons and 7 neutrons, and if a single neutron is captured within its nucleus, it becomes a radioactive C-14 atom whose half-life is 5,730 years. The amounts of calcium and carbon, and thus, Ca-40 and C-13, are known for Jerusalem limestone and could also be measured from the selected limestone sample. As the rates of conversion of Ca-41 from Ca-40 in Jerusalem limestone could easily be calculated, so, too, could the conversion rates of C-14 from C-13 be calculated for Jerusalem limestone. (There's approximately as much C-13 in Jerusalem limestone as there is N-14 in linen.)

Since scientists could calculate the number of neutrons that produced the above background Ca-41 to Ca-40 ratio in this limestone sample, they would necessarily know how many C-14 atoms this neutron flux would also have produced from C-13 atoms in this same limestone sample. The difference between the amount of C-14 that would have been produced in the limestone by the neutron radiating event, and the amount of C-14 remaining within the C-14 to C-12 ratio today, would indicate how long ago – or *when* – this neutron radiating event occurred.

³⁴Personal communications from nuclear engineer Robert Rucker, physicist Art Lind, and David Elmore, former director of the AMS Laboratory at Purdue University

I apologize for being somewhat repetitive regarding the very accurate calculations that can be made regarding the number of radioactive atoms that would be created, the number of neutrons that irradiated various samples or their locations, the source of the neutrons, the age of the samples, when the neutron radiating event occurred, and where it occurred. These calculations and their applications to control materials, the Shroud, Sudarium, and the Tomb of Christ are very new to most of us, and could be of critical importance to humanity. Some reinforcing and repetition have always been important for my own understanding.

We would also know that neutron radiation wasn't even discovered by scientists until 1932 and that the tomb has been covered by marble for centuries. It would have been impossible for this neutron radiating event to have been performed by a counterfeiter. Since 325-326 A.D., learned contemporary and later scholars by and large have collectively agreed or accepted that Jesus' burial tomb was located at this site amidst rubble that was put over it two centuries earlier by the Romans.³⁵ This site has been known as the Tomb of Christ since that time. If part of the original limestone structure of the Tomb of Christ at the Holy Sepulcher is extant, a small limestone sample(s) could be removed from it that would easily be large enough to conduct all the necessary Ca-41, Ca-40, C-14, C-13, or C-12 measurements at an accelerator mass spectrometer (AMS) or other laboratory.

However, that may not be the case for the grains of limestone that are identified by hyper-spectral imaging and removed from the Shroud or Sudarium. Even if a large enough collective number of grains of limestone could be removed from one or both cloths and identified by hyper-spectral imaging as deriving from the same rock shelf or tomb, the samples would have been in different locations in relation to the body wrapped in the Shroud, and thus, irradiated with different amounts of neutrons.

If any nard or ointment is found in sufficient quantity by hyper-spectral imaging on the Sudarium or the Shroud, it could more likely be tested at the atomic level by AMS. Unlike limestone or pollen, the nard would likely be confined to one region on these cloths and be far more chemically rich than limestone or linen. One of the many benefits of testing *all* types of control samples is to determine the minimum size sample that will be needed from the Shroud or the Sudarium.

Since pollen grains are extremely tiny and come from different plants or species, they are easily the *least* likely to be examined by AMS technology. This technology destroys its sample, so even if most or all of the pollens were collectively large enough to receive AMS analysis, you still wouldn't want to destroy the bulk of them. If it could be done the other way around, however, we should. For the results could prove that a miraculous radiating event occurred from the crucified corpse wrapped in the Shroud, and could show the amount of

³⁵M. Biddle, The Tomb of Christ; "The Real Jesus," *National Geographic*, Dec. 2019, pps. 53, 54

neutrons that irradiated each location. This result would refute the controversial radiocarbon dating of the Shroud, prove the real age of this cloth and the various materials on them, when this event occurred, where it happened, and the identity of this man.

Fortunately, this is *exactly* what we can do with the blood, watery fluid and linen from the Shroud and the Sudarium, and with the charred material and the side seam sewing thread from the Shroud, and perhaps, from the original limestone structure from the Tomb of Christ. This could be the greatest opportunity that science or humanity will ever have! We could do all of these things and only destroy the tiniest fraction of these extremely plentiful materials on the two cloths in the title of this paper and from an original limestone slab just discussed from Jesus' reputed burial tomb. Even if the Sudarium of Oviedo and the Tomb of Christ are not relics of Jesus or not extant, *all* of these things could be proven from the Shroud of Turin.

The smartest application of scientific technology for the pollen and limestone grains and possibly for the traces of nard (if any) from the Shroud or the Sudarium, could be Inductively Coupled Plasma Mass Spectroscopy (ICP-MS). While this technology cannot measure the number of neutrons that irradiated a sample, it might indicate whether the sample was irradiated by neutrons. In addition, it could make this determination with only a few cells of blood or other chemically-rich materials, or destroy only a tiny percentage of other less chemically-rich samples. Although it is too early to tell, scientists affiliated with the Test the Shroud Foundation will also be examining this technology. We also invite scientists to join our efforts to test control samples at the molecular and atomic levels, and other testing discussed in this paper.



10. Image Processing Applied to UV Photographs of the Holy Shroud which Includes the Radiocarbon Test Area

Thomas McAvoy

Abstract

In an earlier paper Morgan applied an image processing technique that is used in analyzing geographic photos to an ultraviolet (uv) photo of the Shroud of Turin taken by Vern Miller in 1978. The technique involved principal component analysis, and found that the first principal component explained 97.41% of the variance in the Shroud photo. When the first principal component was calculated for the radiocarbon test regions used to date the Shroud, it was found that these regions were different compared to those of a typical region of the Shroud. The radiocarbon test regions were concluded to be statistically different from the main regions of the Shroud, suggesting that the radiocarbon dating may be invalid. In this paper it is shown that the first principal component is very highly correlated with the image intensity of uv Shroud photos. Using image intensity this paper re-examines the approach by Morgan and demonstrates that the variation in the first principal component could be due to the way the Shroud was illuminated, since Miller took his photo using non-uniform lighting. Regions away from the center of the uv photo, such as the radiocarbon test area, did not receive the same uv intensity as those near the middle, and as a result their reflected intensity would be smaller. By contrast when geographic photos are taken uniform illumination is provided by the sun. Since Morgan's technique assumes uniform illumination, his statistical conclusions can be questioned. One colour photo taken by Vern Miller under uniform illumination is also examined. Applying Morgan's approach to the colour photo indicates that the radiocarbon test region may be anomalous. Additional research can help clarify this question.

INTRODUCTION

Many people believe that the Shroud of Turin is Christ's burial cloth and that it dates to the first century AD. The Shroud has been studied more than any other ancient relic in history. In 1988 radiocarbon dating by three laboratories¹ indicated that the Shroud dated from medieval times (1260 to 1390 AD). Even though the

¹Damon PE, Donahue DJ, Gore BH, Hatheway AL, Jull AJT, Linick TW, Sercel PJ, Toolin LJ, Bronk CR, Hall RE, Hedges M, Housley R, Law IA, Perry C, Bonani G, Trumbore S, Woelfli W, Ambers JC, Bowman SGE, Leese MN, Tite MD, (1989). Radiocarbon dating of the Shroud of Turin, *Nature* 337(6208): 611-615.

statistics used were flawed and their radiocarbon dates showed a bias², many people currently believe them and that the Shroud is a forgery.

In an earlier paper,³ Morgan raised questions about the samples used for the radiocarbon dating. He applied an image processing technique that is used in analyzing geographic images⁴ to an uv photo of the Shroud of Turin taken by Vern Miller in 1978. The GIS technique involved principal component analysis (PCA),⁵ a dimensionality reduction method. The PCA method was applied to the entire Shroud image, and it was found that the first principal component explained 97.41% of the variance in the Shroud photo. A typical region in the Shroud photo, the sample area, was used to calculate average PCA properties for the image. When the first principal component was calculated for the radiocarbon test regions, it was found statistically that these regions were anomalous. It was concluded that the radiocarbon test regions were different from the main region of the Shroud, suggesting that the radiocarbon dates were invalid.

In 1978 Vern Miller, as a member of the Shroud of Turin Research Project (STURP), took approximately 200 high quality photos of the Shroud. In 2019 Miller's photos were published on the web (www.shroudphotos.com). For his paper, Morgan downloaded a cropped photo which included the radiocarbon dating region from a web site that is no longer available (Shroud Science Group page on yahoo.com). In this paper an alternative but identical copy of Morgan's photo and Vern Miller's original photos are used in the analysis that is presented.

This paper re-examines the approach by Morgan to study whether the variation in the first principal component could be due to the way the Shroud was illuminated when the uv photo was taken. When Miller took uv Shroud photos the two lights used were focused on the middle of an area of the Shroud being photographed. As a result, regions away from the middle, such as the radiocarbon test area, did not receive the same uv intensity as those near the middle, and thus their reflected intensity can be expected to be smaller than that in the middle area. The question addressed in this paper is whether the way the Shroud was illuminated affected the PCA analysis. By contrast when geographic photos are

²VanHaelst, R., (1999). Radiocarbon dating the Shroud of Turin - The *Nature* report, <https://www.shroud.com/vanhels5.pdf>.

Riani, M., Atkinson, A.C., Fanti, G., Crosilla, F., (2013). Regression analysis with partially labeled regressors: carbon dating of the Shroud of Turin, *Statistics and Computing* 23, 551-561.

Casabianca T., Marinelli E., Pernagallo G., Torrisi B., (2019). Radiocarbon Dating of the Turin Shroud: New Evidence from Raw Data, *Archeometry* 61, 1223- 1231.

³Morgan, J., (2012). Digital image processing techniques demonstrating the anomalous nature of the radiocarbon dating sample area of the Shroud of Turin, *Scientific Research and Essays*, 7(29), 2641-2655.

⁴Clark Labs, IDRISI GIS and Image Processing Software, <http://www.clarklabs.org>, 2011.

⁵Hotelling, H. (1933). Analysis of a complex of statistical variables into principal components. *Journal of Educational Psychology*, 24, 417-441, and 498-520.

taken uniform illumination is provided by the sun. The lack of uniform illumination in the uv Shroud images was noted in an earlier publication analyzing uv Shroud images.⁶

In addition to analyzing Miller's uv images, one non-uv colour image is analyzed. The lighting arrangement for Miller's colour photographs was different from that used for the uv photos and it provided uniform illumination.

MATERIALS AND METHODS

For his paper, Morgan downloaded a photo of the Shroud showing the radiocarbon test area from the Shroud Science Group web page on yahoo.com. Since this web site is no longer available, an alternative image is used in this paper. The image used by Morgan appears identical to that in Figure 18 in Rogers (2002).⁷ The agreement between Figure 18 and Morgan's image can be seen by comparing Figure 18 to Figure 1 in Morgan (2012)⁸. To begin the analysis in this paper a copy of Figure 18 was obtained by cropping a screen shot of it from Rogers (2002). This photo is shown in Figure 1 with both the radiocarbon test areas and Morgan's sample area indicated.

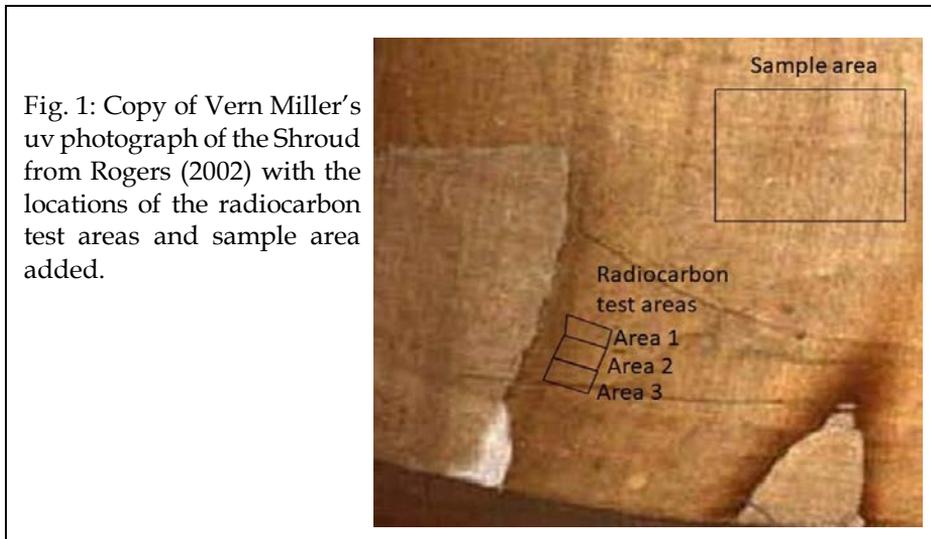


Fig. 1: Copy of Vern Miller's uv photograph of the Shroud from Rogers (2002) with the locations of the radiocarbon test areas and sample area added.

⁶Avis C, Lynn D, Lorre J, Lavoie S, Clark J, Armstrong E, Addington J (1982). In: Image processing of the Shroud of Turin, 1982 *Proceedings of the IEEE International Conference on Cybernetics and Society*, 554-558.

⁷Rogers, R. N. and Arnoldi, A., (2002). Scientific method applied to the Shroud of Turin: A review, <https://www.shroud.com/pdfs/rogers2.pdf>.

⁸Morgan, J., (2012). Digital image processing techniques demonstrating the anomalous nature of the radiocarbon dating sample area of the Shroud of Turin. *Scientific Research and Essays*, 7(29), 2641-2655.

The sample area was chosen to match the sample area in Figure 11 of Morgan (2012). Figure 8 of Morgan (2012) was matched using MATLAB® software (www.mathworks.com/) to give the radiocarbon test areas. Morgan used Corel Paint Shop Pro to reduce the image colour depth for his study. As a result the image used here has more pixels than the image analyzed by Morgan. In the following section Morgan's statistical analysis is briefly repeated to demonstrate the validity of using the alternative image shown in Figure 1.

Two of Vern Miller's 1978 4x5 colour transparency uv images were downloaded from the web (www.shroudphotos.com), and for the analysis below they were cropped to remove the border. For explanation purposes an uncropped image which shows the radiocarbon test area is shown in Figure 2 (image 175 4g-UV-S2-B-22_0491). Figure 3 shows a cropped image near the side wound (image 179 5d-UV-S2-D-15_0496). These images are very dense with pixel dimensions for both figures of 8176x6132. For image analysis these two figures were resized to reduce their pixel dimensions to 2208x1811 for Figure 2 and 2005x1994 for Figure 3. Comparing Figures 1 and 2 it can be seen that Figure 1 appears to be a cropped version of the left-hand corner of the Shroud in Figure 2.

In taking his uv photos Miller used the setup shown in Figure 4 (Miller, and Pellicori, 1981). Two 200 watt uv lamps overlapped on the center point of the Shroud region where the photo was taken.

Figures 1 to 3 are RGB (red green blue) images. In addition to the RGB colour space there are a number of other colour spaces.



Fig. 2: Uncropped Miller image 175 (4g-UV-S2-B-22_0491) © Vernon Miller, 1978.

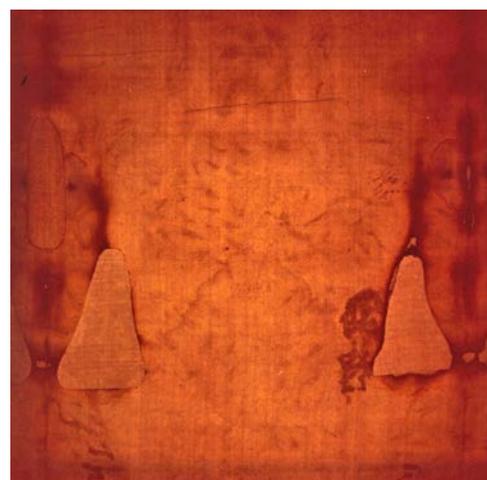


Fig. 3: Cropped Miller image 179 (5d-UV-S2-D-15_0496) © Vernon Miller, 1978.

Figure 5 shows a schematic of the CIE L^*a^*b colour space (en.wikipedia.org/wiki/CIELAB_colour_space). This colour space is designed to approximate human vision. The vertical L axis in the CIE L^*a^*b space gives image intensity. The two horizontal axes, a and b , give image colour. MATLAB® and its Image Processing Toolbox are used to analyze images in this study. The Image Processing Toolbox has subroutines that allow one to convert an RGB image to a CIE L^*a^*b image and vice versa. MATLAB® also has many statistical and plotting routines that are used in the analysis below.

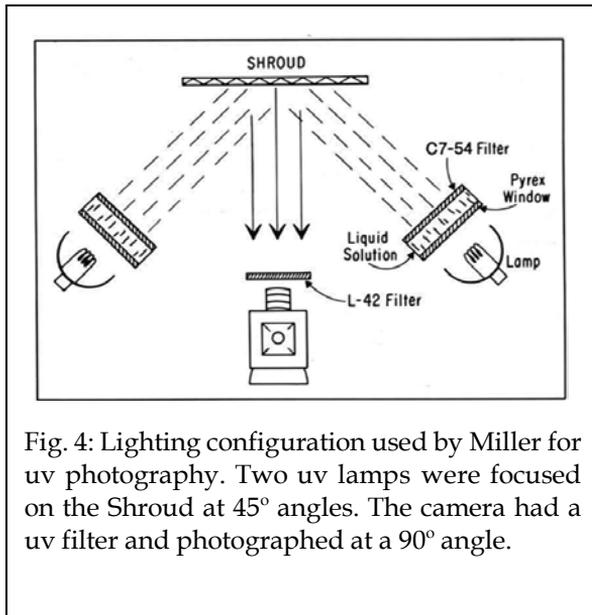


Fig. 4: Lighting configuration used by Miller for uv photography. Two uv lamps were focused on the Shroud at 45° angles. The camera had a uv filter and photographed at a 90° angle.

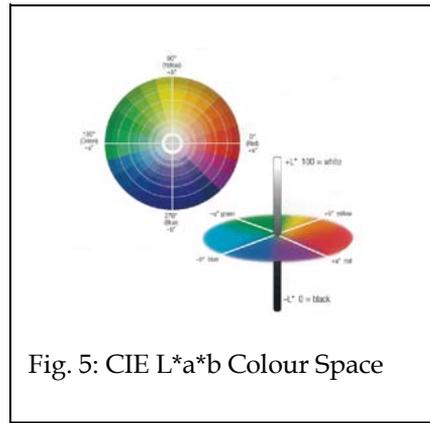


Fig. 5: CIE L^*a^*b Colour Space

RESULTS AND DISCUSSION

Repeat of Morgan's Statistical Analysis

Morgan's statistical analysis is briefly considered here. PCA⁹ was carried out on the entire image in Figure 1 by first scaling the raw pixel data to zero mean and unit variance. It was found that the first principal component explained 96.79% of the variance in the image, compared to Morgan's result of 97.41% explanation. The same one-sample z-test used by Morgan was used to determine whether the radiocarbon dating areas were statistically different when compared to the square sample area. This z-test compares the mean of the first PCA score of the radiocarbon test areas to the mean of first PCA score of the sample area. Morgan

⁹Hotelling, H. (1933). Analysis of a complex of statistical variables into principal components. *Journal of Educational Psychology*, 24, 417–441, and 498–520.

considered two hypotheses, H_0 which was that there was no difference in means and H_1 that the means differed. Rejection criteria were based on a 95% confidence interval. The test statistic for the z-test is defined by the following equation where X is a radiocarbon test area score mean, μ is the population mean taken as the sample area score mean, σ is the population standard deviation taken as the sample area score standard deviation, and n is the sample size taken as the number of pixels in each radiocarbon test area. Table 1 gives selected statistics for the first PCA scores for the three radiocarbon test areas for which dates were reported together with the same variables for the sample area. Area 4 in Morgan (2012) is not considered here since radiocarbon dating results were not published for this region. Table 1 corresponds to Table 2 in Morgan (2012).

Table 1. Selected statistics of PC 1 scores for 3 radiocarbon sample areas and square sample area

| Statistic | Area 1 | Area 2 | Area 3 | Sample Area |
|--------------------|---------|---------|---------|-------------|
| Min. Value | -2.2741 | -2.4239 | -3.5063 | -0.6404 |
| Max. Value | 0.0071 | 0.3118 | 0.0928 | 4.2067 |
| Mean | -0.9342 | -1.1080 | -1.4437 | 1.7939 |
| Standard deviation | .4162 | .6724 | .6586 | .6816 |
| No. of pixels | 965 | 1189 | 1207 | 27000 |

The results of calculating z for each of the three radiocarbon test areas are given in Table 2 which should be compared to Table 3 in Morgan (2012). The differences in the means between the radiocarbon test areas and the sample area are large and as a result hypothesis H_0 is rejected by the z-test in agreement with Morgan (2012).

Table 2. One sample z-test for three radiocarbon test areas.

| Statistic | Area 1 | Area 2 | Area 3 |
|-------------------|--------------|--------------|--------------|
| n | 965 | 1189 | 1207 |
| Area mean (X) | -.9342 | -1.1080 | -1.4437 |
| z-test value | -124.3 | -146.8 | -165.0 |
| Test result | Reject H_0 | Reject H_0 | Reject H_0 |

When Figure 1 is recast into the CIE L^*a^*b colour space then for all the pixels a correlation coefficient of 0.9953 is obtained between the first PCA score and the intensity L in the CIE L^*a^*b colour space. This result indicates that the first PCA score is essentially equal to the image intensity.

Analysis of Miller's 1978 uv Photos

To explain the result in Table 2 Miller's original 1978 uv photos can be analyzed. The MATLAB[®] function contour (Y) creates a contour plot containing the isolines of matrix Y, where Y contains height values on the x-y plane. For Miller's uv images Y contains the image intensity values, L, for each pixel in an uv image. Figures 6 and 7 give the contour plots for the intensity variable L for cropped Figure 2 and Figure 3.

Fig. 6: Plot of CIE L^*a^*b intensity for cropped Figure 2.

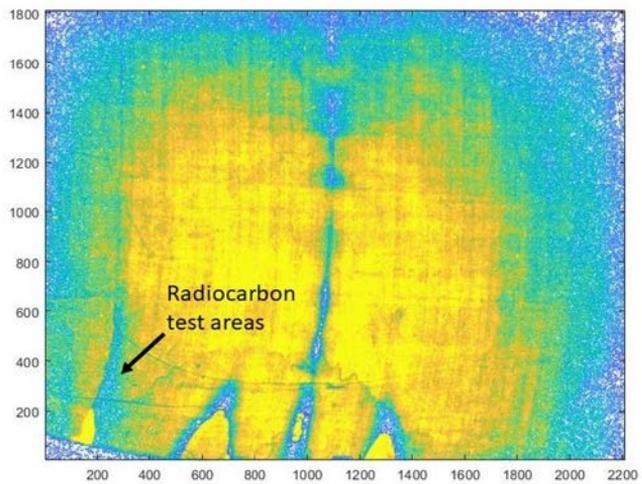
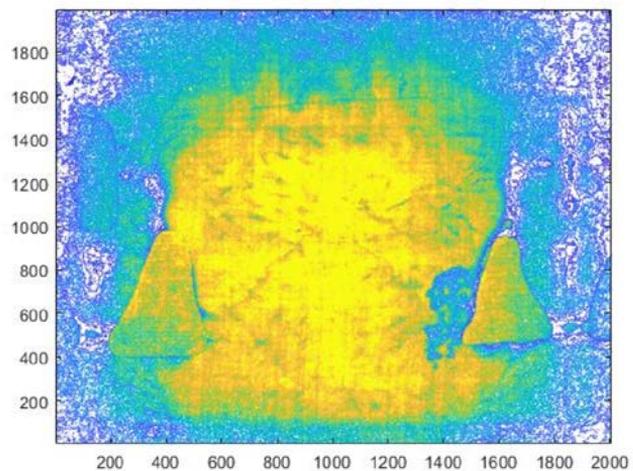


Fig. 7: Plot of CIE L^*a^*b intensity for Figure 3.



The bright yellow regions toward the center in both figures are associated with the highest intensities, while the blue/green regions are associated with lower intensities. The blue regions have a lower intensity than the green regions. Both Figure 6 and 7 clearly show the effects of the uv lighting configuration used by Miller and shown in Figure 4. In Figure 7 the blue/green areas completely surround the yellow area in the center. Six additional uv photos taken by Miller have been contoured in the same way as Figure 7 and they all exhibit the same non-uniform, circular illumination pattern shown in Figure 7.

In Figure 6 the blue/green regions surround the sides and top of the image. The burn marks on the bottom of Figure 6 show up yellow. The reason that a blue/green region does not show up across the entire bottom of Figure 6 can be explained by referring to Figure 2. When the dark border at the bottom of Figure 2 is cropped to carry out the intensity analysis the center of the original image where the uv lights overlapped moves lower, and it is closer to the bottom border of the cropped image. Had the Shroud continued below its border in Figure 2 there would have been a surrounding blue/green region in the contour plot in Figure 6. Even with the cropping effect the radiocarbon test area indicated in Figure 6 shows up in a blue/green area. Figures 6 and 7 as well as those for the other 6 uv photos analyzed but not shown demonstrate that there is a definite non-uniform intensity of light over the Shroud produced by excitation using the two 45° uv lamps. (Avis, et al 1982) also noted the lack of uniform illumination in the uv Shroud images taken by Miller which they analyzed, and they compensated for the non-uniformity by using a median filter.

Since Figure 1 is no doubt cropped from Figure 2 it suffers from the same non-uniform illumination issues. Figure 1 displays an uv image as does Figure 2. However, as can be seen Figure 1 is lighter than Figure 2 and this change is due to processing Figure 1 for publication. The processing for publication probably increased the intensity of all pixels in the

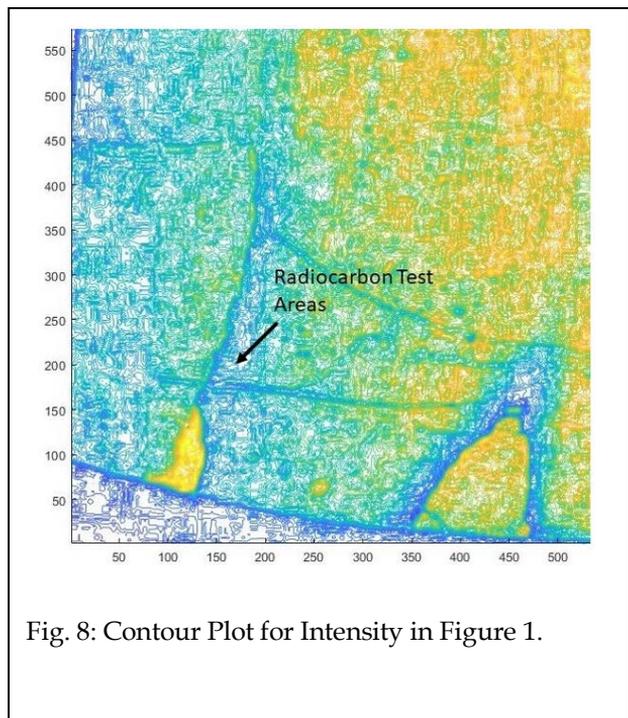


Fig. 8: Contour Plot for Intensity in Figure 1.

image, but as shown in Figure 8 it did not correct for the non-uniform illumination used when the image was taken. Figure 8 shows a contour plot for the intensity, L , in Figure 1. As can be seen except for the burn mark and missing piece at the bottom of the image, the largest intensities occur on the right side of the image and particularly toward the upper right-hand corner of the image. The radiocarbon test area which is shown in Figure 8 has lower intensities, in agreement with the low intensities away from the center in Figures 6 and 7.

As can be seen in Figure 6 the radiocarbon test areas which are blue in colour lie between two regions with yellow colour. Thus as one moves horizontally the image intensity goes through a minimum in the radiocarbon test areas. This minimum can be explained as follows. The yellowish region to the left of the radiocarbon test area is actually a patch that has been added to the Shroud at an unknown time. The yellow colour in this region may arise because the material in the patch fluoresces more strongly than the Shroud itself. As discussed below colour photos demonstrate that the radiocarbon test area is darker than other parts of the Shroud. The darker colour probably is the result of some type of contamination in the radiocarbon test area (Adler *et al.*, 2002) which could affect fluorescence in this region. In addition to these two issues the key issue is that the Shroud was definitely lit non-uniformly with the uv lighting arrangement that was used. However, the PCA approach in Morgan (2012) assumes equal pixel illumination, and the first PCA component is essentially equal to image intensity, L . The radiocarbon dating areas may be different from the main Shroud, but because of non-uniform illumination the PCA method cannot be applied to Miller's uv photos to demonstrate this point. Because of the non-uniform lighting there is simply no way one can draw meaningful conclusions from the PCA analysis done by Morgan. Thus his statistical conclusions based on the PCA analysis that the radiocarbon test areas are anomalous can be questioned. In the next section a non-uv colour photo taken by Miller is examined.

Analysis of Miller's 1978 Non-uv Colour Photo

In addition to taking uv photos Miller also took standard colour photos of the Shroud. For both the colour and uv photography the track along which the camera was moved is shown in Figure 9.¹⁰

The camera was kept at a fixed distance from the Shroud by telescoping rod D. The camera could be moved horizontally on the track and its vertical height could also be adjusted. For uv photography two lights focused at 45° were used (Figure 4). For colour photography one 1000 watt lamp and two 250 watt lamps

¹⁰Miller, V.D. and S.F. Pellicori, (1981). Ultraviolet fluorescence photography of the Shroud of Turin, *Journal of Biological Photography*, 49, No. 3, 1981, 71-85.

were used¹¹ (Schwartz, 2019). Importantly, for colour photography the illumination of the Shroud was directed perpendicular to the cloth and it was much more uniform than that for the uv photography. In taking colour photos the STURP team paid very close attention to the uniformity of lighting that was used (Schwartz, 2019).

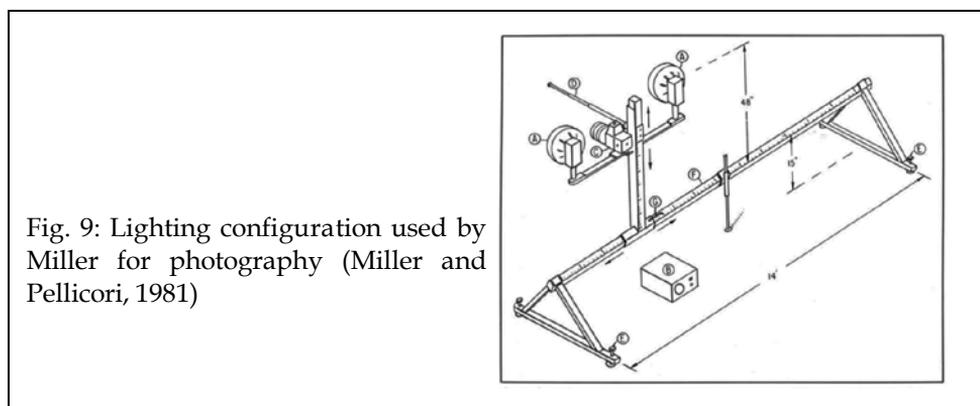


Fig. 9: Lighting configuration used by Miller for photography (Miller and Pellicori, 1981)

Figure 10 shows one of Miller's uncropped colour photos that includes the radiocarbon test areas, and Figure 11 gives the contour plot for Figure 10. The yellow areas in Figure 11 represent high intensity and the green/ blue areas lower intensities. When PCA is applied after cropping the border of the image in Figure 10, it is found that 95.93% of the variance in the image can be explained by the first principal component. The correlation coefficient between the image intensity, L , and the first principal component is .9985, indicating that the first principal component is essentially the image intensity.

Two points can be noted about Figure 11. First the large yellow region suggests that the lighting used for taking the photo in Figure 10 was much more uniform than that used for the uv photos. There is no blue border encircling the yellow region in the photo in Figure 11. Secondly, the contour plot indicates that the radiocarbon test areas appear to be different from the rest of the Shroud. The radiocarbon test areas are in the dark blue/green region in the right-hand corner of the image. Figure 10 shows that the radiocarbon test areas are darker than the colour of the bulk of the Shroud. Indeed Adler *et al.*, (2002)¹² found the radiocarbon test area to be highly contaminated, especially with inorganic compounds. Additional research on Miller's colour photos could be carried out to try to assess

¹¹Schwartz, B., (2019). Personal communication.

¹²Adler, A.D., Selzer, R. and DeBlase, F. (2002) Further Spectroscopic Investigations of Samples of the Shroud of Turin. In: Minor, M., Adler, A.D. and Piczek, D.I., Eds., *The Shroud of Turin—Unraveling the Mystery*, Alexander Books, Alexander, 166-181. <http://www.shroud.com/pdfs/ssi43part9.pdf>

if his colour photos are uniformly illuminated, and if so how much the radiocarbon test areas differ from the rest of the Shroud. The intensity of pixels in the white tape around the edge holding the Shroud in Figure 10 could be useful in checking image intensity to determine if it is uniform. Given the correlation between image intensity and the first principal component for this colour photo it should be possible to use the PCA methodology given by Morgan (2012) for this additional study. One additional paper that avoids the problems with non-uniform illumination in Miller's uv photos can be mentioned. McAvoy (2019)¹³ calculated average values for the intensity of a number of Miller's uv images and was able to draw meaningful conclusions from the averages concerning the fluorescence intensity exhibited by the Shroud.

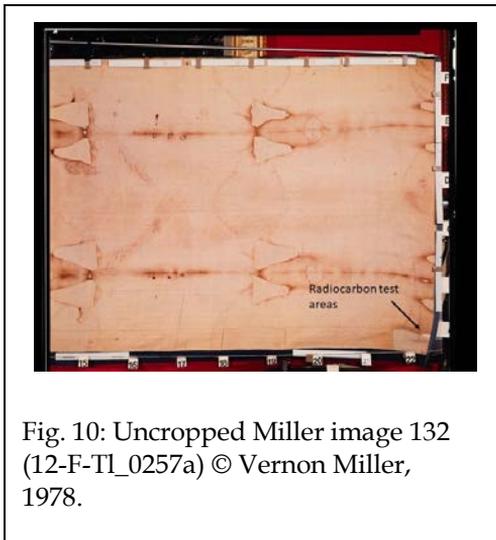


Fig. 10: Uncropped Miller image 132 (12-F-TL_0257a) © Vernon Miller, 1978.

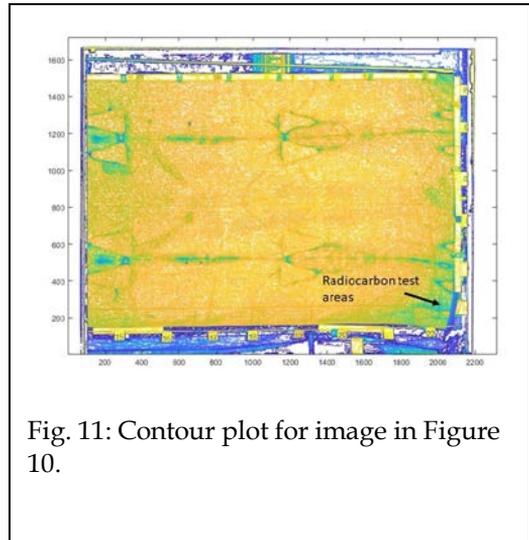


Fig. 11: Contour plot for image in Figure 10.

CONCLUSIONS

This paper examined the conclusions of an earlier paper by Morgan (2012) that used a geographic signal processing approach on an uv photo of the Shroud of Turin to question the validity of radiocarbon dates for the Shroud. In that paper the area where the radiocarbon samples were taken was found to be statistically anomalous. In this paper it is shown that a key assumption of the geographic signal processing approach, namely uniform lighting, did not hold for the image analyzed, and thus the statistical conclusions in the earlier paper can be

¹³McAvoy, T. (2019). Analysis of UV photographs of the Shroud of Turin, *Appl. Opt.* 58, 6958-6965.

questioned. Whether the radiocarbon test area is anomalous is an open question. An analysis of a colour photo of the Shroud indicates that it could be possible to use this photo to address this question.



11. The Holy Shroud and Nuclear Physics: Why Radiocarbon Dating Results Prove the Resurrection of Jesus

Jeffrey Skurka & Catherine C. Osborn

The objective of this paper is to offer an explanation of the mechanism for the excess C-14 measured in the Holy Shroud. Experiments pertaining to radiative capture of thermal neutrons demonstrate that the apparent age of linen can be skewed, which explains the statistical anomaly observed in the results of the 1988 radiocarbon dating of the Shroud.

The Official Results of the 1988 Radiocarbon Dating of the Shroud of Turin

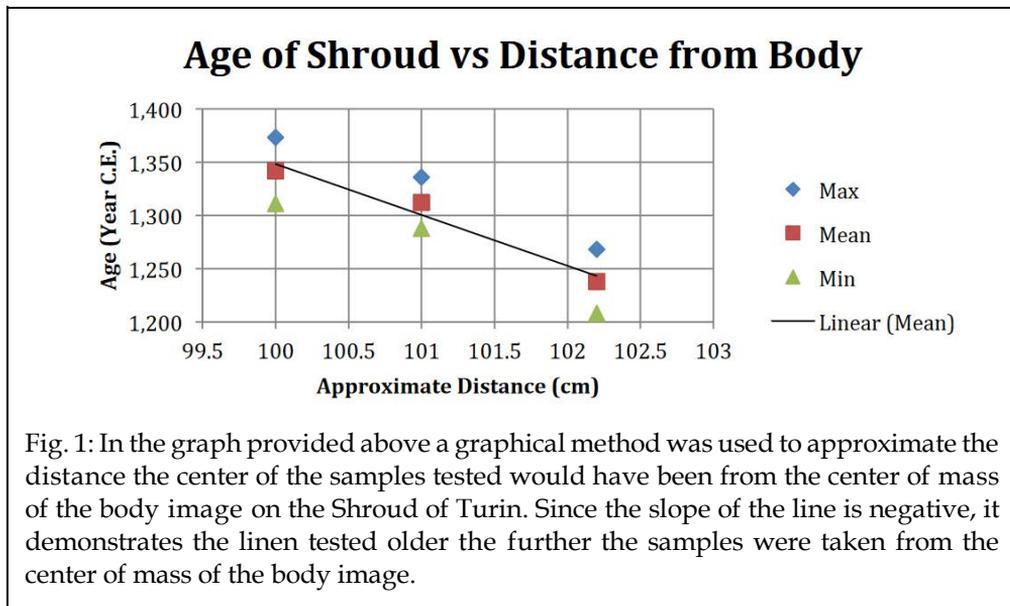
In a well-attended press conference on October 13, 1988, Cardinal Ballestrero announced the official results—the radiocarbon testing dated the shroud from 1260-1390 AD, with 95% confidence. The un-calibrated dates from the individual laboratories, with 1-sigma errors (68% confidence), were as follows: Tucson: 646 ± 31 years; Zürich: 676 ± 24 years; Oxford: 750 ± 30 years. The weighted mean was 689 ± 16 years, which corresponds to calibrated ages of CE 1273-1288 with 68% confidence and CE 1262-1384 with 95% confidence.

Understanding the Numbers

Radiocarbon Dating 16 Results: the year radiocarbon dating tests were performed in 1988 (See Table 1).

| Table 1: Results of the radiocarbon dating | | | |
|--|------------------------------|---------------------|---|
| Tuscan (Arizona #1) Results: linen sample tested closest to the body image | | | |
| 646 ± 31 years | $646 + 31 = 667$ | $1988 - 677 = 1311$ | ← Age difference with the smallest calculated Δ 43 years |
| | $646 - 31 = 615$ | $1988 - 615 = 1373$ | |
| | | $1988 - 646 = 1342$ | |
| Zürich Results: | | | |
| 676 ± 24 years | $676 + 24 = 700$ | $1988 - 700 = 1288$ | ← Age difference with the greatest calculated Δ 165 years |
| | $676 - 24 = \underline{652}$ | $1988 - 652 = 1336$ | |
| | | $1988 - 676 = 1312$ | |
| Oxford Results: linen sample tested farthest from the body image | | | |
| 750 ± 30 years | $750 + 30 = 780$ | $1988 - 780 = 1208$ | ← |
| | $750 - 30 = 720$ | $1988 - 720 = 1268$ | |
| | | $1988 - 750 = 1238$ | |

"As reported in *Nature*, Professor Bray of the Instituto di Metrologia 'G. Colonetti,' Turin, confirmed that the results of the three laboratories were mutually compatible, and that, on the evidence submitted, none of the mean results was questionable."¹ As illustrated in Figure 1, the linen cloth dated older the further the samples were taken from the regions of the cloth that were further away from the centre of mass of the body.



The maximum error as reported by the three laboratories that performed the radiocarbon dating testing on the Shroud at the most should have been ± 31 years. As demonstrated in the above calculations, the least possible difference in age is 43 (1311-1268) years at a minimum and 165 (1373-1208) years at a maximum per the measurements made by the three laboratories. These values do not fall within the expected range of the error analysis. However, because the age difference was within the same approximate range, the laboratories concluded that the age of the linen cloth was between 1260-1390 AD. But let us examine the results of the radiocarbon dating performed on the Shroud more closely. The spatial distance of the body image, the contrasts with respect to light and dark, along with the radiocarbon dating, all follow a direct mathematical relationship. This principle in science is known as the *inverse square law*². In other words, the further one moves away from the source of energy or force, its intensity decreases.

¹P. E. Damon, *et al.*, "Radiocarbon Dating of the Shroud of Turin." *Nature* 337.6208 (1989): 611 - 615.

²"Inverse Square Law." 16 February 2018. *en.wikipedia.org*. 2011.
<https://en.wikipedia.org/wiki/Inverse-square_law>

Evidence that C-14 Content can be Increased in Linen by Radiative Capture

Shortly after the results of the radiocarbon dating were leaked, some scientists, given the statistical anomaly reported, proposed that neutron activation and radiative capture might have been responsible for the excess mass of C-14 as measured by the laboratories. Therefore, the results reported when conducting the C-14 testing were interpreted as a false positive given their expectations of the radiocarbon dating, which has been the cause for much confusion for over 30 years.

Two of these scientists were Thomas J. Phillips of Harvard University and Jean-Baptiste Rinaudo from the Faculty of Medicine of Montpellier in France. They proposed that a neutron flux during the resurrection event could account for the discrepancy in the radiocarbon dating on the Shroud of Turin. In their experiment, they irradiated linen with a known age from a Lyma mummy with a neutron flux of 1×10^{13} n/cm² from a research nuclear reactor.

Their conclusion:

The most evident result of our research is the increase of the C-14 content after neutron irradiation and the impossibility, even with the most severe pretreatments, to reach the "historic" age (calibrated on dendro-chronological curves) of the non-irradiated sample (TO-13583 - 40/10/0 BC). Therefore, if an irradiation had happened, the result would explain the anomalous data obtained in the analyses of the Shroud made in 1988.

It is evident that the C-14 content increases with the increase of the neutron flux. The sample TO-12553, although subjected to a cleaning pretreatment with a yield of 7.8 %, shows a result of the C-14 content greater than the sample TO-5305.³

Simply interpreted, that even after thoroughly cleaning the linen sample of any contaminates, they were able to increase the measured amount of C-14 in the cloth by exposing the linen fiber to thermal neutrons from a research reactor. This result could explain the statistical anomaly observed by the three laboratories that performed the radiocarbon dating of the Holy Shroud in 1988.

Using the Monte Carlo N-Transport computer program, Rucker demonstrated that the Shroud of Turin and the Sudarium of Oviedo (discussed below) would date younger than the expected age from the first century, and would increase in age as a function of the distance the linen clothes were from the body of Jesus during his resurrection. In his investigation, Rucker also concluded that if the neutrons came from anywhere other than the body of Jesus, the analysis fell apart.⁴

³Phillips, T.J., "Shroud Irradiated With Neutrons?," *Nature*, Vol. 337, 16 February, 1989, p.594;

<http://creationevolutiondesign.blogspot.com/2007/05/bogus-shroud-of-turin-4.html>

⁴Rucker, R. A. (2014). MCNP Analysis of Neutrons Released from Jesus' Body in the Resurrection. St. Louis.

Therefore, it is highly probable that another mechanism other than a nuclear fission was responsible for thermal neutrons being emitted from the body of Christ during the resurrection event.

The Sudarium of Oviedo:

Like the Shroud of Turin, the Sudarium of Oviedo is stained with blood, type AB, resulting from puncture wounds from the crown of thorns. There are plant spores that were also found on the Shroud of Turin near the head from *Gundelia tournefortii*, one of the plant species used to fashion the crown of thorns during the passion of Christ. There is also discolouration from pleural fluids expelled from the lungs, most likely from the body of Jesus being placed face down to remove the nails from his hands and feet when taken from the cross. When a transparency of the Sudarium of Oviedo is placed over a photograph of the Shroud of Turin, there is a high correlation between the bloodstains from the two clothes leading many researchers to conclude with a high degree of confidence that both linen cloths covered the same corpse.

Therefore, if like the Shroud of Turin, the Sudarium of Oviedo had been in the tomb during the resurrection it would have also been subjected to a thermal neutron flux. Since the Sudarium of Oviedo was further away from the body of Jesus, "rolled up in a place by itself," following the principle of the inverse square law, the intensity of the neutron radiation affecting the Sudarium of Oviedo would also have been less. Thus, the radiative capture of neutrons would also have been reduced, and as a result, the linen cloth from the Sudarium of Oviedo should date older than the Shroud of Turin but still not from the first century when Jesus was crucified.

Given this hypothesis, nuclear physics validates the theory. When the Sudarium was tested for C-14 in 2007, the results are as follows: 653-786 AD Toronto, and 642-769 AD (in another version 642-869 AD) Tucson. The data once again demonstrates that neutron activation through the inverse square law was most likely the cause of the discrepancy in age when dating both the Shroud of Turin and the Sudarium of Oviedo. Ergo, the radiocarbon dating results of the Shroud of Turin in combination with the results of the Sudarium of Oviedo are the proverbial smoking gun of Christ's bodily resurrection from the dead!

Light, Magnetism, and the Subatomic Particles:

When investigating a possible mechanism responsible for the body image formation, those aspects in science that also demonstrate the principles of the inverse square law were investigated. These are Heat, Light, Sound, Magnetism, Radiation.

Further investigation included the strong nuclear force, the weak nuclear force, electromagnetism, and gravity. Of these forces, it is the electromagnetic force that also follows the inverse square law and acts at the spatial distance in which the body image was formed. It is important to note that magnetism and electricity are fundamentally interlinked and consistent with Einstein's theory of special relativity.

All physical matter, when considering subatomic quantum spin numbers, exhibits properties of paramagnetism or diamagnetism; they are either attracted to or repelled by magnetic fields⁵.

In materials that are paramagnetic, unpaired electrons are free to spin in any direction and can align their magnetic moment in any direction. The correlation here is that when the ferrimagnetic and ferromagnetic materials are very small, they act like a single magnetic spin and have the ability to move or change the orientation of the electron spin of atoms in the near proximity of the induced magnetic field.

Tesla also discovered that high frequency electricity exhibits what is known as a skin effect⁶. An induced magnetic field pushes the current to the outside of the conductor, which travels along the surface of a wire. This phenomenon provides another plausible explanation why the body image is incredibly superficial, only on the very inside surface of the burial shroud. The body image is also wrapped 360° around the individual surface fibrils, evidence of a magnetic curl, and is only on the crowns of individual threads that make up the weave of the linen cloth.

Because neutrons do not have an electric charge, they are more difficult to shield than the three other types of ionizing radiation. Materials that have a high hydrogen content such as water, fats, oils, and plastics are used to shield people and objects from neutrons in the nuclear industry.

When a neutron strikes the nucleus of an atom with a mass greater than hydrogen, and if the velocity is too high, the neutron will either be deflected or reflected back depending upon the angle of incidence at which the neutron struck the nucleus of the target atom. The target nucleus counteracts this disturbance by releasing a gamma ray to balance or dissipate the energy, in a heating effect, due to the inelastic collision. Therefore, neutrons are only ionizing as a secondary effect of their interaction with the nucleus of an atom by causing the emission of gamma ray radiation.

If the kinetic energy/velocity and angle of incidence are not too great, a neutron can be captured, also known as radiative capture. In this interaction, it is possible for the nuclear transmutation of nitrogen-14 atoms into radioactive isotope carbon-14.

⁵"Magnetism." 6 March 2018. *Wikipedia*. Document. July 2014.
<https://en.wikipedia.org/wiki/Magnetism>

⁶Cawthorne, Nigel, *Tesla*. New York: Chartwell Books, 2014. 46, 52. Book.

To better understand why the radiocarbon dating of the Shroud of Turin was affected by the radiative capture of neutrons by nitrogen atoms, it is vital to understand that nitrogen atoms are contained within the DNA molecules of the flax fibers.

In addition, during the production of linen fiber, bacteria-laden water is used to decompose or rot the pectin, the hard-woody outer stalk, of the flax plant⁷. This bacterium through nitrogen fixation would also have left nitrogen atoms on the very surface of the linen fibers during the retting process and production of the linen textile.

Possibly it is the alignment of the magnetic moment of electrons in nitrogen atoms in the DNA molecules of the linen cells and other available sources, which is causing a higher than average nuclear transmutation of C-14 isotopes in the linen cloth. So a magnetic alignment of DNA molecules in the flax plant cells could be skewing the results of the 1988 radiocarbon dating of the Shroud of Turin⁸.

Now the mechanics of the surface phenomena start to come together. First, alpha particles⁹ travel only a few centimeters in air. Second, very thin materials are capable of stopping/shielding alpha particles. Third, alpha particles are deflected by magnetic fields (See Figure 2). The combination of these three principles, resulted in alpha particles collecting on the surface of the linen cloth causing the surface to become electrostatically charged.

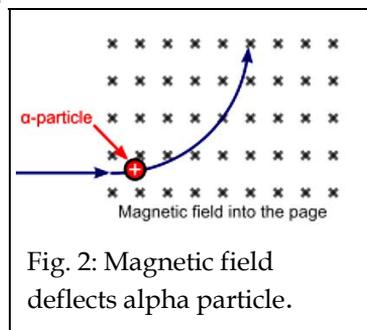


Fig. 2: Magnetic field deflects alpha particle.

To provide a further understanding, rather than individual flax fibrils acting as a single conductor such as with a wire, the flax fibrils were behaving more like a series circuit of air induction coils connected end to end. In an air induction coil, the magnetic field is the greatest at the end of the coil, which can account for why the body image is from node to node throughout the body image. At a node, where two cell walls meet end to end, the cell walls could possibly be acting similarly to an air gap capacitor. With a limited charge, the alpha particles would be impeded and prevented from jumping the gap thus preventing the body image to be formed on an adjacent cell adjoining that node. This combination of induction and capacitance can possibly account for the dark bands that are noted at the nodes of the flax fibrils in the body image.

⁷"How Linen is Made." n.d. DeckTowel.com.

<<https://www.decktowel.com/pages/how-linen-is-made-from-flax-to-fabric>>.

⁸"Carbon - 14." 15 March 2018. *Wikipedia*. 10 July 2014.

<<https://en.wikipedia.org/wiki/Carbon-14>>.

⁹Alpha Particle. (2018, March 6). Retrieved August 6, 2014, from *Wikipedia*:

https://en.wikipedia.org/wiki/Alpha_particle

When the frequency of a magnetic resonance was high enough, the electric current of positively charged alpha particles would then travel along the surface of individual flax fibrils acting as a conductor.

The magnetic curl provides further evidence that an alternating current produced by a nuclear magnetic resonance was the principle fundamental force that resulted in the superficial body image being formed on the surface of the cloth. It is also through the constructive/destructive interference of this magnetic field that gives the body image three-dimensional properties similar to how a standing wave of photons from a LASER produces a hologram in the plane of the film.

Finally, given the varying spatial distance the body was from the linen cloth there would be an unequal concentration of charge (alpha particles) creating a potential difference, or voltage, across the surface of the cloth. Therefore, without the need for a closed/completed circuit, alpha particles would move from a greater concentration to a lesser concentration of electrical potential/voltage across the surface of the linen burial shroud.

Evidence suggests that the body image resulted from a release of energy and/or light emanating from the heart but with a precise up and down directionality. It is proposed that the energy released would probably be more accurately described as a nuclear magnetic resonance (NMR) causing a directional magnetic field emanating from the body of Jesus linearly, in a vertical plane, and collinear with the direction of the force of gravity.

A unique and interesting quality of the human heart is that it produces the greatest electromagnetic field in the body, even as much as 60 times greater in amplitude than the brain.

In chapter 13 of this book, Jose Godínez describes how the electromagnetic field emanating from the lifeless heart of Jesus would have propagated throughout the body¹⁰. Of particular interest is how this field would have changed or become distorted below the knees. In many of the Spontaneous Human Combustion events¹¹, a very strange aspect is that the feet and legs below the knees remain. It is therefore proposed that the strength/intensity of this standing wave emanating from the heart was no longer able to sustain the disassembly of the atomic structure in what appears to be the incineration of the human body.

Consider for a moment the possibility for unpaired electrons spinning freely in any direction, to align, and at a distance on the nuclear scale, to act as a single very strong magnet. Although the magnetic moment of a neutron is very small, one type of magnetism strong enough and capable of directing neutrons at the atomic level is superparamagnetism. What then would happen to the electrons and

¹⁰Godínez, Jose Carlos Espriella. *Strange Quark Matter in the Image of the Shroud of Turin*. See Chapter 13 in this book.

¹¹Spontaneous Human Combustion. Retrieved May 2020, from *Wikipedia*: https://en.wikipedia.org/wiki/Spontaneous_human_combustion

the nucleus of atoms surrounding the location of this developed force of superparamagnetism?

We now have neutrons and alpha particles capable of forming the superficial body image and increasing the amount of C-14 of the linen cloth with magnetic properties. These ionizing particles can be directed or deflected with powerful magnetic fields. Another important aspect of neutrons to consider, is that they can also propagate space-time as a wave.

One of the arguments against the resurrection of Jesus being a nuclear event, is that many people assume it would have been a nuclear fission with fast-moving neutrons like an atomic bomb. But if the resurrection was a nuclear event with these fast-moving neutrons, Jerusalem would have been destroyed as the physical mass of Jesus' body went critical.

First, thermonuclear devices such as an atomic bomb have fast-moving neutrons. In a nuclear reactor, we are dealing with slow-moving or thermal neutrons. However, even with a nuclear reaction containing slow-moving/thermal neutrons, there should have been large amounts of radioactive material left over. Thus another indication that the resurrection event most likely was not a fission reaction. Something else capable of producing neutrons with very slow thermal velocities must have happened.

A thermal neutron, or a slow-moving neutron, can have kinetic energy as low as 0.025 eV (about 4.0×10^{-21} J or 2.4 MJ/kg, hence a speed of 2.2 km/s). At this velocity, the energy also corresponds to the most probable velocity at a temperature of 290 Kelvin (17°C or 62°F).

At these temperatures, it is possible for thermal neutrons to interact with the flax fiber of the linen burial shroud without causing significant damage. It is important to note linen has the highest thermal conductance allowing it to dissipate heat. This results in the greatest resistance to burning/scorching of all the other natural fibers such as wool, cotton, and silk that were used for the production of textiles during the first century.

Nikola Tesla demonstrated that when the energy imputed into some system equals the resonating frequency of an object, the amplitude of the energy of the system is increased by an enormous amount. If sustained long enough, the system will self-destruct.

As a result of this matching resonance, the cells in the body of Jesus built up an enormous magnetic potential. Then after three days in the tomb, reaching a saturation point when the body was transformed, it caused the magnetic field to collapse. A burst of energy was then released in the form of an Electro Magnetic Pulse (EMP) emanating out through the bedrock surrounding the tomb.

Evidence of a release of a high energy EMP during the resurrection may have been found during renovations to the Tomb of the Holy Sepulcher in Jerusalem in 2017. It was discovered that after placing electronic/electrical equipment on the stone slab these devices malfunctioned. When tested, a permanent, anomalous,

magnetic field was discovered above the stone slab that Jesus was laid upon. The resurrection was not caused by this magnetic field but rather the change in orientation of the electron spin left this residual magnetic field in the limestone as a result of the EMP when the magnetic field collapsed during the resurrection.

As a result, having all of the DNA molecules resonating in phase could have also induced a Casimir Effect between the subatomic charged particles in the dead body of Jesus. The attractive force developed between particles became so great that now even the physical parameters of space-time were being changed as the dimensions in the vector field of space-time started to collapse.

If the magnetic resonance were induced at a high enough frequency, it would also have caused alpha particles to wrap 360° around surface fibrils of the woven linen. The ionizing properties of the alpha particles, first being able to strip electrons from chemical bonds could explain what appears to be the oxidation, and then dehydration, furfural loss of two water molecules, thus bearing the conjugation bonds and a carbonyl group coating the surface of the microfibrils. The subsequent brownish-yellow/sepia tone/colouration of a body image is the result of 5-hydroxymethylfurfural (HMF) causing a change in the angular bonds of the molecular structure.

As with a lightning strike, when the magnetic field collapsed, thermal neutrons could have been emitted from the body of Jesus. Hence, when considering the nuclear magnetic resonance of the DNA molecule, the superficial body image can best be described as a photo static quantum hologram.

There is very strong evidence for this phenomenon as discovered by Dr. Petrus Soons when changing the focal length from digitized black and white negative plates taken of the Shroud of Turin in the 1930's. The data from the body image on the burial shroud also has 3-dimensional properties like a hologram.

As this energy was released from the resurrection, it propagated out through the bedrock of the tomb causing a 5.5 magnitude earthquake in the Palestine area in the year 33 AD as evidenced by mud flats in the Dead Sea.

Another possible test of this hypothesis is to examine limestone from the tomb of the Holy Sepulcher for evidence of neutron tracks. As proposed, because the velocity of the neutrons was within a thermal range and slow enough not to damage the linen cloth, heavier radioisotopes such as chlorine and other isotopes with half-lives longer than a couple of minutes would not have been produced as a result of the resurrection event.

Evidence of Human Bodies Being Able to Emit Thermal Neutrons without Nuclear Fission

For years, the argument has been there is not enough fissionable material in the human body to produce neutrons with thermal velocities. Therefore, logic would dictate that some other source/mechanism is capable of producing thermal

neutrons within the human body without requiring a nuclear fission. How was it possible for a human body to emit a neutron flux with thermal velocities without requiring a nuclear fission?

One such phenomenon is Spontaneous Human Combustion (SHC). This is the concept of the combustion of a living (or recently deceased) human body without an apparent external source of ignition.

First, it is important to acknowledge that there are as many differences as there are similarities between the resurrection of Christ and SHC! For example, where there seems to be antigravity acting before the resurrection of Jesus, there seems to be an increase in the force of gravity when examining cases of SHC. So, for the sake of brevity the analysis herein will concentrate specifically on those shared aspects and provide evidence of neutron activation as discovered during fire investigations by trained and seasoned professionals.

A case of particular interest that was examined is that of George Mott who died in a mysterious fire in his Crown Point New York home on March 26, 1986. Although his entire body was nearly incinerated, George's skull was shrunken proportionally to a size that was described as a softball.

Although the mattress and bedding had been severely burned in the immediate area surrounding his cremated body, including charring of the headboard, there was no heat or smoke damage done to the ceiling directly above the bed. Several small bone fragments were found on the dirt floor in the crawl space below as a result of parts of his body burning through the mattress, falling through the now deformed steel springs of the mattress, box spring, and wooden floor.

For reference, the recrystallization temperature for steel is typically between 400 and 700°C (750 and 1,300°F) for steel to be permanently deformed by heat. In contrast, the flash point of cotton fabric to self-ignite is approximately 400°C and can sustain a flame at temperatures as low as 200-210°C (390-410°F). A logical question then is if the fire were a true oxidation-reduction (redox) reaction of ordinary burning why did the entire bed or house not completely burn to ashes?

What if there was a strong enough force, resulting from an increase in the gravitational force, pulling George Mott's physical mass toward the floor and ground ... and what if that force exceeded the yield stress of the steel? Could this cause the mattress springs to be permanently deformed without substantial heating?

Because fragments of bone had burned through the structures of the bed, wooden floor, and steel springs, now permanently deformed, without the combustible parts of the mattress and box spring being incinerated by the fire, then logically there had to be another agent at work.

The only other object that sustained significant damage in the bedroom was the plastic cabinet of the television set. If heat rises and there was no heat or smoke damage done to the ceiling directly above the bed, why then was the plastic cabinet of the TV melted? The distorted TV cabinet is a significant clue of neutron activation as most hard plastics have high hydrogen content which is excellent for shielding neutrons (See Figure 3).



Fig. 3: Melted plastic TV cabinet.

Other anomalies in the house point to evidence of neutron activation. In addition to the plastic cabinet of the television in his bedroom, there were other plastic items also melted throughout the house: the Dixie cup holder on the bathroom vanity top although the paper cups were in near perfect condition, the plastic telephone housing in the pantry and the paper towel holder on the kitchen wall despite the paper towels being completely intact. On top of the refrigerator, bananas were reported as dehydrated. Lastly, water from the bowl of the toilet in the bathroom was gone.

George Mott's refrigerator was assumed to be operating during the time of the fire because it was functioning normally during the fire investigation. There was no evidence to suggest that the refrigerator was inoperable during the fire. Yet examination showed the contents of the refrigerator and freezer, had melted and refrozen. An unopened package of hot dogs in the refrigerator appeared as if they were parboiled. However, genuinely bizarre – not only had the butter melted, but the plastic butter dish had melted as well. Both were in the refrigerator.

Because a neutron does not carry a charge, most materials are transparent to neutrons except items that have high hydrogen content like water, fats, oils, and plastics. Knowing how neutrons interact with materials that have a high hydrogen content, a plausible scientific explanation can be derived from the surreal evidence found throughout the homes of SHC victims left with cremated human remains.

In nuclear power plants, thermal neutrons pass through solid uranium fuel rods via a fission reaction into the surrounding water bath of the reactor chamber thus striking the nuclei of the hydrogen atoms in water molecules. Just like passing through a solid uranium fuel rod, neutrons passed right through the framing and walls of the house, the ceramic toilet bowl, and the sheet metal walls of the refrigerator because most materials are transparent to neutrons. Excitation of the hydrogen nuclei with thermal neutrons causes molecules to vibrate faster thereby increasing the enthalpy (internal heat energy) of the water. This produces the steam and pressure required to drive a turbine converting the thermal energy into electro-mechanical work that is in a nuclear power plant. However, in this case,

thermal neutrons were striking the hydrogen atoms in the water, oils and fats in the food, and plastic, causing everything to melt in the refrigerator and freezer.

Neutron activation possibly consumed George Mott's body causing a significant portion of his body mass (53% water) to evaporate. Most of the other charring and burning of the localized area was probably caused by the excitation of molecules by protons and more likely alpha particles, with a larger mass, that travel only very short distances in air. Also, if the alpha particles were able to strip electrons from other atoms, they would form helium atoms. Being an inert gas, helium molecules would have displaced the reactive oxygen molecules preventing the combustion of nearby flammable materials. Because helium is lighter than air, it would also have collected near the ceiling and would have eventually dissipated by floating away undetected.

There is the similar case of Mary Reeser, who died on July 2, 1951, in St. Petersburg, Florida. Her skull was found shrunken uniformly but disproportionately to a normal human skull. In this case, the size of her skull was compared to that of a teacup. Her skull was examined by Wilton M. Krogman, a Professor of Physical Anthropology at the University of Pennsylvania's Medical School. Given his professional expertise, Professor Krogman would not have mistaken the size of the skull of an adult human female. The wooden frame at the back of the chair, where they found the remains of Mary Reeser's body, was broken. Like George Mott, it appears there was a force pulling her body down toward the ground.

To understand how such an event is possible in the human body, it is essential to scrutinize the shrunken skulls of George Mott and Mary Reeser. They provide paramount evidence.

Again, superparamagnetism is the stronger and more dominant force given an unpaired electron in materials when compared to elements that are diamagnetic. Material containing atoms that have a paired electron spin cause a zero net magnetic effect which also repels magnetic fields; the electron spin in diamagnetic compounds align perpendicular to the unpaired electron spin when subjected to materials nearby exhibiting properties of superparamagnetism.

Therefore, if it were possible to create a magnetic field strong enough at the atomic level, the Lorentz Force, the centripetal force, would cause the electrons to be pulled toward the nucleus as well as pull against it. With an equal and opposite force sufficient enough for the protons and neutrons in the nucleus to overcome the strong nuclear force (as with super-paramagnetism) – what then would happen to the atomic structure?

First, protons with like charges and at a distance within the nucleus of an atom would actively repel each another. Mostly, the weak nuclear force would cause protons to fly off carrying a single + charge. Neutrons and alpha particles with a 2+ charge would be carried along with the protons in the direction of the superparamagnetic force. Since protons (+ e) and alpha particles (+2 e) carry a

charge, they would interact with nearby materials imparting their kinetic energy to the molecules causing them to vibrate faster with an increase in temperature causing materials to char in the absence of oxygen. Since alpha particles do not travel very far in the air, this could explain the local burning of the bedding and headboard in the immediate area of George Mott's body when lying on the bed.

Then, since a calcium atom has a much larger mass, its nucleus having 20 protons and 20 neutrons, the strong nuclear force would be much greater than the other principal elements in the body with lower atomic numbers. What if the magnetic force was not strong enough to overcome the strong nuclear force? What would be the effect on the much larger calcium atom in the bone/skull? An atom is composed of virtually a vacuum of space with a very dense nucleus, containing almost all of its mass, at the center. What if after the consumption of the body, the alignment of the electron spin remained? Could this be the reason the shrunken skulls were found at the fire scenes of both George Mott and Mary Reeser?

Other Supporting Evidence that a Human Body is Capable of Emitting Thermal Neutrons without Nuclear Fission:

In addition to evidence of neutron activation throughout George Mott's house, Larry Arnold procured a book jacket from a book entitled, *Strange Stories, Amazing Facts*, published by Readers Digest in 1976. Larry discovered the book on a table near a small passageway separating the living room from George Mott's bedroom. Consisting of paper, primarily composed of a variant of cellulose molecules like the Shroud of Turin, could the book jacket have evidence of neutron activation, hence radiative capture, as well?

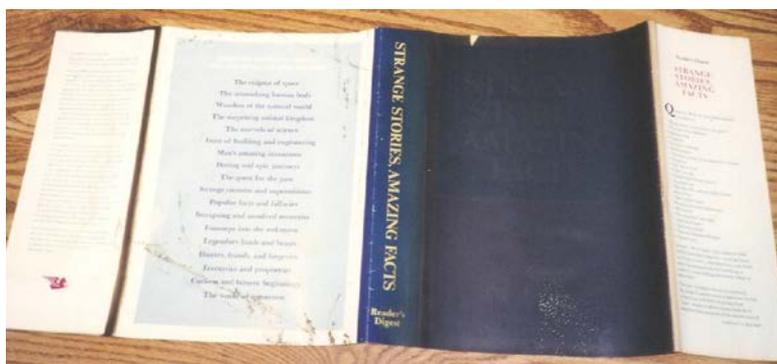
A sample of the book jacket was sent to BETA ANALYTIC, in Miami, Florida and tested for radiocarbon 14 isotopes. The C-14 age was found to contain 106.8 +/- 0.6% of a modern sample. It dated 2542 AD. With a measurement of C-14 greater than 100%, the book jacket, like the Shroud of Turin, essentially contained more C-14 than theoretically should be there.

Obviously the book jacket is not from the future but was affected by whatever caused George Mott's physical body to burn up. Given the other evidence in the house, there are clues correlated to Christ's resurrection. Like the Shroud of Turin being composed of cellulose molecules, the paper in the book jacket, also composed of cellulose molecules, could also have been affected by neutron flux (See Figure 4).

A proper scientific investigation should not ignore the results of the radiocarbon measurement of the book jacket given the other anomalies observed in George Mott's house resulting from the strange circumstances of his death. The radiocarbon dating results of the book jacket were only a small part of the evidence pointing the investigation of the anomaly of C-14 in the Shroud of Turin like a compass needle in the direction toward neutron activation and radiative capture.

In the countryside where George Mott's house stands, the surrounding geology contains iron sands that are permanently magnetized. Also, the tailing piles from the Penfield Iron Works near George Mott's house in the hamlet of Ironville, New York, also contain high concentrations of radioactive isotopes.

Fig. 4: Book jacket
Larry Arnold
found on a table
near Mott's
bedroom. Jacket
had more C-14 in
it than it should
have, and this
dated the jacket to
2542 AD, well into
the future.



Testing this Hypothesis of the Shroud of Turin with Nondestructive Experiments

When examining the data carefully, a strong case can be made that the radiocarbon dating of both the Shroud of Turin and Sudarium of Oviedo is the result of the radiative capture of neutrons. It is also evident that principles of the inverse square law were at play with both linen cloths in the tomb with Jesus during the resurrection. A logical conclusion can, therefore, be inferred that the amount of C-14 varies throughout the Shroud of Turin as a function of the varying distance that the linen cloth was from the body is also following the principle of the inverse square law.

This would also mean that the amount of beta decay varies throughout the burial shroud, but at such low levels it would be difficult to measure using standard instrumentation. We propose using x-ray films or phosphor plate technology. This is a way to measure the variation in the amount of beta decay throughout the entire Shroud as carbon 14 isotopes undergo transmutation back into nitrogen 14 atoms. The difference in the amount of beta decay throughout the linen cloth, although very small, may be detected by x-ray film with a long enough exposure time. Therefore, further destruction of the Shroud of Turin using current radiocarbon dating methods would not be warranted if the goal of the Holy See is to test the hypothesis.

All that would be needed to prove this hypothesis would be a single fibril from the Shroud containing the body image. A positive result would be an image of the fibril on an x-ray slide, and this result would provide proof and reason to

perform this non-destructive test on the entire Shroud. It is known that some Shroud researchers have such fibrils in their safes or vaults.

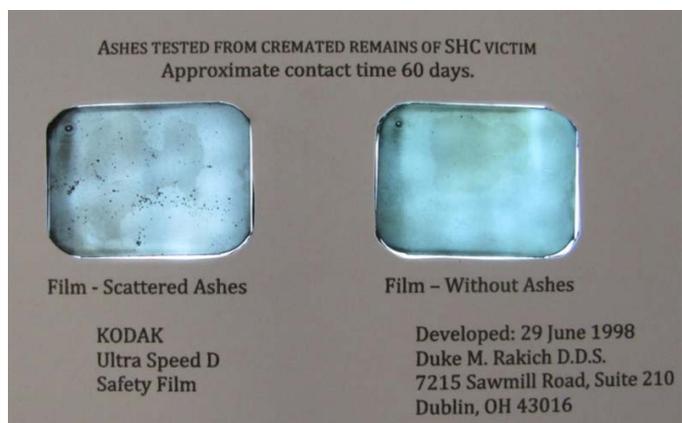
In this passive experiment, the exposure time is the only variable that needs to change if x-ray films or phosphor plates were placed very near the surface but without touching the linen cloth. It would not require any contact or additional destruction of the linen cloth. A suggested time period would be possibly several months. Also, this experiment can easily be performed to test the entire Shroud since this cloth is currently unfolded and laying flat in its air-tight case.

In the absence of any other sources of radiation or light, it would be the beta decay of C-14 atoms over time that would expose the film. This would record the variance in the number of carbon 14 atoms decaying into nitrogen 14 atoms throughout the linen cloth. Beta particles are essentially electrons being ejected by the nucleus of an atom when a neutron decays into a proton, electron, and anti-neutrino to stabilize the imbalance of neutrons in the nucleus of the C-14 atoms.

If the theory is correct, the experiment could result in a high resolution of how Jesus would have appeared in the tomb microseconds before the resurrection event.

A trial run of the experiment was done in 1998 with the cremated remains of a person that had died as a result of a suspected SHC event. The images on the film were distinct dots rather than fuzzy blurs. An opinion of a professor, from the Department of Radiology, was that the film looked more like the absorption of high energy particles rather than an emission reaction. This was the rationale for the film exposure being the adsorption of particles on the surface of the paper rather than the emission of ionizing particles (See Figure 5).

Fig. 5: Kodak film exposed to ashes of the cremated remains of a person who died as a result of a suspected SHC event. The film showed distinct dots rather than fuzzy blurs.



Additional trials of the experiment were performed with cremated ashes attained by rendering pork chops. Following the same methodology as stated

above, the results from these trial experiments failed to produce the same results as from the ashes obtained from an SHC victim. The x-ray films remained blank with no exposure.

If there was a residual alignment of the electron spin causing superparamagnetism at the atomic level left in the bone of the shrunken skulls, was it then possible for the electron spin of bone fragments and carbon ashes to align as well? Was this also the result of alignment with the earth's magnetic field acting in the direction of the gravitational force as the ashes fell on the x-ray slides producing the polarization of beta particles?

Like the body image on the Shroud of Turin, the exposing energy was emitting in an up and down directionality, making a clear, rather than a fuzzy image on the x-ray film. Again, it is hypothesized that superparamagnetism was responsible for the polarization of the energy released during the resurrection of Christ.

Another possible hypothesis of why the exposure was polarized is if there was an alignment of electrons of the calcium and carbon atoms in the ashes, this could be attracting free neutrons from the atmosphere. Over several months time neutrons could collect on the ashes and then decay. Emitting beta particles would then be responsible for exposing the film with a specific directionality in the direction of the gravitational force, again making a clear, rather than a fuzzy image on the film.

One of the observations about the Shroud of Turin is that for a linen cloth that is almost 2,000 years old it is well preserved. It has been determined that although mold spores have been found on the cloth, mold itself does not grow on the cloth accounting for its exceptionally good condition considering its age. Could it also be an alignment of the electron spin that is locking the covalent chemical bonds preventing the normal deterioration that would normally be expected from a linen cloth over 2,000 years?

Reasons for Studying the Shroud of Turin

During our in-depth study and scientific investigation of the Shroud of Turin, many other disciplines in science were explored in an attempt to better understand a possible mechanism that could have resulted in the formation of the body image on the cloth. It would appear that strongest evidence is not with a naturally occurring physical or chemical process, but that the answers may lie in nuclear physics and quantum theory.

One of the greatest reasons for studying the Shroud of Turin is not just to prove the linen clothes true age, but to make groundbreaking discoveries in cosmology and other disciplines of science such as medicine that may ultimately answer what our physical bodies are on the quantum level—Light/Energy!

CONCLUSION

As evidenced by the information contained within the Shroud of Turin, God's fingerprints are all over the linen cloth. Even with the best technology available today, in the best laboratories of the world, human hands still cannot replicate the body image of Christ as found on the Shroud of Turin.

Perhaps the answer lies with a very simple and non-destructive test, which would simultaneously test the entire Shroud of Turin. Also by testing the linen using x-ray slides, it could verify that the mass of carbon-14 varies throughout the body image on the cloth as a function of the inverse square law and is, in fact, scientific evidence of Christ's resurrection!

Quod Erat Demonstrandum!



12. The Quantum Properties of the DNA Molecule and the Formation of the Superficial Body Image on the Turin Shroud

Jeffrey Skurka & Catherine C. Osborn

It is the objective of this paper to follow the scientific data of the Shroud of Turin, and to use principles in nuclear physics and quantum theory, to formulate a hypothesis to explain in its entirety the anomalous properties of the superficial body image and to provide a mechanism for how the image was formed on the linen cloth.

Scientific Facts About the Body and Other Images on the Shroud of Turin

Following is a set of experimental data agreed upon by most sindonologists:

- The body image is anatomically correct, and the wounds agree with the passion, crucifixion, and death suffered by Jesus of Nazareth nailed to a wooden cross as recorded in gospel accounts.
- The image is similar to a photographic negative concerning the contrast of light and dark tones.
- Similar to an x-ray, in a negative photographic image of the body we can see both flesh and bone simultaneously.
- There are no dyes or pigments that were used to create the image. It is not a painting.
- The body image is not affected by heat or water.
- The body image is best described as rapid heating and dehydration of a carbohydrate layer on the very surface crown of individual linen threads, wrapped 360° around individual flax fibrils and only on the very surface against the body enveloped by the woven cloth.
- The body image is best viewed/visible from a distance greater than 12 feet. Viewed closer than 12 feet, the body image seems to disappear.
- The body image has dimensional properties concerning the spatial distance the body was from the cloth; the darkest body image comes from the tip of the nose.
- The image has a precise up/down directionality.
- The body image is displaced along the length of individual cells of the flax fibrils, from node to node.
- There are faint secondary images of flowers on the cloth, such as chrysanthemum and pistacia.
- There are no signs of rigor mortis or decay of the corpse in the body image, which is atypical of a body dead more than 36 hours.

Following is a set of experimental/observational data less accepted by shroud researchers:

- The body image has properties of a hologram; varying focal lengths obtained from negative photographic plates show additional three-dimensional information not

readily seen by an unaided eye. It would appear there are solid objects placed over the eyelids, Roman coins have been suggested, and an amulet over the hollow of the neck that did not interfere with the mechanism that produced the body image.

- There is no flattening of the muscles on the dorsal side of the body image that would be expected if the body was resting directly on the sepulcher in the tomb. As proposed by Dame Isabel Piczek¹, the body of Jesus may have been levitating in the tomb for a time before the resurrection event.
- The body image may be becoming fainter over time.

To date, a hypothesis has eluded researchers of any known chemical or physical mechanism that can account for the body image in its totality and explained in scientific terms. When exploring the functions of the DNA molecule from a perspective of quantum theory, a solution responsible for the superficial body image of Christ on the Shroud of Turin was found.

The DNA Molecule – The Key that Unlocks the Mystery

Part of this research included investigating the function of the DNA molecule, specifically the mitochondrial DNA, from a perspective of quantum theory. Focusing on DNA to raise a person from the dead makes perfect sense since the DNA molecule is the key to all biological life.

Similar to a silicon transistor (developed from principles in quantum theory), the DNA molecule is a billion times more complex. The function of the DNA molecule may depend upon not only the probability of where an electron is at any time within the covalent bonds of the molecule, but more important, the orientation and alignment in which the electrons are spinning relative to the structure of the molecule, and possibly even its location/quantum address within interdimensional space-time.

All physical matter, when considering quantum spin numbers of subatomic particles, exhibits properties of paramagnetism and diamagnetism; they are either attracted to or repelled by magnetic fields.

In materials that are paramagnetic, unpaired electrons are free to spin in any direction and can align their magnetic moment in any direction. The correlation here is that when the ferrimagnetic and ferromagnetic materials are very small, they act like a single magnetic spin and have the ability to move or change the orientation of the electron spin of atoms in the near proximity of the induced magnetic field.

Tesla also discovered that electricity exhibits what is known as a skin effect². An induced resonant magnetic field pushes the current to the outside of the conductor, which travels along the surface of a wire. This phenomenon provides another plausible explanation why the body image is incredibly superficial, only

¹Meier, J. (Writer), & Priest, D. (Director). (2007). *The Fabric of Time* [Motion Picture].

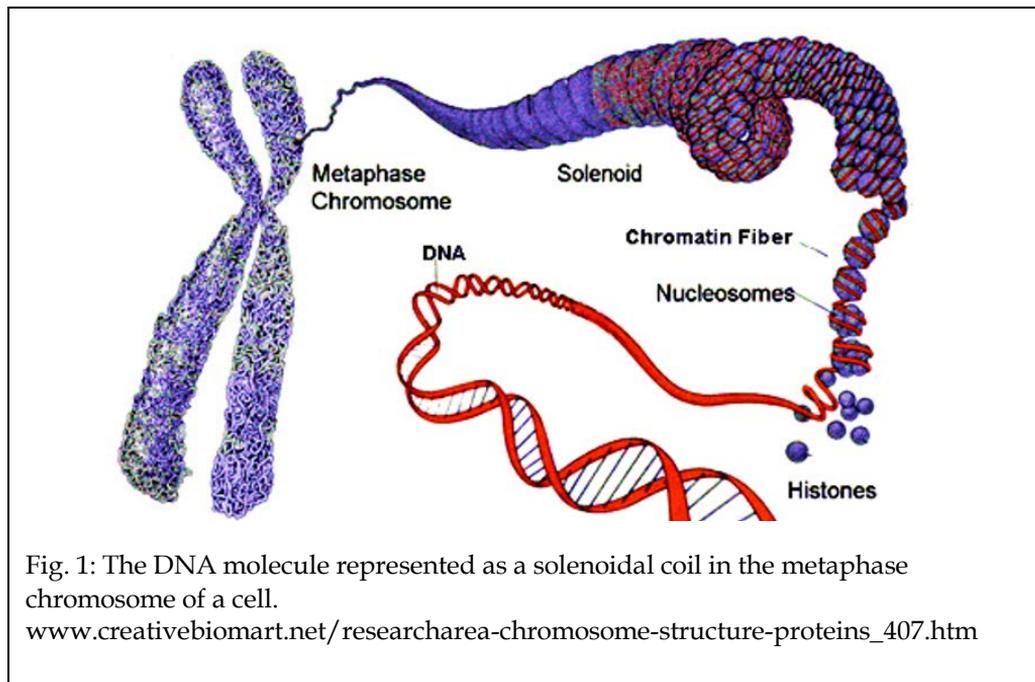
²Cawthorne, N. (2014) *Tesla*. pp. 46, 52. New York: Chartwell Books.

on the very inside surface of the burial shroud. The body image is also wrapped 360° around the individual surface fibrils, evidence of a magnetic curl, and is only on the crowns of individual threads that make up the weave of the linen cloth.

The Shroud of Turin is a fabric woven from linen, a product of the flax plant. The inside core of the flax plant cells, like all living things, contains long strands of deoxyribonucleic acid (DNA) molecules. The primary chemical compound in the cell wall of the linen fiber is cellulose. Linen's fundamental structure is tubular with plant cells consisting of cellulose linked end to end. Cellulose is a polysaccharide molecule consisting of linear chains of linked D-glucose units with a near-perfect crystalline structure.

Like a sodium iodide crystal, the DNA molecule is a highly organized three-dimension lattice structure and has been described as a liquid crystal by biomedical researchers. The DNA molecule also vibrates, like all molecules, with regular frequencies³. As demonstrated by Nikola Tesla, magnetic resonance can be an important part of the function of many dynamic systems.

The DNA molecule, given the Lorentz Force, responds to the different poles of a magnet either by winding or unwinding the double-helix structure. This magnetic property also gives the DNA molecule solenoidal properties (See Figure 1) given the double helix structure of the molecule⁴.



³ Vind, C. (2017). DNA Resonance (123) -- Vibrational. Retrieved from west.net: [http://www.west.net/~simon/DNA---RESONANCE\(123\).html](http://www.west.net/~simon/DNA---RESONANCE(123).html)

⁴Solenoid (DNA). (2018, March 9). Retrieved June 2014, from *Wikipedia*: [https://en.wikipedia.org/wiki/Solenoid_\(DNA\)](https://en.wikipedia.org/wiki/Solenoid_(DNA))

The genetic code or blueprint is contained in the DNA molecules of the cells throughout the entire human body, which include heart tissue, liver tissue, hair, and bone. Then what causes cells to produce heart or liver tissue in one instance and bone or hair in another? Although an oversimplification of the biologic process, a simple explanation is that the cell receives a signal at the surface of a developing cell. As a result, the portion of the genetic code (a gene) is stimulated to synthesize specific proteins necessary for the function of that particular tissue type.

The human DNA molecule is approximately six microns across and two meters in length. Only 1.2% of the human DNA molecule codes for the production of proteins, and the remaining 98.8% are non-coding DNA, described as junk DNA. Although not yet understood, this junk DNA must provide some essential function. One hypothesis is that the non-coding portion of the DNA molecule has the ability, when tuned with our intent or prayer, to interact with gamma radiation.

Gamma ray radiation consists of very high-energy photons—invisible to the human eye, which permeates all of space-time as an electromagnetic wave. Is it through this method that the Holy Spirit created the diversity of life found on earth through stimulation of DNA molecules thus changing its coding sequence when creating new species?

Although not completely recognizing or understanding the significance in 1998, this theory was derived from experiments Jeffrey participated in as proposed by the late M. Sue Benford when measuring levels of background cosmic gamma radiation during prayer and Reiki sessions. Experiments have shown that some people during meditation have the ability to change the magnetic field around their hands. Measurements were made during experiments with practitioners that were trained in prayer and Reiki therapies and other volunteers with no training at all.

Although results are preliminary and much more work is needed with tighter controls and rigor of scientific experiments, the initial tests had some very interesting findings. For people who had received training in the practice of prayer and Reiki therapies, there was a measurable decrease, as much as 15%, of background gamma-ray radiation surrounding the practitioner and people volunteering to be patients. A decrease in the number of hits measured is a curious result because gamma rays are highly energetic electromagnetic waves that should be passing through the human body without any interaction or loss.

Our understanding, or a possible reason, for this decrease in background radiation is that through our prayer and/or intent it was possible to tune the DNA molecule to a specific resonant frequency. It would be analogous of using a radio tuner to electronically change an antenna to a specific length causing a multiple of an electromagnetic frequency emitted from the radio station to attenuate a current/signal in the wire.

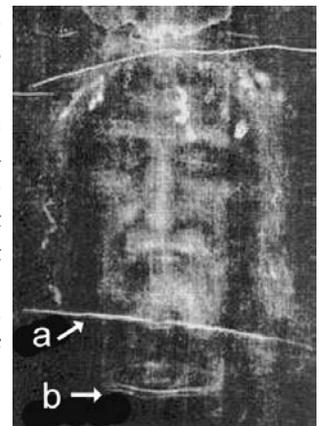
When conducting the experiments, a 3-inch diameter sodium iodide crystal, with a photomultiplier tube attached, was used to detect and then count gamma ray hits. Cosmic gamma-ray radiation would interact with the sodium iodide crystal and emit a photon of light. The photomultiplier tube was connected to a power supply and gate where 100 cycle counts were used to measure gamma ray hits. Coaxial cables were implemented to eliminate any extraneous interference from the power supply and gate to and from the gamma-ray detecting apparatus used for the experiment.

It is proposed therefore, via mutual inductance, ultrahigh frequency gamma radiation interacted with the DNA molecules in Jesus' corpse matching its frequency, or at least a harmonic thereof. Given DNAs' solenoidal properties, they started resonating in phase with one another and at their natural resonate frequency. This phenomenon can also explain the anomalous properties of the body image on the linen shroud in its totality, the secondary flower images found, as well as the remaining blood exudates.

A crucial issue surrounding this research is the mechanism that caused the superficial body image to form on the surface of the linen cloth. It had to be independent of the density (mass per unit volume) or specific gravity of the particular parts of the body wrapped in the shroud. For example, the varied density of flesh, bone, and hair is substantial. We know that hair, which contains only mitochondrial or mtDNA, was also involved in the image formation because it can be seen on the dorsal image on the shroud that Jesus was sporting a ponytail during the crucifixion.

Although disputed by some shroud researchers, for the sake of argument let's consider Dr. Petrus Soons' proposal that there were Roman coins placed on Jesus' eyelids and a solid metal amulet placed over his neck when he was placed in the tomb⁵. The argument against seeing any coins, such as the widow's mite from the first century, over the eyes is that the resolution of the image would have to be finer than the weave of the cloth. However, there appears to be something solid, like an amulet with a defined edge causing a doubled-lined image to form on the lower part of the neck area that is not inherent of the body image. These lines are plainly seen with the unaided eye in the negative image provided in Figure 2.

Fig. 2: Negative image of face on the Shroud showing (a) a line forming a crease in the linen cloth, and (b) edge of a solid object placed over the front of the neck.
Courtesy Barrie Schwartz of www.shroud.com



⁵Meier, J. (Writer), & Priest, D. (Director). (2007). *The Fabric of Time* [Motion Picture].

Another argument suggests that if there were coins over the eyes and an amulet on the neck, the body image would not have been produced under these items because the linen cloth would have been shielded from the radiant energy released during Christ's resurrection. For those parts of the body image shielded by such objects, there would be blank areas void of the body image on the linen burial shroud.

Therefore, what did the parts of the body such as hair, flesh, bone, and secondary flowers images have in common that the coins and amulet did not, that could possibly be responsible for the production of the body image on the cloth? The answer – DNA molecules.

Also, because mature red blood cells lose their organelles, they do not contain nuclei, organelles, DNA nor mtDNA molecules. This could explain why the blood outside the corpse was not caught up in the resurrection event and remains on the cloth and why there is no body image under the blood.

Mature, fully developed red blood cells have both Fe^{2+} and Fe^{3+} iron ions⁶. Therefore, iron in the blood would have a different response in the presence of magnetic fields, in addition to alpha particles, which could also account for why the blood on the Shroud of Turin and Sudarium of Oviedo have a pinkish hue. Another significant aspect of the blood on these linen cloths is that it does not fluoresce under ultraviolet light, which is atypical of normal human blood.

Therefore, if it were possible to manipulate the frequency of the DNA molecule on the atomic level through prayer or a magnetic resonance, can this be the key to not only discovering a cure for cancer but also many other diseases that have plagued humanity through the millennia? Jesus being the author of life, would certainly have understood the physiology and biological processes involved; could this be what he taught the apostles? If yes, then somewhere along the timeline of almost 2000 years of Christianity, this knowledge has been lost.

The Resurrection Event

It is hypothesized that the physical matter of Jesus' body was reorganized/transformed at the subatomic level during the resurrection to a glorified body which scripture also describes as "incorruptible."

Scripture tells us that when Jesus was resurrected from the dead he was resurrected to a glorified body. Clearly, when Jesus emerged from the tomb on Easter morning, his physical body/matter was transformed from the corpse that was placed in the grave late Friday afternoon. Therefore, the resurrection of Jesus

⁶Casiday, R., & Frey, R. (2016). Hemoglobin and the Heme Group: Metal Complexes in the Blood for Oxygen Transport. Retrieved from <http://www.chemistry.wustl.edu>: <http://www.chemistry.wustl.edu/~edudev/LabTutorials/Hemoglobin/MetalComplexinBlood.html>

must have been much different from Lazarus being raised from the dead in that the corrupt corpse needed to be shed and transformed into an incorruptible body (for reference see 1 Corinthians 15:53). Possibly what the authors of scripture were trying to describe, with a complete lack of understanding of nuclear physics, was the reorganization/assimilation of physical matter.

Now for this hypothesis to have merit, the physical mass of a human body would need to return to a state of higher energy. There must be an increase in the frequency of the electromagnetic waveform of matter.

It is proposed that the Holy Spirit was interacting via gamma radiation with the still heart of Jesus, creating a standing wave of electromagnetic radiation. This propagated out from his heart, stimulating a resonance in the DNA and molecules throughout the rest of his body. A unique and interesting quality of the human heart is that it produces the greatest electromagnetic field in the body, even as much as 60 times more in amplitude than the human brain.

In the next chapter of the present book, Godínez describes how the field emanating from the lifeless heart of Jesus would have propagated throughout the body. Of particular interest is how the field would have changed or become distorted below the knees. In many of the Spontaneous Human Combustion events, a very strange aspect is that the feet and legs below the knees remain intact. It is therefore proposed that the strength/intensity of this standing wave emanating from the heart was no longer able to sustain the disassembly of the atomic structure. (Spontaneous Human Combustion is the concept of the combustion of a living, or recently deceased, human body without an apparent external source of ignition.)⁷

For a moment, consider that blood is stagnant, not flowing, in the corpse of Jesus for a period of nearly three days. With the solenoidal properties of the DNA molecule, potential energy could have been stored in the form of a magnetic field built up in the body of Jesus as a result of being bombarded with cosmic gamma rays for three days while in the tomb. The electron spin of iron atoms in the red blood cells began to orientate/align the curl of the north and south magnetic field. The alignment of gamma rays along the DNA molecule could have resulted in superparamagnetism thus creating antigravity causing the body of Jesus to levitate in the tomb.

Also, by aligning the magnetic curl via the quantum spin numbers, it is possible to either negate or increase the effects of gravity. As demonstrated with Fleming's Right-Hand Rule, if a levitating force was acting upward, in opposition to the force of gravity in the vertical direction, the magnetic field and current flow would act within the horizontal plane oscillating along individual fibrils on the surface of the cloth. Levitation allowed a magnetic field to develop in the body. This was possible as the body was not grounded.

⁷Spontaneous Human Combustion. Retrieved May 2020, from *Wikipedia*:
https://en.wikipedia.org/wiki/Spontaneous_human_combustion

If Jesus weighing approximately 170 pounds was laying on the sepulcher of the tomb for three days, it would be logical for those parts of the corpse, the muscles of the calves, thighs, buttocks, heel, and shoulder blades would be flattened from the weight of the body pressing against the limestone. That is not what is seen in the dorsal image of the body (See Figure 3). Therefore, as theorized by Dame Isabel Piczek, sometime before the resurrection the body of Jesus must have been levitating in the tomb.



Fig. 3: Negative image of the dorsal side of the man on the shroud. Courtesy of Barrie Schwartz at www.shroud.com.

Experiments by NASA may provide additional evidence that demonstrates this phenomenon, by using very strong magnetic fields to warp and bend space-time. This could actually change the physical parameters of space-time and may also produce levitation/antigravity. It is proposed that space-time itself is composed of electromagnetic fields. This is why light as an electro magnetic wave can propagate the dimensional parameters of space-time without the need for a medium, such as is required with sound vibrating air molecules. Also, possibly one of the results of warping space-time is neutron activation.

Researchers have suggested that the body image resulted from a release of energy and light but with a precise up and down bi-directionality. In fact, it is probably more accurate to describe it as a nuclear magnetic resonance (NMR) causing a directional magnetic field emanating from the body of Jesus linearly, in a vertical plane, and collinear in the direction of the force of gravity. Arthur M. Young, from Princeton University, also proposed in the 1970's that the DNA molecule itself is light, which is an interesting premise very much in line with

Nikola Tesla's supposition that all matter on the fundamental level is in actuality a condensate of light.⁸

An Anomalous Property-Body Image Not Visible at a Distance of Fewer than 12 Feet

One of the more unusual properties of the Shroud of Turin not well known, except for avid sindonologists, is that the superficial body image on the cloth at a distance of fewer than 12 feet is not visible.

The first step in explaining this phenomenon is to understand the fundamental principles of visible light. The reason we can see the linen cloth is because ambient light is reflected from the cloth's surface. Light is composed of photons that travel through space-time as an electromagnetic wave. An electromagnetic wave even propagates through the vacuum of space-time. The electric and magnetic fields are 90 degrees to one another (See Figure 4).

There is also a duality to photons. At times they act as a wave and other times behave more like a particle. Light simultaneously possesses the characteristics of both waves and particles, each being manifested according to the circumstance.

Also, remember unpaired electrons in atoms are free to spin in any direction.

Suppose a very strong resonant magnetic field such as superparamagnetism caused a residual alignment of the unpaired electrons⁹. And/or perhaps strongly ionizing alpha particles stripping electrons in those areas of the linen fibrils that now contain the body image were caused by a nuclear magnetic resonance from the body of Christ. This happened just before the resurrection event. As with the photoelectric effect, it has been demonstrated that if light hitting a metal plate has enough energy, electrons are displaced and ejected from the metal surface.

What if in this case, a residual alignment of the electron spin were able to disturb the waveform of photons from reflected light so that within the 12-foot distance the body image is not visible because the photon is behaving more like a particle? At a distance greater than 12 feet, the disturbance caused by the interface

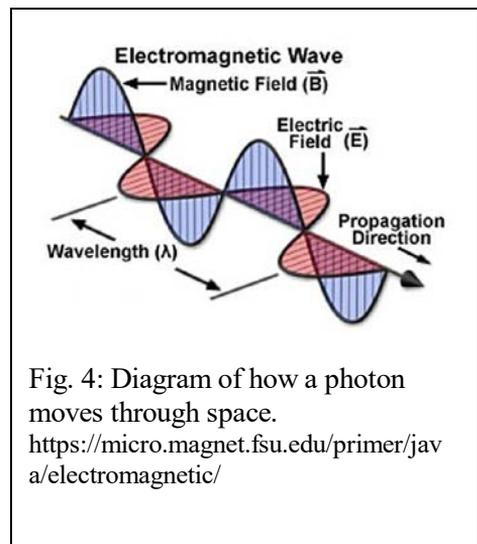


Fig. 4: Diagram of how a photon moves through space.
<https://micro.magnet.fsu.edu/primer/java/electromagnetic/>

⁸https://www.youtube.com/watch?v=H3aGe2RRiA0&feature=emb_rel_pause

⁹Superparamagnetism. (2017, December 5). Retrieved July 2014, from *Wikipedia*:
<https://en.wikipedia.org/wiki/Superparamagnetism>

of reflected light begins to attenuate the photons, almost like the diminished ringing of a bell. The waveform of the photon starts to propagate within the visible spectrum again seen by the unaided eye.

One of the experiments performed during STURP's investigation on the Shroud of Turin in 1978 was to view and photograph the linen cloth using reflected infrared light. There is an impressive result of that experiment. The body image was suspected to be a burn or scorch mark because it was similar in colour to areas in the cloth that had physical burns from previous fires. Yet, the body image was not visible in those wavelengths of reflected infrared light¹⁰. A logical question asked by Russ Breault in his excellent presentations on the Shroud of Turin, "When is a scorch not a scorch?"¹¹

Similar to SHC, it would seem that something other than heat was responsible for the body image on the Shroud of Turin. As proposed, both are the result of strongly ionizing alpha particles.

Lastly, some researchers have suggested, when comparing photographs that have a considerable age difference, that the body image is becoming fainter over time. Therefore, if a residual alignment of the electron spin is in part or wholly responsible for the body image, like all magnetic storage of data, it will slowly be lost over time. It could be a simple matter of just moving the magnetic media from one place to another, through the earth's magnetic field, that data is lost.

CONCLUSION

Gamma rays permeate all of space-time, are omnipresent and invisible to the human eye. Gamma radiation consists of ultrahigh frequency electromagnetic waves with frequencies greater than ultraviolet and x-rays. They are above the visible spectrum. Naturally occurring gamma rays in the environment are believed to be part of the cosmic radiation left over from what cosmologists describe as the Big Bang, permeating all of space-time. To detect this cosmic radiation, one only needs to disconnect the antennae or a cable input to a television set. The snow seen on the television screen accompanied by the audible hiss is evidence of this residual background radiation as radio waves left over from the Big Bang.

An induction coil can also store potential energy as a magnetic field. Suppose during three days in the tomb gamma-ray radiation interacted with the DNA molecules in Jesus' corpse matching the frequency, or at least a harmonic thereof. Given their solenoidal properties the DNA started resonating in phase with one another and at their natural resonate frequency.

Evidence shows that the energy released from the body of Christ during the resurrection was acting in an up/down direction, and moving away from the body. As theorized resulting from superparamagnetism, neutrons would have

¹⁰A Summary of STURP's Conclusions. (1981, October). Retrieved from Shroud.com.

¹¹Breault, R. (2011, April 17). Shroud Encounter. (R. Breault, Performer) Joylan Theater, Springville.

moved antiparallel in the direction of the magnetic field given their magnetic moments. If the DNA molecules in the linen fibrils induced a magnetic field within the plant cells, it is then possible that neutrons could be directed toward the DNA molecules. As a result, the rate of radiative capture of neutrons by the nitrogen atoms in DNA molecules would be increased rather than the neutrons emitting randomly in all directions.

Therefore, if this hypothesis is correct, an induced nuclear magnetic resonance of the DNA molecules in the body of Jesus caused a mutual inductance of unpaired electrons to align and propagate directionally in proximity to the linen cloth.

This mutual inductance, again following the *inverse square law*¹², would also cause the DNA molecules in individual linen cells comprising the fibrils on the surface of the cloth to align. With a close proximity of flowers to Jesus' body, the DNA molecules of the flowers would also start to resonate and align giving the faint secondary off body faint flower images that are also seen on the inside surface of the linen shroud.

Hence, when considering nuclear magnetic resonance of the DNA molecule, the superficial body image can best be described as a photo static quantum hologram.

Much of this work as it relates to the functions of the DNA molecule from a perspective of quantum theory was started in Ohio in 1998. Subsequent experiments are in preliminary stages and have only been limited by the lack of financial resources to further this research. However, if pursued with intent and purpose, the benefits of this research could be staggering as it relates to medicine. This research might possibly find not only a cure for cancer, but also many other genetic diseases that have plagued humanity throughout the history of the world.

Quite possibly, as proposed herein, it is the magnetic resonance within the nucleus of atoms and the ability to change the frequency at which molecules vibrate along with the alignment of the electron spin within the molecular structure, especially pertaining to the DNA molecule, that is the foundation of life. Because if Jesus were to be resurrected from the dead, logically the resurrection event most likely would have involved some type of stimulation of the DNA molecule.

The diversity of life on earth originated somewhere, either here on this planet or perhaps simultaneously somewhere else in the universe. With the advancement of more recent scientific research, this research could provide a provable mechanism for our rich diversity of life found on planet earth.

Quod Erat Demonstrandum!



¹²Inverse Square Law. (2018, Feb.16). Retrieved 2011, from en.wikipedia.org: https://en.wikipedia.org/wiki/Inverse-square_law

13. Strange Quark Matter in the Holy Shroud

José Carlos Espriella Godínez

Abstract

Ordinary matter is built of atoms, and all atoms contain a nucleus at their center. In the nucleus are particles called baryons, like protons and neutrons, which in turn are made by the union of three quarks, mainly up and down quarks (just two flavors). If an extra different quark is added (a strange quark), a three-flavor system is formed (up, down and strange), and it is called Strange Quark Matter (SQM). This paper examines the possibility that some SQM could have been captured by the molecules of the Shroud. One of these molecules is 5-hydroxymethyl furfural which resulted from the oxidation and dehydration of the linen cellulose. This yellow-brownish chemical compound, which I propose as the image chromophore, has a molecular weight of 126 amu, and it could have absorbed some small SQM particles or “nuggets of H-strangelets” having an atomic weight of 5 amu, thus increasing its molecular weight to 131 amu. This process could account for the controversial 131 line recorded in a Shroud’s mass spectrum. It is proposed here that a Quark-Gluon Plasma was created in the interior of the Sacred Heart of Jesus when he resurrected, and this plasma was released in all directions, forming protons, neutrons, electrons and SQM.

I. INTRODUCTION

The Holy Shroud is the most studied artifact in history, and is the most important relic of Christianity because it has imprinted on it the image of a scourged and crucified man who is believed to be Jesus. This cloth also has red marks confirmed to be blood. In 1978, a group of scientists called the Shroud of Turin Research Project (STURP) carried out several tests on this linen cloth, and confirmed that the image was not the result of a medieval artist. No dyes or pigments were found to form any part of the image. The STURP team concluded that the image was imprinted on the cloth by a low temperature heating process or a high temperature heating process of extremely short duration insufficient to produce carbonization. These tests were also able to ascertain that some type of conjugated carbonyl structure was the most likely image-chromophore.¹ Nevertheless, they did not determine which compound this could be, nor its chemical structure.

The scorch marks produced by the fire in 1532 have provided some clues to explain how the image was formed. During this fire, the Shroud was kept in a

¹Heller, J.H. Adler A.D. A chemical investigation of the Shroud of Turin. *Canadian Society of Forensic Science* 14. N° 3 (1981).

silver covered wooden reliquary which, because of the high temperatures, caused the silver to melt through the box producing several scorches which have visual similarities with the image. The scorches that resulted from the fire are located in three different zones:

Zone 1- the outermost zone consisted of light scorches

Zone 2 - the middle zone which consisted of severe hard scorches and finally

Zone 3 - the inner zone which consisted of a completely carbonized zone.

The reflectance spectra carried out on the image and the burns confirmed the visual similarities between the image and the light scorches (zone 1), both presenting the same profile. Because of their similarity, the STURP team were led to speculate:

a common causative agent, suggesting that the linen cellulose had suffered thermal degradation, and the image fibrils were simply more oxidized and dehydrated than the non-image ones, but less oxidized and dehydrated than the scorch fibrils.²

The non-image areas also experienced an oxidation and dehydration produced by the aging of the cloth. Over the years, this process has caused the Shroud to appear slightly yellow.

The same spectrum means the same chemical compounds, so it is inferred that the same compounds present in light scorches (zone 1) produced by the 1532 fire are also present at the image fibrils. Spectra are like fingerprints. Two different people cannot have the same fingerprints, in the same way, two different molecules cannot produce the same spectrum. So we can conclude that the same compounds are present in both zones, however the mechanism of formation was not necessarily the same.

Thibault showed that in order to obtain a scorch in a cloth (even a light scorch), an intimate contact between a heated template and the cloth is absolutely necessary. In the same way he showed that the superficiality of the fainter scorch at the thread level is not as superficial as in the Shroud, and most important, he showed that light scorches do not present any contrast at all, and thus it does not present any 3D properties as the Shroud's image does.³ So if it is true that the same chemical compounds are present in both areas, they had different formation mechanisms, so we can rule out that the image visible on the Shroud is the result of covering a hot statue with a linen cloth.

In 2005, an Italian group headed by Paolo D'Lazaro made an important step toward the explanation of how the image was imprinted in the Shroud. They obtained the same brownish-yellow colouration with the same superficiality as the

²R. Gilbert Jr. and M. Gilbert "Ultraviolet-visible reflectance and fluorescence spectra of the Shroud of Turin" *Applied Optics*. 19 (1980) pp. 1913-1920.

³T. Heimburge "The Turin Shroud Body Image: the Scorch Hypothesis Revisited," <https://shroudofturin.files.wordpress.com/2012/10/scorch-paper-en.pdf>

Shroud when they irradiated linen cloths with ultraviolet ArF excimer lasers of different wavelengths:

the colouration was a function of the irradiation process, showing that short wave radiation modified the electronic structure of linen promoting photolytic degradation of cellulose causing molecular bond dissociations to promote Shroud-like chromophoric changes.⁴

Having this background in our minds, we can think that after Jesus was laid in the tomb after his death, on the third day a burst of ultraviolet radiation⁵ consisting of photons was released from his whole body. This radiation took place in two directions, up and down, and this kind of behavior is known as orthogonal radiation which imprinted only the front and the back of the image without imprinting the lateral sides of the body. These energetic photons triggered a series of chemical reactions on the Shroud, mainly made of cellulose (99%) promoting its degradation by oxidizing and dehydrating the Shroud's fibrils until a brownish-yellow chemical compound was obtained. In this way, the body image was imprinted on the cloth.

As mentioned, the STURP team concluded that the brownish-yellow substance which gives colour to the image (image-chromophore) was produced by an oxidation and dehydration of the linen cloth, so the team argued that this compound should have a conjugated carbonyl structure, but the team never investigated its structure. The next section describes the photo-chemical reactions⁶ that could be triggered by a burst of energy from within the body of Jesus which could lead to the chemical structure of the image-chromophore.

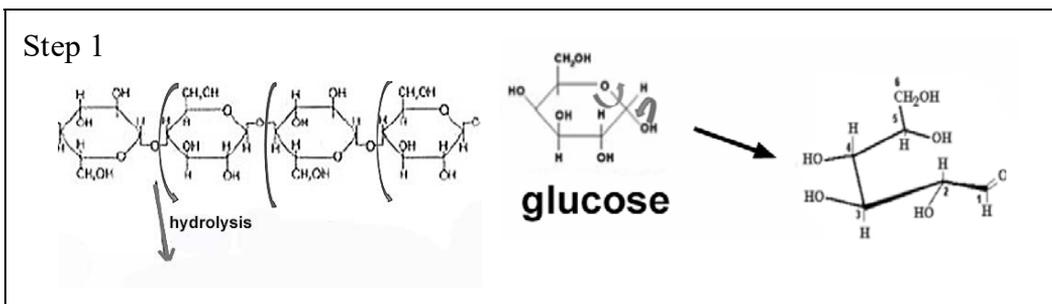
2. CHEMICAL REACTIONS:

1. The Shroud is mainly made of cellulose which is a polymer formed by many monomers of glucose joined by glucosidic bonds. After Jesus was wrapped with the Shroud and put into the sepulcher, the blood was immediately transferred to the linen cloth; the Shroud remained unaltered during two days. On the third day, when Jesus rose from dead, a burst of ultra violet photons (uv) was released from within his body breaking the cellulose glucosidic bonds and producing open rings of free monomers.

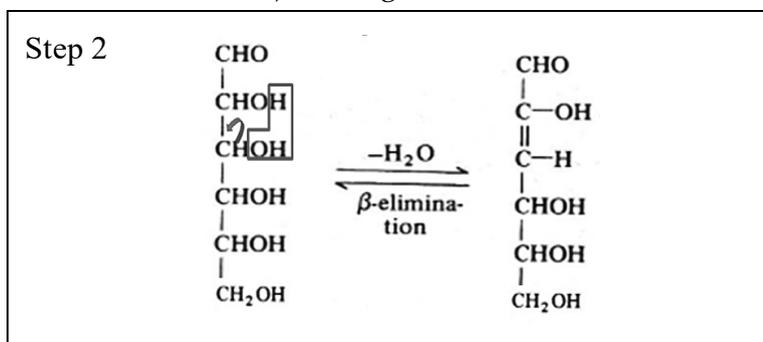
⁴D'Lazaro, P. *et al*, "sub micrometer colouration depth of linen by vacuum ultraviolet radiation" International Workshop on the Scientific approach to the acheiropietos images. Proceedings. Organized by ENEA Research Center of Franscati 4-6 May 2010.

⁵Jackson, J. P. "Is the image on the Shroud due to a process heretofore unknown to modern science?" copyright Turin Center of Colorado 2014.

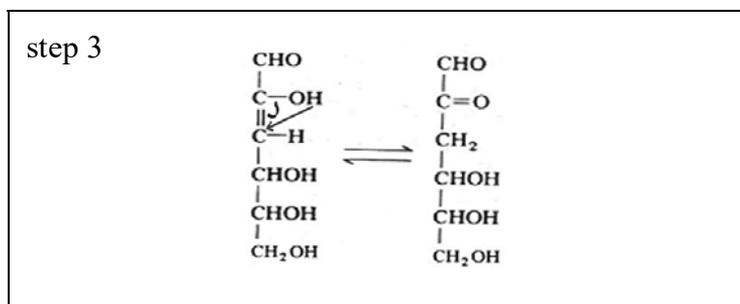
⁶Mei T.Y, Dalyon D.R. *Organic Chemistry in the Laboratory*, D. Van Nostrand Company, New York, 1979



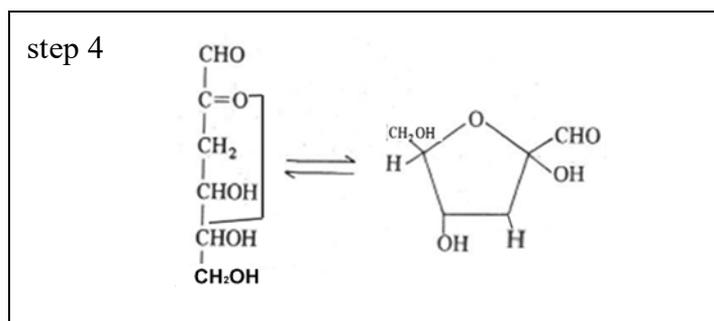
2. Immediately the open ring monomers of glucose lose a molecule of water (H_2O) suffering a dehydration by means of a β -elimination (between the second and third carbon) forming an enolate.



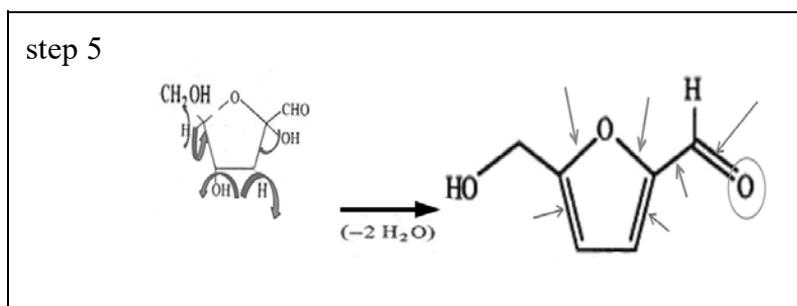
3. Carbon 2 undergoes oxidation by losing a hydrogen (H)



4. Next, the open structure of glucose formed a cyclic structure between carbon 2 and 5 and a furfural ring was obtained. In this step, a hydrogen at carbon 5 was lost causing its oxidation:



5. Finally the molecule of furfural loses two molecules of water suffering dehydration and a chemical compound, 5-hydroxi-metil furfural (HMF), was obtained.



This HMF compound is yellow-brown in colour⁷. It has a carbonyl group in its chemical structure, and has a series of single and double alternating chemical bonds called conjugated bonds. This compound fulfills all the requirements of what the STURP team discovered, and I propose it to be the Shroud's image-chromophore. The molecular weight of this chemical compound is 126 amu.

This molecule of HMF was recorded as a 126 line in a pyrolysis mass spectrum carried out by the STURP team from the back ankle zone (zone 1 EB).⁸ In this spectrum is also visible a 96-line which corresponds to the furfural molecule which resulted after the HMF suffered deformylation breaking its chemical bonds and then losing a formylate group, producing in this way furfural (mw=96 amu).

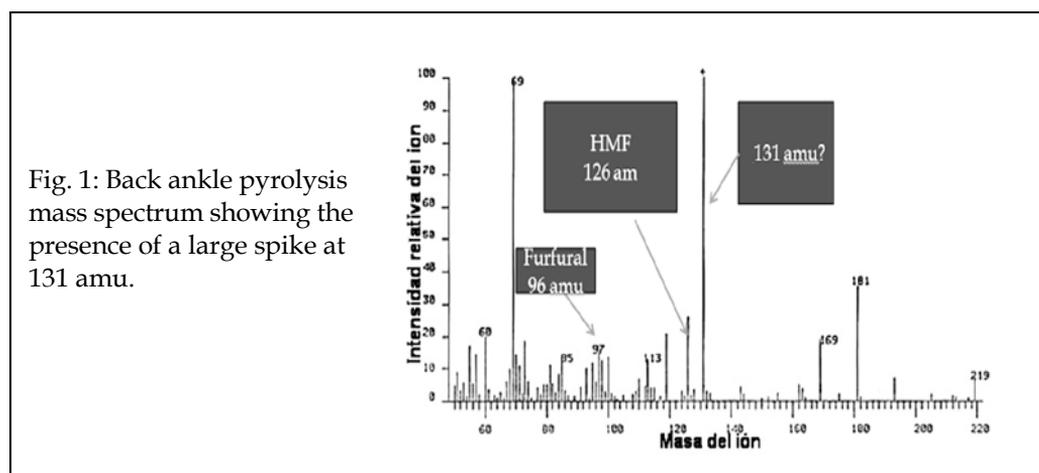
3. THERE IS A UNKNOWN COMPOUND IN THE SHROUD

Also observed in this mass spectrum is the controversial 131-line which is the largest one, but it has yet to be identified as a particular compound (see Figure 1).

⁷William Mejia, José Serrano. "Obtención del 5-hidroximetilfurfural a partir de fructuosa". Universidad de Cuenca. Facultad de Ciencias Químicas. 2011.

⁸R.N. Rogers, www.shroud.com/"Pyrolysis /Mass spectrometry applied to the Shroud of Turin. 2004. *Thermochim. Acta* (425).

Several hypotheses have emerged to explain which chemical compound it could be. For example, Ray Rogers proposed that the 131-line could be the amino acid hydroxyproline: "incidentally the pyrolysis mass spectra of a sample from apparent blood spots showed hydroxyproline peak at ms 131, a pyrolysis product of animal proteins."⁹ But as Latendresse commented about this 131-line, "the image-area fiber used by Rogers is not known to come from a blood stain area of the Shroud so the allusion to hydroxyproline is unrelated to blood."¹⁰ In the same way, Bella *et al.* commented about this peak, "it should not be where no blood stains are present, so this 131-line cannot be associated to the amino acid."¹¹ Latendresse also presented the argument that if hydroxyproline were present in the sample, its mass spectra should show major peaks at m/z 86 and 87, and we do not see any of these peaks in this mass spectrum.



Latendresse also proposed the possibility that this 131-line could be some other amino acid like creatine or leucine¹² both having a molecular weight of 131 amu, but according to Rogers, "the pyrolysis-MS analysis did not detect any nitrogen-containing contaminants. This seems to rule out glair (egg white) as well as any significant microbiological."¹³ The same conclusion emerged from the microchemical tests carried out on the Shroud's fibrils, in particular, the

⁹Rogers R. , Arnold A. "Scientific Method Applied to the Shroud of Turin". A review. 2002.

¹⁰M. Latendresse. "Comments on the mass spectrometry analysis of a sample of the Shroud of Turin", *Thermochim. Acta* 624 (2016) 55-58.

¹¹M. Bella, L. Garlaschelli, R. Samperi. "There is no mass spectrometry evidence that the C14 sample from the Shroud of Turin comes from a medieval invisible mending". *Thermochim. Acta* (2015).

¹²M. Latendresse. "Comments on the mass spectrometry analysis of a sample of the Shroud of Turin", *Thermochim. Acta* 624 (2016) 55-58.

¹³R.N. Rogers, www.shroud.com/"Pyrolysis /Mass spectrometry applied to the Shroud of Turin. 2004. *Thermochim. Acta* (425).

fluorescamine test and the protease test confirmed the absence of proteins (amino acids) in areas different from blood zones.¹⁴

In the same way, the STURP team carried out several tests searching for specific organic structures and functional groups on the uncoated fibrils, body image, non-image areas and scorched fibrils. These tests did not detect the presence of any of the following species: phenols, riboflavin, steroids, indoles, lignin(allyls), porphyrins, pyrroles, creatin, uric acid, urea derivates, amines primary, nitroderivates, saponaria extract and sulphide pigments as well.¹⁵ Also Rogers commented, "with the exception of positive aldehyde and cellulosic carboxyl tests, all other species tested for tested negatively," and also he said, "the pyrolysis mass spectrometry did not detect any unexpected pyrolysis fragments that indicated any Shroud materials other than carbohydrates. That is exactly what would be expected from a piece of pure linen."¹⁶

So according to these results, the only thing we are absolutely sure is that in areas other than blood, there exist only chemical compounds bearing aldehydes and carboxylic acids groups presenting hydroxyl groups and carbon-carbon double bonds. The proposed chromophore of the image, the yellow-brownish HMF, has an aldehyde group in its chemical structure as well as single and double conjugated bonds. This compound is also present in the light scorches (zone 1). At the severe scorches (zone 2), the oxidation went further to produce even more oxidized compounds like carboxylic acids (formic acid or levulynic acid). At zone 3, the oxidation was complete, producing total carbonization to form in the first instance CO₂ and CO, and finally carbon (charred material) plus free oxygen.

Returning to our discussion in trying to explain which this unknown 131 amu compound could be, Latendresse proposed that it could be a lipid coming from the contamination of the secretion of the sebaceous glands (sebum), from the many hands that have touched the Shroud along its history, in particular, he suggested some triglycerides having a molecular weight of 131 amu.¹⁷ These kinds of lipids indeed bear a carboxylic acid group in their structure, but when looking at a spectrum of this compound alone, there is no signal at 131 amu, so these molecules can be ruled out. Bella *et al.* proposed another possible explanation for this 131 amu unknown compound. It could be a contamination of an alkane (hydrocarbon)¹⁸ that

¹⁴Heller, J.H. Adler A.D. A chemical investigation of the Shroud of Turin. *Canadian Society of Forensic Science* 14. N° 3 (1981).

¹⁵Heller, J.H. Adler A.D. A chemical investigation of the Shroud of Turin. *Canadian Society of Forensic Science* 14. N° 3 (1981).

¹⁶R.N. Rogers, www.shroud.com/"Pyrolysis /Mass spectrometry applied to the Shroud of Turin. 2004. *Thermochim. Acta* (425).

¹⁷M. Latendresse. "Comments on the mass spectrometry analysis of a sample of the Shroud of Turin", *Thermochim. Acta* 624 (2016) 55-58.

¹⁸M. Bella, L. Garlaschelli, R. Samperi. "There is no mass spectrometry evidence that the C14 sample from the Shroud of Turin comes from a medieval invisible mending". *Thermochim. Acta* (2015).

resulted from the many candles that have been burnt in front of the Shroud. But again the spectrum of these compound alone does not present any signal at 131 amu, so it is also discarded.

So, after performing sensitive instrumental analysis, the conclusion was that “nothing other than dehydrated carbohydrates could be found in the image area,”¹⁹ and there is no 131 amu compound among them. Furthermore, Kato showed that a normal pyrolysis of cellulose does not produce any 131 amu at all.²⁰ On the basis of what has been discussed so far, what could this mysterious 131 amu compound be?

4. STRANGE QUARK MATTER IN THE SHROUD

I propose that this 131 amu unknown chemical compound is the result of small Strange Quark Matter (SQM) particles created during the resurrection event. These particles collided with molecules of the Shroud, or its degradation products, and were absorbed by them. One of these molecules that captured one of these SQM particles could have been the image-chromophore HMF which has a molecular weight of 126 amu. The HMF, after being stroked by one of these SQM particles, captured it within its nucleus, or into its furfural ring, enhancing its molecular weight from 126 to 131 amu. So let us see what physics can say about SQM.

At the beginning of the Universe, according to physics, there existed 6 types of quarks or 6 “flavors.” These are up, down, strange, charm, top and beauty. The last three being so massive evaporated, while the first three, being less massive, remained. Quarks have fractional charges (“colour”), which when together created baryons.²¹ These particles are composed by the union of three quarks. In this way, protons are baryons formed by the union of two quarks up, and one quark down ($2/3 + 2/3 - 1/3 = +1$), that is, protons are formed by three quarks, but just two “flavors”: up and down; in the same way neutrons were formed by the union of one quark up and two quarks down ($2/3 - 1/3 - 1/3 = 0$). Neutrons are baryons made of three quarks, but just two “flavors”: up and down.

One of the great successes of the quark theory was the prediction of particles formed by three quarks (baryons) having one type of quark, just one “flavor” that is, a baryon made of 3 strange quarks (strange, strange, strange). This particle was called Omega minus and was detected in the Brook Haven Lab. From this, we see

¹⁹R.N. Rogers, www.shroud.com/“Pyrolysis /Mass spectrometry applied to the Shroud of Turin. 2004. *Thermochim. Acta* (425).

²⁰Kunio Kato, Pyrolysis of Cellulose, Comparative studies of the volatile Compounds from pyrolysates of Cellulose and its related compounds. *Agr. Biol. Chem.* 31, n° 6, PP. 637-663, 1967.

²¹J.F. Trefil. *From atoms to quarks. An introduction to the Strange World of Particle Physics.* Charles Scribner & Sons. New York. 1980.

that one “flavor” baryons really exist, in the same way, two “flavors” baryons exist, as well. So is it possible that there might be a baryon made of three quarks with three different “flavors”: up, down and strange? This is what physics call SQM.^{22 23} Introducing a third “flavor” makes it possible to reduce the energy relative to a two-flavor system. When an extra different quark is added (an extra “flavor”), physics has predicted that one may gain in the order of 100 Mev.²⁴ Theoretical arguments indicate that the three flavor quark matter SQM energy may be $E/A = 837$ Mev, even more stable than two “flavors” matter (ordinary matter) $E/A = 930$ Mev (Figure 2).

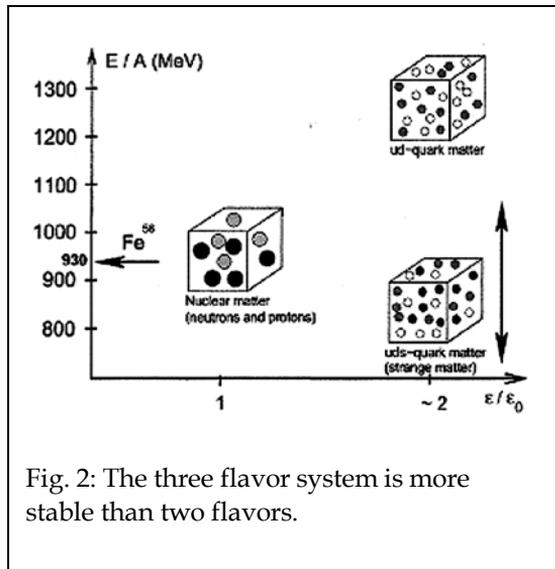


Fig. 2: The three flavor system is more stable than two flavors.

SQM being composed by three different “flavors” poses neutral charge ($+2/3 - 1/3 - 1/3 = 0$). When these particles form small lumps of SQM, or “nuggets” they are called “Strangelets”²⁵ (Figure 3), and a slight positive charge emerges, so it is possible to construct a periodic table of Strangelets (Figure 4)²⁶ similar to the periodic table of elements. We realize that in this periodic table that strangelets pose two values for their masses. The upper value was calculated using the MIT Bag Model mass charge relation: $0.1 A \leq Z < 8A^{1/3}$ and the lower value using $Z = 0.3 A^{2/3}$, this last value is a more stable one because of the formation of quarks pairs, and this state is called Colour Flavor Locked system CFL.²⁷ SQM particles are leftovers from the Big Bang,²⁸ and are absolutely stable. Physicists are totally convinced of its existence, being even more stable than ordinary matter, and this

²².-arXiv:astro-ph/0407155 v2, F. Webner, "Strange Quark Matter and Compact Stars" Department of Physics San Diego State University 5500 Campanile Drive, San Diego, California 92182, USA, 2004.

²³Jes Madsen, "Physics and Astrophysics of Strange Quark Matter". Institute of Physics and Astronomy, University of Aarhus DK-8000 Aarhus C. Denmark, July 2004.

²⁴*Ibid.*

²⁵-arXiv:astro-ph/06 12784. Jes Madsen "Strangelets in cosmic rays", Department of Physics and Astronomy WSPC-Proceedings. University of Aarhus DK-8000, 29 dec-2006.

²⁶.-From Monreal -arXiv:0904.2860 (nucl-ex). 25.- In footnote 24.

²⁷Jes Madsen, "Cosmic rays strangelets". Department of Physics and Astronomy of Aarhus DK-8000 Aarhus Denmark. *J. Phys. G. Nucl. Part. Phys.* 31 (2005) 5833-5839.

²⁸Jes Madsen, "Physics and Astrophysics of Strange Quark Matter". Institute of Physics and Astronomy, University of Aarhus DK-8000 Aarhus C. Denmark, July 2004.

is the reason why they are looking for small nuggets of strangelets in several environments. Most of these searches are sensitive to low A values ranging from nuclei size to radius of approximately 10^{-8} cm, like mineral deposits on the Earth, at the sea level, in the lunar soil or in the cosmic rays with the aid of the Alpha Magnetic Spectrometer AMS. Jes Masden, a SQM physicist says, "one can walk with a bump of Strangelet in his pocket without being swallowed."²⁹

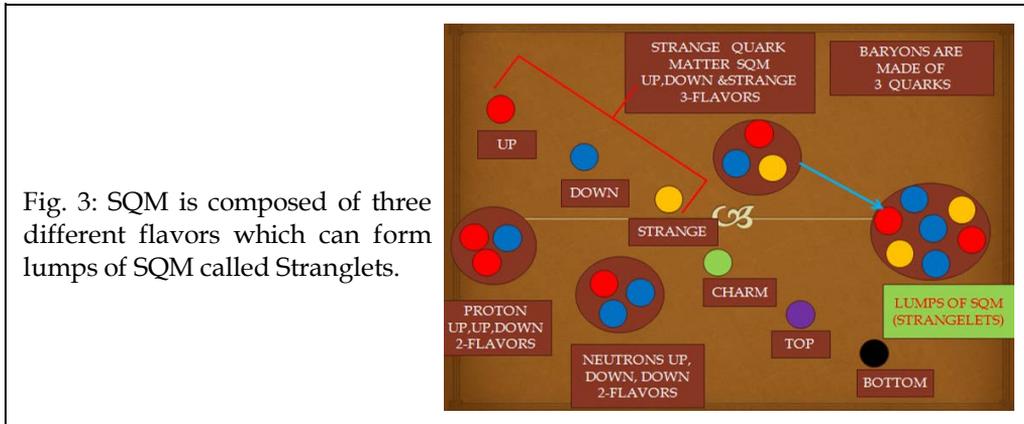


Fig. 3: SQM is composed of three different flavors which can form lumps of SQM called Stranglets.

Periodic Table of Strangelets

| 1 H 10 5 | | | | | | | | | | | | | | | | | | 2 He 20 17 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|--|-----------------------|--|---|--|------------------------|--|------------------------|--|------------------------|--|------------------------|--|------------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|---------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|----------------------|--|
| 3 Li 30 31 | | 4 Be 40 48 | | Z El Element strangelet mass (amu) for MIT bag model and CFL model | | | | | | | | | | | | | | | | 5 B 30 88 | | 6 C 60 89 | | 7 N 70 110 | | 8 O 80 130 | | 9 F 90 160 | | 10 Ne 100 190 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 Na 110 220 | | 12 Mg 120 250 | | 13 Al 130 280 | | 14 Si 140 380 | | 15 P 150 350 | | 16 S 160 380 | | 17 Cl 170 420 | | 18 Ar 180 460 | | 19 K 190 500 | | 20 Ca 200 540 | | 21 Sc 210 580 | | 22 Ti 220 670 | | 23 V 230 710 | | 24 Cr 240 760 | | 25 Mn 250 800 | | 26 Fe 260 850 | | 27 Co 270 880 | | 28 Ni 280 900 | | 29 Cu 290 950 | | 30 Zn 300 1000 | | 31 Ga 310 1000 | | 32 Ge 320 1100 | | 33 As 330 1100 | | 34 Se 340 1200 | | 35 Br 350 1200 | | 36 Kr 360 1300 | | | | | | | | | | | | | | | | | | | |
| 37 Rb 370 1300 | | 38 Sr 380 1400 | | 39 Y 390 1400 | | 40 Zr 400 1500 | | 41 Nb 410 1500 | | 42 Mo 420 1600 | | 43 Tc 430 1700 | | 44 Ru 440 1700 | | 45 Rh 450 1800 | | 46 Pd 460 1800 | | 47 Ag 470 1900 | | 48 Cd 480 2000 | | 49 In 490 2000 | | 50 Sn 500 2100 | | 51 Sb 510 2200 | | 52 Te 520 2200 | | 53 I 530 2300 | | 54 Xe 540 2400 | | 55 Cs 550 2400 | | 56 Ba 560 2500 | | 72 Hf 720 3700 | | 73 Ta 730 3700 | | 74 W 740 3800 | | 75 Re 750 3900 | | 76 Os 760 4000 | | 77 Ir 770 4100 | | 78 Pt 780 4100 | | 79 Au 790 4200 | | 80 Hg 800 4300 | | 81 Tl 810 4400 | | 82 Pb 820 4600 | | 83 Bi 830 4600 | | 84 Po 840 4600 | | 85 At 850 4700 | | 86 Rn 860 4800 | |
| 67 Fr 1200 4900 | | 68 Ra 1300 5000 | | 104 Rf 2100 6400 | | 105 Db 2200 6500 | | 106 Sg 2300 6600 | | 107 Bh 2300 6700 | | 108 Hs 2400 6800 | | 109 Mt 2500 6900 | | 110 | | 111 | | 112 | | 113 | | 114 | | 115 | | 116 | | 117 | | 118 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| 57 La 570 2600 | | 58 Ce 580 2600 | | 59 Pr 590 2700 | | 60 Nd 600 2800 | | 61 Pm 610 2800 | | 62 Sm 620 2900 | | 63 Eu 630 3000 | | 64 Gd 640 3100 | | 65 Tb 650 3100 | | 66 Dy 660 3200 | | 67 Ho 670 3300 | | 68 Er 680 3400 | | 69 Tm 690 3400 | | 70 Yb 700 3500 | | 71 Lu 710 3600 | |
|-----------------------|--|-----------------------|--|-----------------------|--|----------------------|--|-----------------------|--|-----------------------|--|-----------------------|--|-----------------------|--|-----------------------|--|-----------------------|--|-----------------------|--|------------------------|--|------------------------|--|------------------------|--|------------------------|--|
| 89 Ac 1300 5100 | | 90 Th 1400 5100 | | 91 Pa 1400 5200 | | 92 U 1500 5300 | | 93 Np 1500 5400 | | 94 Pu 1600 5500 | | 95 Am 1600 5600 | | 96 Cm 1700 5700 | | 97 Bk 1700 5800 | | 98 Cf 1800 5900 | | 99 Es 1800 5900 | | 100 Fm 1900 6000 | | 101 Md 2000 6100 | | 102 No 2000 6200 | | 103 Lr 2100 6300 | |

Fig. 4: A periodic table of Stranglets similar to the periodic table of elements.

²⁹Jes Madsen, "Physics and Astrophysics of Strange Quark Matter". Institute of Physics and Astronomy, University of Aarhus DK-8000 Aarhus C. Denmark, July 2004.

Strange quarks (1 GeV) are more massive than quarks (5 MeV) and down quarks (10 MeV), and this is the reason why the hydrogen-strangelet SQM mass is 5 amu calculated using the CFL value (see strangelet table), while normal hydrogen weighs only 1 amu. In this paper, I am proposing that at the time of Jesus' resurrection, one hydrogen strangelet per molecule could have replaced a hydrogen atom of the HMF molecule with molecular weight of 126, remembering that in order to form HMF a hydrogen rich environment is required. It could also be proposed that some slightly-hydrogen strangelet was stuck in the interior of the furfural negatively ring of the HMF molecule, or as a third possibility, that small particles of SQM $Q = 0$ had been captured by one of the nuclei of the HMF molecule, enhancing its molecular weight from 126 to 131 amu. Of course not all of the HMF molecules captured SQM particles because we also observe the 126 line in the mass spectrum which corresponds to the HMF without SQM particles.

In support of this hypothesis, we can observe a 100 line at the mass spectrum which could be the molecule of furfural (MW= 96) having captured a SQM particle hydrogen strangelet (5 amu).

5. RELEASE OF STRANGE QUARK MATTER

It is well known that C-14 dating tests dated the Shroud back to the middle ages, and several hypotheses were formulated to explain this anomalous result. One of these hypotheses was formulated by Bob Rucker based on Dr. Thomas J. Philips' assumption that neutrons were released from within the body of Jesus when he resurrected.³⁰ Rucker went further and realized that the discrepancies of the results given by the three labs, were not random but followed a pattern or a "systematic bias."³¹ In other words, he found that the tested samples, as they approached the center of the body, increased in C-14 content representing a decrease in age. He was able to determine that for every centimeter a sample came toward the center of the body, a decrease of approximately 36 years was observed.³² He concluded that the age was a function of the distance from the center of the body and he could obtain an equation of this process ($y = 35.8 \pm 1030.67$).

In order to explain these results, Rucker proposed that neutrons were released from within the whole body of Jesus which, when captured by the nuclei of the molecules of the Shroud, new C-14 was formed and was added to the natural C-14 increasing its concentration.

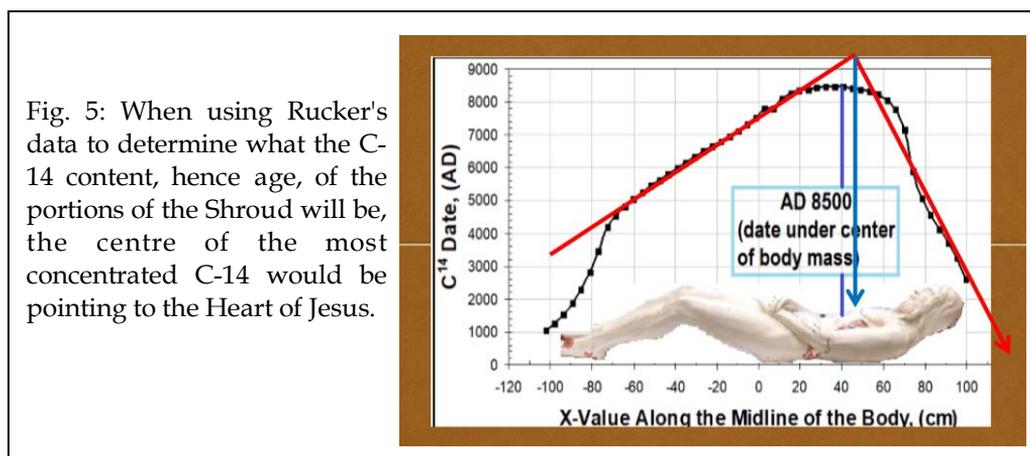
³⁰Thomas J. Philips, "Shroud Irradiated with Neutrons?" *Nature*. Vol. 337. N° 6208: p.594, February 16, 1989.

³¹www.shroudresearch.net/research.html. Robert.A. Rucker "The Carbon Dating problem." Part 2 Statistical Analysis. 2018.

³²www.shroudresearch.net/research.html. Robert. A. Rucker "The Carbon Dating problem." Part 1: Background.

Now we can argue that SQM particles and neutrons had the same origin, and were created within the body of Jesus. Rucker has proposed that neutrons were extracted from the body of Jesus. Bodies naturally have many neutrons, but there is no SQM present in any human body, but these particles could have been created somewhere in the body at the moment of his transformation. In order to find out where, I based my rationale on Rucker's findings.

Rucker found that the maximum intensity of this flux of neutrons occurred at the center of the body. Now, using his published results,³³ we see that the minimum age in the front side of the image is the year 4048, well into the future. Now, let us concentrate on the surrounding ages. We focus on the year 4048, then we find this same age proportionality in every direction. Once doing this, we draw an ellipse to find its center. We realize that the new center moves a little to the upper part of the body and to the left, pointing this time to the Heart of Jesus (Figure 5). With this new result, we can propose that SQM particles were released from within the Heart of Jesus as an expanding sphere decreasing its concentration as it moved away from the Heart in the same way as neutrons, as Rucker found.

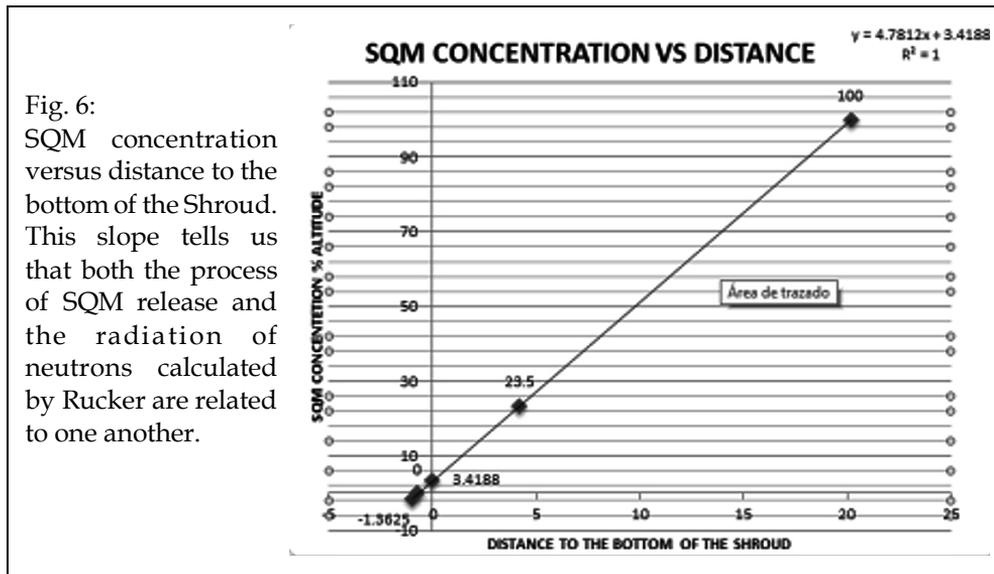


In order to test if the emission of SQM particles was a function of the distance from the Heart and occurred as an expanding sphere, we make use of a second mass spectrum recorded by STURP in 1978.³⁴ This spectrum corresponds to the Raes area in which the 131 line is also observed, and this zone is next to the C-14 tested zone. This zone is a non-image area, so how can we account for the presence of HMF here? Let us remember that the non-image is also oxidized because of the aging of the cloth, and that the STURP team deduced that the image was more

³³ www.shroudresearch.net/research.html. Rucker, Robert. A. "The Carbon Dating problem: The Neutron Absorption Hypothesis."

³⁴ R.N. Rogers, www.shroud.com/"Pyrolysis /Mass spectrometry applied to the Shroud of Turin." 2004. *Thermochim. Acta* (425).

oxidized than the non-image area, but less oxidized than the scorched zone. According to Jackson, the non image zone oxidized with time.³⁵ We can argue that in this region SQM collided with the cellulose molecules of the Shroud, were captured by their nuclei, and as time passed by, the formation of HMF having a SQM particle occurred. By comparing the altitudes of the 131 lines in both spectra (Figure 6), which represent the 131-HMF concentration, and taking the back ankle zone (1EB zone) as 100%, and the Raes sample to 23%, we obtain the ratio of 4.25 for these two values.



Now, we will try to see if the distance between the back ankle zone with respect to the Raes sample decreases by the same ratio. If so, we will be in the position to demonstrate that the HMF-131 concentration decreased as a function of the distance to the Heart, and so SQM concentration decreased as a function from the distance to the Heart.

In order to test this, we need to measure the distance from the back ankle zone to the Raes area. First we realize that the ankle zone is on the back, while Raes area is on the front, so we locate the front ankle zone which has the same SQM concentration as the back ankle. Once doing this, we draw a diagonal line going from the Heart to the Raes area. Now starting at the front ankle, we move through a circle with radius at the Heart, remember we are trying to demonstrate that SQM release was as an expanding sphere. We move in a circle until we meet the previous diagonal line, then measure the distance from this intersection point to the bottom of the Shroud following the diagonal just like Rucker did with

³⁵Jackson, J. P. "Is the image on the Shroud due to a process heretofore unknown to modern science?" copyright Turin Center of Colorado 2014.

neutrons, and a value of 20.2 cm is obtained. Next we measure the distance from the Raes area to the bottom of the Shroud again diagonally which is 4.2 cm. Finally finding the ratio between these two values a value of $20.2 \text{ cm}/4.2 \text{ cm} = 4.8$ is obtained, which is very close to the SQM concentration ratio (4.25), for us to say that SQM concentration decreased as a function of the distance. In other words, the density of SQM released from the sacred Heart of Jesus decreased not randomly but followed a pattern as the distance from the Heart increases, the same as Rucker showed for neutrons.

Once we have found that the release of SQM was a function of the distance, we can take the ratio of decreasing of SQM as the slope of the linear function, then plotting these results we can obtain an equation for the SQM concentration $y = 4.781 x + 3.418$ just like Rucker did with neutrons (see Figure 7). Now, we can introduce in this equation, the distance $x = 167.6 \text{ cm}$ which is the distance from the Heart to the bottom of the Shroud, $y = 4.781 (167.6 \text{ cm}) + 3.418$, obtaining: $y = 804.71 \%$, which is a hypothetical value, but represents an increase of roughly 8 times. If we do the same with Rucker's equation for neutrons, introducing the distance to the Heart it is obtained:

$$y = 35.87 (167.6) + 1030.67 ; y = 7042$$

which represents an increase of 7 times. This is telling us that both the processes of SQM release and neutron release are related to one another.

6. HYPOTHESIS

At this point, I am in the position to formulate a hypothesis. When Jesus rose from the dead, ultraviolet photons were released from the whole body which triggered a series of photo chemical reactions that in turn degraded the linen cellulose imprinting the image we observe in the Shroud. At the same time, a Quark-Gluon-Plasma (QGP) was created in the Sacred Heart of Jesus, made of three different quarks: up, down and strange. After being released they got together creating protons (one up and two down quarks) which according to Lind³⁶ and Rinaudo³⁷ were part of the released radiation. Neutrons were also created (two up and one down quark) and SQM as well (one up, one down and one strange quark) together with electrons which according to Scheuermann³⁸ were also released during the resurrection of Jesus.

³⁶Arthur C Lind, "Image Formation by Protons" presented at the International Conference on the Turin Shroud 2017 in Pasco, Washington, July 22, 2017.

³⁷Jean Baptiste Rinaudo "Modello protonico di formazione della immagine sulla Sindone di Torino "(Protonic Model of Image formation on the Shroud of Turin) presented June 6, 1998 in Torino, Italy, at the III Congresso Internazionale Di Studi Sulla Sindone (3rd International Congress of Studies on the Shroud).

³⁸O. Scheuermann, "Hypothesis: Electron emission or absorption as the mechanism that created the image on the Shroud of Turin - Proof by experiment" first edition September 1983, Fondazione 3M, Segrate, Milano, Italy, 2003.

These particles reacted with the material making up the Shroud and got stuck to it. These SQM particles must have been small because more massive Strangelets would have had too much momentum. They would have passed through the Shroud rather than being stopped by it.

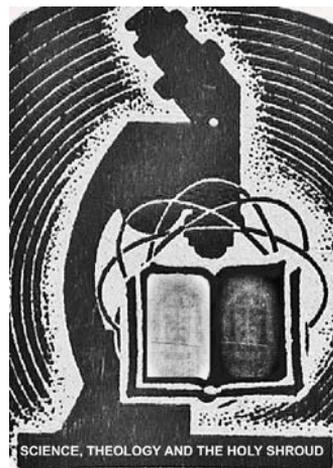
7. CONCLUSION

The presence of SQM in the Turin Shroud is a possibility proposed after studying the pyrolysis mass spectra of some areas in which an unknown compound with a 131 amu was observed. No other compound exists besides those that resulted from the degradation of the linen cellulose of the cloth (oxidation and dehydration). Therefore, this unknown compound could be hydroxymethyl furfural. During the transformation at the resurrection, this compound, proposed to be the image-chromophore with a molecular weight of 126 amu, captured small particles about the nuclear size of SQM (Hydrogen-strangelets) with an atomic mass of 5 amu, thus forming the 131 amu hydroxy methyl furfural.

I demonstrated that these SQM particles probably had their origin in the Sacred Heart of Jesus and were radiated in all directions as an expanding sphere. I further showed that using a second mass spectrum in which the 131 line also appeared that the SQM concentration decreased as a function of the distance from the Heart. From this I hypothesize that during the resurrection of Jesus, besides the uv photons released from the whole body, a Quark-Gluon Plasma of up, down and strange quarks was created in His Sacred Heart. I believe that this Quark-Gluon Plasma is like the one that was formed at the beginning of time which, in turn, formed the protons, neutrons and SQM as well, together with electrons. This hypothesis warrants further study for if it can be validated, it would have an enormous impact on humankind. We can then say that there in the Shroud exists evidence that Jesus created the whole Universe.

John 1:1-3

*In the beginning was the Word,
and the Word was with God, and
the Word was God. He was with
God in the beginning. Through
him all things were made; without
him nothing was made that has
been made.*



14. The photographic film and processing techniques of the Enrie Images

Giorgio Bracaglia

The first photograph of the Holy Shroud was obtained by Secondo Pia in 1898, and the quality of this photograph was limited by his craftsmanship and the technology that was available at that time. The second photograph of the Shroud was captured by Giuseppe Enrie during the 1931 Exposition of the Shroud. His work resulted in a superior reproduction due to the technological advances in photography and Enrie's expertise. This chapter explores the photographic techniques that were designed to maximize the technology that was available to Enrie in 1931.

Enrie was considered a maestro in his craft. Photographers during his period mastered visual development, development alteration, wet plate techniques, and filter usage to correct spectral sensitivity under daylight or tungsten lighting conditions. The term "orthochromatic," which refers to a photographic emulsion that is sensitive to only blue and green light, was a misconception after 1884. It was in that year Josef Eder discovered by applying erythrosine dye in the film's emulsion that it was possible to extend the film's sensitivity to 630 nm with special handling, thus capturing medium yellow to orange hues.

By 1900, orthochromatic films continued to improve with equalizing green and yellow sensitivities. These films were known as "isochromatic." The film used by Giuseppe Enrie was a rapid orthochromatic film sensitive to med-yellow and orange. The process by which Enrie accomplished the great assignment that was bestowed onto him explains how he was able to obtain high-quality photographs of the Shroud. With the guide of Enrie's documentation of the 1931 Exhibition of the Shroud and my conversations with Enrie's lead printer at the Dutto Brothers Studio, Aldo Guerreschi, any misconception that Enrie's photographs were binary, or bitmapped by design, is not the case.

During the period of the exhibition of the Shroud, master photographers such as Enrie would have mixed his own developer formulation. By adjusting the amount of Metol in combination with Hydroquinone, and in conjunction with exposure and filters, Enrie was able to improve the film's tonal range to achieve an expanded gamut. Based on Aldo Guerreschi's RGB colour space readings of the Shroud, a visual simulation model was created to demonstrate the approximate film's characteristic of the spectral sensitivity of Enrie's orthochromatic film. The simulation model also helps to explain how Enrie was able to expand the spectral sensitivity and compares Enrie's orthochromatic to panchromatic film with a spectral sensitivity of 660 nm and even greater.

It was during the early 1970s when the Enrie negatives were first distributed in the United States for scientific research. The researcher who requested the images was Captain John Jackson of the United States Air Force. It was just before the 1973 scientific research of the Shroud being performed in Italy when Dr. Jackson penned a letter to the Holy Shroud Guild. In his letter, Dr. Jackson introduces himself and informs Father Otterbein that his interest in the Shroud dated back to his childhood. What prompted Dr. Jackson to write to the Guild was his curiosity about what the Italian scientific team would discover. It was during this correspondence when Dr. Jackson asked the Guild permission to borrow high-resolution photographs of the Enrie collection.

Visually, the films the Guild possessed were very high contrast. Because of the negatives the Guild possessed, many wondered why Enrie used orthochromatic litho film to photograph the Shroud and not panchromatic film. It was assumed that Enrie selected orthochromatic film to increase the contrast for the viewer for a more pleasing visual appearance. In relation to electromagnetic spectrum visible to humans, orthochromatic film lacks the sensitivity to record wavelengths above 560 nm. Under normal sceneries where the full spectrum captured visually by the human eye, orthochromatic film tends to be much higher in contrast when compared to panchromatic film because of the limited sensitivity of the spectrum. The belief was that Enrie purposely used orthochromatic litho film to exaggerate the details with contrast, thus making the image easier to view, and more appealing to the viewer, when viewing the man on the cloth. However, this is a misconception that was based on the modernization of the photographic industry in the '70s and the Enrie images that were supplied to American scientists for research.

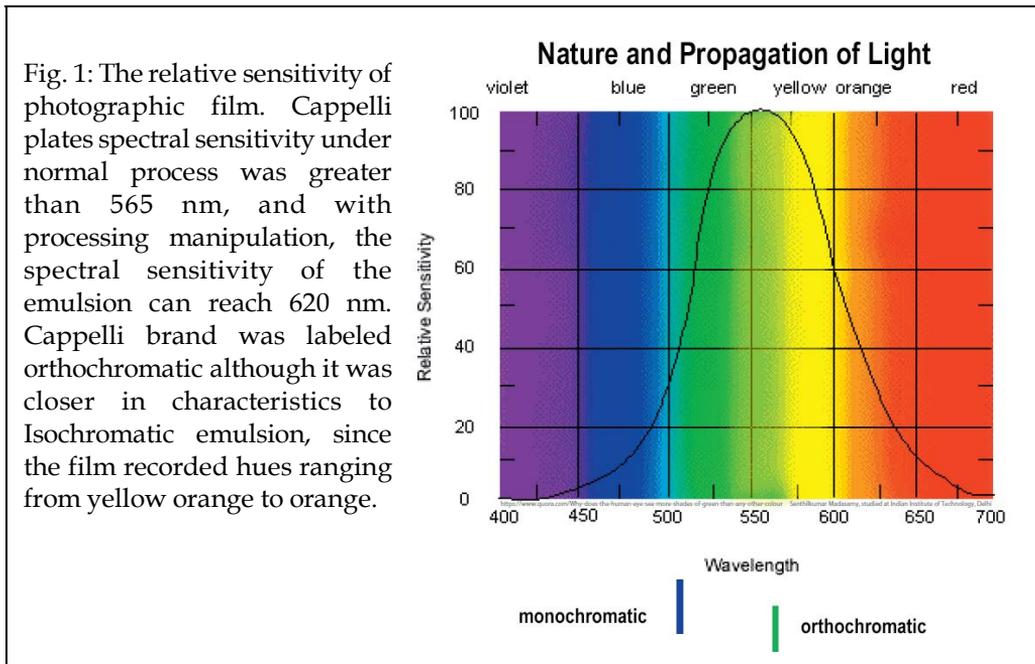
By the 1970s, in almost every street corner one could find a photo finishing lab or commercial print lab servicing photographic needs. No longer did photographers have to maintain wet rooms to manage their film processing. The finishing labs had state of the art processing equipment, and rigorous processing controls gave the photographers confidence to out source their work. By this time, panchromatic films were manufactured in far greater quantity than orthochromatic films, which substantially lowered the cost in production. Specialty make-up artists were no longer necessary to compensate for the lack of sensitivity in the colour red.

These new generations of photographers were no longer concerned about processing by inspection as long as the manufacture's guidelines were used. As for the distribution of the Enrie's images throughout the United States, the Holy Shroud Guild maintained the copyright for use in the United States. Unfortunately, these images were degraded and inherently had more contrast than the Enrie's originals since the Guild received duplicate films made from the original negatives or even copies from duplicates. Every film of Enrie's images distributed by the Guild before 1978 in the United States, by default lost tonal range that affected the film's original characteristics.

When orthochromatic film was first introduced in the 1880s, the film was revolutionary. It had spectral sensitivity of 380 nm–580 nm compared to the prior Monochromatic film that was only blue and partial green sensitivity. It was also found by using a pretreatment called a wet plate technique, orthochromatic films could record beyond 700 nm, which to all intents and purposes can be considered panchromatic. There are two specific orthochromatic films widely used in the industry. The first is used in lithography. With normal development, the specialized film will only record limited densities measured in the film's characteristic curves (Hurter and Driffield Curve). The film's high contrast is designed primarily for making line and halftone negatives for photomechanical reproduction. The binary characteristics of the film are ideal for creating halftone dots used in offset printing. The second type of orthochromatic film is continuous tone limited to record up to 580 nm making red appear much darker than its counterpart, panchromatic.

Giuseppe Enrie was a master photographer. Masters in the field of photography devised their own special developers and exposure techniques. Besides the readability of panchromatic film in 1930, the costs were three times that of orthochromatic and must be developed in absolute darkness. The versatility of orthochromatic film allows master photographers to fine-tune tonal ranges by altering developers, reducing or increasing agitation, exposures in conjunction with development times, lighting, and filters. Since orthochromatic film can be handled in a red safe light, master photographers created their own techniques by visual inspection. Unlike the movie industry in the 1930s getting away from using orthochromatic films, 'still' photographers preferred orthochromatic to panchromatic films to maintain process controls.

Enrie was commissioned to photograph the Shroud by Vittorio Emanuele, the King of Italy. Before he began his assignment, Enrie experimented with two types of films. The first plate he tested was manufactured in Germany, but he found that it was unsuitable since the exposure required too much time to capture the full length of the Shroud. Enrie settled for the local manufacturer, Cappelli, which produced emulsions on film or glass plate in Milan. The Cappelli emulsion Enrie selected was rated at 550 H&D, which is equivalent to 12 ISO using today's international standard. The Cappelli plates spectral sensitivity under normal process was greater than 565 nm, and with processing manipulation, the spectral sensitivity of the emulsion can reach 620 nm. Regardless that the Cappelli brand was labeled orthochromatic, the film actually was closer in characteristics to Isochromatic emulsion, since the film recorded hues ranging from yellow-orange to orange (see Figure 1).

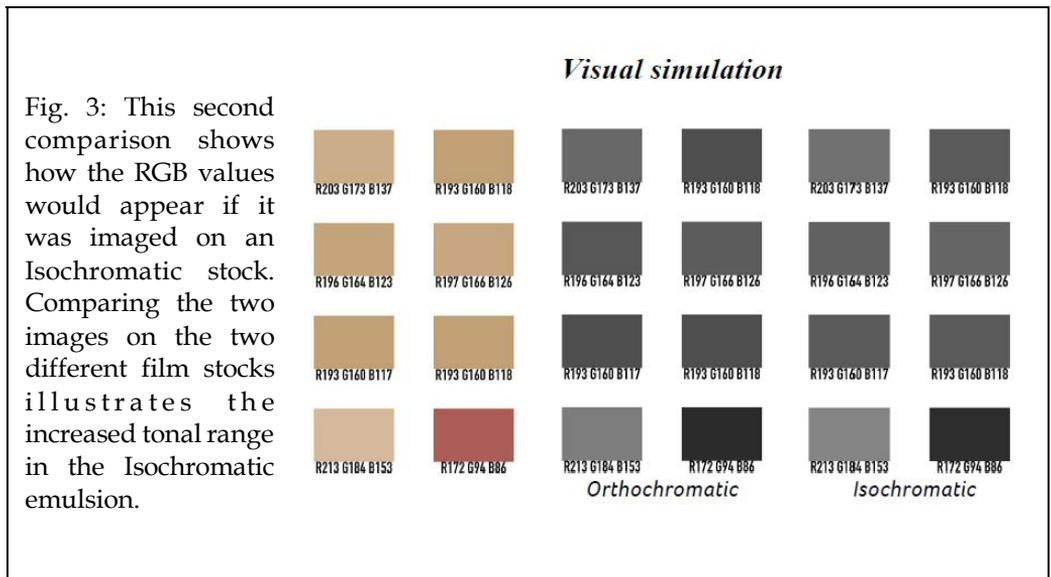
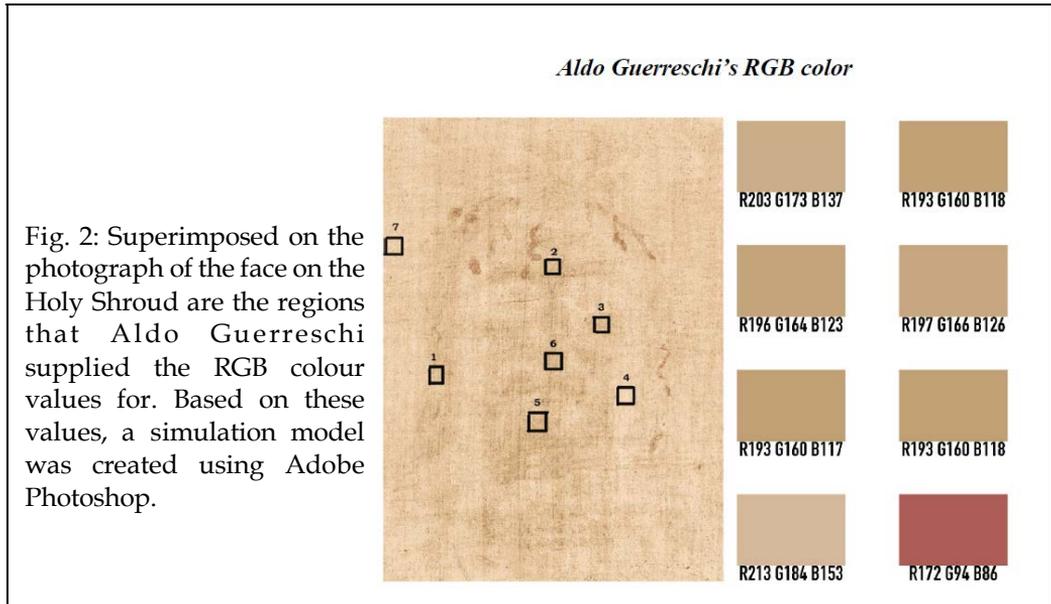


Enrie was an expert varying contrast in orthochromatic films. By creating his own developer formulation, Enrie was able to increase shadow tonalities by increasing the exposure in combination with reducing the development times from the expected film's characteristics. In addition to the formula of the developer, Enrie used levels of agitation, Wratten filters, lighting and visual inspection to achieve the best tonal range. It was for this reason alone why photographers still preferred orthochromatic film to panchromatic film. There is also another argument that can be made using orthochromatic emulsion for photographing the Shroud. Since the Shroud's image is monotone, reproduction using orthochromatic emulsion yields a superior tonal range than panchromatic film. This is primarily due to the increased spectral sensitivity in panchromatic, which will adversely affect the spatial highlight region.

In 2011, Aldo Guerreschi was kind enough to supply me with RGB colour values he interpreted from the Shroud of Turin (Figure 2). Based on Aldo Guerreschi's values, I was able to create a visual model. Using Adobe Photoshop with special plug-ins, a simulation model was created to demonstrate how the Shroud would have imaged on the three black and white films available to Enrie.

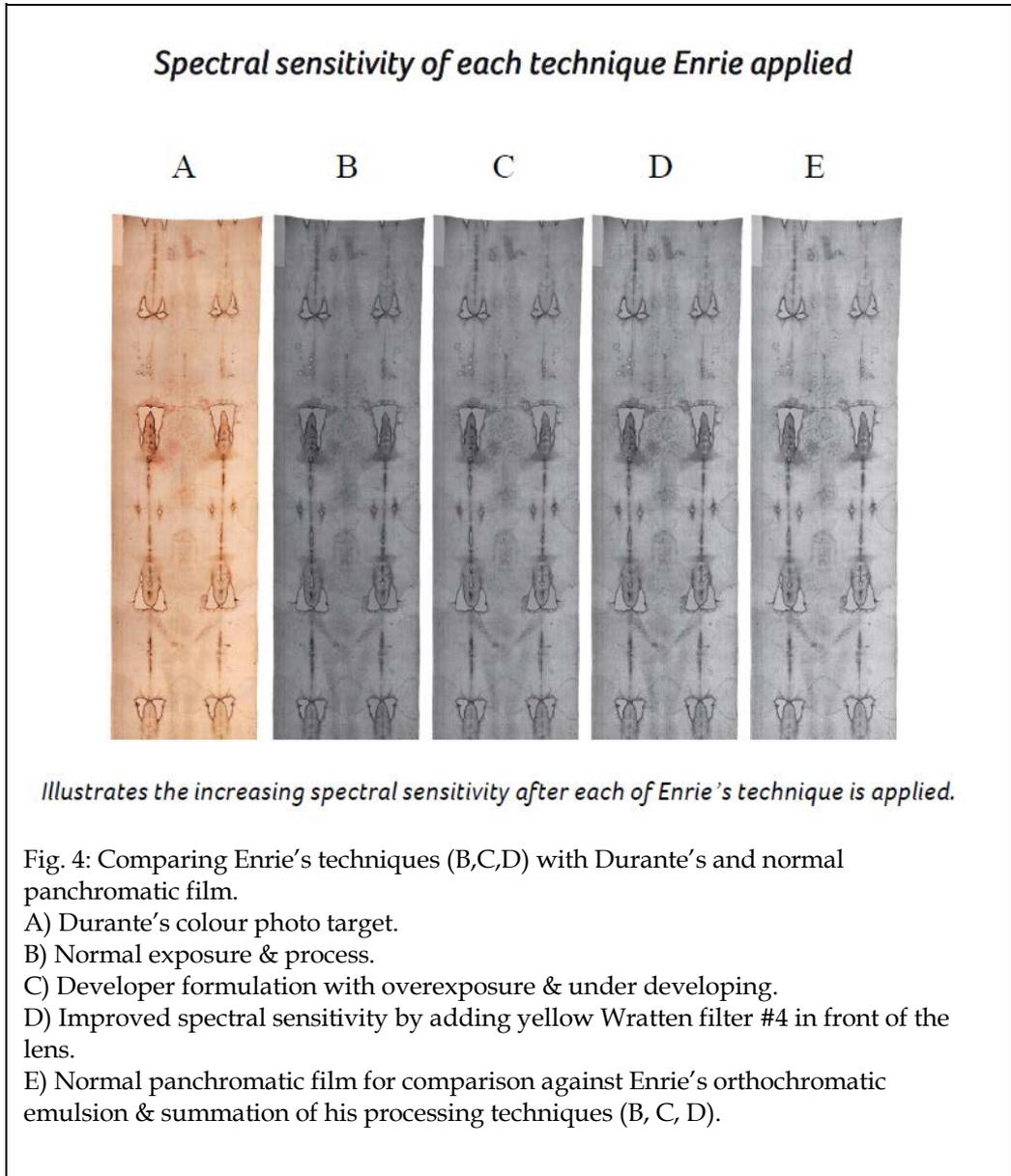
The first important visual simulates how the RGB values from Guerreschi would appear if it was imaged on normally processed orthochromatic stock. The second comparison shows how the RGB values would appear if it was imaged on an Isochromatic stock. Comparing the two images on the two different film stocks

does illustrate that increase tonal range in the Isochromatic emulsion (Figure 3). To further explore how Enrie was able to capture much of the hues presented on the Shroud, a digitized image was generated from Enrie’s Santo Volto print and of the 2002 Gian Durante’s full-length colour photograph.



Once again using Guerreschi’s RGB measurements, the Durante digitized image was balanced to match each reference from Guerreschi aims. Enrie utilized four major processing techniques to expand the spectral sensitivity that provided the excellent tonal range following the designation of each of the five images seen

in Figure 4. One thing is apparent, the dynamic range of any orthochromatic emulsion is less when compared to panchromatic film seen in the simulation images, of Enrie's final outcome in Figure 4 image E, compared to modern panchromatic film represented in image E. However, if the Shroud's hues were in the threshold of Enrie's plate's spectral sensitive somewhere in the range of 630 nm, the issue becomes irrelevant as seen previously in Figure 1.



There are also other important factors why Enrie's image was considered one of the finest reproductions in Shroud photography. It is true, size matters. Because of the plate used by Enrie and the choice of orthochromatic film, Enrie's spatial resolution (Modulation transfer function) was optimal for its time. The rake lighting also improved the spatial resolution by avoiding light fog onto the plate due to the extension of the camera's bellows. Even under optimum conditions in today's image capture capabilities, Shroud research using reproduction images captured either analog or digital will encounter deficiencies. Compared to the human eye, human's spatial resolution and dynamic range are greatly reduced from the original subject. The degradation transposed on either media can vary depending on many factors. For instance, it is true rake lighting improves spatial resolution, but on raised imperfections on the surface, it will produce unwanted shadows that will affect critical observation.

Raking is a technique used in conservation exemplified in the field of art. Lighting a subject at an oblique angle exaggerates the contrast by illuminating the surface facing the light source and shadows facing away from the light source (Figure 5). The topography created by raking allows specific types of examinations performed by conservationists. Enrie used this technique to capture the relief of the linen which increases apparent sharpness and gives the subject greater dimension. The technique is useful for examination for detecting efflorescence, material stress, and for revealing the artist's application techniques. However, this technique becomes a burden in other scientific research since it adds unwanted artifacts created by unwanted shadows, fabric stresses or from material storage done either by folding or rolling.

No matter how good researchers can make these images, nothing is as optimum as the Shroud itself.



Fig. 5: Raking light involves shining light obliquely or almost parallel to the surface to reveal surface topography and relief of the artifact. Far left, picture under normal lighting; near left, with raking light.



15. Blood clotting, Serum Halo Rings, and Bloodstains on the Holy Shroud

Kelly P. Kearsse

Abstract

One of the most interesting characteristics of the bloodstains on the Shroud is the presence of serum "halos/rings" surrounding various wounds in the ventral and dorsal portions of the image. These areas were noted in the 1978 STURP investigation during examination of the cloth under ultraviolet light. The presence of such markings led to the interpretation that clotted blood was transferred to the cloth, and thus could not have been fabricated by the direct addition of whole blood. Relatedly, the improbability that a counterfeiter would have added the detail of "halos/rings" in anticipation of their eventual discovery by the then unknown method of ultraviolet detection has also been commented on relative to the direct addition of blood to the cloth. Here, I have investigated various characteristics of blood clotting and accompanying serum halos/rings and discuss these findings in relation to what is present on the Shroud.

INTRODUCTION

Whole blood consists of a cellular portion, which is approximately 45%, and a liquid portion, plasma, which is approximately 55%. The plasma contains various blood clotting enzymes, which function in a cascade fashion to help blood to coagulate following injury. Once clotting has occurred, the liquid portion of the blood is referred to as serum; serum is essentially plasma minus the clotting factors. Numerous factors may influence the clotting and drying time of blood *ex vivo*, including blood volume, relative humidity and temperature, and surface material.¹

The Holy Shroud is a linen cloth, approximately 14 feet by 3.4 feet, containing the faint ventral and dorsal image of a man with wounds corresponding to scourging and crucifixion. In 1978, a series of studies was performed on the Shroud as an initial attempt to characterize its basic features and the images upon it. To date, this investigation remains the main depository of information about the object, particularly in relation to the bloodstains. Multiple blood components were chemically demonstrated to exist within the Shroud bloodstains, including

¹Rodak, B.F. *et al.*, *Hematology: Clinical Principles and Applications*, Saunders, St. Louis, MO, 2007.

hemoglobin, bilirubin, and albumin.² Interestingly, for many of the wounds examined, a fluorescent border was noted under ultraviolet (uv) light, which was suggested to represent serum "halos" or "rings" at the periphery of the bloodstain.³ The main body of the bloodstain was highly absorbing, in agreement with what has been reported for blood analysis under uv.⁴ Proponents of the Shroud's authenticity argue that the presence of serum contraction rings supports the hypothesis that the cloth once wrapped a body, and that blood was imprinted from actual wounds. Skeptics, on the other hand, might suggest that the blood was directly added to the cloth by an artist.

In searching the literature for information about formation of serum "halos/rings" and their detection using uv light, it was surprising that relatively little information exists on this topic. To better understand what has been described on the Shroud, and to evaluate the properties of formation/detection of serum contractile rings in general, I performed a series of studies under a variety of conditions. I was particularly interested in evaluating the similarities and differences between the transfer of clotted blood to a material, versus blood that was added directly to that material.

MATERIALS AND METHODS

Blood, plasma, and serum

Human blood was obtained from healthy volunteers by the finger stick method using a Health Lancing device (CVS pharmacy, USA) fitted with a micro lancet (CVS Pharmacy, USA).

For transfer experiments, blood was added to parafilm "M" laboratory film (Bemis, Amazon.com, USA) or other materials and filter paper or cloth placed directly onto the blood pool with very little pressure. Twenty to 25 microliters of blood was typically used for each group.

For purification of blood serum and cellular fractions, whole blood was spun in a microcentrifuge, the supernatant was removed and then transferred to a new tube. This cycle was repeated 2x for the supernatant until no red material was visible.

²Heller, J.H. *Report on the Shroud of Turin*. Houghton-Mifflin Co., Boston, MA (1983). Heller, J.H. and A. Adler, "A Chemical Investigation of the Shroud of Turin", *Canadian Forensic Society Scientific Journal* 14: 81-103, 1981.

Adler, A. D. "The Origin and Nature of Blood on the Turin Shroud", *Turin Shroud - Image of Christ?* William Meacham, ed., Hong Kong, March, 1986.

³Miller, V.D. and S.F. Pellicori "Ultraviolet fluorescence photography of the Shroud of Turin", *J. Biological Photography* 49: 71-85, 1981.

⁴Miller, V.D. and S.F. Pellicori "Ultraviolet fluorescence photography of the Shroud of Turin", *J. Biological Photography* 49: 71-85. 1981; Pellicori, S.F. "Spectral properties of the Shroud of Turin", *Applied Optics* 19: 1913-1920, 1981.

Whole blood and serum from Gunn rats was obtained from RRRC, University of Missouri, USA. The Gunn rat contains a spontaneous mutation in the UDP-glucuronosyltransferase (*ugt*) gene and expresses high levels of bilirubin.⁵

Whole blood and serum from *ugt* *-/-* and *hugt* *-/-* mice was kindly provided by Drs. Robert Tukey and Nghia Nguyen, University of California, San Diego, USA. In *ugt* *-/-* mice, the UDP-glucuronosyltransferase gene has been genetically disrupted; these mice express extremely high (lethal) levels of bilirubin. In *hugt* *-/-* mice, the UDP-glucuronosyltransferase gene has been genetically disrupted and replaced with a human counterpart; these mice express high levels of bilirubin.⁶

Linen and Filter Paper

Linen of various sources was used, including that which was purchased commercially or woven from natural, unprocessed flax. Filter paper sources were Whatman filter paper 1mm and 3mm (Whatman, Amazon.com, USA).

Ultraviolet light detection

Ultraviolet light systems were used throughout these studies at an output of ~365 nm. A special thanks to Dr. Pellicori who provided excellent advice on a modern, miniaturized version of the system that was used in the previous study of Shroud.

RESULTS

UV detection of blood components

In our initial set of experiments, we examined the detection of plasma and serum using ultraviolet light. As shown in Figures 1a,b, whole blood and the cellular fraction showed high absorbency (no fluorescence), whereas serum and plasma were the opposites (Figures are at end of chapter). Fluorescence of plasma and serum were of relatively similar intensities (Figures 1a and 1b).

Next, we examined the fluorescence of serum absorbed onto different materials, including linen from various sources. As demonstrated, serum fluorescence was variable among different linen samples (Figure 2), a feature we have noted using more than twenty different types from multiple sources. Thus far, we have not been able to isolate a specific characteristic (colour, washing, dyeing) that is directly related to optimal fluorescent detection. We have also observed an influence of oven baking of linen to simulate aging on the fluorescence of serum under uv (data not shown).

⁵Chowdhury, J.R., *et al.* "Gunn rat: A model for inherited deficiency of bilirubin glucuronidation," *Adv Vet Sci Comp Med* 37: 149-173, 1993.

⁶Chen, S. and R.H. Tukey, "Humanized UGT1 mice, regulation of UFT1A1, and the role of the intestinal tract in neonatal hyper bilirubinemia and breast milk induced jaundice", *Drug Metabolism and Disposition* DOI: <https://doi.org/10.1124/dmd.118.083212> (2018).

Formation and detection of serum halos/rings

To evaluate the presence of serum "halos/rings" resulting from blood transfer, whole blood was placed on parafilm, and clotting allowed to proceed before transfer to filter paper (Figure 3). This system is similar to that described by Lavoie except that in his studies, blood was added to saran wraps.⁷ The system we used was also performed in microscale so that relatively small volumes of blood were needed.

As shown in Figure 4, in samples undergoing clotting prior to transfer, a serum edge was present at the periphery (Figure 4, arrow). Similar results were obtained when linen was used (Figure 5).

The appearance of serum edges in blood imprints was time-dependent, occurring optimally at about 40 minutes (Figure 6). Imprinting was performed while the blood was in the gelatinous (moist) phase of clotting.

Serum edges were also detected when blood was placed onto skin, and clotting allowed to proceed prior to transfer (Figure 7). In contrast, no serum edge was evident when blood was directly added to filter paper (Figure 8), even when a variety of applicators were used (Figure 9). Similar results were obtained when blood was directly added to linen (data not shown).

Blood that had clotted for several hours was vigorously stirred and added directly, yet no serum edge was evident (Figure 10). Relatedly, no serum ring was visible if blood, which had clotted and dried for several days, was ground in a mortar and pestle, rehydrated and directly added (Figure 10). When blood was allowed to clot for 10, 20, 30 minutes, mixed, and then added directly to material, no serum edge was visible (data not shown). Taken together, these results demonstrate that blood added directly to material did not result in the presence of a fluorescent serum edge/halo detectable by uv light. Serum edges/halos were only observed when blood was imprinted during the clotting process.

We next investigated whether it was possible, under any condition, to create blood stains with a "serum edge" by adding blood directly, i.e., blood plus certain additives. Citric acid is commonly used as an anti-coagulant during modern blood collection, and may be found in the liquids of many common fruits. Art Lind has previously commented on the use of lemon juice as an anti-coagulant in studies on the painting of blood onto various materials.⁸ As shown in Figure 11, juice from multiple fruits showed a similar uv fluorescence as serum (Figure 11), as did honey and collagen (gelatin). This was also the case with connective tissue and bone that had been ground and hydrated. Figure 12 shows the uv fluorescence of juice from various regions of pineapple (Figure 12); pineapple is particularly interesting in that it contains bromelain, a compound that is effective at disrupting clotted blood.

⁷Lavoie, G. *Unlocking the Secrets of the Shroud*, Dog Ear Publishing, Indianapolis, IN, 2015.

⁸Lind, A.C. and M. Antonacci, "Hypothesis that explains the Shroud's unique blood marks and several critical events in the Gospels", St. Louis Shroud Conference, October 2014 <https://www.shroud.com/pdfs/stllindpaper.pdf>.

Next, a composite of four samples of blood is featured (Figure 13), one of which represents a (normal) clotted imprint. The other three were created by direct addition of blood containing some of the substances shown in Figure 11. In Figure 14, it can be seen that when a mixture of blood and alcohol/honey or blood and fruit juice was added directly to material, a peripheral edge was observed, similar in appearance to that seen in transfers of clotting imprints (Figure 14).

Bilirubin and serum fluorescence

Regarding natural blood components that might affect fluorescence, we evaluated human serum plus excess bilirubin added *in vitro* (Figure 15), and serum from rodent strains with endogenously high levels of serum bilirubin (Figure 16). As demonstrated, increased amounts of bilirubin was associated with an increased fluorescence under uv, in both a simulacrum with human blood, and rodent strains with hyperbilirubinemia (Figures 15, 16). In all cases, bilirubin fluorescence diminished with time, even in the presence of little to no light (data not shown).

It is often proposed that the high bilirubin levels that have been reported for Shroud blood stains are the result of a severe physiological trauma. Several years ago, Dr. David Lee's lab made the surprising discovery that certain plants also express bilirubin, bilirubin that is chemically indistinguishable from that found in humans.⁹ Conceivably, a skeptic might argue that an artist chose a plant with an orange/red pigment to mix with blood for colouration, and unknowingly also added bilirubin (in a relatively concentrated form). This is an intriguing idea as plant and human bilirubin are chemically identical. It is curious that bilirubin, a molecule that is extremely light sensitive, is found in the flowers and fruits of plants, organisms whose survival depends upon efficient light collection. Perhaps there is an associated molecule in plants that helps to confer stability to bilirubin, although this is entirely speculative.

A few final comments on the blood first/image second hypothesis

Finally, one of the most clever and intriguing experiments that Adler performed is the digestion of Shroud fibers from various locations with a protease enzyme. First, he found that fibers from non-image areas were unaffected as were those from image locations (Figure 17). This is important as it argues against a protein binder being involved in the creation of the image. Second, when fibers from bloodstains were digested, no colouration (image) was found underneath. These results have been used to support the blood first/image second hypothesis, that is, that bloodstains initially present on the cloth protected the fibers underneath from receiving the image during the successive image formation process. Blood first/image second fits best with an authentic scenario; it is

⁹Prione, C., *et al.*, "Animal pigment bilirubin discovered in plants", *J. Am Chem. Soc.* 131: 283, 2009; Prione, C, *et al.* "Bilirubin present in diverse angiosperms", *AoB Plants*, pl 1020, PMID 22476078, 2010.

somewhat difficult to imagine a forger applying the bloodstains first and then creating the image around it.

The Shroud image is believed to result from oxidative/dehydration, conversion of single bonds to double bonds that result in the colouration of fibers. Heller and Adler reported that they could, in fact, reverse the fiber colouration by treatment with a strong oxidizing or strong reducing agent.¹⁰ As food for thought, consider the following idea which is compatible with either an authentic or nonauthentic scenario. Something is present in the blood that acts as an oxidizing/reducing agent, and that is why there is no image underneath (Figure 18). This could be an endogenous blood component (either behaving normally or in an altered state following the imaging event), or an added component. Several of the compounds mentioned previously, such as citric acid, are known reducing agents; whether strong enough to affect fiber colouration is unknown. This idea provides an alternative to a physical blocking mechanism, a molecular basis and chemical explanation as to why fibers underneath bloodstains are devoid of colouration. Adler's observation is very important and worth further investigation to confirm and extend these findings. Indeed, it is unknown if this property is true for the majority of bloodstained areas on the cloth.

DISCUSSION

The current study was motivated by the observation that serum contractile rings were reported for various wounds on the Shroud of Turin, originally visualized under ultraviolet light. This characteristic is often mentioned in support of the authenticity of the Shroud, and the conclusion that the cloth once wrapped a dead body. Adler proposed that a medieval forger would have had to anticipate the forthcoming discovery of uv light, and to "to paint a contractile ring [of serum] around every wound" to achieve a similar result.¹¹ The results in this study indicate that this is not necessarily the case. While our data support the idea that imprints of clotting blood showed serum edges/rings, whereas blood that was directly added does not; evidence was also included to show that serum edges/rings may be created by inclusion of certain additives, known to inhibit/retard coagulation. A forger could have perhaps used such additives for their ability to retard clotting or as a blood "thinner," without realization of their fluorescent properties. The current study represents a preliminary investigation into the formation and detection of serum halo/rings in a microscale environment. Future efforts will involve investigation using increased blood volumes and parameters that affect textile surface properties.

¹⁰Heller, J.H. *Report on the Shroud of Turin*. Houghton-Mifflin Co., Boston, MA, 1983.

Heller, J.H. and A. Adler, "A Chemical Investigation of the Shroud of Turin", *Canadian Forensic Society Scientific Journal* 14: 81-103, 1981.

¹¹Adler, A. D. "The Origin and Nature of Blood on the Turin Shroud", *Turin Shroud - Image of Christ?* William Meacham, ed., Hong Kong, March, 1986.

An association between the levels of bilirubin and increased fluorescence was noted, with the caveat that fluorescence fades over time, even in little to no light. It was also pointed out that certain plants express bilirubin which is chemically indistinguishable from human bilirubin. The suggestion was made that perhaps plants contain an associated molecule that helps confer bilirubin stability as plant life is typically dependent upon light collection and exposure.

Finally, an alternative explanation was put forth for the blood first/image second hypothesis, based on previous protease digestion studies by Adler. It was suggested that an oxidizing/reducing agent is present in blood (either naturally or added) that reverses the colour of the image fibers underneath. This is a speculation and is proposed as food for thought, as an alternative to a physical blocking mechanism for protection of fibers underneath the bloodstains.

Acknowledgments

A special thanks to Dr. Sam Pellicori for helpful advice in ultraviolet filtering and photography. Thanks to Dr. Gil Lavoie for helpful discussion. Thank you to Drs. Tukey and Nguyen for the blood and serum samples from hugt mice. As always, thank you to my wife Kathy, for everything.

Fig. 1a: Separation of blood components and their detection by uv. Clotted blood was spun in a microcentrifuge and separated into cellular and serum fractions. Samples were added to filter paper and examined under normal (white) light and ultraviolet (uv).

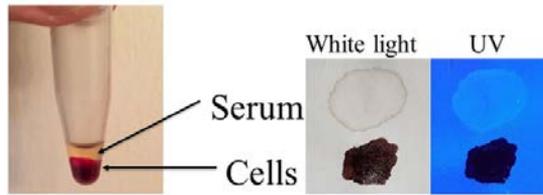


Fig. 1b: UV detection of blood components. Blood fractions were added to filter paper and examined under normal (white) light and ultraviolet (uv).

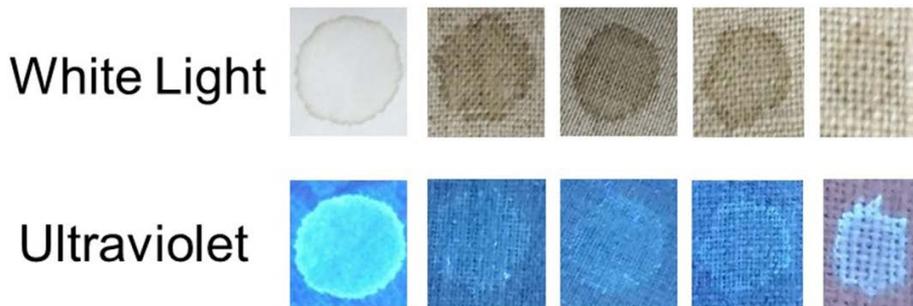
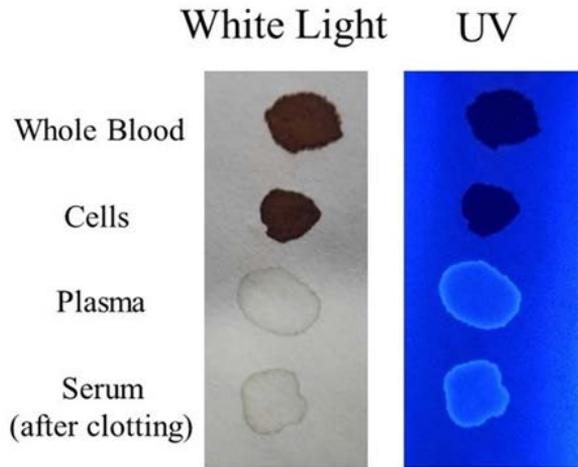


Fig. 2: Uv fluorescence of serum on various linen samples. Purified serum was added to filter paper (far left) and various linen types, and examined under normal (white) light and ultraviolet (uv).

Fig. 3: Blood imprinting/transfer system. Blood was added to parafilm and after a certain period of time, filter paper or linen was placed on top, and allowed to dry. Following drying, filter paper or linen was removed and evaluated.

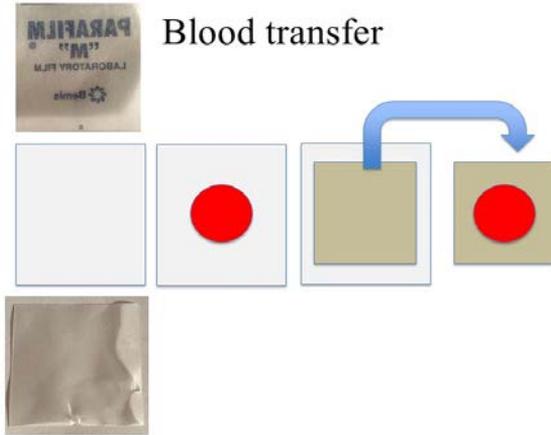


Fig. 4: Evaluation of clotted blood using direct and uv light. Blood was applied to parafilm and allowed to clot for ~40 minutes, then filter paper placed on top. Following drying, filter paper was removed and examined using normal (white) light and ultraviolet (uv).

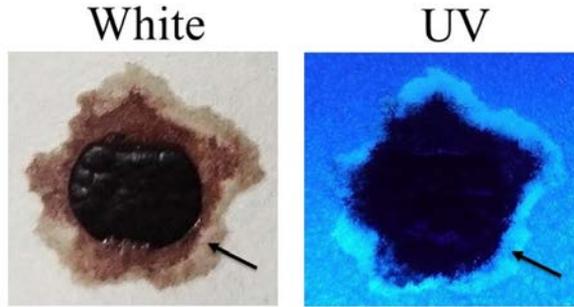
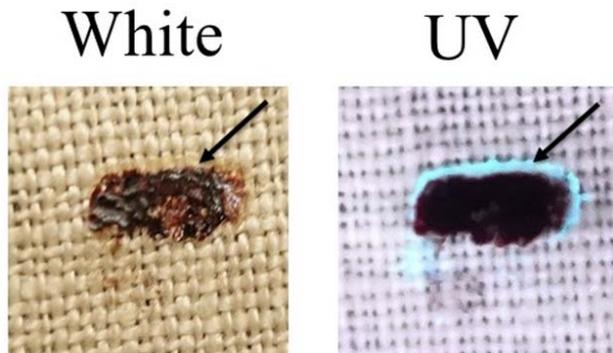


Fig. 5: Evaluation of clotted blood using direct and uv light. Blood was applied to parafilm and allowed to clot for ~40 minutes, then linen placed on top. Following drying, linen was removed and examined using normal (white) light and ultraviolet (uv).



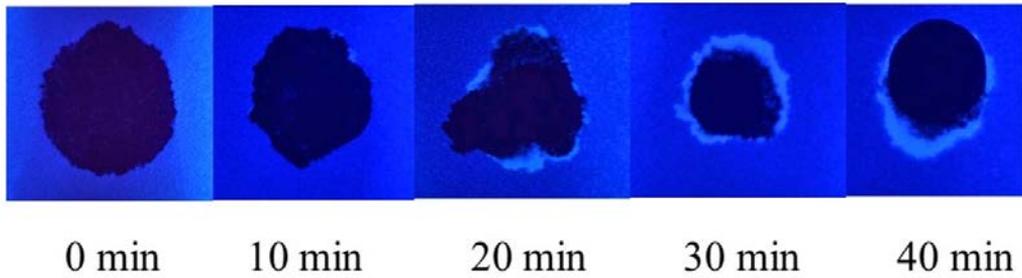


Fig. 6: Time dependence of serum halo/edge detection using uv light. Blood was applied to parafilm and allowed to clot for the time period indicated. At that time filter paper was placed on top, and the sample allowed to dry. Following drying, filter paper was removed and examined using ultraviolet (uv) light.

White

UV

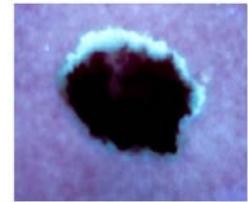
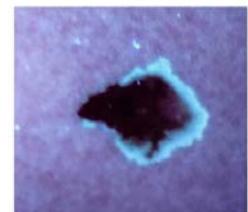


Fig. 7: Evaluation of serum halo/edges formed on skin prior to imprinting. Blood was applied to skin and allowed to clot for ~ 40 minutes; at that time filter paper was placed on top, and the sample allowed to dry. Following drying, filter paper was removed and examined using white and ultraviolet (uv) light.



White

UV

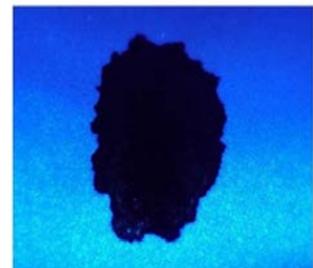
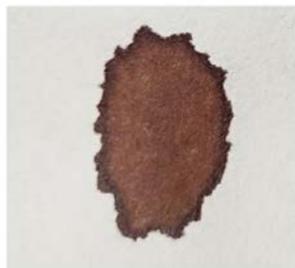


Fig. 8: Evaluation of serum halo/edges in blood added directly to filter paper. Blood was added directly to filter paper, allowed to dry, and examined using normal (white) light and ultraviolet (uv).

Fig. 9: Evaluation of serum halo/edges in blood added directly to filter paper. Blood was added directly to filter paper using the indicated applicator, allowed to dry, and examined using ultraviolet (uv) light. Clotted blood is shown as a control.

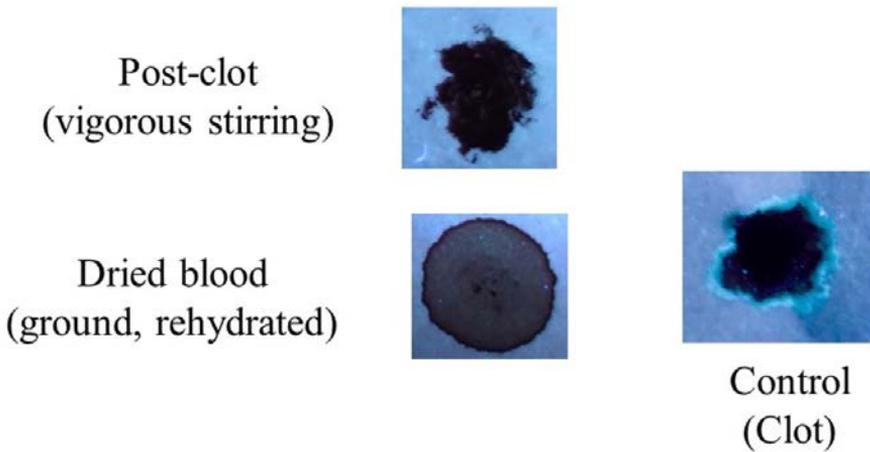
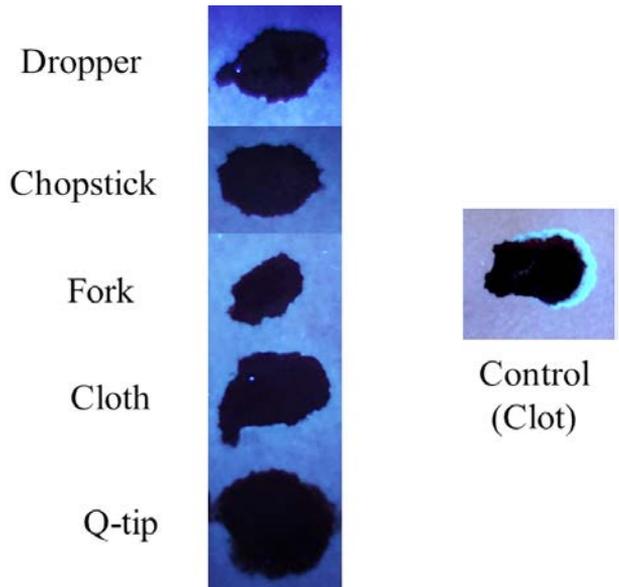


Fig. 10: Evaluation of serum halo/edges in blood added directly to filter paper. Top: Blood was allowed to clot for several hours, and the clot disrupted by vigorous stirring with a micro pipet tip. Blood was then transferred directly to filter paper and examined using uv light. Bottom: Clotted blood that had dried for several days was ground using a mortar and pestle, rehydrated with a small volume of distilled water, and added directly to filter paper. Samples were examined using ultraviolet (uv) light. Clotted blood is shown as a control.

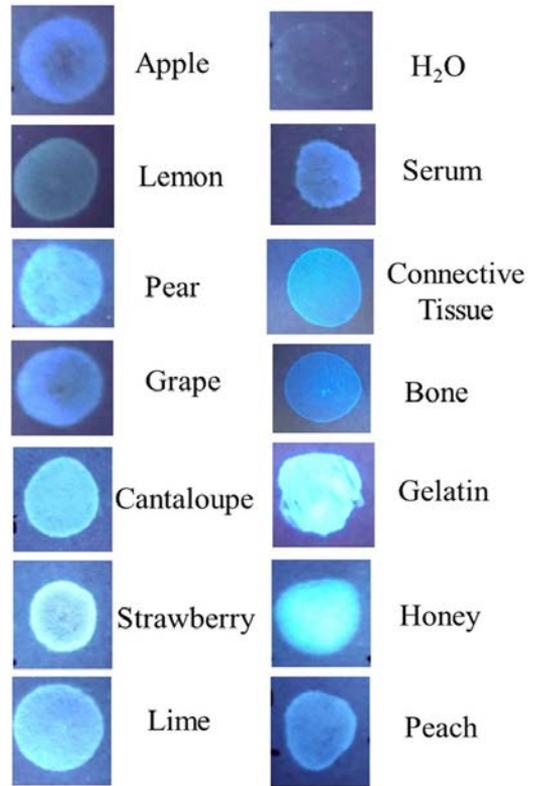


Fig. 11: Fluorescence of various solutions under ultraviolet light. Approximately 10 microliters of the indicated solution were added to filter paper and evaluated under uv. Water (far left) is included as a wetting control, showing that merely wetting the filter paper did not result in a similar fluorescence. All juices were freshly squeezed.

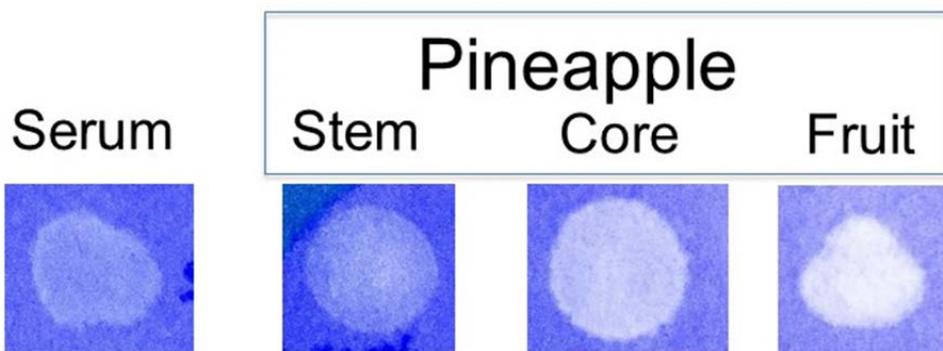
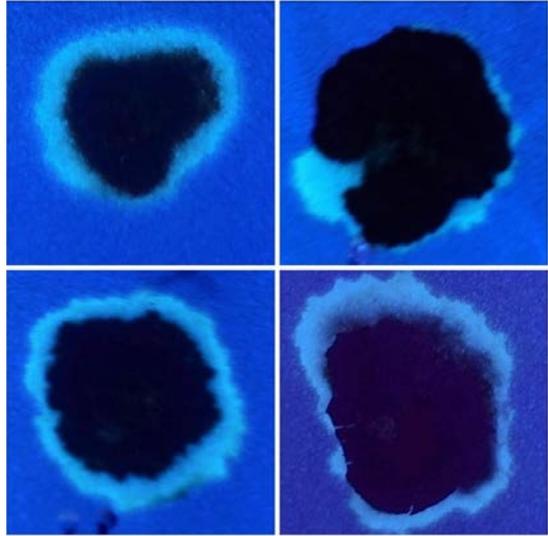


Fig. 12: Fluorescence of juice from various pineapple regions under ultraviolet light. Approximately 10 microliters of the indicated solution were added to filter paper and evaluated under uv. All juices were freshly squeezed.

Fig. 13: Composite showing serum halo/edges formed in clotted blood and blood (plus additives) transferred directly to filter paper. One of the pictures depicts clotted blood transferred to filter paper; the other three show fresh blood (plus additives) transferred directly to filter paper. After drying, samples were evaluated under ultraviolet (uv) light.



White

UV

Fig. 14: Evaluation of serum halo/edges in blood added directly to filter paper. Top row: Blood plus a honey/alcohol mixture was added directly to filter paper and allowed to dry. Samples were examined using normal (white) light and ultraviolet (uv). Bottom row: Blood plus lemon juice was added directly to filter paper and allowed to dry. Samples were examined using normal (white) light and ultraviolet (uv).

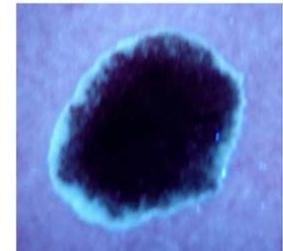


Fig. 15: Effect of bilirubin on ultraviolet fluorescence of human serum. Human serum containing normal or a 50x elevated amount of bilirubin was added to filter paper and evaluated under ultraviolet light. Serum containing excess bilirubin was created as an in vitro simulacrum.

Human Serum plus Bilirubin

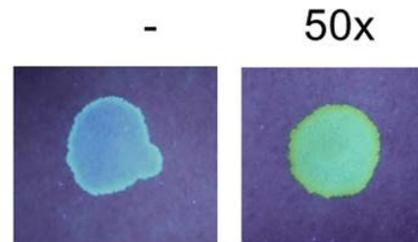


Fig. 16: Effect of bilirubin on ultraviolet fluorescence of rodent serum. Top row: serum from wild type (WT) and Gunn rats was added to filter paper and evaluated under ultraviolet light. Gunn rats contain high levels of bilirubin in their serum. Bottom row: serum from wild type (WT) and hUGT1 mice was added to filter paper and evaluated under ultraviolet light. hUGT1 mice contain high levels of bilirubin in their serum.

Serum (UV)

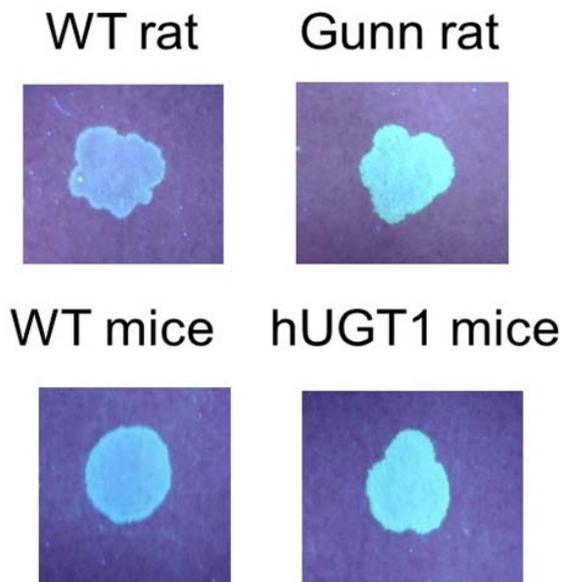


Fig. 17: Adler’s protease digestion experiment. Fibers from three different areas of the Shroud were treated with protease enzymes and evaluated for colouration. See text for details.

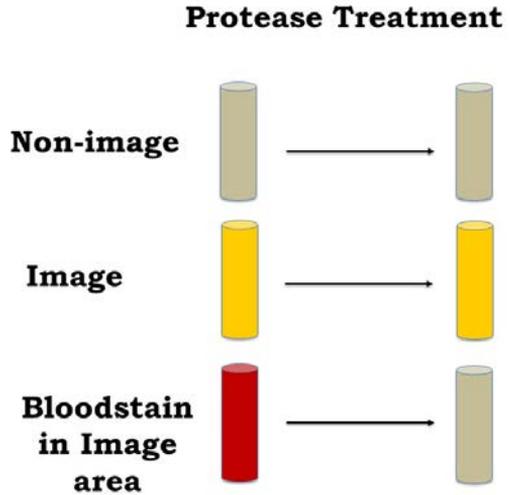
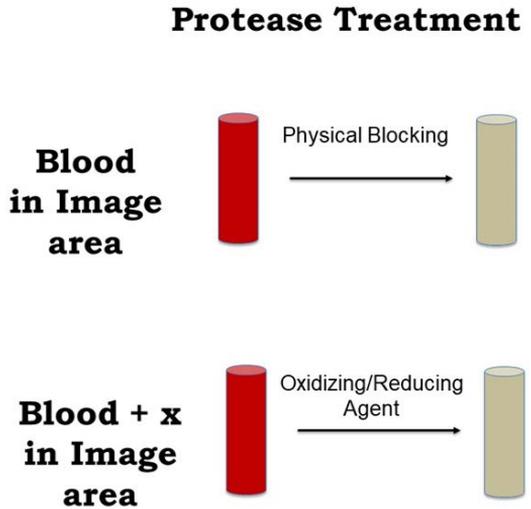


Fig. 18: Two hypotheses to explain the results of Adler’s protease treatment experiments. In the top drawing, bloodstains physically block the fibers (underneath the blood coating) from the imaging event. When samples are digested with protease, the fibers are shown to be uncoloured (no image) underneath. In the bottom drawing, a substance in blood (x) functions as an oxidizing/reducing agent to reverse the colouration of fibers that has occurred during the imaging event. The top drawing is primarily favoured with an authentic viewpoint, blood first/image second; the bottom drawing is compatible with either an authentic or nonauthentic viewpoint and provides an alternative explanation for the obtained results.



16. Hemolysis, Bilirubin, and the Colour of Bloodstains on the Holy Shroud

Kelly P. Kearsse

Abstract

Numerous circumstances may affect the appearance of aged bloodstains, including blood concentration, environmental conditions, and the type of substance on which they dried. A frequent observation of those that have examined the Holy Shroud is that the bloodstains are more reddish than would be expected for aged blood. The reddish colour is not believed to be due to paint, but rather, has been proposed to result from a property of the textile or the blood itself. Here, I have examined two major hypotheses related to the reddish colour of the Shroud bloodstains: (i) the effect of hemolytic agents and (ii) elevated bilirubin levels, about which relatively little information exists, even for normal blood. These data show that bloodstain colour is unaffected by treatment of textiles with various hemolytic agents, including saponin, and that a reddish colour does not persist in bloodstains containing high amounts of bilirubin. In addition, I noted an unexpected effect of glycerin-treated fabric on bloodstain appearance. The contributions of these studies to the reference data available for bloodstain evaluation and their implications for the Shroud are discussed.

INTRODUCTION

In aged objects that are of unknown origin, evaluation of bloodstains can be particularly challenging relative to those that contain certain source material to help provide a context. The Shroud of Turin, or Turin Shroud (TS), is an approximately 14 x 3.5 feet linen cloth bearing the faint frontal and dorsal images of a man with reddish areas corresponding to wounds at the head, hands, feet and back. The first endeavor to scientifically evaluate the nature of the TS bloodstains began in 1973 by members of a "commission of experts," led by Frache *et al.* Their results were negative, hampered by ineffective solubilization methods, with the conclusion that "the negative answer to the investigations conducted does not permit an absolute judgement of the hematic nature of the material under examination."¹ In 1978, the bloodstains were evaluated again as part of the STURP (Shroud of Turin Research Project) examination, involving more than forty scientists of various disciplines; samples were also collected independently by

¹Frache, *et al.* Relazione conclusive sulle indagini d'ordine ematologico praticate su materiale prelevato dalla Sindone, in "La Santa Sindone-Ricerche e studi della Comm. Di Esperti nominate dal Card Michele Pellegrino, nel 1969, Suppl. Rivista Diocesana Torinese, Gennaio, 1976; 49-54.

Bollone and colleagues at this time. To date, this examination remains the most thorough investigation of the cloth, and is the main depository of the data related to the characterization of the bloodstains. It was concluded from such studies that the TS bloodstains were composed of real blood components and not pigment nor dyes.² Most recently, spectroscopic analysis has shown the bloodstains consist of methemoglobin, the deoxygenated form of hemoglobin expected for aged blood, corroborating previous findings on the hemoglobin species present³.

One unusual feature of the TS bloodstains is that their colour is more reddish than would be expected for aged blood, which typically appears brownish to black. Rogers proposed that treatment with Saponaria (soapwort) was part of the normal processing of ancient linen, leaving a surface residue on the TS that retained hemolytic activity. He noted that blood added to Saponaria-treated cloth maintained a reddish colour some thirty years later, compared to controls which were black⁴. Unfortunately, no data or pictures from these experiments have ever been published. Alternatively, it was suggested that high amounts of bilirubin in blood exudates are responsible for the reddish colour of the TS bloodstains, resulting from heightened hemolysis *in vivo* due to excessive trauma; lysis of red blood cells would result in release of hemoglobin, which, in turn, would be converted into bilirubin⁵. Adler maintained that a brown colour (oxidized

²Heller, JH. *Report on the Shroud of Turin*, Boston, MA. Houghton-Mifflin Co; 1983.

Heller, JH, Adler AD. Blood on the Shroud of Turin. *Applied Optics*. 1980; 19: 2742-2744.

Heller, JH, Adler A., A Chemical Investigation of the Shroud of Turin. *Canadian Forensic Society Scientific Journal*. 1981; 14: 81-103.

Jumper, EJ, *et al.*, A comprehensive examination of the various stains and images on the Shroud of Turin, *ACS Advances in Chemistry, Archaeological Chemistry III*. 1984; 205: 447-476.

Case, TW. *The Shroud of Turin and the C-14 Dating Fiasco: A Scientific Detective Story*, Cincinnati, OH: White Horse Press; 1996.

Adler, AD. Chemical and Physical Aspects of the Sindonic Images in The Orphaned Manuscript, A gathering of Publications on the Shroud of Turin, Shroud Spectrum International Special Issue, 1st Edition, ed. D. Crispino; 2002.

Baima Bollone, PL, *et al.*, *La Dimostrazione della presenza di tracce di sangue umano sulla Sindone*. 1981; *Sindon* 30: 5-8.

Baima Bollone, PL. The Forensic Characteristics of the Blood Marks In The Turin Shroud: Past, Present, and Future, ed. S. Scannerini and P. Savarino [Int. Scientific Symposium, Torino, Mar. 2-5, 2000], 125-135. Torino, Italy: Effata Editrice; 2000.

³Heller, JH, Adler AD. Blood on the Shroud of Turin. *Applied Optics*. 1980; 19: 2742-2744.

Lascio, AD, *et al.*, Investigating the colour of the blood stains on archaeological cloths: the case of the Shroud of Turin. 2018; *Applied Optics* 57: 6626-6631.

⁴Rogers, R. *A Chemist's Perspective on the Shroud of Turin*, Raymond Rogers Publishing, USA. 2008.

⁵Heller, JH. *Report on the Shroud of Turin*, Boston, MA. Houghton-Mifflin Co; 1983.
Case, TW. *The Shroud of Turin and the C-14 Dating Fiasco: A Scientific Detective Story*, Cincinnati, OH: White Horse Press; 1996.

hemoglobin, i.e., methemoglobin) plus yellow/orange (bilirubin) would result in a reddish appearance. Moreover, he indicated that reddish colour could be recreated in an *in vitro* blood simulacrum containing high bilirubin, although unfortunately no data or pictures from these experiments were ever published.

In the initial consideration of these hypotheses, I found that little background information existed regarding the effects of hemolysis or elevated bilirubin levels on the colour of bloodstains overall. While a few studies have been done to determine the influence of bilirubin on TS bloodstains⁶, several caveats were present; specifically: (i) anti-coagulants were included; (ii) bilirubin levels were in the range of 5-10x above normal (Adler would propose in his hypothesis that the concentrations would be significantly higher); and (iii) multiple forms of bilirubin were present (see below). The purpose of the current study was twofold: to contribute to the database of endogenous and environmental factors that might affect bloodstain appearance, in general, and to apply such results to the existing knowledge of the TS.

MATERIALS AND METHODS

Linen and filter paper.

Hanks of natural, unprocessed flax (Vavstuga, Shelburne Falls, MA) were woven in a 3:1 herringbone pattern with a Z twist, similar to what has been described for the TS, by professional weaver Tess Farley (USA). Filter paper sources were Whatman filter paper 1mm and 3mm (Whatman, Amazon.com, USA).

Blood.

Human blood was obtained from healthy volunteers by the finger stick method using a Health Lancing device (CVS pharmacy, USA) fitted with a microlancet (CVS Pharmacy, USA). Blood was added to parafilm "M" laboratory film (Bemis, Amazon.com, USA) and transferred to filter paper or linen using a micropipet. Approximately 10-20 microliters of blood were used for each group. For freeze-thaw treatment, whole blood was placed in the freezer (-20°C) overnight, removed to thaw, and this cycle repeated 1-2 more times. Whole blood

Adler, AD. *The Origin and Nature of Blood on the Turin Shroud, Turin Shroud-Image of Christ?* William Meacham, ed., Hong Kong, March 1986.

⁶Lascio, AD, *et al.*, Investigating the colour of the blood stains on archaeological cloths: the case of the Shroud of Turin. 2018; *Applied Optics* 57: 6626-6631.

Goldoni, T., *et al.*, Sindone: raffronto tra il singolare colore delle macchie di sangue e la concentrazione di bilirubina in esso. Prime investigazioni. 2000; *Sindon quad.* 14, pp. 131146.

Svensson, N. Medical and forensic aspects of the man depicted on the Shroud of Turin", *Proc. IWSAI Frascati* (P. Di Lazzaro ed. ENEA, 2010) pp. 181-186.

<http://www.acheiropoietos.info/proceedings/SvenssonWeb.pdf>.

and serum from wild type and Gunn rats was obtained from RRRC, University of Missouri, USA. The Gunn rat contains a spontaneous mutation in the UDP-glucuronosyltransferase (*ugt*) gene and expresses high levels of bilirubin, approximately 7x that of normal, all in the unconjugated form⁷. Whole blood and serum from wild type and *hugt* *-/-* mice was kindly provided by Drs. Robert Tukey and Nghia Nguyen, University of California, San Diego, USA. In *ugt* *-/-* mice, the UDP-glucuronosyl transferase gene has been genetically disrupted; these mice express extremely high (lethal) levels of bilirubin. In *hugt* *-/-* mice, the UDP-glucuronosyltransferase gene has been genetically disrupted and replaced with a human counterpart; these mice express high levels of bilirubin, approximately 10-12x above normal⁸.

Saponin preparation and treatment of textiles

Four sources of saponin were used in these studies: extracts from soapwort roots and leaves, prepared according to the methods of Budan *et al.*⁹; saponin on an applicator stick, obtained from In His Hands Birth Supply company (Liberty Hill, TX); and saponin solution (in glycerol, water) purchased from HawaiiPharm, HI through amazon.com. For pre-treatment experiments, filter paper or linen was soaked overnight in saponin solution or solvent alone (control), removed and allowed to dry. In experiments using saponin on an applicator stick, saponin was mixed directly with the cell preparation prior to addition to linen or filter paper. Triton X-100 detergent was purchased from amazon.com (USA) and used at a final concentration of 1%.

Hemoglobin release assay

Following treatment, phosphate buffered saline was added, samples were spun in a microcentrifuge, supernatant removed, and transferred to a new tube; supernatants were analyzed using a GENESYS 20 spectrophotometer at an absorbency of 543, as described by Rodi *et al.*¹⁰

Bilirubin preparation.

Unconjugated and conjugated bilirubin (Cayman Chemical Co., Ann Arbor, MI) were resuspended in chloroform or water, respectively, at a concentration of

⁷Chowdhury, JR, *et al.* Gunn rat: A model for inherited deficiency of bilirubin glucuronidation. 1993, *Adv Vet Sci Comp Med* 37: 149-173.

⁸Chen, S and Tukey, RH. Humanized UGT1 mice, regulation of UFT1A1, and the role of the intestinal tract in neonatal hyperbilirubinemia and breast milk induced jaundice. *Drug Metabolism and Disposition* 2018; DOI: <https://doi.org/10.1124/dmd.118.083212>.

⁹Budan, B. *et al.*, Potential of extracts from *Saponaria officinalis* and *Calendula officinalis* to modulate in vitro rumen fermentation with respect to their content in saponins. 2014, *Bioscience, Biotechnology, and Biochemistry* 78:288-295.

¹⁰Rodi, PM *et al.*, Comparative study of the interaction of CHAPS and Triton X-100 with the erythrocyte membrane. *Biochim Biophys Acta*. 2014 Mar;1838(3):859-66. doi: 10.1016/j.bbame.2013.11.006. Epub 2013

10 mg/ml. The reported average range for total bilirubin is 0.2-1.0 mg/dL, with levels in healthy individuals of ~ 0.7 mg/dL and 0.3 mg/dL for unconjugated and conjugated bilirubin, respectively. For these studies, a normal level for total bilirubin was taken at 1.0 mg/dL, and exogenous bilirubin added to whole blood for a final concentration of 100-500 mg/dL. Control groups received solvent alone at the equivalent volume.

Chemical induction of methemoglobin

NaNO₂ treatment of whole blood or lysates to induce methemoglobin formation was performed according to the method of Patton *et al.* [19], and was typically used at a concentration of 50 mM. Methemoglobin formation was verified by spectrophotometry using a PASCO 2600 portable spectrometer.

RESULTS

Effect of hemolysis on bloodstain colour

The effect of hemolysis on bloodstain colour was examined in two different ways, first by adding blood to material that had been treated with saponin extract, prepared from roots or leaves from the soapwort plant, and second, by addition of red blood cell lysates prepared by detergent (saponin) or non-detergent methods (freeze-thaw). As demonstrated in Figure 1 (Figures located at end of chapter), blood was oxidized to a similar brown colour on linen that had been pre-treated with saponin extracts, as that of untreated linen. Relatedly, when cells were lysed using saponin on an applicator stick or by freeze-thaw methods, and then added to untreated material, a reddish colour did not persist over time (Figure 2). Similar results were observed when saponin sticks were solubilized in distilled water and the solution used to pre-treat linen or filter paper (data not shown). The effectiveness of saponin in induction of hemolysis was evaluated by hemoglobin release, using spectroscopy as described by Rodi *et al.*¹¹ Extracts from saponin roots were 94% as effective as Triton-X 100 detergent in hemolysis induction, which was used as the standard (set at 100%) in this assay (Figure 3A). Saponin leaves were less effective, at 65% (Figure 3A). When cells were lysed using saponin on an applicator stick or freeze-thaw methods, these were 75% and 95% as effectual as Triton-X 100, respectively (Figure 3B). Taken together, these data show that hemolysis is not associated with the persistence of red colour in bloodstains over time.

Interestingly, unlike previous results when a fourth source of saponin was utilized, a reddish colour was maintained by the bloodstains (Figure 4). This particular saponin (Saponin 4) was purchased in an aqueous form, containing ~ 40% glycerol. Most important, a similar colour effect was observed in groups that

¹¹*Ibid.*

were treated with glycerol in the absence of saponin (Figure 5a). The reddish colour with glycerol treatment persisted for at least one week, but was not observed after several months (Figure 5b). Collectively, these results indicate that the colour results observed with this specific saponin solution, Saponin 4, can be explained as a nonspecific consequence of glycerol (glycerin).

Effect of bilirubin on bloodstain colour

Next, I examined the effect of bilirubin on bloodstain colour, which as previously mentioned relies on Adler's premise that a brown colour (methemoglobin) plus yellow/orange (bilirubin) would result in a reddish appearance. Bilirubin exists in two forms in the body, an unconjugated form which is water-insoluble, and a conjugated form which is soluble; conjugation is necessary for bilirubin to be effectively excreted from the body. Adler would particularly favour the unconjugated form of bilirubin being in excess, due to the rapid occurrence of hemolysis resulting from a proposed excess of physiological trauma¹². Methemoglobin (deoxygenated hemoglobin) is formed during the natural aging of bloodstains, but may also be rapidly induced by treatment with NaNO₂¹³. As shown in Figure 6, NaNO₂ treatment effectively oxidized blood to a brownish colour; this was observed when either whole blood or lysates were used (Figure 7). The presence of methemoglobin following NaNO₂ treatment was verified by spectrometry analysis (data not shown).

As shown in Figure 8, bloodstains in control and NaNO₂-treated samples containing 100 times normal levels of bilirubin (in the unconjugated form) were comparable in appearance (Figure 8). Most important, when blood containing high levels of unconjugated bilirubin was aged naturally (without any NaNO₂ treatment), a brownish colour was observed with time, similar to control groups (Figure 9). Identical results were obtained when comparable levels of conjugated bilirubin were used (Figure 10), or when samples contained a mixture of both bilirubin forms (Figure 11). Bilirubin was also used at lower (10x) and higher (200x, 500x) levels, but in no instance did a reddish colour continue over time (data not shown). Taken together, these data demonstrate that the reddish colour does not persist in bloodstains containing high amounts of bilirubin, present in either unconjugated or conjugated forms.

¹²Heller, JH. *Report on the Shroud of Turin*, Boston, MA. Houghton-Mifflin Co; 1983.
Heller, JH, Adler AD. Blood on the Shroud of Turin. *Applied Optics*. 1980; 19:
27422744.

Heller, JH, Adler A. A Chemical Investigation of the Shroud of Turin *Canadian Forensic Society Scientific Journal*. 1981; 14: 81-103.

¹³Budan, B. *et al.*, Potential of extracts from *Saponaria officinalis* and *Calendula officinalis* to modulate in vitro rumen fermentation with respect to their content in saponins. 2014; *Bioscience, Biotechnology, and Biochemistry* 78:288-295.

Finally, in extension of these results, experiments were also performed using blood from rodent strains that contain endogenously high levels of bilirubin *in vivo*, specifically the Gunn rat and *ugt -/-* mice. The Gunn rat contains a spontaneous mutation in the gene responsible for bilirubin conjugation, with hyperbilirubinemia, all in the unconjugated form. In *ugt* knockout mice (*ugt -/-* mice), the conjugation gene has been intentionally deleted, such mice have a very finite life span (days to one week). *Hugt -/-* mice are knockout mice with a human copy of the conjugation gene, which still exhibit hyperbilirubinemia at a young age. In agreement with our previous results using human blood with exogenous bilirubin added *in vitro*, a reddish colour did not persist in bloodstains from rodent strains with hyperbilirubinemia (Figures 12, 13).

DISCUSSION

The current study represents the first examination of the hypothesis proposed by Rogers that hemolysis resulting from a surface residue of saponin is responsible for the reddish colour of the TS bloodstains. These data demonstrate that bloodstain colour was not affected by various hemolytic agents, including saponin obtained from multiple sources. Rogers suggested the surfactant saponin was responsible due to its reported use in ancient linen manufacturing; however, if the reddish colour of the bloodstains on the TS were specifically due to the action of a hemolytic agent, various lysis methods should yield a similar result. As demonstrated in this report, hemolysis was not associated with persistence of red colour in bloodstains.

In the one case where saponin appeared to affect bloodstain colour, this was shown to be a nonspecific effect due to the presence of glycerol (glycerin). Glycerol is used in the freeze preparation of red blood cells¹⁴, and can induce hemolysis at room temperature, although this is the first instance that I am aware of in which a colour effect on bloodstains has been noted. The colour effect could be an important consideration in the investigation of homicides where the victim had recently washed with a hi-glycerin product, or residual towels were used in the cleanup of bloodstains afterwards. Unlike experimental results, where the starting point may be documented for comparison, such data may not be obtainable in various crime scenes, making the initial evaluation of bloodstain appearance (colour) somewhat subjective. Bloodstains on fabrics containing residues from hi-glycerin soaps might seem more recent due to their reddish colour. In future studies it will be interesting to determine if treatment of textiles with other related compounds shows a similar effect on bloodstain appearance.

¹⁴Pyle, HM. Glycerol preservation of red blood cells. *Cryobiology*. 1964; 1: 57-60.
Lusianti, RE, *et al.*, Rapid removal of glycerol from frozen-thawed red blood cells.
Biotechnol Prog. 2013; 3: 609-620.

A second hypothesis related to the TS was evaluated, that the reddish colour of bloodstains is related to high levels of hemolysis, methemoglobin, and bilirubin. A few reports related to the TS have examined the effect of bilirubin on bloodstain colour; however, as noted in the introduction, such studies were limited by several constraints. The current results importantly extend these previous studies by: i) using blood without anti-coagulants; ii) including much higher levels of bilirubin; and iii) specifically focusing on the various forms of bilirubin that were present. I found that increased bilirubin levels did not result in the persistence of the reddish colour of bloodstains over time, regardless of which type of bilirubin predominated. These results argue against an elevated bilirubin level being responsible for the reddish colour of bloodstains on the TS. Instead, they provide evidence that a high bilirubin content does not affect the appearance of bloodstains over time.

Why are the Shroud's bloodstains reddish in colour? The answer remains unsolved, although using blood from a jaundiced patient and a continuous wave of ultraviolet (uv) irradiation, Lascio and colleagues have recently suggested that a combination of high bilirubin/uv exposure generates a colour shift that is still measurable after four years¹⁵. Although in Adler's studies on the TS, no estimation of specific bilirubin levels/amounts was given, the suggestion that the high bilirubin levels exist in TS bloodstains is interesting as bilirubin is notably light sensitive. Whether or not the stability of bilirubin in bloodstains is dissimilar, particularly over many years, is unclear.

Adler's hypothesis is based on the suppositions that the TS bloodstains are the result of the cloth being wrapped around a body, a body that had undergone severe trauma within the previous twenty-four hours, resulting in increased levels of endogenous bilirubin. As noted in the introduction, a paucity of information exists regarding the correlation of bodily suffering with alterations in bloodstain colour, although in fairness, this may be an issue that has not received much prior attention. Several years ago, Lee and colleagues made the interesting observation that bilirubin is also found in the red-orange fruits and flowers of certain plants, which is chemically indistinguishable from bilirubin expressed in humans¹⁶. Some might argue that an artisan may have used a plant with a red-orange pigment to mix with blood for colouration, and unknowingly also added bilirubin (in a relatively concentrated form) in the creation of the TS. It is uncertain if such plant pigments would have been detected in the relatively limited studies that have been performed on TS bloodstains. On the other hand, if bilirubin levels were the result of physical trauma, this could be an important factor in bloodstain evaluation,

¹⁵Lascio, AD, *et al.*, Investigating the colour of the blood stains on archaeological cloths: the case of the Shroud of Turin. 2018; *Applied Optics* 57: 6626-6631.

¹⁶Prione, C, *et al.*, Animal pigment bilirubin discovered in plants. *J. Am Chem. Soc.* 2009; 131: 2830.

Prione, C, *et al.* Bilirubin present in diverse angiosperms. *AoB Plants*. 2010; p11020, PMID 22476078.

particularly in relation to victims of severe suffering or torture. Perhaps this is a consideration for forensic investigators and pathologists in the future, to note any anomalies (or not) in the colour of aged blood under such circumstances.

FIGURES

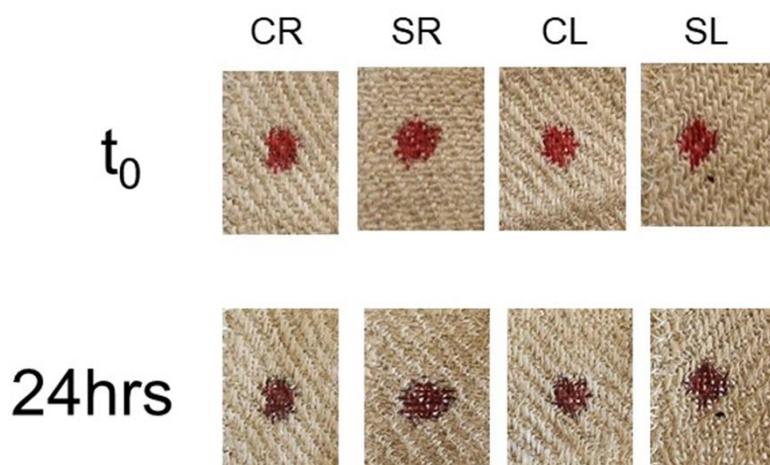


Fig. 1. Bloodstain colour on linen treated with saponin extracts. Linen samples were treated with saponin extracts purified from soapwort roots (SR) or leaves (SL) as described in Materials and Methods. Control extracts (CR, CL) were prepared in parallel and were treated identically as those containing saponin. Whole blood was added to the cloth and colour evaluated immediately (t_0) or 24 hours later. The data shown are representative of three separate experiments.

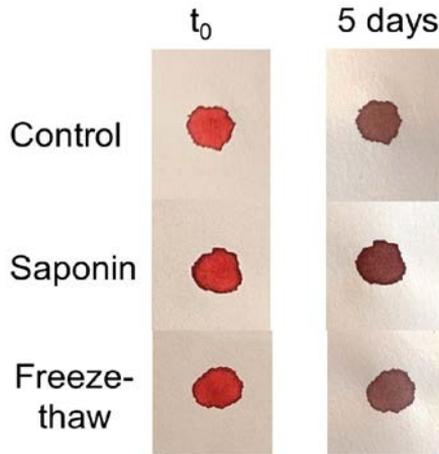


Fig. 2: Effect of hemolysis on bloodstain colour. Whole blood was either untreated (control), treated with saponin on an applicator stick, or subject to several cycles of freeze/thawing to induce hemolysis. Samples were applied to filter paper and colour evaluated immediately (t_0) or 5 days later. The data shown are representative of three separate experiments.

Fig. 3: Hemolysis induction as measured by hemoglobin release. Samples were treated with the indicated substance and supernatants evaluated at an absorbency of 543 nm to measure release of hemoglobin, indicative of cell lysis. Panel A (Top): C = Control; SAP-L = Extract from saponin leaves; SAP-R = extract from saponin roots; Tx-100 = Triton X-100 detergent. Panel B (Bottom): C = Control; SAP-St = Saponin on an applicator stick; FT = Freeze Thaw; Tx = Tx-100 detergent. Each group was performed in triplicate; data are the means plus standard deviations of absorbency at 543 nm. The results shown are representative of three separate experiments.

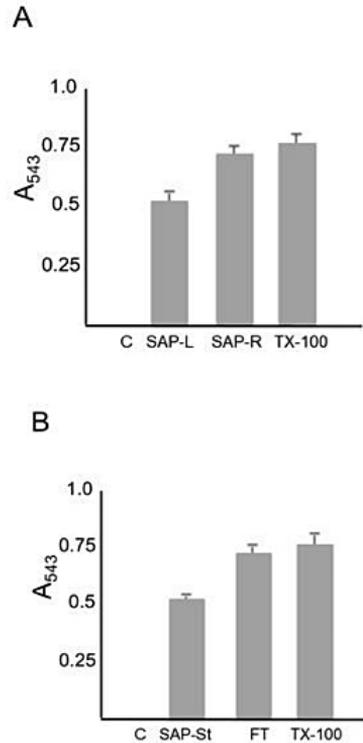


Fig. 4: Effect of saponin solution 4 on bloodstain colour. Whole blood was added to linen pre-treated with the indicated solutions and colour evaluated. Control samples were treated with distilled water; SAP 4 is a commercially prepared aqueous solution of saponin. TX-100 = Triton X-100 detergent. The data shown are representative of three separate experiments.

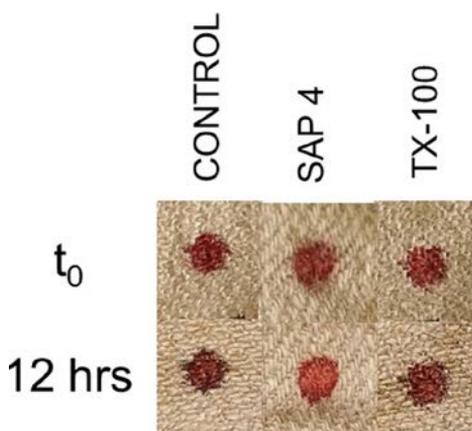


Fig. 5a: Short term effect of glycerol on bloodstain colour. Filter paper was pre-treated with distilled water (control), saponin 4 solution (SAP 4), or 40% glycerol solution (GLY). Whole blood was added and colour evaluated at the time period indicated. The data shown are representative of three separate experiments.

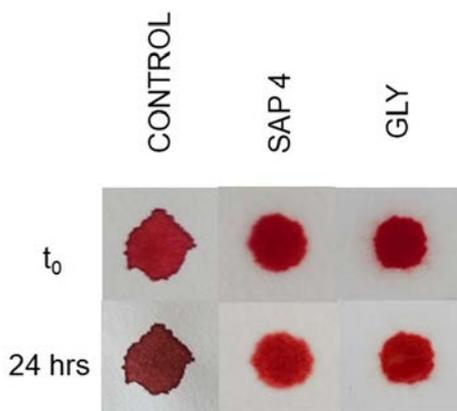
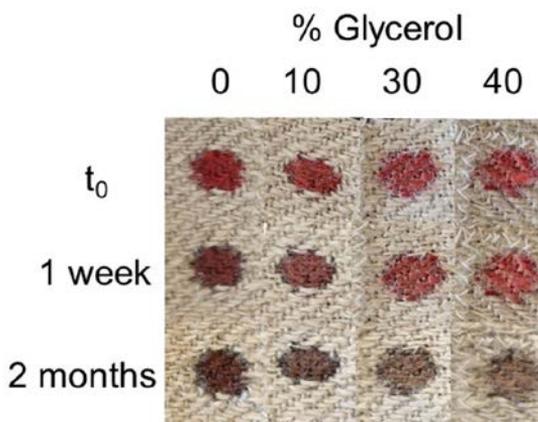


Fig. 5b: Long term effect of glycerol on bloodstain colour. Linen was pre-treated with glycerol solution at various concentrations; whole blood was added and colour evaluated at the time period indicated. The data shown are representative of three separate experiments.



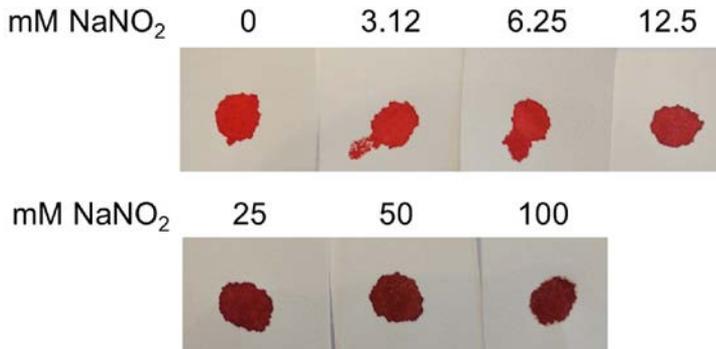


Fig. 6: Dose response treatment of NaNO_2 and bloodstain colour. Blood was treated with the indicated concentration of NaNO_2 to induce formation of methemoglobin, and transferred immediately to filter paper. The data shown are representative of three separate experiments.

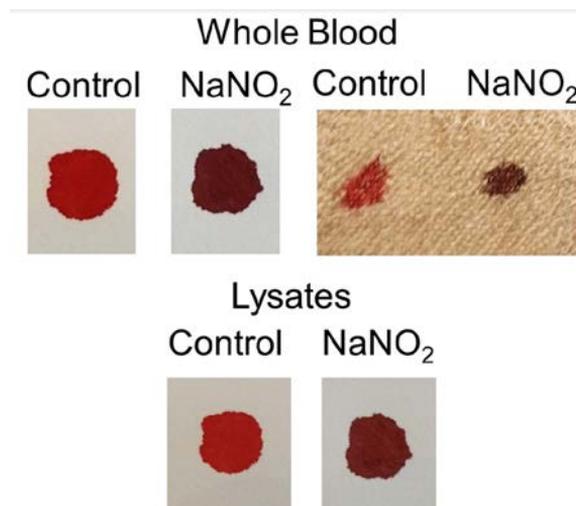
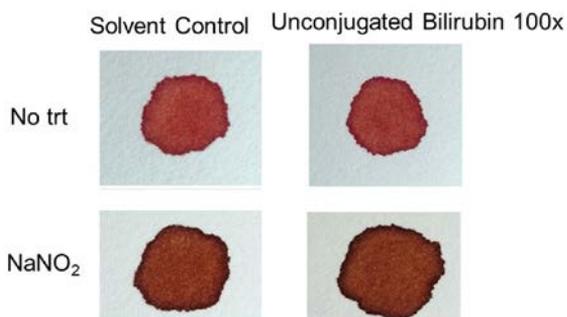


Fig. 7: Effect of NaNO_2 treatment on colour of whole blood and lysates. Whole blood (top) or lysates (bottom) were treated with the concentration of NaNO_2 indicated, and transferred to material. Colour was evaluated immediately. In the groups shown on the top left, filter paper was used, on the top right, linen. In the bottom group (lysates), filter paper was used. The data shown are representative of three separate experiments.

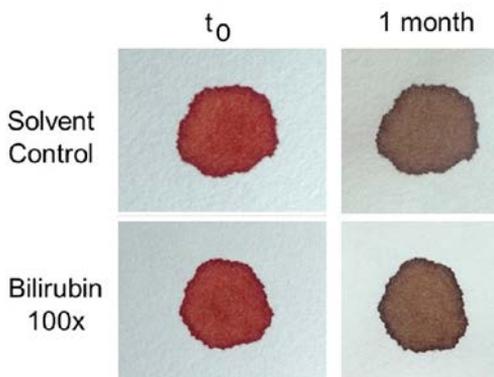
NaNO₂ Treatment (lysates)

Fig. 8: Effect of NaNO₂ treatment plus high bilirubin on bloodstain colour. Lysates were treated with NaNO₂ and mixed with unconjugated bilirubin corresponding to 100x normal levels (see Materials and Methods for details), then transferred to filter paper. Colour was evaluated immediately. The data shown are representative of three separate experiments.



Unconjugated Bilirubin

Fig. 9: Effect of high bilirubin (unconjugated) on bloodstain colour. Whole blood was mixed with unconjugated bilirubin corresponding 100x normal levels (see Materials and Methods for details), then transferred to filter paper. Colour was evaluated immediately and one month later. The data shown are representative of three separate experiments.



Conjugated Bilirubin

Fig. 10: Effect of high bilirubin (conjugated) on bloodstain colour. Whole blood was mixed with conjugated bilirubin corresponding 100x normal levels (see Materials and Methods for details), then transferred to filter paper. Colour was evaluated immediately and one month later. The data shown are representative of three separate experiments.

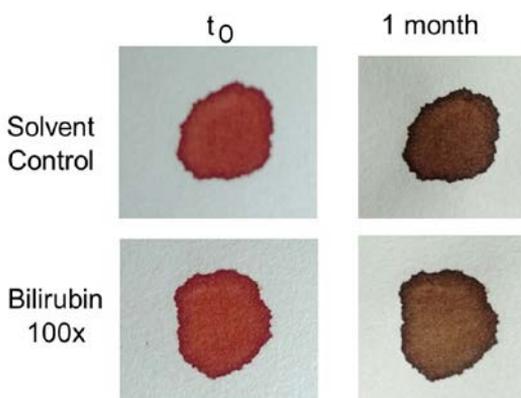


Fig. 11: Effect of high bilirubin (unconjugated + conjugated) on bloodstain colour. Whole blood was mixed with unconjugated and conjugated bilirubin corresponding 100x normal levels (see Materials and Methods for details), then transferred to filter paper. Colour was evaluated immediately and one month later. The data shown are representative of three separate experiments.



Fig. 12: Reddish colour does not persist in blood from Gunn rats, a rodent model containing high levels of endogenous bilirubin *in vivo*. Blood from Gunn rats was transferred to filter paper, and colour was evaluated immediately and 8 months later. The data shown are representative of three separate experiments.

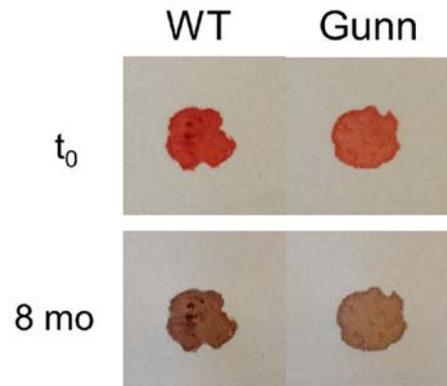
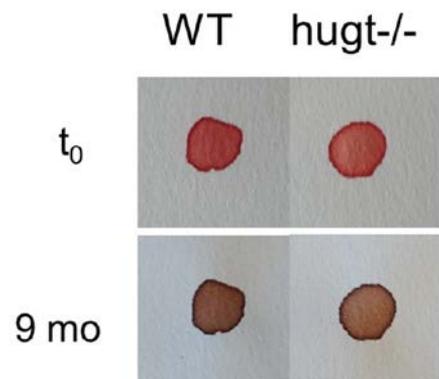


Fig. 13: Reddish colour does not persist in blood from hugt^{-/-} mice, a rodent model containing high levels of endogenous bilirubin *in vivo*. Blood from wild type (WT) or hugt^{-/-} mice was transferred to filter paper, and colour was evaluated immediately and 9 months later. The data shown are representative of three separate experiments



17. 3D Information in the Fields of Bioenergetics and Quantum Theory

Joseph G. Marino & M. Sue Benford(†)¹

Abstract

In the early 1900's, the field of "radionics" began. This field uses electronic devices for conducting distant diagnosis, analysis and treatment of plants, animals and humans. Radionics detects 'bioenergy,' first discovered by Stanford University research physician, Albert Adams. Following his lead, British engineer George DelaWarr built in the 1950s a remote-imaging camera. This camera, using only a small sample of the subjects' sputum, hair or blood, was supposed to image their internal conditions from a distance. When the camera's tuning dial was set to the suspected resonant disease, it could detect 3D holographic bioenergy radiations from the subject. Although this form of complementary and alternative medical (CAM) treatment is not recognized by the United States Food and Drug Administration, it has been shown that various animals and insects, as well as humans, all process holographic information. Holograms have a property called "distributedness," which means that any portion of a recorded hologram contains sufficient data to reconstruct the complete original 3D information pattern. Thus, holographic biophysical radiation can be present in the sputum, hair or blood of the subject. Initially, portions of the radiation were captured on a photographic plate, which reveals only 2D information, but in the 1990's, 3D information was found encoded in these images. A research study was conducted on the camera in 1951 at St. Bartholomew's Hospital in London, where it confirmed the diagnoses of 400 patients. However, DelaWarr faced complex political, scientific, and social scrutiny in post-war England, and despite the success of the 1951 study, his discoveries were virtually forgotten and untested. Notable scientists, such as the late Apollo astronaut Edgar Mitchell, and the late biophysicist John Heller both believed in the validity of DelaWarr's work. This endorsement suggests that the Turin Shroud should be considered in light of radionics and the DelaWarr camera.

INTRODUCTION

Billions of dollars are spent in the United States each year on complementary and alternative medical (CAM) treatments. Many proponents of these techniques believe that a "life force," or bioenergetic radiation, exists in and around all organisms mirroring disease conditions and abnormalities in the physical body. As a result, many CAM practitioners subscribe to the belief that it is possible to "scan"

¹Deceased 2009

a person's aura, or energy field, to uncover such maladies. Based upon a similar premise, a remote-imaging camera was invented in the 1950s by British engineer George DeLaWarr²; it was initially created to assist medical practitioners in diagnosing disease at its earliest stages and was highly successful in creating thousands of diagnosis-quality internal and external images, which recent research revealed contains 3-D spatial information. It is primarily this 3-D spatial-encoding characteristic, and the unique manner in which the images are created, that links the DeLaWarr QuantaGraphs® with the Turin Shroud (TS). Both phenomena can be further equated to modern-day Magnetic Resonance Imaging (MRI).

In 1948, Dennis Gabor, who won a Nobel Prize in physics, discovered holography while successfully inventing the highest-resolution microscope wrote, "It is a striking property of these diagrams that they constitute records of 3D as well as plane (p-l-a-n-e) objects. One plane after another of extended objects can be observed in the microscope, just as if the object were really in position" (*Nature*, May 15, 1948). Much research exists regarding holographs in nature. These studies show that dolphins, bats, fish, flies, birds and humans all process sensory information holographically.

Holographs have a property called "distributedness," which means that any fractional portion of the recorded hologram contains sufficient information to reconstruct the complete original 3-D information pattern. Consequently, it can be posited that within humans, the holographic biophysical radiation can be present in blood, sputum, hair and other small subsets of the human subject, due to the holographic property of distributedness.

Russian scientists have likely measured this holographic bioenergy without discovering its holographic nature. Their research, which suggests the existence of a previously-undetectable subtle radiation linked to physical DNA, may support the hypothesis of an intact energy field containing relevant information of the organism is able to couple to an optical imaging device³

A discovery, made by one of the authors (Benford, in 1999), revealed that the DeLaWarr images vary from X-rays in that they produce a spatially-encoded three-dimensional (3-D) effect, similar to those possible via MRI, which is detectable with the use of VP-8 image analysis technology and/or computerized

²Day, Langston in collaboration with George DeLaWarr: 1963. *New Worlds Beyond the Atom*. New York: Devin-Adair.

³Gariaev PP et al.: 1992. "Investigation of the Fluctuation Dynamics of DNA Solutions by Laser Correlation Spectroscopy." *Bulletin of the Lebedev Physics Institute*, 11-12; 23-30.

Gariaev PP and VP Poponin: 1995. "Vacuum DNA phantom effect *in vitro* and its possible rational explanation." *Nanobiology*. Accessible online at <http://www.soulsofdistortion.nl/dna2a.html>. Accessed 15 November 2019.

digital 3-D software⁴. The VP-8 Image Analyzer is an analog device while the commercially-available Bryce4 Software is digital. Both techniques convert image density (lights and darks) into vertical relief (shadows and highlights). When using either the VP-8 or 3-D software systems, a normal photograph does not result in a three-dimensional image but in a rather distorted jumble of shapes. X-ray images, although spatially superior to routine photographs, are also characteristically distorted. As can be seen in the x-ray of a pelvis (see Figure 1), distortions such as bone-flattening, angle and curvature distortion and lack of accurate soft-tissue reproduction are present.



Fig. 1: Distortions such as bone-flattening, angle and curvature distortion and lack of accurate soft-tissue reproduction are present in x-ray image of a pelvis.

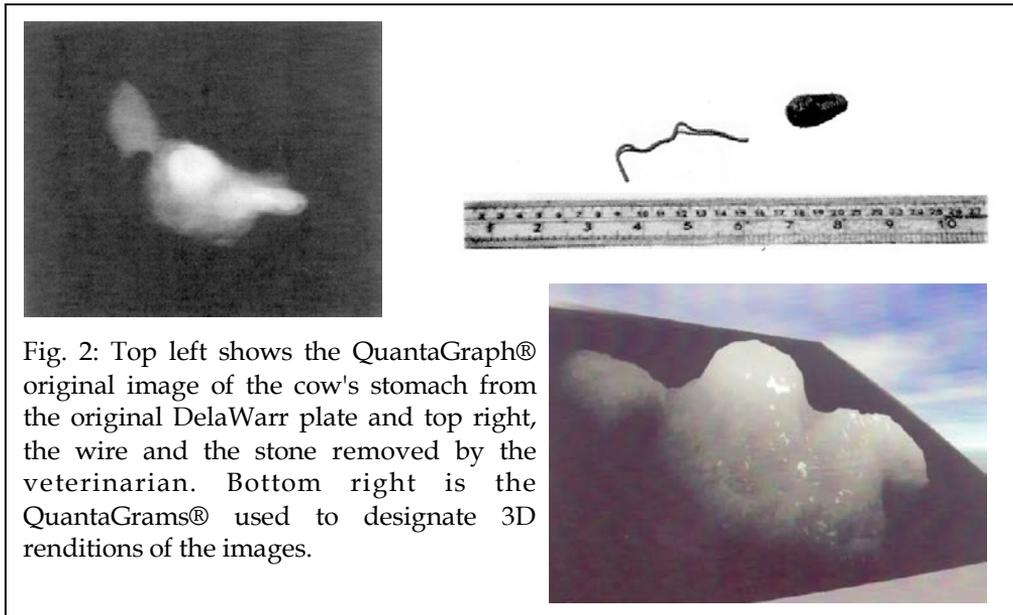
Yet the images produced by DeLaWarr yield very accurate and well-formed three-dimensional relief, as is clearly evident in this QuantaGram® of a cow's stomach (see Fig. 2). (QuantaGram® is used to designate 3D renditions of the images whereas QuantaGraphs® is used to designate 2D renditions of the images.) The observer can select numerous angles by which to review the captured information as well as multiple 3-D relief patterns. Full rotation around the organ and/or object is possible with the digital computer software, thus permitting significantly-enhanced visual assessment. With the original DeLaWarr image, a veterinarian was able to detect a stone and a wire that were later removed. However, the QuantaGram was even able to detect the wire's curvature, which cannot be done with a 2-D analysis.

The late Dr. John Heller, of the New England Institute for Medical Research, who was to later become a member of the 1978 Shroud of Turin Research Project (STURP) that studied the TS during a five-day examination, experimented with many of DeLaWarr's techniques, including the use of radio waves to affect cell behavior. He firmly believed in the validity of DeLaWarr's work⁵.

⁴Benford, MS: 2000. "Empirical Evidence Supporting Macro-Scale Quantum Holography in Non-Local Effects." *Journal of Theoretics*. December, 2(5); accessible online at <http://www.journaloftheoretics.com/Articles/2-5/Benford.htm>. Accessed 8 January 2019.

⁵"Effects of Radio Waves gets Wider Laboratory Study": 1959. *New York Times*. 6 April. Accessible online at <http://www.keelynet.com/biology/delaw2.txt>. Accessed 8 January 2019.

"Radio Waves Found to Affect Cell Behavior": 1959. *New York Times*. 30 March. Accessible at http://www.emraware.com/Documents/rado_waves_cell_behavior.pdf. Accessed 8 January 2019.



DeLaWarr was one of the most successful subtle-energy researchers of all time. Using only a "test object" provided from the subject such as a small blood, sputum or hair sample, this device imaged the subjects' internal conditions at a distance, with a high degree of accuracy. A unique feature of the DeLaWarr camera is that it is able to detect diseases at their earliest stages. In many instances, detection can occur before conventional images such as X-ray, CT, and MRI can resolve anatomical changes. The theory for this is that the DeLaWarr imager is recording the known quantum-field bioenergy radiation for a specific disease. The theory predicts that specific bioenergy radiations, associated with a disease, exists at the very beginning of the disease process, even before physiological changes have occurred. It is only when a specific bioenergy radiation is present that an image will be recorded. If there is no bioenergy radiation present for the selected disease frequency, no image will be recorded, thus leaving the photographic material blank. A common analogy would be tuning a radio dial to 101.3 and receiving nothing because no radio station is transmitting at that frequency and in that region.

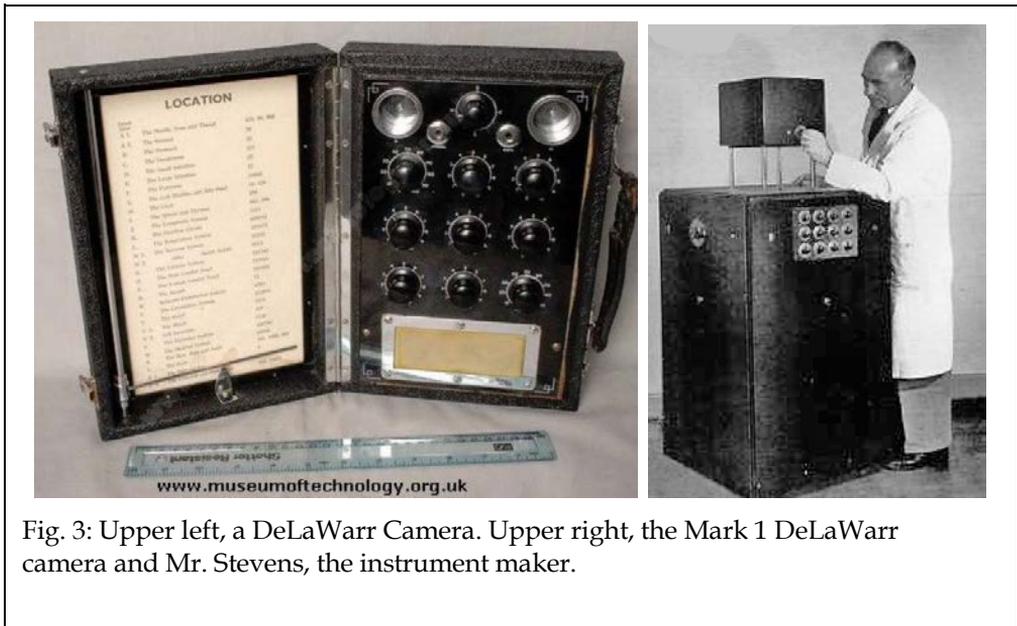


Fig. 3: Upper left, a DeLaWarr Camera. Upper right, the Mark 1 DeLaWarr camera and Mr. Stevens, the instrument maker.

Theory behind QuantaGraphy®

When the DeLaWarr camera was first introduced in the 1950's, there was little scientific understanding of how the system operated, thus fostering intense skepticism and suspicion. In 1951, a research project was instituted at St. Bartholomew's hospital in London to study the applicability of using the DeLaWarr camera to detect various disease conditions under controlled conditions. A physician was trained to use the system and the camera was transported from the DeLaWarr Laboratories to the hospital. More than four-hundred remote images were captured using a drop of blood as the "witness," or test object, for each patient. In order to control for fraud and/or deception in obtaining the images, some of the images were produced with the doctor blinded to the patient's condition. In these randomly-selected cases, the validating data was abstracted from medical records and/or autopsy files after the pertinent remote images were produced. This safeguard was put into place to ascertain whether accuracy in image formation was linked to the operator's prior knowledge of the patient's condition. These tests demonstrated that pre-knowledge was not a factor in producing diagnosis-quality photographs⁶. Despite the fact that there was clear evidence of correct medical imaging and thus could be a valuable medical instrument, the doctor was ordered by higher-ups to discontinue his investigation. It was likely a matter of the device being too far ahead of its time and engendering

⁶Day, Langston in collaboration with George DeLaWarr: 1963. *New Worlds Beyond the Atom*. New York: Devin-Adair.

unbridled skepticism, a common event when advances in science and technology are made.

Due to financial difficulties, the DeLaWarr labs went into a state of dormancy. In the mid-1990s, the late Dr. Peter Moscow purchased the camera and rights to the entire DeLaWarr photographic archive. In 1996, a team of scientists was able to get the camera functioning to a certain degree, thus establishing the premise that further improvements were possible with the augmentation of the existing high-technology. Today, mainstream science may offer a plausible explanation of this complex technology in the form of quantum holographic theory. According to quantum hologram theorist, the late Edgar Mitchell, Sc.D., former Apollo Astronaut and founder of the Institute of Noetic Sciences,

[...]. I have read most of the DeLaWarr book and [...] there is now no doubt in my mind that he was playing with quantum holography (QH), as all the characteristics described in his work, fit exactly the description we have of the QH characteristics [...]. It is clearly the spin involved in charged particles at all levels of complexity that is of major significance in being able to recover and utilize this type of nonlocal resonance at the macro level.⁷

The theories of a holographically-based universe were originally championed by two of the world's most eminent thinkers: physicist David Bohm, a protégé of Einstein's, and Karl Pribram, a highly-respected neurophysiologist from Stanford University. Their holographic model received dramatic experimental support in 1982 when a research team, led by physicist Alain Aspect in Paris, demonstrated that the web of subatomic particles that compose our physical universe possesses what appears to be an undeniable "holographic" property.

Part of this holographic theory posits that holographic images can be projected outside the brain and recorded in a variety of fashions ranging from stigmatas to images. Russian scientists, Dr. Alexander Dubrov and Dr. V.N. Pushkin, have written extensively on this idea. They have stated that proof of the brain's capacity to generate holographic images would require "records of ejection of psychophysical structures outside the brain [...]."⁸

The DeLaWarr photos, although partially assisted with the use of technology, represent images projected from the brain to a photographic plate. However, other more spiritually-based projections have been reported that do not require the use of any technology, only the passion of the operators:

- St. Veronica Giuliani's documented internal passion wounds found on the autopsy where she had previously indicated.⁹

⁷Mitchell, Edgar: 2000. Personal communication from Edgar Mitchell to M. Sue Benford on 5 June.

⁸Dubrov AP and VN Pushkin: 1982. *Parapsychology and Contemporary Science*. New York: Plenum.

⁹Thurston, H:1952. *The Physical Phenomena of Mysticism*. Chicago:Henry Regnery Co.

- St. Teresa of Avila's pierced heart, also later documented on her autopsy.¹⁰
- Nineteenth-century stigmatist Marie-Julie Jahenny materialized a flower on her chest that remained for 23 years.¹¹
- In 1913 a twelve-year-old girl made headlines when she could instantaneously produce pictures on her body.¹²

DeLaWarr created a series of thirteen-thousand images on standard 4 x 5 inch glass plates. Some scientific tests were performed on a few of the plates on 19 April 2000 at The Ohio State University Microscopic and Chemical Analysis Research Center. The scientists there were unaware of the origin of these plates. These tests revealed some strong correlations to characteristics of the TS. As mentioned previously, he claimed these images were created from a "test object," representing the subject who was distant from the camera. He further asserted that the images were not the product of painting, etching, X-ray, etc., but were created when some "unidentified fundamental radiation" interacted with the photoemulsion (a standard silver compound) applied to the surface of the glass plate. He believed this fundamental radiation was somehow linked to magnetism.¹³

In the first phase of the testing, two glass plates from the DeLaWarr archive were examined under a Carl Zeiss light photoscope with a 6.3 multiplier using a variety of amplification settings. The results demonstrated that the silver grains on the surface of the glass plate were bigger in the darker, i.e., more heavily exposed, areas of the image and, subsequently, smaller in the lighter or less-intense portions of the image. This is the typical response of a standard photographic material exposed to a light source. No added pigment, dye, stain or colouration was noted beyond the silver particles.

Phase two of the evaluation involved scraping a sample from the non-image section of the glass plate to determine the chemical composition of the plate itself. The Cameca SX-50 Scanning Electron Microscope (SEM) was used for this analysis. SEM is capable of performing quantitative chemical microanalysis of major and minor elements in solids, including glass. It is ideal for characterization of surfaces or particles, including thin films. The results of this analysis demonstrated that the glass was a standard silicon-based material with no unusual properties.

Phase three included scraping a sample from the image portion of the glass plate. Using the same equipment and procedure as for the non-image sample described above, the SEM results revealed a standard silver-based photoemulsion as described by DeLaWarr. No other pigments and/or proportionately-significant chemicals were identified via the SEM analysis. The OSU scientists concluded that

¹⁰*Ibid.*

¹¹Fort, C: 1974. *The Complete Books of Charles Fort*. New York: Dover Press.

¹²Thurston, H: 1952. *The Physical Phenomena of Mysticism*. Chicago: Henry Regnery Co.

¹³Day, Langston in collaboration with George DeLaWarr: 1963. *New Worlds Beyond the Atom*. New York: Devin-Adair.

the images were, most likely, the result of some "unknown radiation" for which they could not ascertain the origin or composition.

Operation of the DeLaWarr Camera

The question still remains: how is the holographic radiation pattern recorded with the DeLaWarr camera? One must first ask: what is the relationship between the test object and the subject? Secondly, how does the test object carry and transfer the complete information of the subject? Thirdly, how is this information optically obtained by the DeLaWarr camera?

One theory is that the test object contains subtle bioenergy radiations that can affect optical systems and under the right conditions, produce a holographic image. To make a hologram, two optical waves are needed, a reference wave and an object wave. These two waves make a 3-D holographic image by creating an interference pattern frozen in space-time. Both waves are spatially and temporally coherent at the moment of creation, then are separated. The object wave is directed toward the object and experiences intensity changes and phase-shifts. Normal 2-D photos record only the intensity changes of the object wave and do not record the phase-shifts.

However, when a reference wave is directed back toward the emitted object wave, an interference pattern is created, which records the phase-shifts of the object wave relative to the reference wave. These phase-shifts are what produces the apparent freezing in space/time of the object's 3-D image.

This subtle kind of information transfer, also called Einstein, Podolsky, Rosen (EPR) correlation or "entanglement," has been at least partly understood since the 1930s when it was discussed in a famous paper by Albert Einstein, Boris Podolsky, and Nathan Rosen. In the 1960s, John Bell showed that a pair of entangled particles, which were once in contact or coherent but later moved too far apart to interact directly, can exhibit individually-random behavior that is too strongly correlated to be explained by classical statistics. Experiments on photons and other particles have repeatedly confirmed these correlations, thereby providing strong evidence for the validity of quantum mechanics.¹⁴ It is believed that this correlation may be responsible for the interaction occurring between the subject, the test object, the operator of the camera, and the camera itself that ultimately produces the images.

If some or all of this seems hard to accept, I remind you of what the 19th century philosopher Arthur Schopenhauer said how the acceptance of truth normally progresses: stage 1 – It is ridiculed; stage 2 – it is violently opposed; stage 3 – it is accepted as self-evident.

¹⁴Sudbury, T: 1993. "Instant Teleportation." *Nature*. 362:586-587.

Bouwmeester D *et al.*: 1997. "Experimental quantum teleportation." *Nature*. 390:575-579.

Given that there are documented cases in which there have been spiritually-based projections, one must take seriously that Jesus, in some manner, was able to project his front and back images onto his burial shroud.

ACKNOWLEDGMENTS

I would like to recognize my late wife Sue Benford, who was the real force behind this study.



18. Empirical Findings Suggest Comparability Amongst the Turin Shroud (TS), QuantaGraphy®, and Magnetic Resonance Imaging (MRI)

Joseph G. Marino & M. Sue Benford(†)¹

In the background paper previously presented, it was revealed that images from the DeLaWarr camera invented in the 1950s vary from X-rays in that they produce a spatially-encoded three-dimensional (3-D) effect, similar to those possible via MRI. It was also shown that there could be a correlation between the DeLaWarr images and the images from the Turin Shroud (TS). It was mentioned that notable scientists, such as the late Apollo astronaut and quantum-hologram (QH) theorist Edgar Mitchell, and the late biophysicist John Heller, a member of the Shroud of Turin Research Project (STURP) both believed in the validity of DeLaWarr's work. Another STURP member, the late Dr. Don Lynn, who was head of NASA's Galileo, Mariner, Viking and Voyager projects, reviewed some of the DeLaWarr images and the subsequent 3-D renderings and provided invaluable critiques of several earlier versions of this paper.

See what the late astronaut Dr. Edgar Mitchell wrote regarding the possible connection between the DeLaWarr images and the TS:

There is simply no doubt that what DeLaWarr was tapping into was the quantum hologram (QH). He is describing exactly the properties that the formalism suggests should be there. The fact that he was achieving resonance using an array of devices to record acoustic frequencies, magnetic frequencies, visual photographic effects and frequencies is precisely the properties the QH should have, because the information is carried in the phase relationships between the wave forms. The fact that there are preferred polarizations and preferred directions with regards to the Earth's magnetic field for many of the specimens, organs, organisms, conditions, experiments, etc., demonstrates the complex interactions between all levels of chemical, electromagnetic and quantum properties. The fact that a complete mapping can be visually presented in 3-D is also a QH property [...]. It is also demonstrating that one is dealing with different scale sizes of matter and energy, but not different kinds of stuff [...]. *It is reasonable that if the Shroud is indeed a human image, that it was deposited by the same type interactions that you propose [our emphasis].*²

STURP had been given in 1978 five days around the clock to do non-destructive testing on the TS. The team determined that the image is comprised of "yellowed surface fibrils of the linen that are at more advanced stages

¹Deceased 2009

²Mitchell, Edgar: 2000. Personal communications via email from Edgar Mitchell to M. Sue Benford. June.

of degradation than the non-image linen. The chromophore is a conjugated carbonyl." STURP acknowledged that no plausible explanation has been postulated as to how the body image got on the cloth.³

Although disagreements abound about the TS, many scientists agree on various key points about its image:

- There are no significant traces of paint, pigment, dye, ink or stain
- The image is purely superficial, penetrating only the top two microfibrils
- No directionality to the image as with brush strokes
- No outline to the image as would be necessary for it to be a work of art
- No cementing of fibrils as would occur with the application of any liquid substance
- Uniform intensity on both front and back images. No variations in density
- No particles between the threads, which excludes any kind of powder rubbing
- No liquids used to create an image except for the blood images. No paint binder
- The original is a "negative" capable of producing a photographic positive that appears to be a crucified man

Dr. John Jackson, a physicist who was a co-founder of the STURP team, made some interesting observations about the image⁴:

- [...]. [I]t seems as though the image formation mechanism acted through space, between the body and the cloth, such as for diffusion or radiation. However, these mechanisms must be excluded, because, although they can discolour the cloth at a distance, they cannot form a high resolution, sharp image, such as what we find on the TS.
- [...]. [I]t thus seems as though we are looking at the internal skeletal structure of the hand imaged through the intervening flesh tissues onto the TS cloth.
- [...]. [I]t follows that whatever mechanism produced the image of the body onto the cloth, it must be a radically different mechanism than any physical mechanisms that have been considered to date. For what process is capable of rendering internal body structure into the image patterns that we see on the TS?
- Immediately, we recognize that the image must have been generated by some principle whereby body structure became encoded into varying shades of intensity on the cloth.

Further analysis revealed that, when the body image was generated, the TS apparently deformed to a somewhat flatter draping configuration, laterally positioning the image of the sides of the face several centimeters inside the bloodstain pattern. The fact that there is a several centimeter discrepancy between the locations of the bloodstains in the hair and the sides of the face are problematic

³Jumper E *et al.*: 1984. "A comprehensive examination of the various stains and images on the Shroud of Turin. *ACS Advances in Chemistry* 205:447-476. Accessible at <https://www.shroud.com/pdfs/Comprehensive%20Exam%20of%20Stains%20Jumper%20et%20al%201984%20OCR.pdf>. Accessed 23 January 2019.

⁴Jackson JP: 1991. "An Unconventional Hypothesis to Explain All Image Characteristics Found on the Shroud Image." In *Symposium Proceedings: History, Science, Theology and the Shroud*. St. Louis, MO, 22-23 June, pp. 325-344.

for image-formation theorists who attempt to relate the cloth and body correlation as essential to the image itself.⁵ The DeLaWarr process eliminates the need for such a correlation between the image and the actual physical body as the images are produced holographically from a portion of the bioenergetic, not the physical, body.

Further problems exist for researchers in attempting to explain image-intensity discrepancies between the frontal and dorsal images of the TS that may be explained by a bioenergetic radiation mechanism.⁶ Scientific calculations determined that there should be a nearly two-order of magnitude difference in pressure between frontal and dorsal cloth contact regions. However, this was not reflected in the relief amplitudes, or plateau effects, generated via the VP-8 analyses of the frontal and dorsal images. This unexpected result suggests a pressure-independent mechanism may have created the TS image.⁷ Clearly, the DeLaWarr QuantaGraphy® process is "pressure independent."

Three other notable similarities exist between the DeLaWarr images and the TS. First, both were created (putatively in the Shroud's case, definitely in the DeLaWarr case) in complete darkness without use of any visible light source. In the case of the TS, the darkness is implied by the sealed tomb enclosure; whereas, the DeLaWarr system is encased in total darkness while the images are produced. Second, the image-creation process involves substantial amounts of vibration to the encasement structure around the test object (camera with DeLaWarr; tomb with TS). The DeLaWarr system utilizes a vibrational device during the "exposure" time which is required in order to facilitate the "fixing" of the image clearly. According to the New Testament (Mt. 28:2), an "earthquake" shook the tomb of Jesus' and this may have occurred around the time his tomb was discovered empty by the women. Such an earthquake, if it indeed did occur, may also account for the rolling away of the heavy stone at the entrance to the tomb. This argues for an acoustic optical transduction process to be in operation in both phenomena. Third, the TS and the DeLaWarr images both require(d) clear human (or perhaps super-human in the Shroud's case) intentionality in order for the images to appear. As noted previously, the TS image is a negative capable of producing a photographic positive. However, according to Italian scientist and TS researcher, the late Giovanni Riggi di Numana, this image is not a photographic negative but, rather, a "magnetic negative."⁸

⁵*Ibid.*

⁶*Ibid.*

⁷Jackson JP *et al.*: 1984. "Correlation of image intensity on the Turin Shroud with the 3-D structure of a human body shape." *Applied Optics*, July, 23:2244-2269.

⁸Riggi di Numana, Giovanni: 1994. Presentation at University of Southern Indiana (Evansville); Shroud Symposium. 12 Feb.

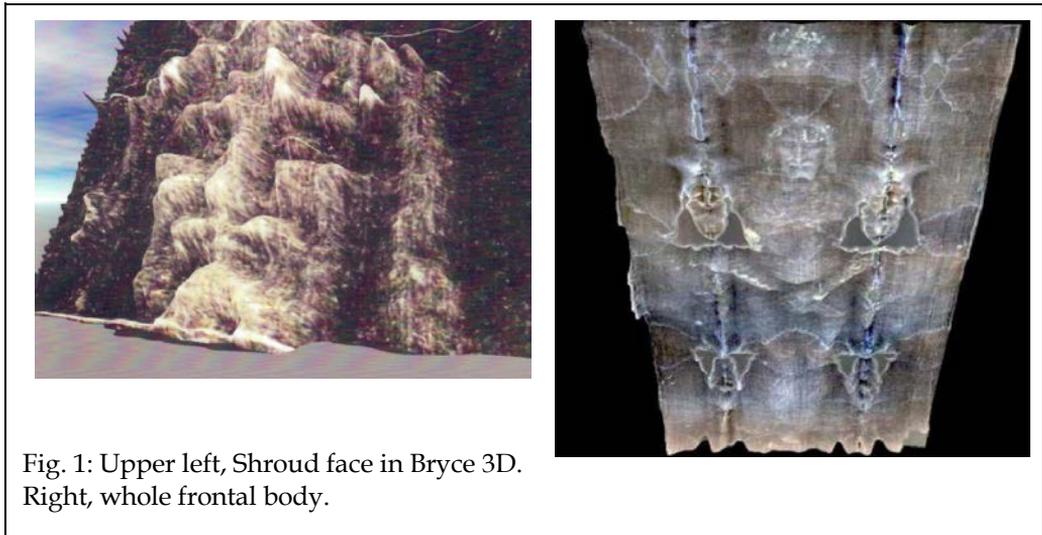


Fig. 1: Upper left, Shroud face in Bryce 3D. Right, whole frontal body.

Comparison with MRI

Magnetic Resonance Imaging (MRI) is one of the most advanced diagnostic imaging systems available today. MRI images are formed by the combination of a strong magnetic field and radio waves interacting with the hydrogen protons in the body. Patients are enclosed in a magnetic field created by a large magnet, which causes the spinning nuclei of hydrogen atoms within the body to change their axes of rotation. Altering the magnetic field by sending radio waves through it further affects the behavior of the hydrogen protons by causing them to move out of alignment. When the radio signal stops, the protons relax back into alignment and release energy. These changes in excitation and relaxation are recorded by receivers (antenna coils), then mathematically reconstructed by a sophisticated computer into spatially-encoded two- and three-dimensional pictures of the body.⁹

MRI and the DeLaWarr Images: Blinded comparison

In June 2000, a blinded evaluation was conducted of several 3-D reconstructions from the original DeLaWarr archive. The review was done by Dr. Philip Morse, MRI expert and now Professor Emeritus of Chemistry at Illinois State University, and resulted in several important findings. Believing that what he was examining were computer-generated MRI-related renderings, Morse commented,

⁹"What is Magnetic Resonance?:" 2001. Reference accessible at <https://web.archive.org/web/20010215214149/www.picker.com/mr/whatismr.htm>. Accessed 8 January 2019.

What it looks like you've done is generate a 3-D image using intensity data as the third dimension with some shading [...]. To get actual 3-D information would require multiple images from different angles and a more complex reconstruction algorithm. It can be done from, for example, MRI slices [...]. You have some great images!!!¹⁰

In attempting to explain the DeLaWarr technique in terms of the principles of MRI, Morse used the cow's stomach images referred to in the previous paper. He commented,

The object is one dimension (wire) so bends will be reflected in the intensity differences depending on the amount of other material surrounding it. The 2-D image actually encodes the spatial distribution of the object because it is only one-dimensional in the first place, so position (location in the stomach) could be encoded by intensity [...]. I'd need to see your (computer) code to figure out what you're doing. I don't see any need at the moment to postulate anything other than graphical manipulation (in the most positive sense) to generate the images you produced. However, if you are using some other method to obtain the images, then ---- THAT is interesting!¹¹

Clearly, the images easily passed muster as excellent, if not superior, reconstructions of some type of "MRI" imaging. Undeniably, no computer code or MRI slice compilation was used in capturing, or rendering, any of the DeLaWarr images. A comparison between MRI, the DeLaWarr images (QuantaGraphy®), and the TS is provided in Table 1 in the PowerPoint presentation found at:

https://www.academia.edu/40320089/_PowerPoint_for_3D_information_in_the_Fields_of_Bioenergetics_and_Quantum_Theory located on the 2019 Conference website. Go to www.custance.org and click on '2019 Conference.'

Summary

The late Canadian physicist and theologian Dr. Thaddeus Trenn summarized our research in this way (Trenn 2001):

The truly novel feature of their research, however, involves the capacity of mind to act as an instrument of coherence. The brain seems to be able to engage the non-local signaling as a type of coherer. While this research is not totally new in the literature, their special application seems to be quite novel and pregnant with potential for the Turin Shroud. This is what excited Adler¹². Essential to the brain-coherer function vis-à-vis engaging, receiving and modulating non-local resonance states is the physiological ability to project this information forward, as it were, so as to capture the results in a type of holistic imaging. Extensive research was already done

¹⁰Morse, Philip: 2000. Personal communication from Philip Morse to M. Sue Benford.

¹¹*Ibid.*

¹²"Adler" is the late Dr. Alan Adler, a blood expert who was on the STURP team, who provided us with materials, protocols and scientific guidance in our experiments.

on this phenomenon during the 1950's in the area of medical technology, by DeLaWarr and colleagues. Ample photographic documents are available. Yet overall acceptance of the phenomenon languished for lack of an acceptable scientific basis of explanation. With the rise of quantum holography in more recent times, this complex phenomenon has begun to be taken quite seriously indeed.¹³

The question remains: is it possible to create a "quantum MRI," like the Turin Shroud, without the assistance of an artificial imaging system? George DeLaWarr speculated that, indeed, it should be possible to produce an image without the intermediary of a camera – given the right set of circumstances. Without doubt, a being of highly-evolved emotional, mental, and spiritual development, such as Jesus, would be capable of manifesting identical images without assistance of a device, regardless of "when" and "from where" the intention is originally projected. This leaves us to ponder whether or not others will achieve this remarkable feat, possibly shedding light on "why" the image was left in the first place. As a result, the Turin Shroud can be said, for now, to be a unique example of an unassisted QuantaGraphic® process.

Although an undeniable comparability exists between the QuantaGraphic® images and the TS, several questions still remain. One aspect of the DeLaWarr images, which cannot be evaluated with the present archive produced on glass plates, is the chemical nature of linen when exposed to the originating energy source. This evaluation would be highly revealing, and the authors suggest that future images be produced on a similar linen cloth as the TS and then subjected to the same scientific rigors as the TS.

In accepting the possibility that the TS image may be more in keeping with Jesus' energetic body than his physical body, we consider another quote of Jackson: "[...]. [S]cientists must be ready to overturn even their most hallowed principles if observation warrants [...]. And let us keep in mind, that, to date, no 'conventional' hypothesis has been advanced, which successfully explains the TS image."¹⁴

ACKNOWLEDGMENTS

I would like to recognize my late wife Sue Benford, who was the real force behind this study. I would also like to thank Barrie Schwartz for his help on some of the PowerPoint slides used in the presentation.



¹³Trenn, Thaddeus: 2001. Personal communications via email from Edgar Mitchell to M. Sue Benford. 20 April.

¹⁴Jackson JP: 1991. "An Unconventional Hypothesis to Explain All Image Characteristics Found on the Shroud Image." In Symposium Proceedings: History, Science, Theology and the Shroud. St. Louis, MO, 22-23 June, pp. 325-344.

19. Unveiling the Holy Shroud Through Photographic Imagery

Eva Kiszti

Although I was familiar with what the Holy Shroud looked like and the ongoing debate over its authenticity, prior to embarking on my very curious journey of discovery, I knew little more about it and had no interest in learning more. On an aesthetic level, I was not taken with the image, particularly with the face, which I found to be abnormally narrow, and I was most troubled by the fact that it was not a realistic representation of what I understood Jesus to have looked like at His death. In keeping with Isaiah 52:13–53:12, Jesus, who had reportedly been viciously and repeatedly beaten and struck, including on His head and face, and then hung on a cross exposed to the elements for hours, should have been horribly disfigured and completely unrecognizable as human:

See, my servant will act wisely;
 He will be raised and lifted up and highly exalted.
 Just as there were many who were appalled at him—
 His appearance was so disfigured beyond that of any human being
 And his form marred beyond human likeness.

Moreover, as to the question of the cloth's authenticity, I preferred to leave it to the experts to determine and debate. Certainly, there are more than enough qualified scientists and researchers from every discipline studying the relic from every angle imaginable. Eventually, I reasoned, a decisive conclusion would be reached and the mystery would be solved, and I thought nothing more of it beyond this. Yet, my passion and dedication to learning about the relic arose from a series of completely unexpected and highly unusual events that I was to witness.

I had been given a framed picture of the Shroud's face as a gift—a reproduction in various shades of sepia, imprinted on canvas—and I propped it up on a counter, leaning against a window, in a rather small room that is almost completely surrounded by windows at counter height. As it is a simple framed picture, the back is uncovered and exposed and, consequently, the canvas material was exposed to a significant amount of daylight or direct sunlight each day. In the evenings, the picture was only exposed to three electric pot lights in the room, which were kept on throughout the night, with one situated almost directly above the picture. There were no other appliances in the room, and other than a wooden table and wicker chairs it was empty. In retrospect, I believe this setup was probably the most conducive for the phenomena to clearly manifest as, in both cases, light had direct unobstructed access to the canvas for prolonged periods of time.

After months of paying very little attention to the picture, I glanced at it one evening and was immediately struck by the fact that the wounds on the face of the image had a red tinge. The following evening, as I was looking at the picture, I watched in amazement as the image began to undergo a succession of changes. First it appeared almost as a coloured pencil portrait drawing, then it turned completely black and white, and changed again into what looked like a painting with vivid colours. Ultimately, it evolved into another version that looked quite human.

Different types of phenomena continued to take place on a regular basis, and on one particular occasion the phenomena appeared to manifest as a peculiar form of what I deemed to be electrical energy, emanating from the ceiling lights. The light directly above the picture began to flicker at various rates of speed, changing in frequency, and the brightness intensified. Thin vertical slightly wavy red and blue lines, arranged in a sequence, appeared over the entire image. The manifestation resembled and sounded to some extent like static interference on an analog screen, and gave the impression that the lines were continuously moving sideways. After some moments, this display stopped and the energy force took on another appearance, this time in the form of what looked like live red and blue electric currents that emitted a crackling arcing noise. These currents were rising simultaneously from both sides of the Shroud man's face, and the red and blue colours appeared once again in a sequence, but this time one on top of the other, and curving over the face to meet up at the center of it. I was intrigued and began documenting what was transpiring with photographic and video evidence.

My method is straightforward. I use a digital camera to capture the images, and other than having the JPEG and RAW format function added, the camera always remains at factory settings. I do not manually adjust anything on the camera as I take my photographs, and I never use a flash. I select a picture of the shroud image—any picture, even a printed one from the Internet, whether in colour or black and white—and decide on the type of light source that I wish to use, whether natural or man-made. I determine the distance from the source that offers me the best view of the Shroud image through the LCD screen, choose the angle I want, and shoot. I do not modify nor doctor the resulting images in any way, and there is absolutely nothing unusual about my method, despite the unusual results.

As I prepare to take my photographs, I can usually see on the camera's LCD display the Shroud image either completely transformed or in the process of undergoing a transformation, as it is often difficult to determine when the image has completed its transformation. Ultimately, many of my photographs are

capturing a moment in time. The result, on my end, is a changed image of the Holy Shroud. For example, it is not unusual for an original black and white picture of the Shroud (see Fig. 1) to appear as a coloured image in my photographs (see Fig. 2). The opposite is also true, as the resulting image I get from a coloured picture of the Shroud will appear black and white, or in colours that are different from the original. Sometimes, only certain areas of a black and white image will be highlighted by colour (see Fig. 3).

At times, I do have to manoeuvre the original source picture to adequately capture the right amount of light needed to obtain a transformed image with my camera. As Shroud researchers know, direct sunlight will result in bleaching a photographic image of the Shroud, so the original source picture being photographed has to be tilted away from the direct sunlight. The same applies to electric light, although to a much lesser degree since it is a closed and more controlled environment. As to how I determine the right distance from the light source and the right amount of light needed to give me the images I capture, it is quite

Fig. 1: The original black and white picture of the Shroud used to take some of the photographs depicted below.



Fig. 2: This image was taken from the black and white picture of the Shroud in Figure 1, but it appears as a coloured image. Moreover, this image is one of many in my collection that shows depth and has a pseudo-3D affect to it.

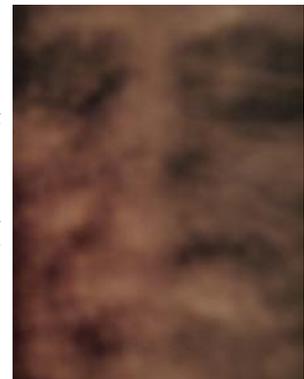


Fig. 3: Image showing areas of the black and white image (see Figure 1) being highlighted by colour that does not exist on the original.



simply through experience. After years of taking these kinds of photographs, I have acquired a skill for, in a sense, working with the unusual energy. Do I get these kinds of images every single time? No, because the conditions are not always right. But I do most of the time.

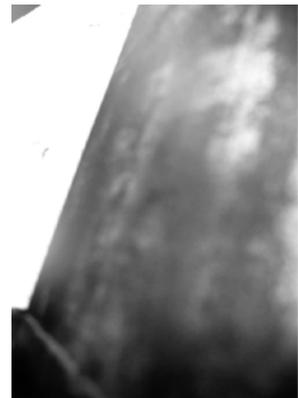
As to what my images illustrate, it is so wide-ranging, detailed, and complex, that it is not possible to offer an adequate general account. To offer an idea of how varied these images are, however, I have included specific examples in this paper. If we are speaking about the Shroud face/head, some captured images appear to show that the head is hollow and filled by a light source (see figure 4), while in other images, other faces are present that appear to be emerging or to have emerged from the primary face/head (see figure 5). As for the body of the Shroud, some images tend to show that it is, in a manner, layered (see figure 6). Other images appear to show the face/head and body composed of rays (see figures 7 and 8). Additionally, most of my images have a semblance of depth to them, creating a visual pseudo-3D effect (see figure 9).

A good example of the scope of what I call the “energy force’s transforming process” is evidenced in the second face on the outer side of the shroud. Since neither Colin Berry nor Mario Latendresse were able to see any clear indication of a second face, I was curious as to what I might capture if I tried to photograph the two second face pictures – the before and after – that are available on Berry’s blog

Fig. 4: Captured image appears to show that the head is hollow and filled by a light source. This image was originally taken from the same black and white picture of the Shroud in Figure 1.



Fig. 5: Other faces are present that appear to be emerging from, or to have emerged from, the primary face/head. This is from the same black and white image shown in Figure 1.



site.¹ When I printed out the images on standard letter paper and began photographing the prints using natural light, a face did appear. I have included the resulting image (see figure 10).

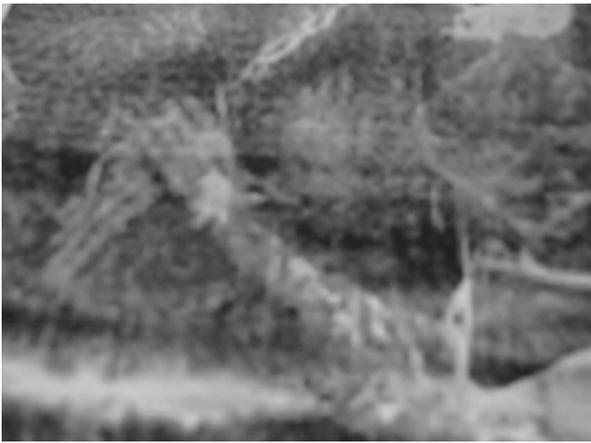


Fig. 6: Man's body on Shroud appears to have a layered effect, almost like basket weaving.



Fig. 7: Face/head appears to be composed of rays.



Fig. 8: The body, specifically the area of the hands, is composed of rays.



Fig. 9: Example of an image that shows depth and a pseudo-3D effect.

¹ Colin Berry, "Comment promoted: what are we to make of the second face on the reverse side of the Turin Shroud?," Shroud of Turing Without All The Hype (blog), March 19, 2017, <https://shroudofturinwithoutallthehype.wordpress.com/2017/03/19/comment-promoted-what-are-we-to-make-of-the-second-face-on-the-reverse-side-of-the-turin-shroud/>.

In another particular photograph that is of the face/head, there is a smaller face also present in the vicinity of the shroud man's left eye. It resembles to a marked degree the face on the statue unveiled by Giulio Fanti, and I have included a photograph of the statue for comparative purposes (see Figure 11).

What these images reveal about the shroud is telling. Moreover, I also have video footage that evidence this energy force's existence, showing that it can appear in various forms, sometimes as rather large waves and sometimes as particles, parallel horizontal bands, or even a single light ray, to name just a few. Moreover, it can appear white or coloured, and it is precise and powerful.

I am convinced that this energy force, which is clearly strongly attracted to any picture of the Shroud (see figures 12 and 13) – particularly to the face/head – may very well have played a role in imprinting the image on the cloth. My reasoning is that, if Jesus is the Son of God and if a resurrection actually took place in the cloth, it would have had to involve some form of divine energy, one that we have yet to understand. In my search for clues I have relied primarily, albeit not exclusively, on the Bible.

One curious characteristic of this unusual energy force that I explore is that it can separate into rainbow colours, as if it passes through a prism. The colours that play a predominant role are blue, red, and yellow. When observing the energy emanating from a circular light source, the order of these three colours is first blue, then yellow, and lastly red, which is furthest from the center. I noted that the colour blue appears to play the leading role in some respects, in the sense that it does not always accompany the other colours, but will always be present. Depending on the circumstances, neon violet or purple is also common, and gold will appear but not often.



Fig. 10: The image I captured of the second face from Colin Berry's website photos.



Fig. 11: My captured image compared to Giulio Fanti's 3D replica.



Fig. 12: These images were taken from the same video. Top, what image looks like for most of video. Bottom, instant a flash of light took place and picture turned green.

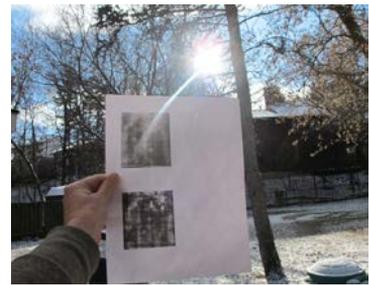


Fig. 13: An example of how light appears to be attracted to any image of the Shroud.

In the Bible, the rainbow, specifically named, is found only in Genesis, Ezekiel, and Revelation, although it is definitely used in conjunction with God's glory, magnificence, and power. In Revelation 10:1, it is an angel who has the rainbow above his head and is robed with a cloud, and we are told that the angel's face was like the sun. Additionally, with regard to the theme of clouds in the Bible, the first thing that comes to mind is Jesus being taken up by a cloud during His ascension (Acts 1:19).

It was the cloud of glory, the *shekinah* cloud that appeared so often in the Old Testament. It was that which appeared to Ezekiel, the chariot made up of cherubim and angels. It was the cloud-chariot that formed a pillar of cloud to lead the people through the wilderness. It was the cloud that surrounded Jesus on the Mount of Transfiguration.² And when Moses went up on the mountain, "the glory of the Lord settled on Mount Sinai, and the cloud covered it for six days" (Ex. 24:16). Interpret that in poetic Hebrew parallelism and one realizes that "the glory

² "The Ascension of Christ," Ligonier Ministries (n.d.), <https://www.ligonier.org/learn/devotionals/the-ascension-of-christ-2/>.

of the Lord” and “the cloud” are synonymous. ... The cloud represents the presence of God.³

The mention of clouds is relevant, for it can happen that as I am taking photographs of the Shroud, a luminescent cloud or clouds will begin to form from the electrical light source. As to how exactly this phenomenon begins is difficult to say, but upon observation it appears that the radiance being emitted from the electric lights interacts in some peculiar manner. The cloud will gradually increase in size and will even begin to float away from the light source. This phenomenon can be seen with the naked eye, photographed, and videotaped.

Another relevant clue that I had not been previously aware of, was the aureola on the Shroud. In his book *The Keramion, Lost and Found*, Philip Dayvault writes:

Most noteworthy, the positive ventral, or front, Shroud image ... displays a slightly apparent aureola (gold) around the entire body, with a halo (blue) around the head. The aureola is somewhat less visible on the dorsal image. This splendid effect of both the aureola and halo is known, suitably, as a “Glory.” In the earliest of Christian art, the radiance of a luminous cloud would surround the entire personage, usually of the Godhead.⁴

Interestingly, in Catholicism “the halo represents the light of divine grace suffusing the soul, which is perfectly united and in harmony with the physical body,”⁵ while in the Eastern Orthodox Church, the aureola/halo “is a symbol of the Uncreated Light or the grace of God.”⁶

I was not familiar with the term Uncreated Light, or with the theology behind the distinction made between Created Light and Uncreated Light, but I have come to discover that Christians, particularly Orthodox Christians, believe Uncreated Light to be the uncreated energy of God. The article “The Teaching of St. Gregory Palamas: Theosis is Possible Through the Uncreated Energies of God” states:

God is not only essence, as the West thinks, He is also energy. If God was only essence, we could not be united with Him, could not commune with Him, because the essence of God is awesome and unapproachable for man. ... Again, if God had only Divine essence—of which we cannot partake—and did not have his energies, He would remain a self-sufficient deity, closed within himself and unable to communicate with his creature.

³ Arlo D. Duba, “Caught Up in the Cloud: Rescuing the Ascension Story from Familiarity,” *Reformed Worship* (2020)
<https://www.reformedworship.org/article/march-2000/caught-cloud-rescuing-ascension-story-familiarity>.

⁴ Philip Dayvault, *The Keramion, Lost and Found: A Journey to the FACE of GOD* (New York: Morgan James Publishing, 2016). 36.

⁵ Dayvault, 182.

⁶ Orthodox Church of the Mother of God, “Halo,” *Orthodox Terminology* (2020),
<https://churchmotherofgod.org/orthodox-terminology/glossary-h/522-halo.html>.

... As [the] Holy Fathers repeatedly say, God is filled with a divine Eros, a divine love for His creatures. Because of this infinite and ecstatic love of His, He comes out of Himself and seeks to unite with them. This is expressed and realized as His energy, or better, His energies. With these, His uncreated energies, God created the world and continues to preserve it. He gives essence and substance to our world through His essence-creating energies; His is present in nature and preserves the universe with His preserving energies; He illuminates man with His illuminating energies; He sanctifies him with His sanctifying energies. Finally, He deifies (theosis) him with His deifying energies. Thus through his uncreated energies, Holy God enters nature, the world, and human life. ... If man did not have the image of God in himself, he would not be able to see its prototype. Each of us is an image of God, and God is our prototype. The image seeks the prototype, and only when it finds it does it rest.⁷

Additionally, according to Dr. Fritz Albert Popp, a researcher in biophysics who founded the International Institute of Biophysics in Neuss, Germany, and the inventor of biophoton theory, ... we know today that man, essentially, is a being of light. ... We are still on the threshold of fully understanding the complex relationship between light and life, but we can now say emphatically, that the function of our entire metabolism is dependent on light.⁸

Within this context of Uncreated Light, the biblical accounts of the radiance on the face of Moses as he is meeting with God (Exodus 34) and on Jesus during his transfiguration (Matthew 17) beg the question of whether the radiance displayed by Moses' and Jesus' face is inner light in the sense that the Holy Spirit had entered their bodies, or from outside the body (i.e., God's glory) that they are simply reflecting, or from outside the body that they are absorbing? For the Jews, Moses' radiance was a reflection of God's glory and did not originate within Moses, and according to the Bible, Jesus, "who for a little while was made lower than the angels"⁹ did have His divine power diminished and was reliant to some degree or another on the power of God. Intriguingly, in both biblical accounts, as with the angel mentioned in Revelation 10:1, it is specifically the face that is described as shining. The importance of the face is reinforced by other verses in the Bible, such as Psalm 80 that implies that it is the face of God that is needed to shine upon the people in order for them to be saved.

⁷ Archimandrite George, "The Teaching of St. Gregory Palamas: Theosis is Possible Through the Uncreated Energies of God," *Another City: A Journal of Orthodox Culture* (2019), <https://anothercity.org/the-teaching-of-st-gregory-palamas-theosis-is-possible-through-the-uncreated-energies-of-god/>.

⁸ Fritz Albert Popp, "Dr. Fritz Albert Popp," *Biontology Arizona* (2020) <https://www.biontologyarizona.com/dr-fritz-albert-popp/>.

⁹ Hebrews 2, verse 9, ESV.

Keeping this in mind, in 2009 a team from the Tohoku Institute of Technology discovered that “the human body literally glimmers.”¹⁰ Moreover, “this wasn’t infrared radiation caused by heat. ... Those signals are actually from photons of visible light (light-particles) not caused by heat.”¹¹ In the study, the team found that the head glowed the most, and given that in my images the Shroud man’s head appears to undergo a different type of transformation than the rest of his body, this is an important clue.

2 Corinthians 3:17 raises the concept that God’s glory, the Uncreated Light, is available to us by way of the Holy Spirit, who has replaced Jesus on earth, and we can garner His divine light and “reflect” His glory through the transference of energy. What is relevant is that the Bible verse relating to this transference implies that the process is an actual metaphysical manifestation, in the sense that a divine and supernatural light is actually imparted. Paul uses the word “reflect,” in that we will reflect the glory of the Lord. Would the glory of God then be transferred into our souls by continuously projecting Uncreated Light onto us in a mystical manner, as it is simultaneously being reflected back to the source? I think the answer is clearly demonstrated by Jesus in the biblical story of the miracle involving the haemorrhaging woman (Mark 5:25-34):

..And Jesus, immediately knowing in Himself that power had gone out of Him, turned around in the crowd and said, “Who touched My clothes?” But His disciples said to Him, “You see the multitude thronging You, and You say, ‘Who touched Me?’” And He looked around to see her who had done this thing. But the woman, fearing and trembling, knowing what had happened to her, came and fell down before him and told Him the whole truth...

As is implied, the woman, “knowing what had happened to her,” must have felt the transference of Jesus’ energy enter her. If not, how else could she have physically “felt in her body” that she had been immediately healed? Could this energy be the same type that manifests itself on the Shroud images?

Related to this, could the energy force acting upon the Shroud images and displaying properties of light be the same light mentioned in Genesis 1:3? Prior to God speaking light into existence, only darkness existed. Logically, once light appeared, and before God separated the light from the darkness, both light and darkness coexisted in some form for a time. No mention is made of this first light shining, despite the fact that it was called “day” and its existence was responsible

¹⁰ Masaki Kobayashi, Daisuke Kikuchi, and Hitoshi Okamura, “Imaging of Ultraweak Spontaneous Photon Emission from Human Body Displaying Diurnal Rhythm,” *PLOS ONE* (July 2009), <https://doi.org/10.1371/journal.pone.0006256>.

¹¹ Josh Hrala, “You Can’t See It, But Humans Actually Glow With Our Own Form of Bioluminescence,” *Science Alert* (2016), <https://www.sciencealert.com/you-can-t-see-it-but-humans-actually-glow-in-visible-light>.

for the arrival of “morning,” but in existing—together with night (i.e., darkness)—one full day could be accomplished.

In Genesis 1:14, however, God is shown having a clear intent or a specific purpose with man in mind when creating this light, as He appears to be arranging everything here for the existence and sustenance of man. He states that these lights are to be “in the expanse of the heavens” and that they would have roles, one of which was, within this context, to separate the day from the night, to be responsible “for days,” and “to give light on the earth.” Since it is clearly stated that these lights were to specifically “give light on the earth” as we know it, and to specifically “separate the light from the darkness” as we know it to be, then I do not believe that what is called “light” in Genesis 1:3 was, in any sense, the kind of light that is visible to the human eye. Rather, in my opinion, it is obvious that the first separation of light from darkness had only laid the groundwork for the following steps in creation, and that the light did not shine or radiate anywhere near the same manner as the sun would be radiating.

Visible light on the electromagnetic spectrum encompasses a very narrow band of wavelengths. Since there exists a vast range of wavelengths that our eyes are not sensitive to (but that are also defined as light), there is always the possibility that the light referred to in Genesis 1:3 derives from the area on the electromagnetic spectrum that is not visible to the human eye. That being said, bearing in mind this unknown energy force that exhibits properties of light, I am inclined to think that the light in Genesis 1:3 was a similar energy force derived from what is referred to as Uncreated Light. Either set of circumstances would align with Hebrews 11:3, which states, “Through faith we understand that the worlds were framed by the word of God, so that things which are seen were not made of things which do appear.”

All that said, I contend that the key to understanding the image on the Shroud of Turin lies in an existing but unknown force or energy that exhibits the properties of light. It is not an energetic force that we are familiar with, but a force of some type that we do not even realize exists—a curious force that involves frequency and vibration.

CONCLUSION

Undeniably, there is currently a hiatus in directly examining the Shroud and no new significant discoveries are forth coming. While I understand that scientists must remain solely concerned with verifiable scientific methods and processes, and must follow a specific set of rules adhered to by the scientific community, I believe that my photographs offer a unique and unexplored alternative in the study of the Shroud of Turin, and that these same scientific methods and processes can be applied to further investigate what is taking place.

It would be a most interesting exercise to do a thorough scientific analysis on the composition of the light that appears in the transformed images to try to answer such questions such as what type of force is responsible for these unusual images; what type of light is able to turn a black and white picture into a coloured, and vice versa; and what is creating the extra faces visible within my images. Most intriguing, however, is the question of what these images imply. Can they be explained, or would they simply be deemed a scientific challenge?

Within this context, I am reminded of two quotes attributed to Nikola Tesla:

"If you want to find the secrets of the universe, think in terms of energy, frequency and vibration."

and

"The day science begins to study non-physical phenomena, it will make more progress in one decade than in all the previous centuries of its existence."



20. The Holy Shroud and the Holy Fire of Jerusalem

Patrick R. Lublink

INTRODUCTION

The Holy Shroud and the Holy Fire of Jerusalem are two unsolved mysteries related to the death and resurrection of Jesus Christ. The Holy Shroud is believed by many to be the actual burial cloth of Jesus Christ purchased by Joseph of Arimathea as recorded in all four Gospels.¹ It is a linen cloth measuring 4.4 meters x 1.1 meters which contains an image of a man who was brutally scourged, crowned with thorns, crucified and pierced by a spear in his chest.

The Holy Fire of Jerusalem is a phenomenon which takes place in the Orthodox world on a specific day, in the same manner, every year at the Tomb of Jesus located in the Church of the Holy Sepulchre in Jerusalem. This phenomenon is virtually unknown in the West, but for Orthodox Christians it is a powerful symbol of the resurrection. It is said to be a gift of God and happens annually. Its recorded history can be reliably traced for the past 1,200 years.²

This paper will include a brief history and some of the science of these two phenomena and will explore their connection. In my opinion, should the Shroud of Turin and the Holy Fire both be proven to be authentic, then their relationship is clear. The phenomenon known as the Holy Fire of Jerusalem could and would have been the means by which the image on the Shroud of Turin was formed.

While it is beyond the scope of this paper to prove this relationship, it is hoped that it will nevertheless encourage more theological reflection, as well as additional historical and scientific research.

The Shroud of Turin

Historically, a cloth described as the Shroud bearing the image of Christ was witnessed by Robert de Clari in 1203, but disappeared from the city when the city was sacked in 1204. Although the means by which this cloth made its way from Jerusalem to Constantinople remains uncertain, it reappeared in Lirey, France, in 1353.³ It is also known that the House of Savoy took ownership of the Shroud in 1453. They owned the Shroud for 500 years until 1983 when the last King of Italy, Umberto II – a member of the house of Savoy – bequeathed the Shroud to the Pope and his successors.⁴

¹Matthew 27:59, Mark 15:46, Luke 23:53 and John 19: 38 – 40.

²H. Karlakidis, *Holy Fire*, Elea Publishing, Athens 2015, 39.

³J. Jackson, *The Shroud of Turin – A Critical Summary of Observations, Data and Hypotheses*, CMJ Marian Publishers, Oak Lawn 2017, 29.

⁴Cf. G.M. Zaccone, *The Shroud from the Charnys to the Savoys The Turin Shroud, Past,*

The Shroud drew the attention of the scientific community in May 1898 when the first photographs were taken. For the first time in its history, it was discovered that the image imprinted on it had photographic negative properties. This was the beginning of serious scientific inquiries which are still ongoing today. Further examinations in 1978 established that the image on the shroud was not a painting.⁵ This image appears to be a sort of cold scorch produced by some unknown process, some sort of mild heat or light at a moderate temperature. This action caused an oxidation and accelerated dehydration of the linen fibers.⁶

An interesting observation was made in Jerusalem in 2016 which may concern the Shroud of Turin. As part of a conservation effort of the Church of the Holy Sepulchre, the traditional resting place of Jesus after his crucifixion, scientists removed for the first time since 1555 a marble slab that had covered the original surface where the body of Jesus was placed.⁷ According to reports, a number of the instruments used by scientists for analysis and measurement were affected by strong electromagnetic disturbances when they were placed on the stone slab. This led some of the scientists to observe that "[...] these unusual electromagnetic anomalies at the tomb of Jesus may lend credence to a scientific hypothesis on the creation of the image on the Shroud of Turin."⁸ If confirmed, there would also appear to be a link between these unusual electromagnetic disturbances and what is known in the Orthodox world as the Holy Fire of Jerusalem and a possible link with the Shroud.

Dr. Giulio Fanti, associate professor at the Department of Industrial Engineering, University of Padua, Italy, agrees to possible links between the Shroud of Turin and the Holy Fire. Fanti, who has written extensively on the Shroud of Turin and who is convinced of its authenticity, wrote in 2015: "[...] it would be interesting managing to study from a scientific point of view the phenomenon of the Holy Fire that every year ignites in the tomb of Jesus in Jerusalem on the eve of Orthodox Easter, perhaps trying to connect it with the body formation on the Shroud."⁹

Because the phenomenon of the Holy Fire is practically unknown in the West, it deserves further study particularly whether it is related to how the image of the Shroud may have been formed.

Present, and Future, International Scientific Symposium, Torino 2–5 March 2000, Sindon – Centro Internazionale di Sindonologia & Effata Editrice, 2000, 383.

⁵<https://www.shroud.com/78conclu.htm> accessed 15 May 2019.

⁶J. Jackson, *Critical Summary...*, 69.

⁷<https://news.nationalgeographic.com/2016/10/jesus-tomb-opened-church-holy-sepulchre/> accessed 12 July 2018.

⁸<https://aleteia.org/2016/11/15/mysteries-surround-the-opening-of-the-tomb-of-christ/> accessed 12 July 2018.

⁹ Cf. G. Fanti and P. Malfi, *The Shroud of Turin*, Pan Stanford Publishing, Singapore 2015, 306.

The Holy Fire of Jerusalem

The Holy Fire of Jerusalem, also called the Holy Light, is a phenomenon which takes place in the same manner, every year at the Church of the Holy Sepulchre on the eve of Easter. It is a phenomenon witnessed by a crowd of people who gather each year to experience it. It happened this year on Saturday April 27, 2019.¹⁰

The ritual leading to the appearance of the Holy Fire begins with the Greek Orthodox Patriarch of Jerusalem descending into the empty tomb of Christ within the church, holding unlit lamps and candles and reciting special prayers. Immediately prior to this, religious and secular authorities have examined the aedicule (a small structure surrounding the tomb) prior to the Patriarch's arrival to make sure no oil lamps have been left burning inside that could be used to light his candles. They also ensured that there were no matches or any other means to create a flame. Moments later, a light is said to appear in the tomb where the patriarch has been praying alone. His candles are lit with this miraculous flame and, accompanied by the pealing of bells, the patriarch emerges to spread the fire among the crowd. The flame is passed from candle to candle and then placed in lanterns so that it can be transported abroad to other countries. Incredibly, the Holy Fire does not cause burns during the first fifteen minutes. During this time, many of the faithful bathe their faces and hands in the flame.¹¹

The Holy Light not only appears inside the Tomb but at times spreads by itself around the Church, emitting, from the Holy Sepulchre, light with a hue completely different from natural light and sometimes igniting spontaneously other candles which are held by those present.¹²

According to the Orthodox Church, the ceremony surrounding the miracle of the Holy Fire may be the oldest unbroken Christian ceremony in the world and is, for the Orthodox, the central focus of the commemoration of Christ's victory over death.¹³ Reliable historical sources confirm that this phenomenon was known possibly as long ago as the 4th Century. An early Arminian document tells of the miraculous appearance of the Holy Fire at the Church of the Holy Sepulchre to St. Gregory the Illuminator around the year 330 AD.¹⁴ In the 7th Century, St. John of Damascus speaks of this fire as the "Uncreated Light of the Creator, the source of

¹⁰<https://www.timesofisrael.com/orthodox-christians-mark-holy-fire-easter-ceremony-in-jerusalem/> accessed 15 May 2019.

¹¹Cf. Bishop Auxentios of Photiki, *The Paschal Fire in Jerusalem*, Saint John Chrysostom Press, Berkeley 1993, 160. The theological perspective on this aspect of the Holy Fire is that in the flame of the fire there co-exist the properties of both immaterial and material light.

¹²Cf. H. Skarlakidis, *Holy Fire...*, 26.

¹³Cf. Bishop Auxentios of Photiki, *The Paschal Fire...*, 3.

¹⁴Cf. H. Skarlakidis, *Holy Fire...*, 37.

energy which raised Jesus from the dead."¹⁵ In his work, *On the Resurrection of Jesus Christ*, St. Gregory of Nyssa tells us how, while it was still dark, Peter and John were able to see Jesus' wrappings inside the tomb.¹⁶ He believes this was an occurrence of the Holy Fire and writes: "Those who were with Peter saw and believed because the tomb was filled with light, so that even though it was still night, they saw the inside of the tomb."¹⁷

In a 1998 interview, Patriarch Diodoros explained exactly what happens at the moment of the phenomenon. He described that he first kneels in front of the stone on which the body of Christ was laid and then he recites a number of prayers. At some point, an indefinable blue light rises from the core of the stone as mist rises out of a lake and ignites the oil lamp and the candles.¹⁸

For many centuries, the annual miracle of the Holy Fire was very popular even with the Moslem community in Jerusalem,¹⁹ whose residents not only participated in the rite but also transported the Holy Fire to their homes and mosques.²⁰ A Muslim document from the 9th Century simply tells of "a bright white fire spontaneously appearing inside the shrine as if sent from heaven, and of Christians lighting their candles from the Greek patriarch's Holy Fire before returning home in triumph, brandishing their divine favour and shouting 'Hasten to the religion of the cross!'"²¹

The mood changed in the 10th Century when Islamic authorities demanded the complete termination of all future celebrations. In a document written in 947 AD, the Emir's demand to the Patriarch of Jerusalem read: "In performing your

¹⁵Cf. *Ibid.*, 33.

¹⁶John 20:1-8 (NIV) reads: "1. Early on the first day of the week, while it was still dark, Mary Magdalene went to the tomb and saw that the stone had been removed from the entrance. 2. So she came running to Simon Peter and the other disciple, the one Jesus loved, and said, "They have taken the Lord out of the tomb, and we don't know where they have put him!" 3. So Peter and the other disciple started for the tomb. 4. Both were running, but the other disciple outran Peter and reached the tomb first. 5. He bent over and looked in at the strips of linen lying there but did not go in. 6. Then Simon Peter came along behind him and went straight into the tomb. He saw the strips of linen lying there, 7. as well as the cloth that had been wrapped around Jesus' head. The cloth was still lying in its place, separate from the linen. 8. Finally the other disciple, who had reached the tomb first, also went inside. He saw and believed."

There may be a problem with using John 20:8 to suggest that the Holy Fire was occurring when the disciples entered the tomb. First, it was unlikely to still be dark when Mary Magdalene went back to the tomb with the disciples; second, a light appearing in the tomb would have been noted (as it was for the burning bush Moses saw, or the transfiguration the disciples saw). In his interpretation of the events recorded in this Gospel, St. Gregory of Nyssa may have been influenced by his belief that the Holy Fire exists.

¹⁷Cf. H. Skarlakidis, *Holy Fire...*, 33.

¹⁸Cf. H. Skarlakidis, *Holy Fire...*, 33.

¹⁹Cf. Bishop Auxentios of Photiki, *The Paschal Fire...*, 32.

²⁰Cf. H. Skarlakidis, *Holy Fire...*, 12.

²¹F.E. Peters, *Jerusalem*, Princeton University Press, New Jersey 1995, 261.

celebrated miracle with magic artifices, you have filled all of Syria with the religion of the Christians and you have all but destroyed all of our customs."²²

In the 11th Century, Caliph al-Häkim ordered the destruction of the entire complex of the Church of the Holy Sepulchre as a direct result of his reaction to reports of the miraculous manifestation of the Holy Fire of Jerusalem.²³ This miracle became a contributing factor toward the persecution of Christians. Caliph al-Häkim passed an ordinance against Christians; pilgrimages were banned, properties were confiscated, crosses were burnt and small mosques were built on the roofs of churches.²⁴ It is reported that the phenomenon of the Holy Fire continued to occur after the destruction of the Sepulchre.²⁵ The church was rebuilt 40 years later at great expense by the byzantine emperor Constantine IX and Patriarch Nicephorus of Constantinople.²⁶

Throughout its recorded history and to this day, thousands of faithful from the Orthodox world and also Catholics and Protestants attend the ceremony with unwavering enthusiasm. In informal discussions with several Orthodox priests, I learned that devotion to the Holy Fire is real and that they affirm and accept the miracle as an act and a gift of God.²⁷

The first serious scientific inquiry took place in 2007 when a team of scientists led by physician Andrei Volkov, Associate Professor in Mechanics of Materials at the National Research Nuclear University of Russia, took precise measurements of the phenomenon. Their results were published in April 2013 in the Russian journal *Science and Religion* (Í àóèà è Ðäëè äëÿ):

"[...] For the first time in history, a strong radio pulse was recorded at the moment of the Holy Fire's descent [...] we have found further evidence that the miracle of the Holy Fire is an actual occurrence and not a hoax or fraud [...] At the descent of the Holy Fire, flashes of light diffuse across the walls of the church [...] we can assume that the lighting of the Holy Fire is the result of electrical discharge [...] It is clear that the origin of this concentrated discharge on this specific day, at this specific time and at this particular location remains unknown [...] The appearance of the flashes on the church's walls, as well as its chaotic movements, could be explained as a glow of low-temperature plasma [...]"²⁸

²²Bishop Auxentios of Photiki, *The Paschal Fire...*, 30.

²³Cf. *Ibid.*, 34.

²⁴Cf. *Ibid.*, 35.

²⁵Cf. H. Skarlakidis, *Holy Fire...*, 87.

²⁶*Ibid.*, 85.

²⁷Father M. Penney, Rector of the Koimisis Tis Theotokou Greek Orthodox Church in Kingston, Ontario and Father C. Baxter, Ukrainian Orthodox military chaplain serving with the Canadian Army. In addition, Father Baxter owns a set of candles which were originally lit by the Holy Fire and presented to him several years ago.

²⁸H. Skarlakidis, *Holy Fire...*, 135.

Low temperature plasma is a highly ionized gas, very rarely formed in nature.²⁹

In 2016, the temperature of the Holy Fire was measured using an infrared pyrometer and was reported at an average temperature of 42°C when it first appears, before reaching 320°C after a delay of approximately ten to fifteen minutes.³⁰

In April 2019, Dr. Giulio Fanti conducted scientific research and his findings were published the following July in *Juniper—the Global Journal of Archaeology and Anthropology*.³¹ Dr. Fanti witnessed the phenomenon firsthand and reported that outside the Tomb of Jesus, a series of multiple strikes of lightning was emitted at regular intervals at a frequency varying from 3 to 10 Hertz, just before the Patriarch came out of the Tomb with the Holy Fire. He then carried out a series of experiments. One of these consisted of comparing the effects of the Holy Fire with that of a common flame lit by a lighter, at a distance of about 3 cm from a linen fabric similar to the fabric of the Shroud of Turin. The study consisted of the analysis of the effects produced on a linen fabric exposed to the two flames for a period ranging from about 4 seconds to about 30 seconds.

In these experiments, the flame from the common fire left the linen charred. On the other hand, the flame from the Holy Fire produced only browning on the fabric as the result of an oxidation and dehydration of the fibers.³² This finding was ground-breaking in the search for answers as to how the image on the Shroud was formed. Recall that the colour of the image on the Shroud of Turin is brownish-yellow and that it consists of an oxidation and dehydration of the linen fibers.³³ The similarity between the marks observed by Fanti and those found on the Shroud of Turin are remarkable.

Unsurprisingly, the miracle of the Holy Fire is not universally accepted. In 1238, Pope Gregory IX denounced the Holy Fire as a fraud and prohibited the participation of Latin clergy in it.³⁴ In an updated version of John Calvin's *Treatise on Relics* written in 1870, Protestant Reformers speak of the Holy Fire as "sacred juggleries [...] which outrival the most superstitious practices of ancient or modern Paganism!"³⁵ 19th Century Greek humanist scholar Adamantios Korais was critical of the Holy Fire which he considered to be religious fraud. He referred to the event as "machinations of fraudulent priests" and to the "unholy" light of Jerusalem as "a

²⁹G. Fanti, Is the "Holy Fire" Related to the Turin Shroud? *Glob J Arch & Anthropol.* 2019; 10(2).

³⁰Cf. <http://orthochristian.com/96672.html> accessed 10 July 2018

³¹G. Fanti, Is the "Holy Fire" ...

³²Cf. *Ibid.*

³³Cf. *Ibid.*

³⁴Cf. H. Skarlakidis, *Holy Fire...*, 16, 94.

³⁵J. Calvin, *A Treatise on Relics*, Edinburgh 2nd Edition 1870, 153. As found on <http://www.gutenberg.org/files/32136/32136-pdf.pdf> Accessed 19 July 2018

profiteer's miracle."³⁶ Despite heavy criticism, belief in the Holy Fire continues among many people and further studies are warranted.

Relationship between the Holy Shroud and the Holy Fire

The Shroud of Turin and the Holy Fire of Jerusalem have different historical backgrounds and yet they are directly connected with the resurrection of Jesus Christ from the dead. The undeniable history of the Shroud concerns its time in Europe only, while its whereabouts from the time of the burial of Jesus to the 13th Century is reconstructed within the Byzantine world. The Holy Fire, on the other hand, is a phenomenon which takes place at the same time, in the same manner, every year at the Church of the Holy Sepulchre. Still, they potentially possess a common point of origin.

Should the Shroud be proven to be Jesus' burial cloth, then this linen cloth is the one purchased by Joseph of Arimathea, as recorded in the Gospels, and the image on the cloth was formed at the tomb of Jesus, presumably at the time of the resurrection. Likewise, if the Holy Fire is proven to be genuine, it is logical to assume that this Fire was not only present on the day of Jesus' resurrection, as St. Gregory of Nyssa wrote, but can be inferred as a manifestation of the energy which caused the resurrection. Recall that St. John of Damascus, who lived in the 7th Century, wrote of this fire as the Uncreated Light of the Creator, the source of energy which raised Jesus from the dead.

Given that a possible explanation for the image of the Shroud is that it is the result of a low heat scorch and given that the Holy Fire was possibly identified as low heat plasma, then the relationship is clear. The phenomenon known as the Holy Fire of Jerusalem could and would have been the means by which the image on the Shroud of Turin was created.

CONCLUSION

Little scholarship is available which considers the relationship between the Holy Shroud and the Holy Fire of Jerusalem. The work of Dr. Giulio Fanti in 2019 as well as the observations made in 2007 and 2016 might provide important clues as to how the image on the Shroud was created.

These two miracles belong to two distinct branches of the Church which are not in communion with each other. From a religious perspective, these miracles are matters of faith and not science. Ironically, while the Roman Catholic Church denounced the Holy Fire as a fraud, some (but not all) Orthodox authorities deny that the Shroud could be Jesus' burial cloth.³⁷ Regardless, it is hoped that a common

³⁶No author named. "Adamantios Korais", https://en.wikipedia.org/wiki/Adamantios_Korais (accessed 13 July 2018).

³⁷Bishop Auxentios of Photiki, *The Paschal Fire...*, 186. In private correspondence with

ground will be found so that further study into the relationship of these two phenomena can be conducted.



Harris Skarlakidis, on 11 April 2018, Skarladikis surprisingly indicated to me that he was unaware of any scientific work on the Shroud of Turin. He stated, however, that should the Shroud be proven to be genuine, then its connection with the Holy Light would be obvious.

21. A Response to John Calvin's Treatise on the Holy Shroud

Patrick R. Lublink

INTRODUCTION

It might come as a surprise to many that 16th Century Reformer John Calvin was aware of the Holy Shroud and that he wrote about it in 1543 in his book entitled *Le traité des reliques* (*A Treatise on Relics*).¹ He also wrote about it in his commentary on John's Gospel found in his 12-volume set of *New Testament Commentaries* and written in 1553.²

His book was especially timely because relics were very popular at that time. Calvin spoke of "the absurdity of the relics..."³ which to him was a deception organized by the Roman Catholic church. Some of these relics included the crown of thorns, the nails, pieces of the cross, the seamless robe of Jesus, Jesus' sandals, the sponge, Judas' coins, the spear, jugs from Cana and more. Such an abundance of "genuine" relics was simply impossible and, in his words, absurd. In addition, alleged relics of saints were being sold in the marketplace to the gullible and the desperate.

Accordingly, he spoke with great passion against all relics. In short, Calvin did not believe that the Shroud of Turin was the actual burial cloth of Jesus Christ, not only because it was just one more relic, but simply because the Bible is apparently silent on the subject. In his opinion, the Shroud also seemed to be in direct contradiction with the gospels, especially John's.

This paper will demonstrate that John Calvin was not correct in his assessment of the Shroud, especially in view of what is now known about this artifact. He may have also been unfairly biased against Roman Catholics whom he referred to with the derogatory term of "papists." This prejudice may then have blinded him to the possibility that the Shroud of Turin could be the authentic burial cloth of Christ.

Since the author of this paper reads and writes French fluently, Calvin's original French text has been used for this research. Contrary to the English language, the French language has changed little over the past 450 years and can be easily understood by a modern reader. Two English translations were also considered. The first one, from Henry Beveridge, was published in 1844⁴ and the

¹ <https://www.info-bible.org/histoire/reforme/traite-des-reliques-jean-calvin.htm> accessed 30 June 2019

² <https://biblehub.com/commentaries/calvin/john/20.htm> accessed 2 July 2019

³ J. Calvin, *A Treatise on Relics (with Commentary by Count Valerian Krasiński)*, Wilder Publications, Floyd, 1854 Reprint ed. 2018, 5.

⁴ J. Calvin, *Tracts and Letters (edited and translated by Henry Beveridge 1844)*, Baker Book House, Grand Rapids, Michigan, Reprint ed 1983.

second one, from Count Valerian Krasiniski, was published in 1854⁵. Krasiniski's translation is not entirely reliable because in several areas, he summarizes rather than translates Calvin's work and his translation was part of a dissertation into which he brought his own opinions and commentaries. There also appears to be a debate among some scholars as to whether Krasiniski's translations correctly represented Calvin's thoughts on the Shroud. For example, some scholars believe that in this translation Calvin never claimed that he was aware of the existence of more than one shroud in Europe.⁶

On the other hand, Beveridge's translation more accurately represented Calvin's treatise, although some scholars believe that he, too, tended to avoid using the "more-than-one-of" argument against the Shroud. This is intriguing as it is clear in the original French text and in both English translations that Calvin clearly stated his belief that there were many shrouds exhibited throughout Europe whose custodians claimed that theirs alone was the one true burial cloth of Jesus Christ. This will be examined further in this paper.

It is therefore undeniable that John Calvin thought that the 'Papists' claimed to possess more than one authentic Shroud. To be clear, he believed that the communities which claimed to have the authentic burial cloth of Christ argued among themselves stating that they, alone, had the authentic artifact and that all other shrouds were fake.

In the original text, Calvin uses the word "suaire," translated as "shroud," to mean both a full burial cloth, (*suaire de la sépulture tout entier*)⁷ and a napkin (*le suaire qui fut mis sur sa teste au sepulchre*)⁸: that is, he speaks of a shroud which covers the entire body and a shroud which covers part of the body only, such as a veil or a napkin covering a face. This nuance is not readily obvious in the English translations. For example, Calvin referred to the Veil of Veronica as a shroud (*suaire de la Véronique*), which he also simply called "the Veronica" (or a true icon), as one of the many supposedly authentic shrouds of the time. Therefore, the context of the text dictates whether he referred to the full burial cloth of Christ or to a napkin.

In the context of the Veil of Veronica, it is undoubtedly a napkin and not a full burial cloth as evidenced later by a statement by Calvin: "...les évangélistes ne font nulle mention de cette Véronique, laquelle toucha la face de Jésus-Christ d'un couvre-chef..."⁹ Here, in this text, Calvin clarified that this cloth touched Jesus' face

⁵ *Ibid.*

⁶ Private correspondence with Dr. Gary Chiang, Professor Emeritus of Biology at Redeemer University, Ancaster, Ontario, 8 March 2019.

⁷ Literal translation: "a shroud in its entirety" or "a complete shroud"

⁸ Literal translation: "The shroud which was placed on his head in the sepulchre"

⁹ Literal translation: "the Evangelists make no mention of this Veronica which touched the face of Jesus Christ with a head cover". "Couvre-chef" can also be translated as a head scarf, a face cloth, a veil, a headgear or a hat.

on his way to the cross hereby removing any doubts that he might have been referring to the burial cloth.

In other words, this particular relic was a face cloth or a napkin, one that is still promoted by the Roman Catholic Church to this day; its story is commemorated in the sixth Station of the Cross in several churches to this day. Historically, the existence of a mysterious image on a piece of cloth, known and venerated as the Veil of Veronica and displayed in Rome in the middle ages, is well documented. However, that history is somewhat problematic, and it is beyond the scope of this paper to examine it.

After writing about the Veronica, Calvin then addresses the “suaire de la sépulture tout entier; comme Nice, celui qui a été transporté là de Chambéry¹⁰.”

Therefore, throughout the remainder of this paper, this author’s responses on Calvin’s treatise are directed specifically to the entire burial cloth, and not to a napkin or a face cloth. It is particularly evident in Calvin’s commentaries of John’s gospel chapter 20 that he was commenting on the burial cloth of Christ purchased by Joseph of Arimathea, since this is the passage which deals with the empty tomb.¹¹

This paper will demonstrate that Calvin’s original text made it clear that he was aware that several cities claimed that only they possessed the original Shroud. Calvin believed that the existence of more than one supposedly true shroud was strong evidence against the authenticity of the Shroud of Turin as the true burial cloth of Christ and that it was consequently a medieval forgery.

Some of Calvin’s arguments will now be considered.

“It is now time to consider the shroud, about which relic they have openly betrayed their impudence and stupidity. [...] There are, at least, six cities which boast of having the real burial cloth in their possession, *the one in Nice which was brought in from Chambéry* (italics mine), also those of Aachen in Germany, Maastricht, Besançon, Vindon in Limoges and also a little town in Lorraine near Alsace...”¹²

Calvin wrote about several supposedly genuine burial cloths of Jesus Christ in existence throughout Europe. While he does not mention the Shroud of Turin by its current name, he referred to a shroud which had been moved temporarily to Nice (France) from Chambéry. Historians confirm that during Calvin’s lifetime, the Shroud of Turin was indeed located in Chambéry and had been moved temporarily from Chambéry to Nice between 1537–1540: at the time when Calvin

¹⁰ Literal translation: “the complete (or entire) shroud; like Nice, the one which was brought in from Chambéry”

¹¹ <https://biblehub.com/commentaries/calvin/john/20.htm> accessed 25 February 2020

¹² <https://www.info-bible.org/histoire/reforme/traite-des-reliques-jean-calvin.htm#Le%20saint%20suaire> accessed 30 June 2019 (*my own translation into English*)

wrote his Treatise. The Shroud was relocated to its current location in Turin in 1578 where it has been known since then as the Shroud of Turin. It is therefore perfectly clear that John Calvin referred to the Shroud known today as the Shroud of Turin by acknowledging that the Shroud located in Nice during his writings had moved from Chambéry.

Nice is located on the French Mediterranean Coast about 300 kilometres from Geneva where Calvin lived. Considering the means of transport at that time, it is not clear whether he actually travelled such a great distance to that location to see the Shroud in person.

Calvin also wrote:

"In all the places where they pretend to have the grave-clothes, they show a large piece of linen... with an image of an entire body."¹³

Since Calvin did not clearly specify "front and back image," some researchers believe that Calvin was referring in his writings to the Shroud of Besançon and not to the Shroud of Turin because of the words "of an entire body."

Although there is some historical evidence that the Shroud of Turin may have been located in Besançon for some time between its disappearance from Constantinople in 1204 and its appearance in Lirey, France in 1353,¹⁴ it is clear that the shroud displayed in the 16th Century in Besançon was a forgery, or a poor copy of the original Shroud. Although this shroud was destroyed during the French Revolution in 1794, paintings of this cloth are still in existence today. This particular shroud was clearly very different from the Shroud of Turin since it only revealed a frontal image of a crucified man but no dorsal image. The nail wounds were in the center of the hands and no marks of scourging appeared anywhere on the body. The body of Christ looked like a stick-figure, straight up and down, with the neck, pelvic area, and knees all of one width with the result that the image on the shroud showed no true lifelikeness.

Besançon is located a little more than 100 kilometres from Calvin's home in Geneva. While it is not clear at all whether he travelled to that location to see the shroud for himself, taking into account that the shroud was located at a relatively short distance from his home, the possibility certainly exists. Whether he saw the Shroud of Besançon, the Shroud of Turin or any shroud at all is simply not known.

There is certainly some evidence in Calvin's writings that he may have seen the Shroud of Besançon or one of the shrouds other than the Turin Shroud because of his statement "it is easy to see that those shrouds were hand-painted."¹⁵ It must

¹³ *Ibid.*

¹⁴ D.C. Scavone, *The Shroud of Turin*, Greenhaven Press, Inc, San Diego, California 1989, 97. This information is also found in J. Jackson, *The Shroud of Turin – A Critical Summary of Observations, Data and Hypotheses*, CMJ Marian Publishers, Oak Lawn 2017, 35.

¹⁵ <https://www.info-bible.org/histoire/reforme/traite-des-reliques-jean->

be acknowledged that the Shroud of Turin does not look like a classical medieval painting, even before the 1978 scientific examination demonstrated that point.

While it has been established that John Calvin was clearly aware of the existence of the Shroud of Turin located in Nice, the arguments in his Treatise were perhaps based on his personal knowledge of the Shroud of Besançon or some other shrouds which were clearly forgeries. From there he may have extrapolated his findings to conclude that all shrouds, including the Shroud of Turin, were forgeries.

He also wrote...

“For whoever believes that this shroud exists in one particular place, brings a charge of falsehood against all the others which boast to possess it. For example, he who believes that the cloth which was in Chambéry is the genuine shroud condemns those of Besançon, of Aachen, of Vindon [...] as guilty of falsehood and of wickedness.”¹⁶

In this statement, Calvin used the same logical fallacy that many use against Christianity, namely that all religions contradict each other by claiming theirs is the only true religion and that all others are false, therefore all religions are false. The truth is that one of those religions can be true, and all the rest false, which is Christianity's claim. It follows, then, that the Shroud of Turin can be the authentic, the very burial sheet of Jesus, while all the other relics listed by Calvin are false.

Then Calvin offered the following arguments based on his interpretation of the Holy Scriptures, referring to the synoptic gospels and especially to the Gospel according to St. John:

“With regards to the shroud in which the body was wrapped, I would like to ask why is it that, while the Evangelists carefully related the miracles which took place at the death of Jesus Christ, and leave out nothing relevant to the history, how it is that this completely escaped them, to not say a word about such an excellent miracle, that is that the image of the body of our Lord Jesus Christ was impressed in the shroud in which he was buried?”¹⁷

His commentary on John's Gospel found in his 12-volume set of *New Testament Commentaries* also reflects this interpretation and, incidentally, confirms that he spoke of Christ's burial cloths and not, for example, about the shroud of Veronica since this alleged miracle purportedly occurred on His way to the cross.¹⁸

“To this is added the amazing miracle which they [the papists] have made up, that an image of Christ's body is impressed on the linen.”¹⁹

calvin.htm#Le%20saint%20suaire accessed 30 June 2019 (*my own translation into English*)

¹⁶ *Ibid.*

¹⁷ *Ibid.*

¹⁸ John Chapter 20.

¹⁹ <https://biblehub.com/commentaries/calvin/john/20.htm> accessed 2 July 2019.

John Calvin essentially believed that since the evangelists recorded all of Jesus' miracles, that an image on a cloth would surely qualify as a miracle and would surely have been recorded if it had actually occurred.

This is an example of an argument from silence, namely, "the Shroud must be false because the New Testament writers do not mention it." However, it is well known that the Gospels did not mention everything about Jesus as evidenced by the following words of St. John in his writing: "Jesus performed many other signs in the presence of his disciples, which are not recorded in this book." (John 20: 30) Jesus did many other things as well. So, when Calvin wrote that the evangelists recorded all miracles, he is simply mistaken.

Moreover, it must be pointed out that the New Testament in fact speaks about the Shroud because it is part of the Easter story. All four Gospel accounts tell how Joseph of Arimathea bought a fine new linen burial cloth to wrap Jesus' body after he was taken down from the cross.²⁰ The Gospel of John also mentions the burial cloth once more where it is recorded that St. John and St. Peter ran to the tomb on Easter Sunday morning and saw the empty burial cloths.²¹ In addition, contrary to John Calvin's assertion, the "papists" certainly did not make up an amazing miracle that an image of Christ's body was impressed on the linen cloth.

Calvin would in all likelihood have been unaware that historically, a cloth described as the Shroud bearing the image of Christ was witnessed by Robert de Clari in 1203, but disappeared from Constantinople when the city was sacked in 1204. Although the means by which this cloth made its way from Jerusalem to Constantinople remains uncertain, it reappeared in Lirey, France, in 1353.²² In fact, to this day the Vatican's position is to make "no pronouncements claiming whether it is Jesus' burial shroud, or if it is a forgery."²³

Ironically, Calvin also referred in an earlier section of his treatise to King Abgar of Edessa receiving a cloth on which a miraculous image of the face of Jesus had been imprinted and which he (Calvin) classified as a "pure fairy tale."²⁴ Calvin never explicitly linked the image of Edessa with the Shroud of Turin, as some modern historians have hypothesized²⁵, but described it as simply one more fraudulent relic and as further evidence that all shrouds were forgeries.

There is now overwhelming evidence that the Shroud of Turin is the actual burial cloth of Jesus Christ and not a "made up miracle." However, since Calvin lived in the 16th century, well before the scientific, historical and artistic evidence

²⁰ Matthew 27:59, Mark 15:46, Luke 23:53 and John 19: 38 – 40.

²¹ John 20: 6 – 7.

²² J. Jackson, *Critical Summary*..., 43.

²³ M. Bunson, *OSV's encyclopedia of Catholic history*, revised edition, Our Sunday Visitor, 2004, p. 912.

²⁴ <https://www.info-bible.org/histoire/reforme/traite-des-reliques-jean-calvin.htm#Le%20saint%20suaire> (my own translation into English)

²⁵ I. Wilson, *The Shroud*, Transworld Publishers: London 2010, 133.

that has confirmed the Shroud of Turin's authenticity, it can be argued, in his defence, that he acted in ignorance and unbelief.

In his commentary, Calvin wrote:

“St. John, in his Gospel, relates even how St. Peter, having entered the tomb, saw the linen clothes lying on one side, and the napkin that was about his head on the other; but he does not say that there was a miraculous impression of our Lord's figure upon these clothes.”²⁶

John Calvin made an important argument which cannot easily be dismissed. However, there may be several reasons why the Gospels did not mention an image. One such possibility is that the disciples simply did not see the image in the darkness of the tomb inside the folded linen cloth, especially when they were overwhelmed by the fact that Jesus' body was missing. Another possibility is that it may be that the image was not yet visible on the cloth as some Shroud researchers have suggested.²⁷ Logically, if an image could not be seen on Easter morning, then the Gospel writers could not mention one.

He also wrote in his Treatise:

“[...] and it is not to be imagined that he would have left out such a work of God if there had been any thing of this kind.”²⁸

Contrary to Calvin's statement, it would not be difficult to imagine why such an image was not mentioned in Scriptures. It must be remembered that Christianity was from the very beginning, and for several centuries after that, a persecuted minority religion. It can be deduced therefore that if the New Testament writers were to publicly announce that they had in their possession Jesus' burial shroud, complete with the imprint of His crucified (and resurrected) body, it would lead the Romans and the Jews to demand, with threats of pain, torture and death, that they surrender it. It is easy to imagine that they would confiscate and destroy the Shroud if they knew it still existed. The Shroud would in all likelihood be kept hidden, and the Gospel writers would have remained silent about its removal from the tomb.

Calvin also wrote:

“Another point to be observed is, that the evangelists do not mention that either of the disciples or the faithful women who came to the tomb had removed the clothes in question, but, on the contrary, their account seems to imply that they were left there.”²⁹

²⁶ <https://biblehub.com/commentaries/calvin/john/20.htm> accessed 2 July 2019.

²⁷ The possibility that the image may have been latent was discussed at the 2019 Custance Shroud Conference, Ancaster, Ontario. Though this may be an appealing theory, it is one which, to date, has not received much support.

²⁸ <https://www.info-bible.org/histoire/reforme/traite-des-reliques-jean-calvin.htm#Le%20saint%20suaire> (*my own translation into English*)

²⁹ *Ibid.*

Calvin is once again guilty of the argument from silence since the gospels do not clarify whether the disciples recovered Jesus' burial cloths from the tomb or whether they left them. Neither does the Bible say how long Peter and John were present at the tomb, nor what happened while they were there. It is conceivable that Peter and John (or some other disciples), took Jesus' burial clothes away rather than just leaving them there in the tomb because they could serve as a concrete reminder of His earthly life among them, as well as evidence to the other disciples that Jesus had been resurrected. The Bible is simply silent on this point.

Calvin strongly asserted the following:

“But this gross falsehood is intolerable, for it openly contradicts the Gospel history.”³⁰

With all due respect to John Calvin and to his rich contribution to the Church, it must be said that he is grossly mistaken here. Calvin does not explain why the disciples' keeping Jesus' burial Shroud would be a gross falsehood and how it would openly contradict the Gospel history. It would be in direct contradiction with the Holy Scriptures only if they stated that Jesus' burial cloths were not recovered from Jesus' tomb or were destroyed. This was not the case.

As already stated, Jesus' linen burial cloths were mentioned in all four gospels before Jesus' resurrection, and in one gospel after it. Nothing is said one way or the other about what happened to them after the resurrection. There are clearly no contradictions.

Commenting on the use of “strips of linen” from the Gospel according to St. John (John 20:6), Calvin wrote in his commentaries:

“...who pretend that the whole body was sewn up in one linen cloth...”³¹

This is a misrepresentation of the facts since Scriptures make it clear that Jesus Christ was wrapped in a linen cloth and not “sewn up.” However, John's Gospel speaks of burial cloths, *othonia*, in the plural and this was a valid point of contention for Calvin. Conversely, this gospel would also appear to be in direct contradiction with the synoptic gospels, namely that Joseph of Arimathea had purchased a clean linen cloth, in the singular, and wrapped Jesus in it (i.e., Matthew 27: 59). In his Gospel, John's use of *othonia* has led to a popular belief that Jesus was wrapped like an Egyptian mummy. This procedure however does not follow what is known of normal first-century Jewish burial ritual.³² It is widely

³⁰ *Ibid.*

³¹ <https://biblehub.com/commentaries/calvin/john/20.htm> accessed 2 July 2019.

³² C.f. Ada Grossi. “Jewish Shrouds and Funerary Customs: A Comparison with the Shroud of Turin.” *Academia.edu*. (Accessed 20 May 2019).

https://www.academia.edu/2427474/Jewish_Shrouds_and_Funerary_Customs_a_Comparison_with_the_Shroud_of_Turin_in_1st_International_Congress_on_the_Holy_Shroud_in_Spain_Valencia_April_28-30_2012_ed_Centro_Espa%C3%B1ol_de_Sindonologia_CES_.1

accepted among Shroud researchers that *othonia* in John should be understood to mean that Jesus' dead body was enveloped from head to feet in one burial cloth, and that separate strips of linen were used to bind the hands and feet as well as the jaw.³³

One last word from Calvin:

"In short, either St. John is a liar, or all those who boast of having the holy shroud in their possession are convicted of falsehood and deceit."³⁴

This is yet another fallacious argument by Calvin, this time the fallacy of false dilemma, claiming there are only two possible alternatives. Clearly a third alternative exists, namely that one of the shrouds—the Shroud of Turin—the one that he listed as being in the city of Nice, France, in his *Treatise on Relics*, is the true original burial cloth of Jesus Christ and all the others are forgeries. In view of the current knowledge on the Shroud, this would appear to be the case.

CONCLUSION

Calvin's *Treatise on Relics* was timely and relevant because in the 16th Century the Roman Catholic church's fixation with relics was huge and misplaced. It is not surprising that John Calvin reacted to such abuse and deserves to be applauded. Unfortunately, since few, if any, of the true relics could be distinguished from the fraudulent, John Calvin rejected all of them.

It is also clear from his treatise on relics that John Calvin was aware that several cities claimed to have the true shroud of Christ. He was also aware of the existence of the Veronica and of the cloth of Edessa which he put in the same category as all the other shrouds. He knew of the existence of the Shroud of Turin which was at that time in Nice but dismissed it as not being authentic.

Today, there is overwhelming scientific, historical and artistic evidence that the Shroud of Turin is truly the actual burial cloth of Jesus Christ purchased by Joseph of Arimathea as recorded in all four Gospels. Calvin was, of course, unaware of evidence produced by research done over the past 120 years of Shroud studies. Because of the "absurdity of relics" which could not possibly be real and the "deception by the Church in the 16th century"³⁵ and his interpretation of Holy Scriptures, he concluded that all relics must be false. As a result, Calvin did not consider for a moment that one of the shrouds, namely the one located at that time in Nice, could have been the authentic burial shroud of Christ. Though Calvin was right in many of his writings, his strong bias against the organized church at the time blinded him to that possibility.

³³ Cf. K.E. Stevenson and G.R. Habermas, *The Shroud and the Controversy*, Thomas Nelson Publishers: Nashville 1990, 150.

³⁴ <https://www.info-bible.org/histoire/reforme/traite-des-reliques-jean-calvin.htm#Le%20saint%20suaire> (my own translation into English)

³⁵ J. Calvin, *A Treatise on Relics...*, 5.

Finally, Christian believers need to remember that the core of the Christian faith is that God became incarnate in Jesus Christ—flesh and blood. Jesus Christ, the Son of God, came to this earth and lived among His people. It should be no surprise to find a material, physical evidence of his passage.



22. A Contextual Analysis of Pope Innocent III Letters of the Fourth Crusade

Cheryl H. White & Peter B. Mangum

The “Missing Years” of Shroud history commencing in 1204, when it disappeared from Constantinople, until such time as scholars know it was in the possession of Geoffrey de Charny in Lirey, France, in the middle of the fourteenth century, are years that intrigue and baffle historians because there is a deafening silence in the record. While it is possible to fill that silence with proposed scenarios that seem logical, plausible, and even believable, it is not yet possible to fill the gap with the rigor that the discipline of history demands, which is the clear written record. Even the Shroud’s existence in Constantinople lacks the clarity that academic historians prefer, a challenge that is related to its varying descriptions in primary sources.

In such conditions, there is a crucial role that the discipline of philosophy must play, particularly drawing upon the tenets of epistemology, as Shroud studies advance. How do scholars arrive at *any* knowledge with certainty? How can the global community of scholars advance the knowledge of the Shroud in a way that will potentially close this significant historical gap, yet always leave open the possibility for new evidence? With an undisputed record that begins in the middle of the fourteenth century, and the previous lack of clear and consistent terminology to describe the cloth in Edessa, Constantinople, and other places, it is one thing for scholars to insist upon the “correctness” of an interpretation and quite another to do so in a way that draws upon the record. The written record is the fundamental cornerstone of arguing anything as a historical position. In the absence of the discovery of previously unknown documents, there is but one way, philosophically, to approach this challenge, and it is through re-examination of the known record. This approach represents a form of metacognition – to think about previous thinking – but such is an essential element to meeting a historical *challenge* in the absence of a historical *record*.

The basic historical facts that provide the framework for the analysis that follows are not in question. On 12 April 1204, a Crusader army under the command of Boniface, the Marquis de Montferrat, broke through the fortified walls of Constantinople after a protracted month-long siege. The military leadership of the Fourth Crusade permitted a murderous sacking of that ancient Christian city in a series of events that forever altered the course of civilization and indeed, the very nature of Christendom. When Pope Innocent III called for the Fourth Crusade in 1201, he doubtlessly envisioned, as had his predecessors going back to Pope Urban II in the eleventh century, the hopeful potential for a common cause in the Holy Land to heal the Great Schism in Christianity. This goal likely seemed ever

further from view as Innocent III dared to try once more, since after the initial success of the First Crusade in 1099, the city of Jerusalem suffered increasing encroachments and finally fell to Saladin, Sultan of Egypt, in 1187. The Second Crusade (1147) and the Third Crusade (1189) failed in the stated goal of securing Christian access to Jerusalem. Unfortunately, due to the diversion of Crusader efforts to lay siege to Constantinople, the Fourth Crusade never even reached the Holy Land. It resulted only in deeper division in an already wounded and embittered medieval Christianity, existing separately at Rome and Constantinople since 1054.

After the capture, looting, and destruction of many sites throughout the city of Constantinople, Baldwin of Flanders established a temporary Latin Empire, asserting dubious imperial authority by his coronation in the *Hagia Sophia* as Emperor Baldwin I. Letters from the Crusader leaders to Pope Innocent III in the months following the sacking of Constantinople belied the true conditions there. In fact, the correspondence of 1203-1204 brought the pontiff to the false conclusion that the city had not only peacefully welcomed in the Crusaders, but had agreed to reunite the Eastern Church with the Holy See of Rome. This provides the important and immediate historical context for the analysis of the hopeful letter that follows herein.

The correspondence between the pontiff and the Crusader commanders reveals that over the next several months following the dating of this letter, and into the year 1205, Pope Innocent III only gradually came to full realization of the extent of horrors that had occurred under the banner of the Holy Cross, and done in the name of the Apostolic See. Upon learning the full truth concerning the spoiling and looting of holy places, he responded with anger, issuing writs of excommunication for many Crusaders who had taken part in the atrocities. The stealing of relics was actually among the many crimes that the pope enumerated in a letter dated 12 July 1205 addressed to the papal legate:

How, indeed, will the church of the Greeks, no matter how severely she is beset with afflictions and persecutions, return into ecclesiastical union and to a devotion for the Apostolic See, when she has seen in the Latins only an example of perdition and the works of darkness, so that she now, and with reason, detests the Latins more than dogs? As for those who were supposed to be seeking the ends of Jesus Christ, not their own ends, who made their swords, which they were supposed to use against the pagans, drip with Christian blood, they have spared neither religion, nor age, nor sex. They have committed incest, adultery, and fornication before the eyes of men. They have exposed both matrons and virgins, even those dedicated to God, to the sordid lusts of boys. Not satisfied with breaking open the imperial treasury and plundering the goods of princes and lesser men, they also laid their hands on the treasures of the churches and, what is more serious, on their very possessions. They have even ripped silver plates from the altars and have hacked them to pieces among themselves.

*They violated the holy places and have carried off crosses and many relics.*¹
(emphasis added)

While Pope Innocent III was unfortunately not specific in any later correspondence by naming the relics he knew Crusaders had taken from that city, there are some important linguistic and contextual clues within the previous letter of November 1204 that indicate he knew that the Eastern Church possessed the burial shroud of Jesus. As adjunctive to the relic inventory of Nicholas Mesarites already known to exist from Constantinople dating to 1201, the letter in question can provide further evidence that Pope Innocent III knew the Shroud to be there.

The authors have annotated the pope's November 1204 letter to offer relevant context and commentary, posing the thesis that beyond being a pastoral letter to Crusader clergy, it also contains references to *specific* historical relics: the burial cloths of Jesus referenced in the Gospels. Any references to knowledge of the location of a burial shroud before 1355 is important, since that is when the cloth known today as the Shroud of Turin enters the undisputed historical record during its public display in Lirey, France. A literature review indicates that the only references to this particular letter appear within nineteenth century liturgical texts as justifications for the use of a linen corporal at the altar, based upon the prevailing opinion of previous centuries that Pope Innocent III wrote this as primarily exegetical and homiletic in its intent. In fact, the letter does read as a primarily theological treatise, yet also makes use of important literal references.

It is worthy to note that there is a dearth of scholarship involving this particular letter, likely due to its initial interpretation as pastoral and theological, and not overtly historical. The *signature of meaning* that earlier scholars ascribed to this letter has obscured it from examination for other potential meanings, including historical references, and this is certainly true of its potential relationship to sindology. Indeed, the entire corpus of this pope's letters surrounding the Fourth Crusade has not been closely examined since the 1898 photograph of Secondo Pia that revealed the full and unique complexity of the image on the Shroud of Turin. With that in mind, it is likely that scholarship prior to 1898 overlooked the significance of a specific reference contained within the letter, and therefore, the context of it merits a thorough re-examination.

A significant portion of the letter in question constitutes an exegesis of the Resurrection narrative from the Gospel of John, Chapter 20, as a way of explaining the theological differences between eastern and western churches that must be reconciled in light of the false news that the Crusaders achieved unity between Rome and Constantinople. Pope Innocent III expressed his belief that in order to reach a full reconciliation, there must be a shared full understanding of the profound mysteries of Christ. Indeed, it is the historical assertions of Christology

¹Pope Innocent III Letters, Petro, Tituli Sancti Marcelli Apostolicae Sedis Legato, 12 June 1205.

that lie at the heart of this letter, and frame the references to the burial cloths found in the tomb, not only as a metaphorical device for understanding great mysteries of the Christian faith, but also as actual objects known to be in existence. There are specific places within the letter in which Pope Innocent III seemingly departs from deeper theological exegesis and may in fact be referencing the actual burial linens of Jesus, known to be held in Constantinople and in Oviedo. Without referencing their specific locations, the pope's choice of words and context indicate not only a knowledge of their existence, but their role in communicating the great mysteries of the Christian faith since the apostolic age.

Pope Innocent III (Letter CLIV)
Vatican Register 6 (Original held in Vatican Secret Archives)
Patrologia Latina (transcription)

To the bishops, abbots, and other clerics in the army of the Crusaders
being at Constantinople.

[The letter] expresses thanks that the imperium has been transferred from the Greeks to the Latins, and treats the error of the Greeks with regard to faith.

(At St. Peter's, the 13th of November 1204)

We read in the prophet Daniel that it is God in heaven who reveals mysteries, changes the times, and transfers dominions. And this we see in the rule of the Greeks in our own time, and we rejoice that it is fulfilled that, since it is He who rules in the government of men and gives it [the imperium] to whomever he wants, the imperium of Constantinople is transferred from the haughty to the humble, from the disobedient to the devout, from schismatics to Catholics, in a word - from Greeks to Latins.

Indeed, that has been accomplished by the Lord, and it is a wonder in our eyes. It is, indeed, a change [brought about] by the right hand of the Highest, by which right hand of the Lord, He worked a miracle, that He should exalt the most holy Roman Church, as He brought back a daughter to her mother, a part to the whole, a member to the head. For the time seems to have arrived in which, after the golden calves have been destroyed, Israel shall return to Judah and Samaria shall be returned to Jerusalem, insofar as one no longer climbs up to the Lord in Dan and Bethel, but onto Mt. Sion, since the inner court, which, according to the Apocalypse of John, is outside the temple, has been cast outside. We therefore, give thanks to him from whom everything best is given, and every perfect gift, even if we cannot give as much as we ought, we do nevertheless as much as we can, and we sacrifice the calves of our lips to Him who in our time gave this glory to his own holy and glorious name,

which was invoked by us. For now that which, having been brought to completion, exists according to the letter, is fulfilled according to the spirit.

Note: The opening paragraphs of the letter indicate that Pope Innocent III is laboring under the false assumption that there has been a peaceful transfer of power from the Byzantine emperors to the new Latin emperors. His rejoicing at the news indicates he did not yet know the reality of the brutal siege and sacking of Constantinople. Furthermore, the pope references what he clearly perceives as a restored unity of the divided churches, believing, as he notes, that God has exalted “the most holy Roman Church,” and that a great restoration has been brought to completion. This misguided belief on the part of Pope Innocent III is crucial to understanding the exegesis of John’s Gospel that follows below in the letter. He treats the theological differences between East and West by use of metaphor, to be certain, but he also points to specific means by which the fullness of revelation has been transferred through the apostolic witness. The indicators of this are found in text construction, logic, and linguistic textual clues.

For we read that when it was still dark, Mary Magdalene went to the tomb and saw the stone removed from the tomb, and the rest that follows in the gospel lesson. Of course, by Mary Magdalene, we understand the synagogue, and by the tomb, we understand the Old Testament; by the stone of the tomb, the letter of the law is designated (or marked), which had been carved on stone tablets.

Note: this paragraph is the first time in this letter that Pope Innocent III uses a specific Latin verb, *designantur*. The passive form of the verb “designo” is translated as *marked or designated*. The comparison of the stone of the tomb to the law once actually carved in stone directly makes a physical and visual reference to something known to have existed. The pope continues this literary device throughout the letter, with metaphors that rely upon known physical objects. In this case, the connotation is visual, and in context, is also fully historical. In the following paragraphs, Pope Innocent III uses an analogy of darkness and light to refer to the Old Testament (the synagogue) giving way to the unfolding of the New Testament beginning with the Resurrection. He continues the theme of the letter by framing the fullness of Christological understanding in the context of an apostolic witness at the empty tomb, narrated in the Gospel of John.

Mary therefore is that, the synagogue. Morning, that is, in an earlier time. When there was still darkness, that is, the time of blindness and ignorance, before the law of Moses had been given. So, the Apostle says: I did not know concupiscence, unless the law said: Be thou not concupiscent (Rom. 8); she came to the tomb, that is, she took the Old Testament, in which the mystery of the scriptures was concealed, just as bodies lay hidden in the tomb, and when at last the darkness began to fade, and day was beginning to shine forth fully, that is, with the light that

illuminates every man who comes into this world: in whose eclipse we read that the rocks were split and the tombs were opened. She saw among the primitive faithful, who were of the circumcision; for salvation is from the Jews. A stone removed from the doorway of the tomb, that is, a discrete understanding of the letter from the Old Testament, because he knew that the law ought not to be understood by the teachers of gospel truth in both a literal and a spiritual sense, just as one of them, namely, Paul the Apostle, protests: The letter kills, but the spirit gives life. (II Cor. 2), and just as the same man says in another place: It is written that Abraham had two sons, one from a slave woman, and one from a free woman; but the one from the slave woman, was born according to the flesh; but the one from the free woman through the promise: which are so-called though allegory. (Gal. 4). And the same: Not all of those who are from Israel are Israelites, nor are those who are the seed of Abraham counted among his seed. (*ibid.*)

So, Mary Magdalene, as she ran, came to Simon Peter and to the other disciple, whom Jesus loved, and says to them: They have taken my lord, and we do not know where they have put him. (Jn. 20). Just as by Mary Magdalene we understand the synagogue of the Jews, so by Peter, who was specially destined for the Latins, and had his burial in Rome among them, we understand the Latins. Moreover, by John, who was sent to Greece, and came at last to rest in the Lord at Ephesus, we understand the Greek people. Peter made one church, that is, the one head of all churches. So, the Lord said to him: You are Peter, and upon this rock I will build my church. (Mt. 16). And John built many churches in Asia, just like the many members [attached to] a single head. So, in the Apocalypse he makes mention of the seven churches, and of each of them one by one, so that just as the many members are governed under one head, so the many particular churches are ruled by one, universal church.

Therefore, Mary came to Peter equally, and to John, because the synagogue, through the early apostles, who had believed from her, preached the word of the Gospel to both the Latins and the Greeks. For their sound went out into the whole world, and therefore Mary is said to have run, because the word of preaching ran quickly. She comes, I say, and says to them: They have taken the Lord from the tomb, and we do not know where they have placed him. (Jn. 20), but if she spoke more clearly: the scribes and the Pharisees, as they lay dying, buried the truth, which is Christ, in the Old Testament, so that there would appear no mention of him according to them, and so, according to their interpretation, when Christ is put into the Old Testament, He is not recognized.

Therefore, Peter went out, and that other disciple, and they went to the tomb. The two were running together, and the other disciple ran faster than and in front of Peter and came first to the tomb, and when he had bent down, he saw the burial clothes laid down, but he did not go in to see. For, to the preaching of that church which had believed from its circumcision, the Nations heard, which were predestined to life, namely,

the Greeks and the Latins, and they ran, competing with one another for understanding of the Old Testament, so that through it they might recognize the truth of such great things, which God had shown. But, although the Greek people had received the Old Testament earlier, which had been announced to them first, the Latins fully understand, because many apostles had also come to them earlier, like Paul and Barnabas, but because of John, who did not enter the tomb, nor saw the sudarium, which was off by itself, rolled up in one place, the Greek doctors [teachers] did not have the full understanding of the Old Testament completed, and the profound mysteries of God, neither then, nor even now, except for a few of them...

Note: Innocent III explains that the transmission of the fullness of divine mystery was through the apostolic witness of Peter and John, who both ran to the empty tomb. However, the pope points out that while John looked inside, he did not enter. Here, the pontiff is using “entering the tomb” as a literary device for explaining different degrees of understanding the profound Christological mysteries that existed between East and West. He frames the race to the tomb as a competition for understanding. Therefore, John’s testimony to the churches of the East was incomplete, since he did not go inside the empty tomb. The pope equates Peter’s entering the tomb and seeing the burial linens with a fullness of truth in the West. Yet, he also points out that a few of the Greek doctors in fact, did understand the fullness of the mystery. How? Significantly, the pope immediately makes the observation in the very next passage.

For, by the burial linens, which wrapped the body of Jesus, the mysterious humanity of Christ is marked (or designated), by the sudarium, which had been upon his head, we understand the mystery of his divinity.

For, according to the Apostle: The head of man is Christ, the head of Christ is God (I Cor 11). So, we read in Isaiah that two Cherubim, who, it is written, have six wings, were covering their faces with two wings, and their feet with two, while flying with two, because the mysterious divinity, which is designated by the head or by the face. And those things, which the Lord God made before the creation of the world, and which he is going to make after the judgement, are hidden, but what happens in between is more open, and around those things we also fly.

So, Simon Peter was following him and entered into the tomb, since the Latin people penetrated the interior and the deeper things of the Old Testament, and therefore saw the burial clothes placed aside, and the sudarium, which had been on His head, not placed with the burial clothes, but wrapped up separately in one place, because he distinguished between the sacraments [mystery] of humanity and those of divinity, so that, just as in God one does not distinguish nature but distinguishes persons, so in Christ, one does not distinguish persons but distinguishes natures.

Note: Pope Innocent III again uses the Latin verb *designantur* in describing the burial linens, translated as marked or designated, a specific verb choice that is strongly suggestive of a visual connotation. Moreover, the full contextual implication is crucial. The pope has explained that it was entering the tomb, and an actual physical visualization of the burial linens and the *sudarium* that accomplished Peter's complete Christological understanding. The pope then immediately refers to those same literal objects as having conveyed the fullness of understanding to those "few" Greek Doctors. This seems far more than a theological metaphor, because Innocent III states that the imparting of knowledge was by the burial linens and *sudarium* in the tomb.

There is strong historical provenance that the *sudarium* has been held at Oviedo, Spain, since the seventh century. But before this, the shroud and the *sudarium* were both in the East, perhaps even held together. The *sudarium* traveled from Palestine to Alexandria in approximately 600 AD, and then on to Oviedo. By 1204 AD, the East would have possessed only the visible design of *humanity* marked upon "the burial linens which wrapped the body of Jesus," since the emblem of *divinity*, the *sudarium*, was already known to be in the West. Indeed, the pope specifically states, "by the *sudarium* which had been upon his head, *we understand* the mystery of his divinity." Who is "we," if not the western Church, and how is that understanding accomplished if not without possessing the *sudarium*? Therefore, logic follows that in this single declarative statement, "by the *sudarium* which had been upon his head, we understand the mystery of his divinity," the pope is referring to the actual *sudarium*, known to the western Church for six centuries at the time of the writing of this letter.

Contextually, the pope clearly refers to the literal objects that conveyed understanding—first to Peter, and later, to a few of the Greek doctors. In order to state such, Innocent III therefore acknowledges that the burial shroud, as a literal physical object, existed in the Eastern Church. The pope has already made the point that because Peter entered the tomb and saw the burial linens and the *sudarium*, and took that knowledge to Rome, the western Church enjoyed the full understanding of the mystery. Significantly, he also notes that the truth of that direct encounter with the humanity of Christ marked upon the burial linens was also transferred to Paul and Barnabas.

Peter's apostolic witness was to Rome. Conversely, John went to the East with what the pope suggests was an inferior testimony, lacking in the completeness of understanding. It is interesting that Innocent III points not to the apostles themselves, nor to creeds, councils, or even specific Greek Fathers to explain how it was that a few in the Eastern Church understood great Christological mysteries. Instead, his explanation rests solely on specific objects in

the tomb, equated directly to the earlier Petrine testimony about having literally seen them.²

This shift of emphasis in the letter from Peter as the conveyor and teacher of the fullness of the mystery in Rome, to those actual objects from the tomb as instructive to the Greek doctors, is notable. Why else would the pope name the linens and *sudarium* in this textual construct, if not to say that they provided a theological teaching in a *visible* way? He states quite clearly that these objects made possible the understanding of the mystery for a few of the Greek doctors, just as they had for Peter.

To take a broader historical view, it is important to note that every major Christological heresy of the early centuries originated in the East, which doubtless explains why Innocent III believed the “Greek” understanding to be deficient. Yet, the pope’s use of the burial cloths in this discourse, if intended to be mere metaphor, is completely contrary to logic (and as the most accomplished of the medieval canonists, the well-ordered mind of Innocent III is noted by every major biographer). For instance, it is counterintuitive to think of the *linteamina* as representing Christ’s humanity, since one would more rightly view an empty shroud in an empty tomb as representing divinity. That is, unless he knew there to be an image of man marked upon it (here, the specific verb choice of *designantur* takes on great significance). Only if there is a visible outline of a man upon the cloth does the pope’s equation to humanity make sense.

Additionally, why would the pope state that the *sudarium* represented divinity unless he knew there was no image upon it? Why would Innocent III use this particular analogy of divinity? This is certainly explainable in the theological context of the High Middle Ages, reflected in what is perhaps the most important theological contribution of Innocent III’s pontificate. The *sudarium* has visible blood and water stains, the combination of which point to a prominent emerging thirteenth century theological context for Incarnational explanations of divinity. Indeed, this theology found the fullest possible expression in the first canon promulgated by the council called by this very pope – the Fourth Lateran Council of 1215 AD, which formalized the doctrine of Transubstantiation.

²It is an interesting related linguistic and contextual note that St. Paul uses a very specific Greek word, *proegraphie*, in Galatians 3:1, when he rebukes the Galatian people, “before whose eyes Jesus Christ was publicly portrayed as crucified.” This word, like the Latin *designantur*, has a specific visual connotation. How was Jesus Christ portrayed as crucified? We know from the introduction of Peter’s own first epistle that Galatia is one of the places he visited, so the pope’s association here between Peter’s witness to the burial cloths and the passing of the mystery to Paul certainly invites more scrutiny. Such potentially significant contextual and linguistic links merit further study to contribute to greater understanding of Shroud historicity. Larry Stalley’s chapter 25 in this book provides an in depth analysis of Galatians 3:1 which concludes that the Galatians were given visual evidence of the crucifixion of Christ.

The remainder of this letter continues with an exposition touching upon the *filioque* controversy, but again implying a distinction in the knowledge that Peter and John gleaned from the encounter at the empty tomb, with John's knowledge being inferior, drawing upon his own Gospel. Interestingly, the remainder of this letter differs substantially in both tone and content from the preceding passages, in that the shift here seems to be primarily theological. After exploring the profound Trinitarian mysteries in the paragraphs above making reference to specific objects in the tomb, Pope Innocent III returns to the use of pure metaphor to differentiate yet again between the fullness of understanding of Christological mystery in Rome, and a less complete understanding for the "Greeks." This portion of the letter seems to more directly speak to a reunification of the church, relying not upon the specific burial linens as earlier in the letter, but on the tomb itself as a shared experience of understanding.

The letter concludes with the hopeful assumption and expression that the divided church is whole again. For the purposes of continuity only, the remainder of the letter is included below:

Therefore the Greek, although he believes there are three persons in the divinity, he does not believe that the Holy Spirit proceeds from the Father in the same way as he proceeds from the Son. So, not in order to accuse himself, but in order to censure the Greeks, John adds this about himself: For he did not yet know the scripture. (Jn. 20). Moreover, why [should it be] that the Jewish people were chosen earlier for the worship of one God, but two were added in the end times, except for the fact that one person is in the trinity, which is sent by no one, since it is from no one. But there are two, which are from one, and are sent from one. Because if the Jewish people, which were chosen in [the time of] the patriarchs, bear a type of the former, from which all power is in heaven and is named on earth. The Latin [people], to whom the vicar of Christ is given, bears the type of the latter, unless of the Son himself, who is said to have met the Blessed Peter, and to have said both to him and for him: Do I come to Rome to be crucified again?

But since Blessed John, from whom also began the religion of the perfect monks, was given to the Greek people, he bears well the type of that Spirit, which seeks and loves monks. But, if this is so, why is it that the Greeks do not yet accept that they can believe that the Holy Spirit proceeds from the Son just as He does from the Father, if not for the fact that some of them have indeed accepted humbly the teaching of the Jewish people, who bear the mystery of God the Father, but so far refuse to receive doctrine humbly from the Latin people, who hold in this matter the likeness of God the Son, in the same way that the Spirit is said to accept from the Son what He should announce, so the Greek people, who sometimes take doctrine from the Hebrew people may at last likewise accept teaching from the Latin people?

Therefore, since the Father loves the Son above all else, since whatever the Father has, He has conferred it all upon the Son, and

therefore the Son loves the Father above all else, since whatever the Son has taken wholly from the Father, so in equal proportion, the Father and the Holy Spirit love themselves above all else, because whatever the Father has He has given wholly to the Holy Spirit, and whatever the Holy Spirit has, He has taken wholly from the Father. Unless therefore such a condition were to exist between the Son and the Holy Spirit, surely they would not love themselves above all else, and so the Son would love the Father more than the Holy Spirit, and the Holy Spirit would love the Father more than the Son, which is unbecoming and absurd, and completely impossible. For since these three are one and the same, in no way different or distinct, there is nothing more in one than in another that ought to be loved, since the indemnity does not admit inequality. So then these three love themselves and one another above all else, it is fitting that the Holy Spirit, just as He proceeds from the Father, should also proceed from the Son, insofar as just as Father is from no one, and two others are from him, so the Holy Spirit should be from the two others, and none should be from Him, and by this, there should be a relative distinction in persons among all of them, just as there is among all of them a substantial identity in nature.

This mystery, if it had been understood clearly by the Greeks, they would have already entered the tomb with the Latins, knowing that God is not of dissension but of peace. But, since John did not [yet] know scripture, namely that it was fitting for Christ to rise from the dead, it is no surprise, if the Greeks still do not know that the letter is dead, although the Spirit of Christ lives; but they will know soon, just as we believe and hope, they will know, they will assuredly know, and the remainder of them will be converted in their hearts totally, and they will come to Zion seeking the Lord, and David their king, and they will adore on the altar, which has been set up in Rome, as a perpetual right, and from then on the hand of the Lord will be with them. For at last that the evangelist subjoins will be fulfilled (and perhaps it has begun to be fulfilled): Then therefore he entered and the disciple who had come first to the tomb saw and believed (*ibid.*), and so the first were made last, and the last, first. For he will see what Peter saw, and he will believe what the Latin Church believes, so that henceforth they will walk together in the house of the Lord being of one heart.

And Mary was standing outside the tomb weeping. Therefore while she wept, she lowered herself and looked into the tomb, and she saw two angels clad in white sitting, one at the head and one at the feet, where the body of Jesus had been laid. Indeed, as the Greek people come in, the synagogue of the Jews stands outside, since it sees the exterior husk of the letter, and yet does not attain the inner nut of truth. For the book, which the hand sent to Ezekiel unfolded, had been written on both inside and out. And so, she weeps as one starving, because she chews on the outer husk and is in no wise nourished by the inner nut, and she who chases after external things does not receive that which is inside. So, when she

will see herself deceived by her own expectation, at the end of the age, she will lower herself from her hardness of heart, and as if looking into the tomb, she will more simply shatter her own law, and she will see two angels in white sitting, one at the head and one at the foot, that is, as expositors of both the New and the Old Testaments, speaking with one heart and openly about the divinity and humanity of Christ, and she will not seek [anything] from them, but they will rebuke her saying: Why do you seek the living among the dead? (Lk. 24). So, they call the woman, who thinks not with a man's understanding but with a woman's feeling, and therefore says to them: They have taken my Lord, and I do not know where they have placed him. (Jn. 20). Little by little, she progresses toward the understanding of the truth, while she begins to understand that they have taken Jesus, which translated means saviour or salvation. Concerning the Old Testament, since the old law led no one to perfection, nor will anyone be justified by his works, but still she does not know where they have put him, since she does not yet fully believe the gospel, in which Jesus is found. But having at last returned to the truth of the gospel, she will see Jesus standing and not indeed lying down, but she will not yet know that He is Jesus, that He is the messiah, and she will believe that He has now come. Wherefore also she calls Him her Lord, but she does not understand that He is God.

And then Jesus asks her: Woman, why do you weep? Whom do you seek? (*ibid.*) because the grace of Christ will anticipate her; but she, thinking him to be a gardener, says to him: Sir, if you took him (*ibid.*), etc. Mary is not deceived in this thought. For Jesus is the caretaker and guardian of his garden, of which we read in the Song of Songs: An enclosed garden, a decorated fountain (Cant. 4). Finally, Jesus will call her by name, when He will turn the hearts of fathers against their sons, so that the remnant of Israel be saved, and when she responds, Rabboni (Jn. 20), He adds: Do not touch me. I have not yet ascended to my Father. But go to my brothers and tell them: I ascend to my father and your father, my God and your God (*ibid.*) as if to say: although you believe that I am the messiah, who has been promised by the law and all the prophets, nevertheless you do not believe that I am equal to God the Father. Go then to my brothers, namely, by consensus, to the preachers of the gospel truth, and tell them, proclaim "this is!," and believe with them, because I ascend to my father and your father, my God and your God, that is, I am equal to and consubstantial with God the Father in divinity.

Look now, brothers and sons, you can collect [yourselves] openly, because God at last fulfills through you among us as a foretasted sacrament that which he foresaw from eternity and foreshadowed in the gospel, so that you may understand that, not through fortuitous chance, but indeed through an exalted plan, God works this mystery through your service, in so far as from now on, there is one flock and one shepherd. For certainly the creator of time with a dispensation that he has foreseen

distributes all times, so that when the plenitude of the Nations has entered into the faith, then also all Israel may be saved.

We therefore warn you, collected together, and we urge you very attentively, and through these apostolic letters we command, insofar as in order to enkindle the feeling of your devotion, which the Christian army has toward its holy mother, the Church of Rome, that you faithfully explain what has been written above to it [the army], and that you take care to induce our most beloved son in Christ, Baldwin, the illustrious emperor of Constantinople, as well as the greater and lesser men who are members of that army, to exert their zeal in setting the kingdom of the Greeks in obedience to the Apostolic See, through which they surely will, and without which they certainly will not be able to maintain their own government.

Given at Rome at St. Peter's on the 13th of November

In conclusion, we acknowledge the obvious conclusion that the future of Shroud studies includes addressing the significant historical challenges that are quite well-documented in previous scholarship. Most notably, there is a significant challenge posed by the diversity of identifiers used prior to its fourteenth century entry into the undisputed historical record, after which time there is a clear consensus of the Shroud's location and its chain of custody. Arguably, scholars must consider the merits of re-examining the known record for linguistic and contextual indicators such as described herein to potentially contribute to a greater breadth of understanding for the preceding centuries. In the absence of direct historical evidence that can incontrovertibly be tied to the cloth known today as the Shroud of Turin, the record of the past continues to be elusive in producing a clear provenance. This analysis provides a model for the re-examination of the known record, while yet searching for the previously unknown and vital historical connectors.

Translation Notes:

Designantur: passive *designo*. Designated, marked. Scheme or plan.

Sacramentum - all instances translated herein as sacrament, but could also be translated mystery. The Greek Church refers to the sacraments as mysteries still today. So this usage here could either mean the sacraments as ecclesiastical ceremonies or the "mysteries," as in the Christological dogmas of the Church.



23. The Beirut Icon and the Holy Shroud

César Barta, Pedro Sabe, & José Manuel Orenge

Abstract

The Medieval Knight, Robert de Clari, described seeing in 1203 a shroud having an image similar to that on the Shroud of Turin in the Church of Blachernae in Constantinople. Many experts on the Shroud of Turin agree that the Mandylion or Image of Edessa, which was in Constantinople, was actually the Shroud of Turin disguised as an icon of the face of Christ. Nevertheless, there are historical documents that contradict the possibility that the Mandylion and the Shroud were one and the same object. As an alternative, we propose that the shroud de Clari witnessed in the Church of Blachernae traveled from Jerusalem to Constantinople through Beirut, not Edessa. Therefore, the Holy Shroud was more likely related to the Icon of Beirut rather than the Mandylion. This icon was described as an image of Christ that represented his entire body with the wounds that he endured during the Passion.

Evidence that the Mandylion was not the Shroud

The testimonies of the Shroud of Turin present in Constantinople are robust. However, this paper does not deal with the later transfer of the cloth from Constantinople to France, but rather the earlier transfer from Jerusalem to Constantinople. A historically reliable testimony comes from the French Knight Robert de Clari. The de Clari record tells us about a shroud with the figure of Jesus Christ's whole body that had wrapped him.¹ This is the translation from the old French:

"...the Church of our Lady of Blachernae where was kept the shroud in which Our Lord had been wrapped, which every Friday was raised upright, so that one could see plainly on it the figure of Our Lord. And no one ever knew, either Greek or French, what became of this shroud after the city was taken."²

This Shroud was in the church of Blachernae and could be the Turin cloth. This is our starting point for tracing the Shroud back into its earlier history.

¹Robert de Clari (XI c.) ; *La Conquête de Constantinople. Croisades et Pèlerinages*. Robert Laffont. Paris. 788, 1997.

²The original old French: *medame Sainte Marie de Blakerne, ou li sydoines, la ou Nostres Sires fu envolépés, i estoit, qui cascuns desvenres se drechoit tous drois, si que on i pooit bien veir le figure Nostre Seigneur, ne ne seut on onques, ne Griu, ne Franchois, que chis sydoines devint quant la vile fu prise*. Robert de Clari. *La conquête de Constantinople*.

We note that de Clari places the Shroud in the Church of Blachernae, and he informs us of the disappearance of the cloth, but he does not describe the Shroud as an "acheiropoieton" (Greek ἀχειροποίητος, an image not made by human hands), and he does not link it to the Mandylion in any way. Therefore, we question whether the shroud in the Church of Blachernae could also be the cloth known as the Mandylion. After Ian Wilson first proposed that the Turin Shroud was the image of Edessa or the Mandylion, this has become a popular theory for the supposed early history of the Turin cloth.³ However, we know that the Mandylion was preserved in the Pharos Chapel of the imperial palace, distant from the Church of Blachernae (see Figure 1). As pilgrims testify, the Pharos Chapel was the Mandylion's "home" for centuries from its arrival to Constantinople until it left the city.⁴ This chapel housed the most important collections of Christian relics.⁵

A description of the Mandylion in Constantinople was also given by the same Robert de Clari.⁶ He saw the reliquary of the Mandylion hanging from two silver chains still in the Pharos Chapel, not in the Church of Blachernae. According to his account, the face of Christ on the Mandylion was created in Constantinople when a mason was placing tiles on the house of a widow. Jesus Christ appeared to the man and Jesus covered his own face (only the face) with the cloth leaving the miraculous image impressed on it.

De Clari's description of the legend associated with this icon does not mention Edessa, King Abgar nor the time of Jesus Christ. It was not an image of the whole body but only of the face. It also had no connection to a bloody burial cloth. This object was most certainly the same Mandylion from Edessa since it was located in the place where the records place the Mandylion, and it has the account of how Christ took the cloth and let his face imprint on it, as is the case for the original legend of the Mandylion. There is no other reference to any other sacred cloth that de Clari could have seen in the Pharos Chapel.

³Wilson, I. *The Shroud of Turin*. Oxford 2005. Also Wilson (1998); *The Blood and the Shroud of Turin*. London 1998.

⁴Barta, C. "Le Mandylion, le Linceul et la Sainte Chapelle". *Cahiers sur le Linceul de Turin, Montre Nous Ton Visage (MNTV)* 58I (June 2018) 18

⁵For a thorough study of the Christ relic collection see Bacci, Michel. "Relics of the Pharos Chapel: A View from the Latin West" in Lidov (2003); Lidov, Alexei, ed., *Eastern Christian Relics*, Moscow 235–46, 2003.

https://www.academia.edu/913214/Relics_of_the_Pharos_Chapel_A_View_from_the_Latin_West. See also Lidov (2012) Lidov, Alexei, "A Byzantine Jerusalem: The Imperial Pharos Chapel as the Holy Sepulchre", in *Jerusalem as Narrative Space Erzählraum Jerusalem*, edited by Annette and Gerhard Wolf Hoffmann, Leiden-Boston 63–104, 2012.

⁶Clari, Robert de, *La Conquête de Constantinople. Croisades et Pèlerinages*. Robert Laffont. Paris. 783, 1997.

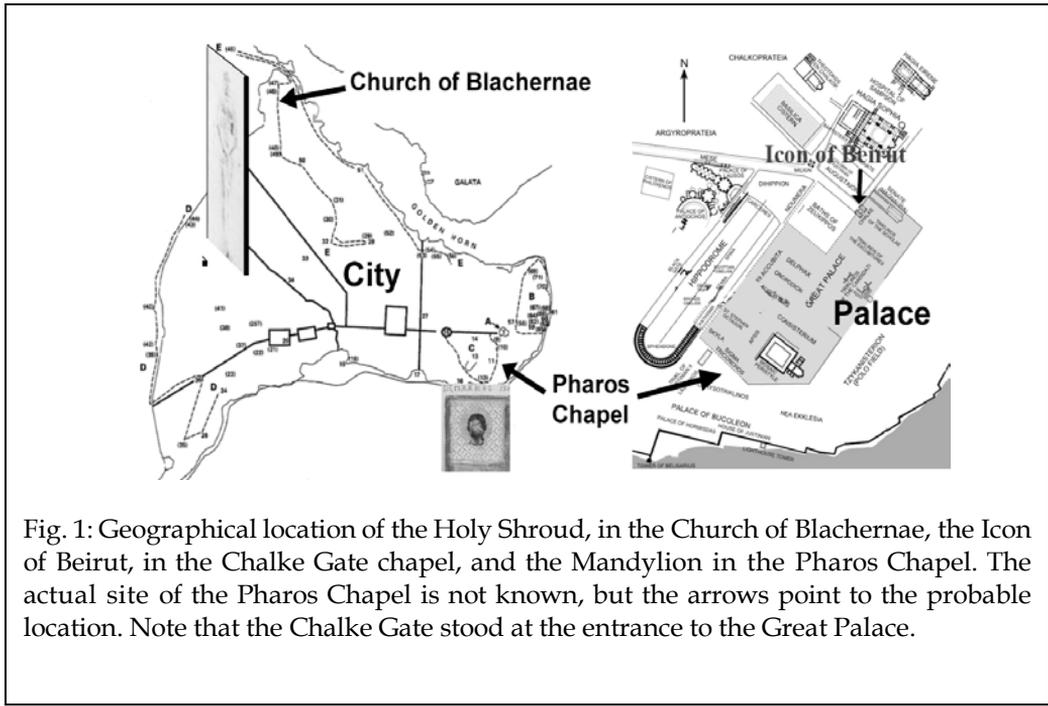


Fig. 1: Geographical location of the Holy Shroud, in the Church of Blachernae, the Icon of Beirut, in the Chalke Gate chapel, and the Mandylion in the Pharos Chapel. The actual site of the Pharos Chapel is not known, but the arrows point to the probable location. Note that the Chalke Gate stood at the entrance to the Great Palace.

Moreover, this cloth was associated with another object, the Keramion, which is a tile also portraying the face of Christ. The image on this tile was miraculously transferred to it from the Mandylion when both were in Edessa. De Clari describes these two rich reliquaries in the middle of the Pharos Chapel. In one reliquary, there was the cloth and in the other, the tile. According to the account of de Clari, the tile ended up having the image of the face on it because the mason hid the cloth that he received from Christ under a tile until the evening. After he removed the tile as he left, he discovered that the face was also impressed on the tile. For additional confirmation, the description of de Clari matches completely with the illustration in the codex Rossianus,⁷ where Mandylion and Keramion are drawn side by side (see Figure 2).

After two and a half centuries since its arrival to Constantinople, all the features that related the Mandylion to the Shroud were removed from its history. The account had changed but the object remained. This is a perfect example of how the legends associated with sacred objects only try to explain what the object is, but they do not tell necessarily the historical facts. In conclusion, we believe that this evidence points to two different sites, the Pharos Chapel and the Church of Blachernae, in which were located two different relics, the Mandylion and the Shroud, respectively.

⁷Manuscript Rossianus 251, f 12 v^o. *Vie de Saint Jean Climaque par le moine Daniel*. Circa 11th century. Vatican Library

Fig. 2: Mandylion (left) and Keramion (right). Illustration of the Heavenly Ladder of John Climacus. Manuscript Rossianus 251, f12 v^o Bibliothèque Vatican Library



We can add more data.

Although, de Clari suggested that the Shroud disappeared after the city was sacked in 1204, the Mandylion did not disappear. This further suggests that the Mandylion was not the shroud of Blachernae. The Mandylion was saved in the Imperial Treasury along with other important relics after the sack of the city. The Mandylion or Image of Edessa remained in the Byzantine city until 1248, when it was sent to Paris where it was housed in the Sainte Chapelle until the French Revolution. Jannic Durand, the Louvre curator, provided the most reliable analysis.⁸ In addition, the Sainte Chapelle inventories, and the official documents of the transfer are well known, and these contradict the theory that the Shroud and the Edessa cloth were the same object. Even though many authors continue to believe that the Mandylion disappeared after 1204, this belief cannot be supported. This misunderstanding contributes to keeping the hypothesis alive. However, the Shroud of Blachernae, as described by Robert de Clari, did disappear during the sack of the city. This disappearance allowed for its secret transfer to France, and its further public expositions in Lirey.

To keep it possible that the Shroud of Turin and the Mandylion were the same object, one of the authors of this article (Barta) proposed two hypotheses as a conciliatory alternative⁹:

⁸Durand, Jannic et Marie-Pierre Laffitte, *Le Trésor de la Sainte-Chapelle*, Publication du Louvre. Réunion des musées nationaux. Paris 71, 2001. And Alexandre Vidier, *Le Trésor de la Sainte-Chapelle*, Mémoires de la société de l'histoire de Paris et de l'Île-de-France, Paris (Tome 34), 190-192, 1908.

⁹Rodriguez Almenar, J. M. and C. Barta, "The image of Edessa included the whole body but only its empty reliquary arrived at Paris". Int. Conf. on The Shroud of Turin. Pasco, WA (Jul.19-22) 2017. Also, Barta, C. "Lo que la Síndone es y no es". I Congreso Internacional de la Sábana Santa en España. Valencia (April 28-30) 2012.

1. The Shroud had been removed from its reliquary in the Pharos Chapel before 1203 when de Clari saw it in the Church of Blachernae.
2. An empty reliquary was sent to Paris.

However, these hypotheses have no documentary support and remain conjectural. Now, new information renders both hypotheses untenable.

1. Byzantines were prevented from removing the Mandylion from its reliquary, because of a superstition that arose after an earthquake had occurred during a previous removal. (This is documented.¹⁰)
2. The reliquary in Paris was not empty but contained a 'Veronica' cloth. (Again, this is documented.¹¹)

Therefore, it is unlikely that the Mandylion was not removed from its reliquary, and that it was the Shroud of Turin in disguise. As we have noted, the Mandylion was preserved in the Pharos Chapel. Exhibitions of the Mandylion in Constantinople can be found until the middle of the eleventh century. However, when the pilgrim who wrote his Description visited the city (around 1075-1099) the superstition preventing its opening had already been established. Therefore, if the authorities applied that rule, by the time of the fourth crusade in 1204, the Mandylion could not have been removed from its reliquary.

Moreover, the reliquary that arrived in Paris was not empty. A more detailed analysis of the texts that describe what arrived in Paris leads us to conclude that the reliquary was not empty, and that the content was a 'Veronica'¹². Inside the reliquary there was a cloth with an image of a face, surrounded by a gold plate decorated with a "trellis." This description matches well with an old representation of the Mandylion¹³ and with the description in the *Narratio*.¹⁴ In the eighteenth century, the Mandylion ended up being designated a 'Veronica' in the inventories of the collection of Paris. It was a canvas of the face of Christ mounted on wood and surrounded by a gold plate with rhomboid reliefs (left picture in Fig. 2). Identifying the Mandylion as a 'Veronica' defines the precise nature of the image because, at that time, the reproduction of the Veronica's model in Europe was well known and fits the description of the object in the Sainte Chapelle. Consequently,

¹⁰Ciggaar Krijnie N. "Une Description de Constantinople dans le Tarragonensis 55" RBE 53 (1995) 117-140.

¹¹Durand, Jannic et Marie-Pierre Laffitte, *Le Trésor de la Sainte-Chapelle*, Publication du Louvre. Réunion des musées nationaux. Paris 71, 2001, And Vidier(1908), Vidier, Alexandre, "Le Trésor de la Sainte-Chapelle," Mémoires de la société de l'histoire de Paris et de l'Île-de-France, Paris(Tome 34) 190-192, 1908.

¹²Barta, C., "Le Mandylion, le Linceul et la Sainte Chapelle". Cahiers sur le Linceul de Turin Montre Nous Ton Visage, MNTV n. 58 (June 2018) 16-30.

¹³Manuscript Rossianus 251, f 12 v°. *Vie de Saint Jean Climacque par le moine Daniel*. Circa 11th century. Vatican Library

¹⁴Barta, C., "Le Mandylion, le Linceul et la Sainte Chapelle." Cahiers sur le Linceul de Turin, MNTV n. 58 (June 2018) 16-29.

In addition to the Mandylion, there are traces of other images of Christ in Constantinople but the documentation and the iconography for these are scarce. One of the images of Camuliana could be a candidate¹⁸ because it can be described as "not made by human hands." However, its transfer to Constantinople is not particularly well documented¹⁹ and it disappears too early from the record. We can take as a clue for the timing of the Shroud's arrival to Constantinople, the changes that began to appear in the representation of Christ in the city. Such is seen on the Epitaphios, the Man of Sorrows, or the Codex Pray. They started about the end of the 10th century so we should assume that the "inspiration" or source for this development arrived in the city shortly before this period. This excludes the Camuliana candidate that arrived about the 6th century.

The iconography of the Codex Pray (Figure 3), the Man of Sorrows (Figure 4), and the Epitaphios (Figure 5), shows the figure of Christ in a similar way as it is seen on the Shroud of Turin. There are witnesses that back the presence of the Shroud of Turin being in Constantinople. Then, we have to search how and when the Shroud in the Church of Blachernae arrived in Constantinople. As a new plausible hypothesis, we have found promising clues in the Icon of Beirut which we will now examine.

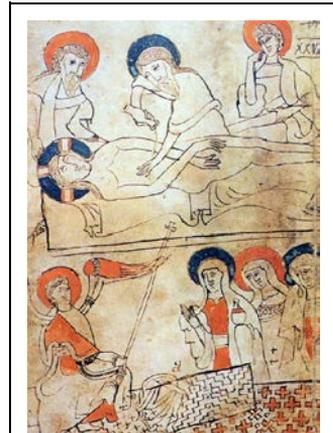


Fig. 3: The Codex Pray



Fig. 4:
Man of
Sorrows

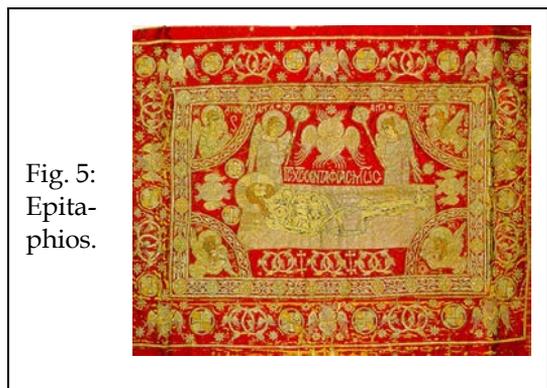


Fig. 5:
Epita-
phios.

¹⁸Kitzinger, E. "The Cult of Images in the Age before Iconoclasm". *Dumbarton Oaks Papers*, n. 8 114, 1954.

¹⁹The date of 574 is provided by Dobschütz, but it is brought into question (https://en.wikipedia.org/wiki/Camuliana#cite_ref-7).

The Legend of the Icon of Beirut

There is an old story that involves an image of Christ, Jews and Christians. This account was read in the Second Council of Nicaea, of the year 787. In the fourth session of this Council of Nicaea a letter (falsely) attributed to Saint Athanasius of Alexandria (d. 373 AD) was read, in which the legend of the 'Icon of Beirut' was narrated. In the council, Peter, bishop of Nicomedia, defending the need for the icon's veneration, presented the story of the miracle of the icon which took place in the city of Beirut. The icon in question, according to the story of the letter read in the council, was an image of the whole body of the Lord. First, it had belonged to a Christian and then to a Jew. It was mistreated: the Christ feet and hands were nailed, Jews hit in the head and a spear pierced his side. But, suddenly, blood and water began to flow from the icon.²⁰ Here is a partial translation of the text from its Latin version²¹:

"There is a city called Beirut, located in the confines of Tiro and Sidon, subject of Antioquia. In that city of Beirut there were many Jews. Well, next to the synagogue of the Jews, which apparently was very large, a certain Christian received from another a small room for rent. While he lived in it, the Christian fixed in front of his bed an image of Our Lord Jesus Christ, who was painted in an honest manner and represented Our Lord Jesus Christ in *real size*.²² A short time later, out of necessity, that Christian searched for a larger room. Having taken everything, the image of the Lord was left behind. A Jew rented the house in which the image of the Lord was. When he had moved in with all his belongings, he lived in the house, but he did not realize that the icon of the Lord was there, because he had not inspected that place as he had just moved in there. One day, that same Jew invited one of his compatriots to dinner. While they were having lunch, the guest Jew, looking up, saw the icon of Our Lord Jesus Christ and said to the one who had invited him: "You, who are Jewish, how is it that you have an image of this kind?" And he continued expressing many rude and expletives remarks against the Lord. Then, the one who had invited him, noticing the image, apologized to his Jewish guest, saying: "Until now I had not seen the image." His guest kept silent until he went to meet the high priests, sustaining accusations against the Jewish tenant in the house where the image of the Lord was located. He said: "He keeps an image of the Nazarene in his house." When they heard this, they said, "Can you show it to us?" He answered: "In his house I will

²⁰For a summary, see the website of the Orthodox Church of America: under the title Commemoration of the Miracle of the Icon of Our Lord Jesus Christ in Beret, which is celebrated on October 11. Cf. PG 28,795: "Admonitio in Historiam Imaginis Berytensis". And E. von Dobschütz : *Chritusbilder. Untersuchungen zur christlichen Legende* . Leipzig 1899.

²¹The translation from Latin is the work of Pedro Sabe academic in Latin and Greek texts.

²²*integrae staturae*.

show it to you." Although becoming very irritated, they calmed down that afternoon, however, when next morning arrived, the chief priests and the elders took with them the outraged Jew and a large number of people and went to the house of the Jew, whose house had the image of the Lord. Arriving at the place, the high priests and the elders, together with the whistle blower, rushed in, and saw the image of the Lord, standing. Then, exceedingly angry at the Jew who lived in the house, they excommunicated him from the synagogue, and throwing down the image of Our Lord Jesus Christ, they said: "Just as our fathers once mocked him, so we also mock him." At that moment, they began to spit in the face of the holy image, giving blows, and saying: "Everything our parents did to him, let's do it in his image!" Then they said: "We heard that they nailed his hands and feet." And then they nailed nails through the hands and feet of the image of the Lord. Once again, angry, they said: "We heard that they gave him vinegar and gall to drink with a sponge, let's do it ourselves!" And so, they put in the mouth of the image of the Lord a sponge full of vinegar. Again, they said: "We were taught that our parents hit his head with a cane, let's do the same to him! Taking a reed, they hit the head of the Lord. And, in addition, they finally said: "In every detail they taught us that they opened his side with a spear, we did not omit anything! Let's pierce it too. "To do so, they charged one of them to take the spear and hit the side of the image of the Lord. Then a lot of blood and water flowed from him (...).²³

The story continues further, with great praises to the Lord Jesus Christ. Then, the blood was collected in ampules and sick people were anointed with this blood. Many were healed. Then, it tells the story of the confession of the Jews to the faith in Christ, who, en masse, went before the bishop, who received them all and baptizes them in successive days.

Of course, we should not take this legend literally and present it as a historical fact. It is not necessary to believe that the icon was literally nailed, pierced, and that blood and water flowed out because of the mistreatments. The legend simply tries to explain why the image included the whole body, with the blood and the wounds of the crucifixion (highlighting the wound on the side).

We point out that this legend describes the icon as a painting of the whole body (*integrae staturae*) with the wounds of the Passion. Interestingly, it highlights the chest wound but makes no mention of the crown of thorns. In addition, the image had, initially, gone unnoticed by the Jew. Even today, many people need help to recognize the faint image of the Shroud. As a negative image, it is not evident, and it is difficult to distinguish if you are not from some distance away. In the Table 1 (at end of this chapter) we compare the characteristics of the image

²³Lamberz, Erich (ed.), *Acta Conciliorum Oecumenicorum, Series Secunda, III,2, De Gruyter, Berlin-Bohn*319; 321; 323; 325, 2012.

on the Shroud to the Icon of Beirut and to the Mandylion that the associate documents indicate.

Tracing the Path of the Icon of Beirut

The Latin translation of the miracle of Beirut by Anastasius the Librarian, written in the year 873, describes the origin of this icon and its journey from Jerusalem as follows:

Nicodemus, who participated in the burial of Jesus, made the icon with his own hands. When he died, the icon was given to Gamaliel, the teacher of St. Paul. When Gamaliel saw the end of his days approaching, he passed it onto Jacques. Jacques then passed it onto Simeon, then Simeon to Zacchaeus. This is how the icon remained in Jerusalem until the devastation of the city in the year 70. Subsequently, the icon was taken by the Christians to Syria, and remained in Beirut until the year 975, as we shall see later. This description appears to be an addition to older versions, but was written when the icon was still in Beirut. It could be based on a legend, according to which, Gamaliel, his son Simeon and Nicodemus would have picked up the shroud and the other relics of the Passion of Christ, to hide them in a safe place under Gamaliel's care somewhere near Jerusalem. First, Mary Magdalene, and subsequently, Simeon, Christian bishop of the city knew the hiding place.

All this, according to the tradition collected by the ancient Christian authors Photius and Clement. It seems that Hegesippus, writer and Christian traveler of the second century, reported such data with even more details. Hegesippus texts were available in the sixteenth or seventeenth centuries, but now seem to have disappeared completely.²⁴ It should be noted that the interpolation associates the legend with the Icon of Beirut, although the source that mentions Nicodemus, Gamaliel and Simeon refers to relics and not to the icon. Therefore, it can be assumed that the author of the interpolation is considering that the icon is a relic.

²⁴Carnac, Pierre. *El Sudario de Turín*. Ed. Lidium. Buenos Aires p.33, 1984. We have not been able to verify the version referred by this author for which a further investigation is pending. The reference to Gamaliel and Nicodemus provided by the Patriarch of Constantinople Photius in the ninth century and by Clement only say that Nicodemus was baptized by St. John and St. Peter, together with Gamaliel and his son. [P.G. vol 103 CLXXI (171) p. 499-500 (Bibliotheca. Eustracio). English translation http://www.tertullian.org/fathers/photius_copyright/photius_04bibliotheca.htm maliel was a martyr remaining among the Jews as a hidden disciple of the new faith. The *Recognitions of Clement*. http://www.documentacatholicaomnia.eu/03d/0050-0150,_Pseudo_Clemens,_Recognitions_%5bSchaff%5d,_EN.pdfnd, we know that in the second century Hegesippus cited the *Gospel of the Hebrews* (Eusebius). A thing that can be interesting is he says that the "servant of the priest (servo sacerdotis)" is who receives the Shroud. It may refer to the servant of Nicodemus, who was a priest.

As we will see here below, there is an old reference affirming that Nicodemus made the icon remembering the image of the whole body that Christ left in the shroud used for his burial. However, the assumption that Nicodemus actually made a sculpture of Jesus Christ crucified makes no sense. It is out of context and totally anachronistic. Nicodemus as a Jew would not make images. And in the few years after Christ, there was no representation of Christ crucified. This artistic motif started only centuries later. The implication of Nicodemus in the story of the Beirut icon cannot be interpreted in the way that he was the author. But it could be justified because Nicodemus kept the cloth.

This legendary origin of the Shroud, in the case of the Icon of Beirut, is, by far, much closer to the Gospel accounts of the burial of Christ than in the case of the Mandylion. At least Nicodemus participates in the burial and he is directly associated to the Shroud. While in the legend of the Mandylion, it is an Ananias in the service of the court of Edessa who picks up the Mandylion during a preaching of Jesus Christ who was still alive. This Ananias does not appear in the Scriptures.

In our quest to discover the early history of the Shroud of Turin, we should also look in the truth and reality embedded in the legend of the Icon of Beirut. From the earliest days of Christianity, Beirut welcomed Christians. Indeed, Christ himself preached in Tiro and Sidon,²⁵ which is only 44 km from Beirut. Around 362, Julian the Apostate burned the basilica that existed in Beirut, which was rebuilt shortly after in 381. Thomas, bishop of Beirut, attended the Council of Constantinople in 381, and Eustace at the Council of Chalcedon in 451.²⁶ Beirut was even established as an autonomous diocese in the mid-fifth century. By the end of that century there were at least six churches in the city. Another new church was built precisely to commemorate the miracle of the bleeding icon.²⁷ All this shows that the Christian presence in Beirut remained uninterrupted. If the testimony about the icon in the Second Council of Nicaea is of the eighth century, then the origin of the legend could date back to the fifth century, according to an editor of the fifteenth century Arab historian.²⁸ The bishop of Beirut took the synagogue between 630 and 635. These dates match with the year when Heraclius recovered Beirut and the year when the Arabs took the city respectively. The church would have been Saint Saviour that, according to the tradition was before a synagogue,

²⁵Mc 7: 31.

²⁶Kassir, S. Histoire de Beyrouth, Ed. Fayard, Paris p.51, 2003.

²⁷Kassir, S. Histoire de Beyrouth, Ed. Fayard, Paris p.51, 2003.

²⁸Cheikho, Louis S.J. (ed.), Sâlih bin Yahyâ, Kitab tarikh Bayrut, Beirut, p. 17 nt. 2. 1902. The legend must be before 750, according to Paul Riant, *Exuviae Sacrae Constantinopolitane, Lectiones Bergenses*, tome II. p 5. And it is already in a Greek dossier compiled in Rome in 774-775 according to J.-M. Sansterre (1999), *L'Image Blesée, l'Image Souffrante : quelques récits de Miracles entre Orient et Occident (VIe-XIIe Siècle)*, Brussels-Rome, p. 117, note 14. And J.-M. Sansterre (1999), " Les images dans les sociétés médiévales : pour une histoire comparée ", *Bulletin de l'Institut Historique belge de Rome*, n. 69, Bruxelles-Rome, 1999.

and it was the church of Franciscans in the Middle Age to end as the Séreil mosque. The icon was already in the synagogue before the change of ownership, that is, before 630.²⁹ Of course, it is not possible to think that a legend develops in a few decades, when the possible witnesses of an event may still be alive. For the development of a legend it is necessary for there to be a passage of some generations. Only then, can the legend become established. Moreover, an additional argument is that there is no reference to the Arab capture of the city around 635, which confirms that the story is earlier than that time.

The Icon of Beirut is brought to Constantinople

That icon that must have carried the signs of the Passion was taken to Constantinople in 975. We are informed of such detail by another contemporary document of the events, whose author is Leon the Deacon, who informs us of the transfer of this same icon to Constantinople by the Byzantine emperor John I Tzimiskes, during his military campaign in this region.³⁰ Another testimony is a letter from Tzimiskes himself to Ashot III, king of Armenia, in which he mentions that he obtained several relics in the conquered cities and, among them, the icon from which blood and water flowed. The letter has come to us through an Armenian chronicler of the twelfth century, Matthew of Edessa. The letter is one of the few documents that provides at least a minimal indication about the image's features. We will analyse this text in some paragraphs below. For the current objective, the letter is a confirmation that the icon was transferred to Constantinople. The date is important because it happened a short time before the representation of Christ's burial appeared in Byzantium.

According to some authors,³¹ the icon was installed in the chapel of Christ the Saviour in the imperial palace. It was over or near the Chalkê Gate (Bronze Gate). Above the main entrance of the Chalkê, there stood an icon of Christ which was a major political target for the iconoclasm. It was removed and replaced more than once. At the time of Tzimiskes, it was a mosaic probably on the façade.³² The chapel in the Chalkê was different from that of Pharos Chapel where the Mandyllion

²⁹Jabre-Mouawad, Ray, " La mosquée du Séraï à Beyrouth : histoire d'un lieu de culte ", *Tempora : Annales d'Archéologie* 14-15 (2003-2004). For the dates interval, personal communication by e-mail 27 August 2019.

³⁰Niebuhr, B.G. (ed.), *Corpus scriptorum historiae Byzantinae*, Bonn, p. 168 1822. In. 3. Alice Mary Talbot (2005) and Denis F. Sullivan, *The History of Leo the Deacon*, Washington, p. 209, 2005.

³¹Durand, J. and M. P. Laffitte, *Le Trésor de la Sainte-Chapelle*, Ed. Louvre, Paris, p. 27, 2001. Also, A.M. Talbot (2005) and D. F. Sullivan, *The History of Leo the Deacon*, Washington, p. 27, 2005. Also, *Patria of Constantinople*. English version in Berger (2013), Albrecht, *Accounts of medieval Constantinople: The Patria*. Dumbarton Oaks Medieval Library, Harvard University Press, p. 224-225, 2013.

³²Mango, Cyril. *The Brazen House; a study of the vestibule of the imperial palace of Constantinople*. Copenhagen, p.122, 1959.

resided. The Chalkê gave entrance to the imperial complex from the main avenue of the city (Fig. 5). Shortly after the arrival of the icon to the chapel of the Chalkê in Constantinople, there are mentions of a healing cloth in this chapel. According to Mango,³³ Alexios I Emperor (d. 1118) and Alexios Komnenos, Protosebastos (d. after 1182) were cured of illness by the application of a cloth that was in front of the icon at the Chalkê. This cloth, according to Glycas,³⁴ also bore a portrait of Christ. This cloth was large enough to cover the emperor.³⁵ The Latin translation describes the cloth as the most holy.³⁶ Its healing function keeps the original legend of the role of the blood which flowed from the icon. Even with its sacred significance, the cloth was moved from the chapel of the Chalkê to the emperor's home. He had already moved the imperial palace to Blachernae. In our hypothesis, it would not be the last time that the cloth went to Blachernae and was deployed there. As we will see below, this icon could be moved to Blachernae like the hair of John the Baptist.³⁷ All of these clues lead to connect the healing cloth of the Chalkê with the Icon of Beirut. We have here other support to assume that the Icon of Beirut was a textile with an image.

The Shroud in the church of Our Lady of Blachernae

When the fourth Crusade arrived at Constantinople in 1203, Robert de Clari saw the Shroud in the Church of our Lady of Blachernae. As mentioned above, in our quest to discover the old history of the Shroud of Turin, we take the icon in Blachernae as the prime starting point for the existence of the Shroud of Turin before its appearance in France. But there is no other mention of an image of Christ in that church other than that testimony by de Clari in the 13th century. In Blachernae, the most popular image was an icon or veil of the Virgin Mary.³⁸ Neither the Mandyllion nor the Icon of Beirut were described as in the Church of Blachernae, which would have been their usual place after they arrived in the city. If one of them were the Shroud, it had to be transferred to the Church of Blachernae. However, de Clari testified that the Mandyllion remained in the Pharos Chapel inside the Bucoleon complex. It remained there until its transfer to Paris

³³Mango, Cyril. *The Brazen House; a study of the vestibule of the imperial palace of Constantinople*. Copenhagen p.132-133, 1959

³⁴Glycas, Michael. *Annales, Corpus scriptorum historiae byzantine*, p. 623: (1827-1897).

³⁵Zonaras, John. *Epitomae historiarum*, XVIII, Vol III. Ed. Theodorus Buttner-Wobst, p. 751, (1897).

³⁶Latin *Sacrosancto*. That means consecrated by religious ceremony, sacred, inviolable, most holy; venerable.

³⁷Mango, Cyril. *The Brazen House; a study of the vestibule of the imperial palace of Constantinople*. Copenhagen p. 150 note 7, 1959.

³⁸Marcelle Ehrhard, *Le Livre du Pèlerin d'Antoine de Novgorod*, Paris 1932, p.58.. Cf. Paul Riant: *Exuviae sacrae Constatinopolitanae*, II, p. 224

according to trustworthy documents.³⁹ The Mandylion was not in Blachernae and the Shroud that de Clari saw must have been another cloth.

On the other hand, the same crusader, de Clari that is, mentions nothing about the Chalkê Chapel. The Icon of Beirut could remain in the Chalkê chapel or not. If this icon remained in the Chalkê chapel, the pilgrims who visited the city years later would tell us about it. We verified that, among the known accounts of the pilgrims who visited the city years later, never mentioned the Icon of Beirut in the Chalkê sanctuary nor in any other chapel of the city.⁴⁰ This is completely compatible with the disappearance of the icon after the fourth Crusade. If, according to de Clari's testimony, the Shroud in the Church of Blachernae disappeared after 1204, and the Icon of Beirut also disappeared, both of them can be one and the same cloth. This fact is necessary, but it is not enough to justify the transfer from the Chalkê chapel to Blachernae.

The Byzantines could have moved the Icon of Beirut to the Church of Blachernae because of John Tzimiskes. The chapel was something personal to John Tzimiskes and it did not have much of a future. Romanos I Lekapenos (920-944) built a small preliminary chapel attached to the Chalkê Gate.⁴¹ Then, John Tzimiskes (969-976) enlarged it and he adorned it magnificently in 971,⁴² and placed in it the Icon of Beirut and the hair of John the Baptist in 975.⁴³ Tzimiskes was then buried in this chapel. But, Isaac II Angel (1185-1195 and 1203-1204) eliminated the Chalkê Gate before the end of the 12th century.⁴⁴ The building lost its function as a door after 1200⁴⁵ and only retained its religious role. In fact, the architectural ensemble no longer mattered since the beginning of its renovation by Tzimiskes because its predecessor, Nikephoros II Phokas (963-969), surrounded the palace with a tighter wall leaving the chapel outside.⁴⁶ The chapel was never very

³⁹Durand, Jannic et Marie-Pierre Laffitte, *Le Trésor de la Sainte-Chapelle*, Publication du Louvre. Réunion des musées nationaux. Paris 71, 2001.

⁴⁰Khitrowo, B. de. *Itinéraires russes en Orient*. Paris. Leroux, 1889. And Majeska (1984), George P. "Russian Travelers to Constantinople in the Fourteenth and Fifteenth Centuries". *Dumbarton Oaks*. Mango confirms the disappearance. Mango (1959); Mango, Cyril. *The Brazen House; a study of the vestibule of the imperial palace of Constantinople*. Copenhagen, p.152, 1959.

⁴¹Constantinopla, *Arqueología*, National Geographic, RBA Coleccionables, p. 60-62, 2017.

⁴²Talbot, Alice Mary and Denis F. Sullivan, *The History of Leo the Deacon*, Washington, p. 207, note 38, 2005. Also <http://www.bisanzioit.blogspot.com/2018/08/la-chalke-costantinopoli.html>.

⁴³Talbot, Alice Mary and Denis F. Sullivan, *The History of Leo the Deacon*, Washington, p. 207, 2005. Also Mango (1959), Cyril. *The Brazen House*; p. 150 and n. 7, 1959.

⁴⁴Constantinopla, *Arqueología*, National Geographic, RBA Coleccionables, p. 62, 2017

⁴⁵Mango, Cyril. *The Brazen House; a study of the vestibule of the imperial palace of Constantinople*. Copenhagen, 1959.

⁴⁶Constantinopla, *Arqueología*, National Geographic, RBA Coleccionables, p. 60-62, 2017.

important, except for John Tzimiskes, and when the Crusaders arrived, the chapel was in decline, which justified carrying its relics to the chapel of the new palace of Blachernae. The hair of St. John the Baptist that was placed by Tzimiskes in the chapel together with the icon, was already in Blachernae before the Fourth Crusade.⁴⁷ The Icon of Beirut may have also been moved to Blachernae where it was seen in 1203 by de Clari.

Since that moment, any reference to the presence in Constantinople of an image similar to the Shroud of Turin might refer to either the Icon of Beirut or the Mandylion. The Codex Pray (Figure 3), the Man of Sorrows (Figure 4), and the Epithaphious Threnos (Figure 5) refer to an image that has been related to the Shroud of Turin. However, they are more compatible with the Icon of Beirut than with the Mandylion. The simultaneous presence of both objects in the Byzantine capital makes it difficult to differentiate which of them would be the Shroud of Turin. Note that there are only 31 years between the arrival in Constantinople of the Mandylion and the Icon of Beirut. The reasoning used to sustain the identification of Mandylion with the Shroud based on the iconographic novelty appearing in Constantinople after the tenth century, can now also be used to sustain the identification of the Icon of Beirut and Shroud of Turin as one. The only references that could distinguish between both candidates would be those between 944 and 975. If the Mandylion's celebrity is much greater, it can be explained because, for the imperial court, the image of Edessa also played a political and military role as a banner of the city. The Icon of Beirut, on the other hand, only had a religious significance. It did not attract the particular interest of the emperor.

At the end of the tenth century and specifically in Constantinople there are representations of the suffering and naked Christ with signs of the crucifixion. We contend that they have their origin in the arrival of the Icon of Beirut with much more probability than in the arrival of the Mandylion, which continues to be considered predominantly as an image of the face of Christ while he was alive. The representative of the Pope, in 1054, excommunicated the patriarch of Constantinople for, among other things, allowing Christ to be shown "dead" on the cross.⁴⁸ As we have seen, the time of arrival of the Icon of Beirut to Constantinople is close to the arrival of the Mandylion, and this coincidence could contribute to the evolution of the legend associated to the Mandylion, which ends up including an image of a full body and is associated with blood.⁴⁹ The legend of the Icon of Beirut, however, incorporates these elements from the beginning.

⁴⁷Khitrowo, B. de. *Itinéraires russes en Orient*. Paris. Leroux, p. 100, 1889.

⁴⁸Fogliadini, Emanuela. 2020. Las Imágenes Sagradas en Bizancio (Siglos VI-VIII) Teología e Iconografía entre Mito y Realidad. *Estudios Bizantinos*, 7, 135 (note 12).

⁴⁹Cataldo, Sébastien, "Le Mandylion or the story of a man-made relic," Conference of Saint Louis, p. 14, 2014. The legend of the Mandylion indicating the whole body appears in the same codex as that of the Icon of Beirut: Vossiamus Latinus of the tenth century and could be a "contamination" of one legend on the other.

When considering the Icon of Beirut as a firm candidate to be identified with the Shroud, we realize that many of the claims applied to the Mandylion, such as the burial representations or the iconography of Jesus Christ, tell us that the Shroud was known in the Antiquity, but it does not mean that the Mandylion was the Shroud. The Shroud could have been another image that, in our hypothesis, would be the Icon of Beirut.

Pollens and other clues

Claims of another kind, such as pollen analysis, are also applicable to the Icon of Beirut. It is known that the Shroud of Turin has pollen grains that can be tracked all the way from Jerusalem to the West. The list of 58 pollen grains of different plants found by the late Swiss detective Max Frei,⁵⁰ indicates the presence in nine different geographic areas. Many plants are present in several of the nine areas. Since the Icon of Beirut traveled from Beirut to Constantinople, whereas the Mandylion came to Constantinople from Edessa in Turkey, the presence of certain plants may help to determine if the Shroud of Turin was either the Icon of Beirut or the Mandylion. The pollens from plants present in Jerusalem, or throughout Europe, or in Constantinople are useless because we assume that both icons were exposed to these places. For example, the Lebanese Cedar, even its name points to Beirut, it is useless because it is present in the Mediterranean area and in the Constantinople and Jerusalem environs. We would need to have plants that are not present in Jerusalem, or in Europe, or in Constantinople in order to determine what route was taken by the Shroud between Jerusalem and Constantinople.

According to the list of pollen species on the Shroud, only two species satisfy this criterion: *Atraphaxis spinosa* and *Prunus spartioides*. To find the geographical distribution of these plants we consulted data from the Global Biodiversity Information Facility (GBIF). It is an international organization whose data is provided by many institutions from around the world. Its data are primarily the distributions of plants and other biological species for the world. According to GBIF, the *Atraphaxis spinosa* is abundant in Asian countries to the East of Armenia and has some presence in the South of Israel. Thus, it cannot determine if the Shroud traveled either through Edessa or Beirut. On the other hand, *Prunus spartioides* is found in very few places. It was added by Frei to the list only at the end of his investigation in 1982.⁵¹ According to the GBIF data, it is present in the border between Syria and Lebanon, which is approximately 75 km from Beirut. It is not present either in Jerusalem, or in Constantinople, or in the regions around

⁵⁰Riedmatten, P. de. "Que penser aujourd'hui des pollens trouvés sur le Linceul ?" MNTV, n.59, 20-21, 2018. The pollens table is an excerpt of Marion, A. *et al.* Nouvelles découvertes sur le Suaire de Turin, Albin Michel. 1997.

⁵¹Riedmatten, P. de. "Que penser aujourd'hui des pollens trouvés sur le Linceul ? ", MNTV, n.59, note 37 p. 19, 2018.

Edessa suggesting that the Shroud must have been near or in Beirut at one time. Thus, this reinforces the Shroud's connection with the Icon of Beirut.

Other claims, such as the Emesa's vase, are used to support the Mandylion as predecessor of the Shroud, but it actually supports the Icon of Beirut better, given the vicinity of the city of Emesa to Beirut, rather than to Edessa (Figure 9).

Volto Santo di Lucca (The Holy Face carved on a wooden crucifix) and the Icon of Beirut

The legend of the Icon of Beirut in the Occident is often known as the *Passio Ymaginis Domini* which had a yearly liturgical celebration on November 9th. The recovery of the legend in the Occident is developed throughout the 10th to the 12th centuries by the celebration of that festival, the translations of the Acts of the Nicaea II, and the literature of pilgrims. That is to say, it developed in text but not with images.⁵² We have no contemporary artistic copy of the original. However, it subsequently became represented as a crucifix. In the study of Espí,⁵³ the author justifies that the original icon was represented as a crucifix due to theological trends in the Western world.

The legend of the Santo Volto de Lucca (the Holy Face of Lucca, carved onto a crucifix, see Figure 6) and other similar stories have, in fact, a resemblance to the original Beirut story.⁵⁴ The common feature shared is the creation of the icon by Nicodemus. The relationship of the sculpture of Lucca with the Icon of Beirut paradoxically gives us an additional relationship between the Icon of Beirut and the Shroud of Christ. It is in the story of Gervase of Tilbury in his *Otia Imperialia* about the sculpture of Lucca.⁵⁵ In that story written between 1210 and 1214, he tells us that when Christ was taken down from the cross, his figure appeared on the shroud on which they wrapped him. The cloth was larger than his whole body and the figure was used by Nicodemus as a model to sculpt the Holy Face of Lucca. Gervase is based on older documents.⁵⁶

⁵²Bacci, Michele. "Quel Bello Miracolo onde si fa la Festa del Santo Salvatore. Studio sulla metamorfisi de una leggenda", 16-17. G. Rossetti (ed.), In *Santa Croce E Santo Volto: Contributi Allo Studio Dell'origine E Della Fortuna Del Culto Del Salvatore*, 16-17, 25-28, 2002.

⁵³Espí Forcén, Carlos. "De Oriente a Occidente. La Leyenda Bizantina de la Passio Imaginis en el Siglo XV en la Corona de Aragón". *Estudios bizantinos* 2p. 205-229, 2014.

⁵⁴Bacci, Michele., "Quel Bello Miracolo onde si fa la Festa del Santo Salvatore. Studio sulla metamorfisi de una leggenda", 16-17. G. Rossetti (ed.), In *Santa Croce E Santo Volto: Contributi Allo Studio Dell'origine E Della Fortuna Del Culto Del Salvatore*, p. 7-86, 2002.

⁵⁵Gervase of Tilbury (XII c.). *Otia Imperialia*, III, 24. German edition by F. Liebrecht. Hannover, p.19-20,1856.

⁵⁶Dubarle, A. M., O.P. *Histoire Ancienne du Linceul de Turin jusqu'à XIIIe siècle*, O.E.I.L., p. 61-66, 1985.

All of this describes with clear precision what the Shroud of Turin represents—the shroud that covered the crucified Christ. According to Gervase, that shroud was the model for the crucifix of Lucca. But in reality, the model for the legend of Lucca's sculpture is the Icon of the Beirut story. As such, it is a possible vestige of the identification between the Icon of Beirut and the Shroud of Christ.

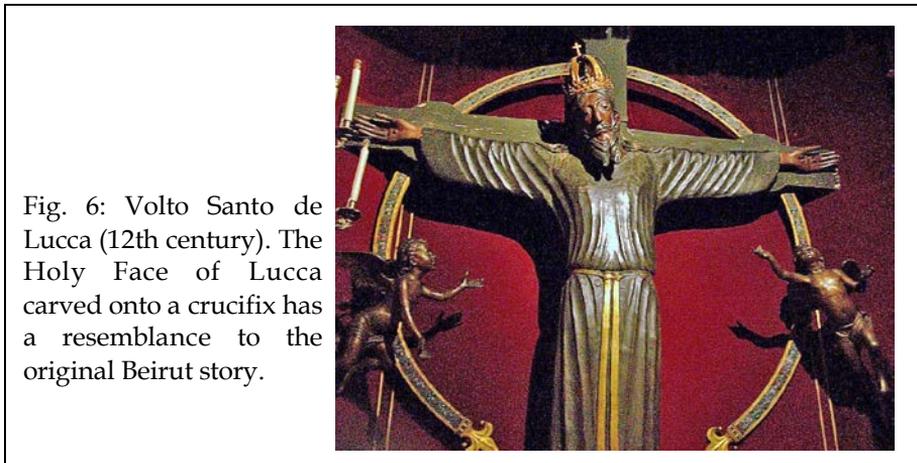


Fig. 6: Volto Santo de Lucca (12th century). The Holy Face of Lucca carved onto a crucifix has a resemblance to the original Beirut story.

Analysis of key texts

This section dealing with the Nicaea council and Tzimiskes letter provides evidence that the original languages support the suggestion that the Holy Shroud could have been the Icon of Bierut. Unfortunately, this section could not be included in this chapter. It can be found on the conference internet site at: <https://www.shroud.com/pdfs/anc-barta-pap.pdf>, pages 22 to 27.

Possible Verification

As we explained, the Icon of Beirut for its history and its journey, could be the Shroud witnessed by de Clari in the Church of Blachernae. We believe that this hypothesis has more justification than the Mandylion hypothesis. The surprise is that this hypothesis could be verified by physical analysis. In January 967, before the arrival of the Icon to Constantinople, Nicephorus Phocas brought to the city blood from the Icon of Beirut. Today there are two relics of the Holy Blood in

Venice which come from Constantinople. One of these relics is a thread dyed with blood and water that flowed from the side of Christ⁵⁷ (Figure 7). Therefore, it would be possible to verify if that thread could have come from the Turin Shroud. This case would only be decisive if there is a positive result (i.e., if the thread were from the Turin Shroud). If not, it would not be decisive since in Constantinople there were probably more than one relic of the blood of Christ. There are varieties of ampules in other locations that have been attributed also to the blood of Christ.

Fig. 7: Reliquary of the Blood of Christ in the Basilica of St. Mark: Treasure and Sanctuary of San Marcos. The blood is on cloth sealed within the reliquary and visible through glass.



CONCLUSION

Among the abundant documents for the Mandylion, there are some dated at the end of its time in Constantinople which cannot support its compatibility with the Shroud of Turin. On the other hand, with the consultation of ancient documents (in Greek, Latin and Armenian), we are able to reconstruct a probable path for the Shroud observed at Blachernae from Jerusalem to Constantinople through Beirut. This shroud bore an image of Christ that represented his whole body and it included the wounds of the Passion. It was transferred to Constantinople shortly before the beginning of Christ's representation as depicted in the image on the Shroud of Turin (e.g., the Man of Sorrows). It was kept in the Chalkê Gate chapel where a large healing cloth with an image of Christ is mentioned. It disappears after the Fourth Crusade. Gervase of Tilbury relates in some way the Icon of Beirut with the image of Christ that was imprinted on his Shroud. Due to such data, it corresponds well with the Holy Shroud of Turin. There are a few documents about it, but none of them can dismiss our hypothetical identification.

We do not claim to have found indisputable proof of the origins of the Shroud. It is only a hypothesis to be considered as a possibility, especially if the historical facts cause us to reject the other theories. It remains to deepen the study

⁵⁷Durand, Jannic and Marie-Pierre Lafitte, *Le Trésor de la Sainte-Chapelle*, Publication du Louvre. Réunion des musées nationaux, Paris, p. 27 and 67, 2001. Also, Mango (1959), Cyril. *The Brazen House; a study of the vestibule of the imperial palace of Constantinople*. Copenhagen p.151,1959. Two ampules with that blood of Christ were transferred from Constantinople to the Saint Chapelle in Paris, but disappeared during the French Revolution.

of the cited and other texts and to ensure their reliability. It could possibly be confirmed by analyzing the thread preserved in St. Mark's Basilica, Venice.

Table 1 characteristics of the Shroud that are present in the Icon of Beirut and in the Mandylion

| Characteristics of the Shroud image | Present in the Icon of Beirut | Present in the Mandylion |
|-------------------------------------|-------------------------------|--------------------------|
| Whole body | Yes | Uncertain ^(a) |
| Mistreated face | Yes | Uncertain |
| Nails in the hands | Yes | Not |
| Nails on the feet | Yes | Not |
| Wound in the side | Yes | Uncertain ^(b) |
| Blood | Yes | Uncertain ^(c) |

- (a) The whole body appears only as an interpolation in more recent versions in Constantinople and it was not in the Robert de Clari testimony.
- (b) Only a particular interpretation of the Gregory Referendario could invoke the chest wound. It was neither in the Robert de Clari testimony nor in any other.
- (c) The alternative story included in the Constantine VII *Narratio* places the image impression in the Gethsemane garden where Christ sweated blood. It was neither in the Robert de Clari testimony nor in anywhere else.



24. The Veil of Veronica: From Concealment to Revelation

Mary-Catharine Carroll

Background and thesis: The cult of the saints, at the height of its popularity in the 15th century, was an integral component of western Christianity. A popular story concerned St. Veronica, keeper of a miraculous cloth known as the Veil of Veronica ("the Veronica"). According to tradition, the cloth was miraculously imprinted with Christ's image after the woman, Veronica, gave it to him to wipe his face on the road to Calvary.

Like the Shroud of Turin, the Veronica is considered to be a miraculous image made without human intervention. But, unlike the Shroud, which has a front and back of a full-body image, the Veronica bears only the face of Christ.

Although the Veronica story is not in the New Testament, it was written down beginning in the 4th century, and later recorded in artistic representations, including the *Sixth Station of the Cross*. Art historian Neil MacGregor notes that images of the Veronica eventually outnumbered written texts so much so that "by the end of the fifteenth century there was an agreed likeness of Christ" that most Europeans could recognize.

But what was the motivation to set down this "legend," thereby ensuring its popularity and longevity? Perhaps, it was because the Veronica contained truths about humanity's being created in God's image and the revelation of the invisible God in Christ. But the most fundamental argument, however, was the Incarnation, the Son of God becoming a human being. Because images of Christ in his human form showed the historicity of God made man, it was therefore appropriate to make images of him as a man. And as humanity's image reflects God's, the images of the incarnate Christ show his divinity and humanity, and therefore teach the doctrine of the Incarnation. The Veronica's primary doctrinal significance is as a symbol of the Incarnation, which reveals God's continuing presence in the world.

This paper surveys biblical and Patristic writings, as well as the Veronica in art and literature to explore its status as a symbol of Incarnation that reveals God's human face in Christ.

Every year on August 16, the Orthodox Church celebrates the transfer in 944 A.D. of the Icon of our Lord Jesus Christ from the Kingdom of Edessa to Constantinople. Like the Shroud, this icon belongs to the tradition of miraculous images described as "not made by hands" (Gr. *acheiropoieta*).

The Office of the Day (official set of prayers "marking the hours of each day and sanctifying the day with prayer") includes the following text:

"After making an image of Your most pure image, You sent it to the faithful Abgar, who desired to see You.

You sent letters traced by Your divine hand to Abgar, who asked for salvation and health which come from the image of Your divine face.¹

These texts refer to the multifaceted legend of Abgar, King of Edessa, which was recorded by the biblical scholar and historian, Eusebius of Caesarea, in his monumental work of the 4th century, *Church History*. Intriguingly, Eusebius added that he had actually translated the correspondence between the King and Jesus from Syriac to Greek.

In response to Abgar's letter requesting help for a serious disease, possibly leprosy, Jesus replies that he cannot visit, but will instead send a disciple. The disciple (Thaddeus or Addai) cures Abgar in Jesus' name, Abgar is baptized and Jesus' letter is used as a talisman to protect the city. In later versions, the letter either includes or is replaced by an image of Jesus. Known as the *Image of Edessa* or *Mandyllion*, the image was discovered in the 6th century above one of the city gates, but the *Mandyllion* supposedly disappeared² when the Crusaders' sacked Constantinople in 1204.

While this ancient story makes it seem like holy images were favourably accepted, some early Church Fathers argued against them. For example, Clement of Alexandria (150 to c. 215) warned that these images were distracting and deceptive, while Origen of Alexandria (184 to c. 253) encouraged the faithful to behold God with "spiritual eyes," rather than focus on Jesus' human limitations.

Throughout Christian history, controversy around holy images has resulted in iconoclasm – rejection or destruction of religious images as heretical. The early 8th century to the mid-9th century featured at least two major periods of iconoclasm that required a defence of sacred art. Iconoclasts argued that the second Commandment prohibited icon veneration:

You shall not make for yourself an image in the form of anything in heaven above or on the earth beneath or in the waters below. You shall not bow down to them or worship them. (*Exodus* 20:4-5)

While iconoclasm can be understood in light of this prohibition, disagreements often occurred in areas of heterodox interpretations of Christ's nature and person.

A widespread early heresy was Arianism, which asserted that the Son (Christ) was a creature brought forth by the Father, and therefore not equal to the Father. At the First Council of Nicaea (325), Athanasius of Alexandria defended the orthodox view that Jesus is of one substance (*homoousias*) with the Father. The *Nicene Creed*, which emphasizes Christ as "consubstantial with the Father ...

¹ Marie-José Mondzain, *Image, Icon, Economy: The Byzantine Origins of the Contemporary Imaginary* (Stanford: Stanford University Press, 2005), 195.

²That the Mandyllion actually disappeared after the sack of Constantinople is a theory suggested by Ian Wilson, but this scenario may not be the case. Refer to Barta *et al.*, chapter 23 in the present collection of works.

Begotten not made, one in being with the Father,” rejected Arianism and established clear teaching on Christ’s divinity.

In 431, the Council of Ephesus opposed Bishop Nestorius who seemed to argue for two persons in Christ: divine and human, rather than a single person. The Bishop could not reconcile a divine nature with Jesus’ humanity (human deeds and suffering). But, when Cyril of Alexandria argued that Jesus was one person with one human and one divine nature, the Council agreed.

Twenty years later, the Council of Chalcedon confronted the Monophysite heresy, which held that Christ’s nature remained divine even though he had taken on human flesh. Chalcedon declared that Christ was one person, or *hypostasis*, “known in two natures [divine and human] without division or separation.”³ In the late 7th century, the second Council of Constantinople (680-681) condemned Monothelitism, which accepted that Christ had two natures, but taught that he had no human will, only a divine will.

In 726, Emperor Leo III proclaimed that image use as idolatrous and ordered the removal of Christ’s image from the imperial palace in Constantinople. Three decades later, the Eastern Roman Emperor, Constantine V (718-775), convened the Council of Hieria, which asserted that Christ’s *hypostasis* could not be captured in an image because his divine nature cannot be circumscribed.

John of Damascus (676-749), however, took the opposite view. In *Three Treatises on the Divine Images*, he wrote: “I am emboldened to depict the invisible God, not as invisible, but as he became visible for our sake ... I depict God made visible in the flesh.” Neither did he make “a likeness of God [who is uncircumscribable], nor of anything else as God” nor did he “worship the creation [image] instead of the Creator.”⁴

Christ, the Incarnation, redeemed humanity and creation (matter)—both of which were made by God. Therefore, John argued, matter can lead the faithful to the “immaterial God.”⁵ (II, 22). John based his theology of images on the doctrine of the Incarnation, the revelation of the image of the invisible God in the human form of Jesus Christ.

In 787, the second Council of Nicaea concurred that because Christ was revealed in the flesh, sacred images were part of the unwritten tradition going back to apostolic times.

So far, I’ve discussed images and related controversies in the Greek East. In the Latin West, the *acheiropoieta* motif was associated with Veronica, the woman whose name, some believe, is a combination of the Latin word, *vera* (true) and the Greek word, *eikóna* (image).

³ “Chalcedonian Creed,” accessed February 24, 2019, <http://www.grbc.net/wp-content/uploads/2015/09/The-Chalcedon-Confession.pdf>

⁴ John of Damascus, *Three Treatises on the Divine Images*, trans. Andrew Louth (Crestwood: St. Vladimir’s Seminary Press, 2003), III, 6 and II, 9.

⁵ *Three Treatises*, II, 22.

There are several versions of the Veronica story, the most familiar being the meeting with Jesus on the road to Calvary. In the story, Veronica wipes Jesus' face with her veil, and then his image miraculously appears on the cloth. Veronica goes on to use the cloth to heal disease. While this version dates to the late medieval period, there is an earlier tradition of Jesus, a woman and images. In Book VII, Chapter XVII of *Church History*, Eusebius wrote about the woman of Paneus who commissioned a bronze statue of herself and one of Jesus.

"[T]here stands upon an elevated stone ... a brazen image of a woman kneeling, with her hands stretched out, as if she were praying. Opposite this is another upright image of a man ... extending his hand toward the woman ... They say that this statue is an image of Jesus ..."⁶

In the apocryphal *Acts of Pilate (Gospel of Nicodemus)*, from the 4th century, a woman named Berenice testifies for Jesus during his trial, and when Jesus enters the *praetorium*, the tops of the standards bearing the image of the Emperor bend down and adore him. In the early medieval *Curing of Tiberius*, the facially disfigured Emperor is healed by Veronica's miraculous cloth; and, in the *Vengeance of the Saviour*, dated to the early 8th century, Veronica's cloth cures King Titus' facial cancer and the Emperor's leprosy. In the *Golden Legend* from the late 13th century, Veronica is walking to an artist's workshop to commission a portrait of her beloved friend, Jesus. On her way there, she meets Jesus. He takes her cloth, presses it to his face and imprints his image on it. As in the other stories, the cloth goes on to cure illness.

So far, these stories have Veronica and Jesus meeting in an urban setting. But in several late medieval French narratives, including Robert de Boron's *Joseph d'Arimatee* and *the Bible en François*, the Veronica legend is transposed onto the road to Calvary.

While the Veronica story has similarities with the Abgar legend, Veronica's later link with Christ's Passion highlights a difference between the Greek East and the Latin West. In the East, salvation is understood in terms of unifying the human and the divine, with the divine vanquishing human frailty and exalting the human person. In the West, however, the emphasis is on Christ's sacrifice on the cross, which was required to redeem humanity from sin and death. Theologian Ulrich Fabricius refers to the Eastern model as "the visible blessing of Christ's humanity" and the Western as "the blessing of Christ's death."⁷

Somewhere between the 8th and 10th centuries, a cloth that tradition linked to Christ's Passion was venerated at Old St. Peter's Basilica. Called a *sudarium* (sweat cloth), it was allegedly stained with Jesus' sweat and blood, but was not considered

⁶ "Church History," *Documenta Catholica Omnia*, accessed February 24, 2019, http://www.documentacatholicaomnia.eu/03d/0265-0339_Eusebius_Caesariensis_Church_History_EN.pdf

⁷ Ulrich Fabricius, *Icons: Portrayals of Christ*, trans. Hans Hermann Rosenwald (Recklinghausen: A. Bongers, 1967), ix.

a likeness of his face. By the early 13th century, however, the cloth began to be revered as a portrait of the Saviour (“a true icon ... a true image”). In 1245, Matthew Paris’ *Chronica Majora* included a reproduction of the Veronica and stated that Pope Innocent III had written the prayer, *Salve sancta facies* (*Hail Holy Face*) that when recited in front of the Veronica (or a replica) would reduce a person’s time in Purgatory. The introduction of prayers attests to the cloth’s representation in word and image, and its ontology as legend and object.

Innocent III’s Holy Office of the Veronica opens with Psalm 66.2: “May God have mercy on us and bless us: may he cause the light of his countenance to shine upon us,” and quotes Psalm 4.7: “The light of thy countenance O Lord is signed upon us.” But then, art historian Jeffrey Hamburger writes, the Pope added his own prayer: “O God, who didst will to leave to us, who are sealed with the light of Thy countenance, Thine image as a memorial of Thee, impressed on a handkerchief at the insistence of Veronica.”⁸

The light of God’s countenance refers to the *imago Dei* (image of God), the unique seal that God placed on humans to identify their special place in creation. Hamburger suggests that Jesus’ imprinting his face on the cloth is similar to human flesh’s malleability, into which the *imago Dei* was stamped and to which it will be restored at the end of time. For Joseph Leo Koerner, the Veronica “resembles the original divine signature on the face of man, as being made in the image and likeness of God.”⁹

The *imago Dei* appears in the first book of the Bible, Genesis:

Then God said, “Let us make humankind in our image, according to our likeness [...] So God created humankind in his image, in the image of God he created them; male and female he created them.” (Gen 1:26–28)

In the New Testament, the primary word for “image,” *eikôn*, is used within the context of humanity’s relation to the image of Christ or God, and is linked to salvation via the doctrine of the Incarnation: “For those God foreknew he also predestined to be conformed to the image of his Son, that he might be the firstborn among many brothers and sisters.” (Rom. 8:29) This meditation articulates the ontological basis for the *imago Dei*—God made humanity in his image because he planned to assume human flesh and enter into history to restore his image. The *imago Dei* allowed Jesus’ human nature to accommodate Christ’s divine nature, thereby resulting in his being both God and fully human in a single person.

In *Against Heresies*, Bishop Irenaeus (140–202) stated that the Incarnation returned the salvation “lost in Adam” and restored the *imago Dei*, while Bishop

⁸ Jeffrey Hamburger, *The Visual and the Visionary: Art and Female Spirituality in Late Medieval Germany* (Cambridge: MIT Press, 1998), 355.

⁹ Joseph Leo Koerner, *The Moment of Self-Portraiture in German Renaissance Art* (Chicago: University of Chicago Press, 1993), 88.

Athanasius (296–373) believed the Incarnation dissolved death, resurrected life and allowed humans to know God and his Word.

Earlier, I spoke about iconoclasm in the East and its relation to heterodox interpretations of the Incarnation. While cases of iconoclasm in the West were sporadic, debates about the Eucharist also challenged Incarnational Theology.

As early as 110 AD, Bishop Ignatius of Antioch warned about people who did not believe that Christ was incarnate in the Eucharist. Then, around forty years after the second council of Nicaea, the Carolingian theologian, Radbertus, asserted that following the consecration, the Eucharistic bread and wine were literally transformed into Christ's flesh and blood, while the monk, Ratramnus, argued that the consecrated elements were more symbolic. Then, in the 11th century, Archdeacon Berengar of Tours claimed that Christ's presence in the bread and wine was figurative, and that the words of consecration should be interpreted metaphorically.

In 1215, the Fourth Lateran Council, convened by Veronica's advocate, Innocent III, described the bread and wine as "transubstantiated" into Christ's body and blood. The Lateran Council could trace the belief to the gospels and to Paul's letters that describe the relationship between the Incarnation and the Eucharist.

Starr Hoffman's study of the Veronica notes that around this time, the laity received the Host only on specific days of the liturgical year, and within time, the chalice was withheld. These changes resulted in the faithful's separation from the Incarnate Christ in the Eucharist. To compensate, Veronicas were placed throughout the sanctuary and displayed on rood screens, which eventually resulted in their incorporation into the Eucharistic liturgy.¹⁰

So, just as Christ was the invisible God in the flesh, the Veronica was the visual equivalent of Christ's invisible presence in the Eucharist. By representing Christ's body, the Veronica gave the faithful the opportunity to connect with God's physical presence in the consecrated elements. In turn, both the Veronica and the Eucharist would evoke reflections on the Incarnation and the redemptive meaning of human suffering.

The *Mass of St. Gregory* depicts the interrelationship of the Veronica, the Eucharist and the Incarnation. In a textual version from the 7th century, St. Gregory is saying Mass when the Host suddenly turns into a bleeding finger. In the 14th century, however, text and image were standardized: the piteous Christ, accompanied by the Veronica, miraculously appears in place of the Host on the altar. This image directly connects Christ and the Veronica with the transformation of the Eucharistic elements, allowing the Veronica to be understood in relation to the Real Presence of Christ on the altar, and the Eucharist as the center of the Mass.

¹⁰ J. Starr Hoffman, *Passionate Transformation in Vernicle Images*, Masters thesis, University of North Texas, 2004 (Denton: University of North Texas Press, 2004), 17.

Although Veronica is not mentioned in Scripture, tradition associates her with the unnamed woman in the Synoptic gospels with the chronic blood flow, later called the *Haemorrhissa*, who was cured after touching the hem of Jesus' garment. For example, Eusebius' story about the Paneus statues is titled *The Statue Erected by the Woman with an Issue of Blood*. In *Acts of Pilate*, Berenice testifies that Jesus healed her of a flow of blood after she touched his hem. Likewise, the *Curing of Tiberius* features the keeper of the cloth, Veronica, whom Jesus cured of a blood disorder. In the *Vengeance of the Saviour* the king is told about "Veronica, who suffered twelve years from an issue of blood."¹¹

The meeting on the road to Calvary has similarities with the Synoptic accounts of the healed woman, which may explain why early writers connected the two. For example, both accounts include an unaccompanied woman approaching Jesus; an immediate miracle that arises from touching cloth; a foreshadowing of future miracles; and, elements of discipleship. Finally, both texts are part of a larger, coherent narrative, which is the story of faith and salvation.

The meeting between Jesus and Veronica is honoured in the *Sixth Station of the Cross*, which follows an episode from the Synoptic gospels, *Simon the Cyrene helps Jesus to Carry the Cross*. While Simon is strong-armed into helping, Veronica voluntarily puts herself in danger to help Jesus. Simon's forced obedience is therefore contrasted with Veronica's unconditional love, for which she receives the miraculous image.

Even though Veronica is not explicitly mentioned in the New Testament, possibly the truths about humanity's being created in God's image, and the revelation of the invisible God in Christ, were so compelling that early writers, and later, artists, connected her with the *Haemorrhissa* of the Synoptic gospels and inserted the story into the visual narrative of Christ's Passion.

A veil is a piece of material that covers the face or head—so the notion of concealment is built into the meaning. But rather than conceal, the veil of Veronica displays the miraculous image and reveals the Face of God in Christ, the Incarnation.

In *The Art of God Incarnate*, Aidan Nichols writes that St. Paul communicates Christ's universal significance via a theology of the image: "[F]or St. Paul, the man, Jesus, fulfilled the spoilt promise of Adam and renewed the image of God in the human."¹² When St. Paul calls Christ "the image of the invisible God, the firstborn of all creation" (Col. 1:15), he confesses the consubstantiality of the Father and the Son (i.e., they are of one essence). Jesus himself says "Whoever has seen me, has

¹¹ The Avenging of the Saviour," www.pseudepigrapha.com.

http://pseudepigrapha.com/apocrypha_nt/avsav.htm (accessed November 27, 2018), 474-475.

¹² Aidan Nichols *The Art of God Incarnate* (Eugene: Wipf and Stock Publishers, 1980), 36.

seen the Father” (John 14:9). So, what was formerly concealed has been revealed in Christ.

But, what of Veronica herself? In the narratives, she is neither wealthy nor famous. Her story begins with a nameless woman defined by illness—the *Haemorrhissa*—who becomes Veronica the image bearer. She is each of us, created in God’s image, and exhorted to reveal the Face of God through lives of faith, grace and courage.

St. Paul’s words give meaning to the story of St. Veronica: “We all, with unveiled face, beholding the glory of the Lord, are being changed into his likeness from one degree of glory to another; for this comes from the Lord who is the Spirit” (2 Cor. 3:18). When the veil is lifted, we are able to see and reflect the glory of the Lord and be transformed into his image.

The Veronica shows us the Face of God, the True Image, and facilitates the restoration of the *imago Dei*. Abgar, Tiberius and Titus in those early stories had disfigured faces—but they were cured and transformed by looking upon the face of Christ—the perfect image of God and man.



25. Possible References to the Holy Shroud in the New Testament

Larry Stalley

Abstract

Critics and skeptics make a strong argument against the authenticity of the Holy Shroud with this simple observation: The Biblical writers failed to mention such a marvelous treasure! However, due to the threat of confiscation and destruction of the Shroud by opponents to their faith, a plausible inference can be made that early Church leaders would want to keep the Shroud's existence a secret from outsiders. This paper provides brief analyses of statements from within the New Testament that might be "veiled references" to what we know today as the Shroud of Turin. Four passages are especially strong candidates in this regard. This paper is intended to serve as an introduction to those four Biblical texts, while making mention of other possible textual candidates as well. These texts are: Galatians 3.1; Matthew 12.38-42; Hebrews 9.11-12; and John 20.1-10. Elsewhere I have written an extensive exegesis on each of these passages.

1. It is beyond reasonable doubt that the Holy Shroud is Authentic

Over the past forty years a growing plethora of evidence strongly supports the conclusion that the Shroud of Turin is authentic. I find the following evidence particularly interesting:

- Obviously "the man on the cloth" was a criminal found guilty of a capital offense who was unusually both scourged (a punishment for non-capital crimes) and crucified. Under Jewish law the body should have been buried before sundown, probably in one of the two plots specifically reserved for criminals.
- As a criminal, this man had been interred making use of a very rare and expensive cloth of fine linen with a unique, herringbone weave—a type of cloth not manufactured during the Middle Ages. The cloth fits the Biblical description of a high-priestly robe.
- The image is of a real man who had undergone a unique crucifixion, matching the crucifixion of Jesus in the Biblical record. Yet, the emperor Constantine outlawed crucifixion in the early fourth century so that this crucifixion would not have happened in the Middle Ages!
- Pollen found on the cloth provides forensic evidence for a Jerusalem¹ presence and for some key locations on what was likely the historical trail the Shroud traveled

¹"Four of the greatest number of pollen grains found on the cloth are unique to Judea." Maggie Ciskanik, "5 Key Pieces of Evidence on the Shroud of Turin," Magis Center of Reason and Faith (August 7, 2018), <https://magiscenter.com/5-key-pieces-of-evidence-on-the-shroud-of-turin/>

before residing in Turin, Italy over the past several centuries.² The depiction of a Jewish burial and a Roman crucifixion found on this image is “*not what any forger with medieval or modern presuppositions would have thought of; but it makes complete sense of the texts and conforms with the other ancient evidence.*”³

- The incredible, faint, full-body image of a crucified man on the cloth was *not* the work of an artist.
- No one has been able to explain how the image could have been formed by natural causes, nor has anyone been able to fully replicate it! The image has inexplicable properties associated with being a three-dimensional, high-definition, photographic negative! How is that possible? It also shows evidence of x-ray⁴ and holographic properties! Why, if a forgery, is the image a negative? Why would a medieval forger produce such an image when none of his contemporaries could see the details? Those details were first made visible with the work of a photographer in the year 1898.

“A good question to ask is: How could a medieval ‘artist’ make or take a photo negative when photography was not introduced to the world until 500 years later in 1839?”⁵

Either the image is “*the riddle of the ages*”⁶ or it is the Father’s witness to the Gospel story and His *miraculous*, gracious gift to every doubting Thomas.⁷

2. The Radiocarbon Dating Experiment

In 1988 a single sample taken from the cloth and divided several times was dated by means of radiocarbon dating and assigned a medieval date (1260-1390 AD). However, since then a number of peer-reviewed articles have been published in scientific journals seriously challenging the conclusion of that experiment.⁸ Not only were long-established protocols violated during that experiment, but these subsequent studies seriously called into question the purity and the quality of the sample tested. Professor Harry Gove, the inventor of the radiocarbon dating

²Max Frei, “Nine Years of Palynological Studies on the Shroud,” *Shroud spectrum International* (1982) 1(3):3-7.

³This fact is discussed by John A. T. Robinson, “The Shroud of Turin and the Grave-Clothes of the Gospels,” *Proceedings of the United States Conference of Research on the Shroud of Turin* (Albuquerque, New Mexico, 1977) 23-30. The quote is taken from page 25.

⁴This is apparent from the bones being seen in the fingers.

⁵“Shroud of Turin Facts,” https://www.signfromgod.org/shroud_of_turin_facts.

⁶David Van Biema, “The Shroud of Turin,” *Time Magazine*, April 20, 1998.

⁷See the author’s paper, “Sign of Jonah,” *op. cit.*

⁸Raymond N. Rogers, “Studies on the Radiocarbon Sample from the Shroud of Turin,” *Thermochimica Acta* 425, no. 1-2 (January 20, 2005) 189–94; Tristan Casabianca *et al.*, “Radiocarbon Dating of the Turin Shroud: New Evidence from Raw Data,” *Archaeometry* (March 22, 2019), <https://onlinelibrary.wiley.com/doi/abs/10.1111/arcm.12467>.

method utilized on the Shroud sample, characterized the experiment as “a rather shoddy enterprise.”⁹

A science editor for *Nature* wrote this comment in 2008, twenty years after the infamous experiment:

“It’s fair to say that, despite the seemingly definitive tests in 1988, the status of the Shroud of Turin is murkier than ever. Not least, the nature of the image and how it was fixed on the cloth remain deeply puzzling.”¹⁰

If a natural explanation for the formation of the image is possible then why hasn’t someone successfully stated it and proven it by replicating the image?¹¹ After years of trying, seeking a natural explanation profoundly leaves one with “a mystery wrapped in an enigma.”¹²

When every *known* natural cause for the formation of the image is eliminated shouldn’t an open-minded person consider the possibility of a supernatural explanation?

3. Veiled References to the Shroud in the New Testament?

A primary reason why John Calvin and many Bible scholars rejected the Turin Shroud as being authentic is due to the lack of any references to it in the New Testament.

“How is it possible that those sacred historians, who carefully related all the miracles that took place at Christ’s death, should have omitted to mention one so remarkable as the likeness of the body of our Lord remaining on its wrapping sheet? This fact undoubtedly deserved to be recorded.”¹³

However, if we keep in mind the persecution occurring during the period when the New Testament was written, it should not surprise us that the writers would not avoid making clear references to the miraculous image lest it be hunted down, confiscated, and destroyed by either religious opponents or hostile political authorities. As Jesus himself both warned and commanded: “Do not give that

⁹Harry E. Gove, *Relic, Icon or Hoax? Carbon dating the Turin Shroud* (London: The Institute of Physics Publishing, 1996) 242.

¹⁰Philip Ball, “Shrouded in mystery,” *Nature Materials* 7, no. 5 (May 1, 2008) 349, <https://www.nature.com/articles/nmat2170>.

¹¹A summary of the STURP conclusions states: “The dilemma is ... that no technologically-credible process has been postulated that satisfies all the characteristics of the existing image.” L. A. Schwalbe and R. N. Rogers, “Physics and Chemistry of the Shroud of Turin,” *Analytica Chimica Acta*, 135 (1982) 45.

¹²Viviano, “Why Shroud of Turin’s Secrets Continue to Elude Science,” *National Geographic*, April 17, 2015, <https://news.nationalgeographic.com/2015/04/150417-shroud-turin-relics-jesus-catholic-church-religion-science.htm>

¹³John Calvin, *Treatise on Relics* (1543) 238, https://www.ccel.org/ccel/calvin/treatise_relics.v.html.

which is holy to the dogs, neither cast your pearls before swine, lest they trample them under their feet, and turn and tear you to pieces.”¹⁴ And, shortly after the Sign of Jonah prediction, we read in Matthew’s Gospel: “To you it has been granted to know the mysteries of the kingdom of heaven, but to them it has not been granted.”¹⁵

So, a plausible inference can be made that, due to the threat of persecution and confiscation, any reference to the Shroud in the New Testament itself would be veiled. Such secrecy would be in keeping with what would become known as “The Discipline of the Secret.”¹⁶

William Ramsey, the renowned archaeologist who focused his efforts on early Christianity, wrote: “it was the recognized duty of a Christian to use carefully veiled language.”¹⁷

In the remainder of this paper I will briefly present several excellent candidates from within the New Testament which should be looked upon as possible “veiled references” to the Shroud of Turin. Some of these statements are stronger candidates than others. There are four primary passages or texts within the New Testament which serve as excellent candidates. This paper is intended to simply introduce the reader to these texts and to provide a summary of my conclusions. In addition, five minor texts or statements within the New Testament will be briefly analyzed. Three of these minor texts were suggested by attendees at the 2019 International Conference on the Shroud where this paper was presented.

Because the burial Shroud had been defiled by blood and had been in contact with a corpse, the first Jewish Christians could have looked upon it as an unclean garment that needed to be disposed of and buried. Why wasn’t that done? The statements cited in this paper bear witness that the early Christians treasured the Shroud. They viewed His burial garment as having been sanctified by His sacrificial blood and identified it (typologically) with His priestly-kingly robe! These “veiled references” from the New Testament provide the reader with supporting evidence for the thesis that the Turin Shroud should be regarded as a spectacular *Sign* from heaven, bearing witness to God’s signature miracle of the death, burial, and Resurrection of Jesus.

¹⁴Matthew 7.6

¹⁵Matt 13.11

¹⁶See Jack Markwardt, “Ancient Edessa and the Shroud, History Concealed by the Discipline of the Secret,” Proceedings of the Columbus International Shroud Conference, Columbus, Ohio (2008) 16-18.

¹⁷W. M. Ramsay, *The Cities and Bishoprics of Phrygia* (Oxford: Clarendon Press, 1897) 789.

3.1 “...Before your own eyes Christ was vividly depicted as crucified!” (Galatians 3.1)

The earliest evidence that Jesus’ burial cloth was treasured – and used as an aid in evangelism, bearing witness to the gospel – is the Apostle Paul’s statement to his recent converts in the Roman province of Galatia. Their faith had been shaken by heretical missionaries. These missionaries accused Paul of preaching a false Gospel and insisted that his converts must submit to circumcision and to keeping the Mosaic Law if they genuinely wanted to follow Christ. In response, Paul wrote:

“You foolish Galatians! Who could have succeeded in bringing you under the spell of an evil eye, when directly before your own eyes the lasting effects of the crucified Christ were vividly depicted (or posted up)?”¹⁸

Paul is not stating that his converts had witnessed the actual crucifixion of Jesus approximately twenty years earlier and hundreds of miles away in Jerusalem. Rather, the perfect tense of the Greek participle for the verb *ὁράων* (“to crucify”) puts the focus on their eyes having seen the “lasting results” or “enduring effects” of Jesus’ crucifixion.

Also, the verb translated “*vividly depicted (or posted up)*” is in the past, aorist tense¹⁹ from *ἔδειξεν*. In this context, the verb carries the idea “to show forth” or “to portray publicly.”²⁰ *ἔδειξεν* was used by Greek writers for posting an “official notice, an “edict,” or a “warrant,” such as in the public square.²¹

- “This was the common word for the posting of public notices.”²²
- F.F. Bruce comments: “...display before (one’s audience), as on a public placard – a thoroughly classical usage.”²³

Due to Bible scholars failing to understand how this statement from Paul in Galatians could have happened literally, commentators have chosen to interpret Paul’s visual language metaphorically.

- “Paul is referring to his own preaching, arguing that the gospel had been made as clear by him as if he had posted it on a public bulletin board.”²⁴

¹⁸Gal 3.1. This translation is the author’s suggested rendering of the Greek text.

¹⁹The aorist tense implies a completed action had taken place sometime in the past

²⁰W. Bauer, W. F. Arndt, and F. W. Gingrich, *A Greek-English Lexicon of the New Testament and Other Early Christian Literature* (Chicago: University of Chicago Press, 1957) 771.

²¹See Schrenk, “*ἔδειξεν*,” in *Theological Dictionary of the New Testament*, edited by Gerhard Kittel (Grand Rapids: Eerdmans, 1971) I.771.

²²Gordon D. Fee, *Galatians: Pentecostal Commentary Series* (United Kingdom: Deo Publishing, 2007) 104.

²³F. F. Bruce, *The Epistle to the Galatians: A Commentary on the Greek Text*, NIGTC (Grand Rapids: Eerdmans, 1982) 148.

²⁴James Montgomery Boice, *Galatians: The Expositor’s Bible Commentary 10* (Grand Rapids: Zondervan, 1976) 453.

- “Paul acted as an ancient orator when he came to Galatia and delivered his speech with such vivid language that the audience imagined that ‘we were there when they crucified the Lord.’”²⁵

Commentators equate Paul’s statement with his preaching because they failed to find a literal object that would have made it possible for the Galatians to have seen what Paul said they had seen with their own eyes. However, the Turin Shroud does provide a literal object—with its stunning visual wound marks—whereby the Galatians could literally have seen the “lasting results” or “enduring effects” of Christ having been crucified.

Centuries later in Europe, on special occasions the Turin Shroud would be brought out and publicly displayed before the people. Several cardinals would stand on a raised stage and, grasping the edge of one side with their hands, they would hold the Shroud up for the people to see. The canvas itself served as a placard or signboard for displaying the image.

May 4th each year became known as “The Feast Day of the Shroud.” This was an annual festival when pilgrims traveled to see the Shroud “with their own eyes” and, thereby, be blessed. Medieval engravings exist depicting such a scene. If we attempted to describe the occasion, we would be pressed to do better than “*before your very eyes the lasting effects of the crucified Christ were vividly/publicly depicted (or posted up)!*”

Is it possible that Jesus’ apostles in the early Church made use of the Shroud as an aid in telling and providing evidence for the Gospel story? Was it used as an aid in evangelism?

The early Church historian, Eusebius, penned a very interesting statement in the late 3rd or early 4th century. In discussing the apostle Peter making his way to Rome, Eusebius wrote:

“He (Peter) ... bore *the precious merchandize of the revealed light* from the east to those in the west, announcing the light itself...”²⁶

What exactly did Eusebius mean by “*the precious merchandize of the revealed light*”? Was the Shroud put to evangelistic use “announcing the light itself”?

Peter is the best candidate for being the first custodian of the Shroud. Some believe he made his way to the capital city of Rome as early as 42 A.D., after James was martyred and Peter escaped from prison.

It has been argued that Peter used Antioch of Syria as the base for his missionary activities between 47 and 54 A.D.²⁷ During those very years Paul and

²⁵Ben Witherington III, *Grace in Galatia: A Commentary on Paul’s Letter to the Galatians* (Grand Rapids: Eerdmans, 1998) 205. See also Hans Dieter Betz, *Galatians: A Commentary on Paul’s Letter to the Churches in Galatia* (Philadelphia: Fortress Press, 1979) 131.

²⁶Eusebius, *Ecclesiastical History* (Grand Rapids, MI: Baker, 1955) II.XIV: 64.

²⁷Glanville Downey, *A History of Antioch in Syria from Seleucus to the Arab Conquest*

Barnabas, having been called out by the Holy Spirit, were formally sent out by the church at Antioch on their first missionary journey. They found themselves on that journey preaching the Gospel in the province of Galatia. So, a pertinent question to ask is: Were Paul and Barnabas given the Shroud to be used as an evangelistic aid during their travels?²⁸

A real historical context is very possible for the Shroud being behind Paul's statement in Galatians 3.1. Therefore, a literal interpretation of Paul's statement in that intriguing verse should be preferred to the unnecessary and, therefore, questionable metaphorical interpretation.

3.2 "He saw and believed!" (John 20.1-10)

What is so important about the "grave clothes" in John's Gospel that *they* become the focal point of the empty tomb on the morning of the Resurrection? Specifically, four verses (vv. 5-8) are focused on the "linen wrappings" (ὁ ἅ òèüíéá) and the "face cloth" (ὁ ἰ ὁ ἄ ἤ ἴ ἱ ἱ).

Of note, there was something about the burial linens that gave birth to faith in the Resurrection for "the disciple whom Jesus loved" (the likely author of that Gospel). Whereas Paul wrote that "faith comes by hearing,"²⁹ for that disciple faith came by seeing: "*He saw and believed*" (v. 8).

There is a progression of intensity that builds regarding the funeral linens. This is evidenced in the original Greek by four different words the writer uses for "looking" and "seeing." Emphasis should be placed on the verb "lying" (ἐλάτ ἄ ἱ ἱ), as it occurs three times in verses 5-7. In addition, how one interprets the perfect tense of the verb "rolled up" or "folded up" (ἐἰὸ ἅ ὀ ὀ ἔ ἔ ἱ ἱ) in verse 7 will be critical to one's conclusion about the passage. Furthermore, the reader is teased by the lack of an object for the verb (ἄ ἄ ἱ ἱ) in verse 8: "*He saw and believed!*" What exactly did John see?³⁰ All we are told is that it had to do with how the linens were "lying" and the "face cloth" folded up apart from the other linens.

Clues for what John is saying are found both before and after this passage. This story should be understood within the larger context of John's Gospel, especially with regards to the stories that immediately follow in chapter twenty.

First, we are intended to understand that, contrary to what Mary had concluded from her initial visit to the empty tomb, the corpse of Jesus had not been stolen!

Second, John may be telling us that no one had unwrapped the linens to set Jesus free!³¹ His glorious, resurrected body may have miraculously passed right

(Princeton, NJ: Princeton University Press, 1961) 281-82.

²⁸ Acts 13-14; cf. Gal 3.1

²⁹ Rom 10.17

³⁰ It is unlikely he saw the image on what we know as the Shroud of Turin since it exists on the inside of the cloth.

³¹ Contrast this statement with what had been said about Lazarus (John 11.44).

through the burial garment, leaving it intact but without a corpse. It is interesting how this understanding of the passage is supported both by the *Letter of Hebrews*³² and by the one unconventional, scientific explanation for how the image was formed on the cloth!

Finally, the Shroud—with its miraculous image of Jesus' wounds of crucifixion—is in the background to the subsequent story regarding "Doubting Thomas." But one should not think that viewing the image will grant some special blessing beyond a stronger faith. Jesus informs us that faith apart from seeing is blessed (20.29).

"Reach here with your finger and see My hands; reach here your hand and put it into My side; and do not be unbelieving but believing!"³³

3.3 "No sign will be given except the sign of Jonah!" (Matthew 12.38-42)

What specifically was "the sign of Jonah" that we find Jesus promising His opponents in two of the Four Gospels? The interpretation and identification of that Sign has been debated and has been somewhat of a riddle.

One undeniable and intriguing truth underlies the three passages³⁴ where this *Sign* is mentioned: Jesus *did* promise *one* good, visible sign! When those texts are carefully analyzed, several *identifying markers* emerge. These markers enable us to identify and distinguish the genuine *Sign of Jonah* from false contenders.

- It should be a sign that will be able "to be seen" by Jesus' opponents.
- It should be a sign "from heaven."
- It should reveal visible evidence of Jesus being dead for a short period of time—for "three days and three nights."
- It should witness and parallel Jonah's deliverance of being set free from the captivity of the prophet's entombment in the belly of the sea monster.
- It will function as a warning of "Judgment" to come upon an "evil and adulterous generation."

Only in the miraculous image on Holy Shroud do all the identifying markers come together as required by both the request made to Jesus from his opponents, as well as by the markers necessary from Jesus' response to them.

The live appearances Jesus made (in His glorified body) after the Resurrection could be viewed as the extraordinary visible *Sign of Jonah* to His disciples—testifying that the Father had worked His signature miracle affirming Jesus identity as the Christ, Daniel's "Son of Man."³⁵ However, a visible *Sign* was both requested by Jesus opponents and was stated by Jesus Himself to be the one *Sign* for "an evil and adulterous generation." Furthermore, the *Sign* was to function

³²Hebrews 10.19-20.

³³John 20.27

³⁴Matt 12.38-42; 16.1-4; Luke 11.29-32

³⁵Dan 7.9-14; cf. 12.1; Rev 20.11-15

as a warning of judgment upon that generation. Therefore, the live appearances made only to His disciples do not satisfy all the criteria. Fortunately, following the Ascension, God graciously provided a surrogate *Sign* for that evil generation and for future generations: Jesus' burial cloth—bearing its incredible miraculous image—was the Father's witness to the Gospel and the *Sign of Jonah* for every ensuing generation!

Is there *one* piece of objective, visual evidence that offers strong evidence for the death, burial, and Resurrection of Jesus? The answer is, yes! There is *one!* One *Sign!* The miraculous image left on the burial cloth of Jesus is the *one* tangible *Sign* that bridges the gap of history with the Gospel story of Jesus. In that regard, the Shroud of Turin is a game-changer for the theologian in search of the historical Jesus.

Whether or not earlier generations perceived this image as the promised *Sign of Jonah*, science has enabled today's generation to both see and perceive this incredible image better than any previous generation ever could! The Christian community should welcome the Turin Shroud as God's powerful witness to the Gospel message and as His gracious gift to every doubter.

The incredible image on the Shroud of Turin is the miraculous *Sign of Jonah* for today's evil and adulterous generation! Next to love, it is the supreme apologetic for the Church today; it is where science touches faith.

3.4 "Christ ... as high priest ... by means of the greater ... sacred tent, (not made by human hands) ... entered the (heavenly) sanctuary" (Hebrews 9.11-12; cf. 10.19-20)

The writer of Hebrews made use of typology in discerning spiritual truths. He asserted that what we see on earth is sometimes merely a "copy (or type) and shadow" of the unseen reality of the heavenly.³⁶

He informs us that Jesus was a priest after the order of Melchizedek, who was both "king of Salem and priest of the Most High God."³⁷ I am proposing the thesis that early Christians viewed Jesus' burial shroud typologically, identifying it with His priestly-kingly robe. I believe that identification is witnessed elsewhere in the early Church, but the priestly aspect is especially present in the *Letter of Hebrews*. In this current paper I am presenting a brief summary of that evidence.

3-4a. Jesus as High Priest and the typology of the Tabernacle

The author of Hebrews presents the reader with a typological riddle in 9.11-12:

When Christ came and ministered as the superior High Priest, what could be (1) described as a "*sacred tent*" that is "*not of this creation*," that was (2)

³⁶Heb 8.2, 5; 9.23-24

³⁷Heb 7.1

associated with both the actual *blood* of Jesus and the heavenly *Sanctuary*, but (at the same time) was (3) distinct³⁸ from both?

It is not difficult to perceive how early Jewish Christians viewed the Shroud as being associated, typologically, with the covering of a “sacred tent” (ὁἔç íç ~ ò). Both the Shroud and the covering of the “Holy Place” were made from linen cloth.³⁹ Furthermore, because Jesus’ burial cloth had been sanctified by his sacrificial blood, it could typologically be identified as being a sacred covering: either as (a) “the Holy Place” of the heavenly sanctuary or (b) as His “priestly robe.”

Interestingly, Jesus’ burial cloth had the three necessary characteristics to serve as a High-Priestly garment: (1) it was made of “fine linen,” (2) it had been consecrated (i.e., made holy) by being sprinkled with “sacrificial blood,” and (3) it had a special “checker work” weave.⁴⁰ And then there is this pertinent question: How could Jesus be the superior High Priest and perform His priestly duties without a priestly robe? It is unlikely the early, Jewish Christians overlooked this matter. So, it seems a plausible inference can be made that Jesus must have had a proper priestly robe when He served in the Holy Place, ministering as the superior High Priest.

How did the early Church view the burial cloth of Jesus that was discovered in the empty tomb? Why wasn’t it viewed as an unclean object—desecrated by blood and the corpse—and disposed of? Here is the likely answer: Jesus’ Shroud was viewed as having been consecrated by His sacrificial blood. This had two consequences.

First, the early Christians treasured Jesus’ Shroud and, due to persecution, attempted to safeguard it from enemies of the Church. On that basis, it is a plausible inference that any reference to the Shroud during the period of the early Church would be done in a veiled or cryptic manner.

Second, because the Shroud had been both consecrated and possessed a shadowy, *miraculous* image—one “not made by human hands” and “not of this

³⁸By “distinct” I mean not identical to, not one and the same (9.11). The use of the preposition with “sacred tent” requires it to be understood as different from the “sanctuary.” “The syntax of vv. 11-12 demands that a distinction be made between the ὁἔç í Þ ‘front compartment,’ through which Christ passed and ὁἔç ἄἔἄ ‘the sanctuary,’ into which he entered.” William L. Lane, *Hebrews 9-13*, Word Biblical Commentary (Nashville, TN: Thomas Nelson, 1991) 47b:238.

³⁹The Tabernacle was covered with a cloth made of fine twisted linen, blue, purple and scarlet yarn, with cherubim embroidered by skilled craftsmen. That linen cloth was then covered with a layer of cloth made from goat hair, which in turn was covered with ram skins (dyed red), which was covered with a top layer of hides from sea cows, providing a waterproof covering and camouflaging the rich interior from enemies and bandits. Rose Book of Bible Charts, Maps, and Time Lines, 10th Anniversary Edition (Peabody, MA: Hendrickson, 2015) 93.

⁴⁰Exod 28.4-5, 39; 29.21

creation” — a set of beliefs developed around it. What message was it supposed to convey? How might the Shroud be used in evangelism to teach the Gospel to potential converts and to new disciples?

Consequently, a rich typological understanding developed around the Shroud. The early Christians identified it, typologically, with His priestly-kingly robe. The earthly being a *shadow*, or a type, of the heavenly. Furthermore, evidence suggests the Shroud was identified as a type of the heavenly tabernacle (“*the greater and more perfect sacred tent*”⁴¹) that “*the Lord pitched, not man.*”⁴² The author of Hebrews developed a rich and fluid typology based on his understanding of the Shroud. He linked it with the Holy Place⁴³ and the inner curtain⁴⁴ that, “*by means of His flesh*” He went “*through*” to enter the heavenly sanctuary.

What could be described as a “*sacred tent*” that is “*not of this creation,*” that was associated with both the actual *blood* of Jesus and the heavenly *sanctuary*, but (at the same time) was distinct from both? I know of only one answer: Jesus’ consecrated burial Shroud, stained with His sacrificial blood and bearing the miraculous image of His crucified body.

Typologically, the Shroud was a bridge linking the transition from Jesus’ earthly entombment to presenting (as High Priest) His perfect sacrifice in the heavenly sanctuary.

3-4b. “*When the Lord had given the linen cloth to the servant of the priest*”

Additional support for this thesis is provided by the statement in the very early apocrypha work, *The Gospel According to the Hebrews*, which states, after the Resurrection: “...*Now the Lord, when he had given the linen cloth to the servant of the priest, went to James and appeared to him.*”⁴⁵ It is commonly believed that Peter would have been “the servant of the priest.”^{46 47} If Peter was the “servant” then

⁴¹Heb 9.11

⁴²Hebrews 8.2; 9.11-12

⁴³Heb 9.11-12

⁴⁴“...Jesus inaugurated a new way for us through the curtain, that is, by means of His flesh...” (Heb 10.20).

⁴⁵The Gospel According to the Hebrews is now a “lost gospel.” Jerome gave us this interesting quote in the late 4th century (392-3). [Jerome, *De Viris Illustribus*, 2.] Originally it was written in the Aramaic language but in Hebrew characters. It was, therefore, in use by Palestinian Christians who spoke Hebrew (Aramaic), which explains its name. “At Jerome’s time, most people regarded this apocryphal gospel as the Hebrew original of the canonical Gospel of Matthew which Papias mentioned (Eusebius, *Historia ecclesiastica* 3, 39, 16; 6, 25, 4; Irenaeus 1, 1).” Johannes Quasten, *Patrology* (Christian Classics: Westminster, Maryland, 1992) 1:111-12.

⁴⁶See footnote 56 where I discuss why Peter is the best candidate to have been the first custodian of the Shroud.

⁴⁷Consider the sacrificial-priestly-servant theme(s) behind 1 Pet 1.2, 15-16, 18-19, 22; 2.4-10; 3.15, 18; 4.10-11. It is important to remember the need the writer felt to be cryptic about the identity of the Shroud’s custodian in order to safeguard the cloth from potential enemies. Some choose to identify the apostle John with “the servant of the

Jesus must have been “the priest.” That results in this statement being a very early reference⁴⁸ where Jesus’ burial cloth is mentioned in the same sentence with the Lord being a priest.

That linkage aligns very nicely with the very intriguing statement found in *Hebrews*:

“Now when Christ came as a High Priest, with (ἁέϋ) (or by means of) the greater and more perfect **sacred tent** (ὁεçí ç~ð), not made with human hands, ... and ... with (ἁέϋ) His own blood ... He entered into the heavenly Sanctuary (ὁε ἄἄἄ) ...”⁴⁹

3.5 “...one like a Son of Man, clothed in a robe reaching to the feet...” (Revelation 1.13; cf. 19.16)

In the first chapter of his *Revelation* John describes “the Alpha and the Omega,” the Almighty, as Daniel’s “One like a Son of Man” who was presented before “the Ancient of Days.”⁵⁰ Some of the descriptive terms for Jesus in John’s passage are found elsewhere in Scripture for the LORD God Almighty. But what was the source for the “Son of Man” being “*clothed in a robe reaching to the feet*”? This is found nowhere else in Scripture.⁵¹ It is interesting that the “man on the Shroud” is depicted on the cloth down to his feet.

This verse is similar to the later statement in Revelation, “*And on His robe and on His thigh He has a name written, ‘KING OF KINGS, AND LORD OF LORDS.’*”⁵²

These two verses in Revelation (along with Hebrews 7:1 and Daniel’s enthronement of the “Son of Man”) give support to my thesis that early Christians identified Jesus’ consecrated burial cloth typologically with His heavenly, kingly robe. This thesis is reinforced and strengthened by the allegory of the prince’s marvelous robe found in the early apocryphal poem, *The Hymn of the Pearl*, which later became inserted into the *Acts of Thomas*.

priest.” However, there is no certainty that John was “the disciple whom Jesus loved.” Ben Witherington, for example, has concluded Lazarus was likely that beloved disciple. Furthermore, the evidence for John being “the servant” relies on the Johannine narrative of the Passion story. However, this lost gospel aligns itself closely with Matthew’s narrative.

⁴⁸It must have been written before the last quarter of the second century as Clement of Alexandria used it in his *Stromata* (2.9.45).

⁴⁹Heb 9.11-12

⁵⁰Dan 7.13

⁵¹Daniel 10.5 does speak of “a certain man dressed in linen,” but does not speak of a full-length robe “reaching to the feet.”

⁵²Rev 19.16

3.6. “To these he presented Himself alive...by many *convincing proofs*” (Acts 1:3)

What were these many “proofs” shown to His apostles *after* His Passion, proofs that served to convince them He was alive? We are not told; we can only speculate. But we do know that the disciple whom Jesus loved came to faith in the Resurrection as a result of the way His funeral “linens” were “lying” in the empty tomb.⁵³ So a primary candidate for one of these “convincing proofs” should be the Shroud with its miraculous image.

“Convincing proofs” in the original Greek is one word *ἀπειρήσει*, a strong word which occurs only here in the New Testament. It carries the idea of proofs that are “convincing” and “decisive.”⁵⁴ One Greek grammarian states: “A *tekmῆrion* is such an evidence as to remove all doubt.”⁵⁵

Certainly the live appearances Jesus made to His apostles after His Passion, as recorded in Luke’s Gospel, are understood here: “... *appearing to them over a period of forty days.*”⁵⁶ But that doesn’t exclude early Christians—those who were enlightened about the Shroud bearing a miraculous image—from understanding His burial cloth was also one of those “convincing proofs.”

3.7 “He has fixed a day in which he will judge the world . . . having furnished proof to all men by raising Him from the dead.”⁵⁷ (Acts 17:31)

While the “convincing proofs” of 1.3 were specifically given to Jesus’ “apostles,” now we have “proof” (*πίστις*)^{58 59} that has been furnished to “all men.” This proof is identified with Jesus serving as the Judge at the end of time due to his Resurrection from the dead. But how can all men be certain of His Resurrection? What evidence or “proof” did Paul have to present to the Athenians that the Resurrection took place? Why should they believe him? Were they simply to take him at his word? Did Paul have the Shroud along with him as an aid in

⁵³ John 20.8. See the author’s paper, “He Saw and Believed,” op. cit.

⁵⁴ Bauer, Greek-English Lexicon, 815.

⁵⁵ J. Rawson Lumby, *The Acts of the Apostles*, Cambridge Greek Testament (Cambridge: University Press, 1912) 81.

⁵⁶ Acts 1.3b

⁵⁷ After my presentation at the 2019 International Conference on the Shroud, I asked if anyone had suggestions of a NT text that might be a veiled reference to the Turin Shroud. Russ Breault suggested this verse from Acts 17.

⁵⁸ Whatever was the “convincing proofs” mentioned in 1.3, here is another verse in the same document that bears some of that same thinking. Evidence was available to believe in the Resurrection. The word here in 17.31 is different: *πίστις* (faith), as a “pledge” or “proof” (of Jesus’ fitness for the office to Judge). Bauer, Greek-English Lexicon, 668.

⁵⁹ The writer of Hebrews uses *πίστις* in a very similar way when he links it with *ἐπιστήμη* (“proof” or “inner conviction”): “*Faith is the essence of hoping, the proof or evidence of not seeing*” (Heb 11.1). In his Greek-English lexicon, Bauer gives this rendering for such “faith:” “*the assurance of what we hope for, the proving of (or a conviction about) what we cannot see.*” Bauer, “*πίστις*” 669.

evangelism, using its miraculous image as “proof” of the death and Resurrection of Jesus? Galatians 3.1 could certainly be support for such a thesis.

3.8 “For now we see in a mirror dimly, but then face to face.”⁶⁰ (1 Cor. 13.12)

The Greek “by means of⁶¹ a mirror” (ἄε' ἁ οὐδὲν ἴδῃ) is found only here in the New Testament. One author wrote: “Ancient mirrors made of burnished metal – a specialty of Corinth – were poor reflectors; the art of silvering glass was discovered in the 13th century.”⁶²

The Greek word for “dimly” (ἀίεῖν ἄ) means an “obscure image” or “riddle.”⁶³ We derive our English word “enigma” from this Greek noun. Literally the text says, “We are seeing at the present time by means of a mirror in an enigma (or riddle).”

This is an intriguing statement to contemplate with regards to the Turin Shroud, seeing how it bears a shadowy image of the crucified Lord. Readers could find their “hope” strengthened by the Shroud’s existence. Those who were aware of the image “not made by human hands” understood it to be a powerful, apologetic witness. Some might have believed that simply seeing it would grant a person a special blessing. However, void of love the Shroud loses its evangelistic power and influence. “But now abide faith, hope, love, these three; but the greatest of these is love.”⁶⁴

3.9 “In His day, the Son of Man will be as lightning flashing...”⁶⁵ (Luke 17.24-25)

“For just as the lightning, when it flashes out of one part of the sky, shines to the other part of the sky, so will the Son of Man be in His day. But first He must suffer many things and be rejected by this generation.”⁶⁶

Earlier in Luke’s Gospel his readers were informed that Jesus’ opponents were demanding to see a “sign from heaven.”⁶⁷ In response, Jesus promised one spectacular miracle that He labeled “the sign of Jonah.” Immediately following that promise, the Lord began to speak on the metaphor of light.⁶⁸

⁶⁰This statement was also proposed at the 2019 International Shroud Conference as a possible veiled reference to the Shroud. Unfortunately, I do not know who suggested it.

⁶¹The preposition ἄε' could be translated here as “in,” “through,” or “by means of.”

⁶²Finlay, Expositor’s Greek Testament, 5 vols (Grand Rapids, MI: Eerdmans) 2:901.

⁶³Cf. Bauer, *Greek-English Lexicon*, 23.

⁶⁴1 Cor 13.13

⁶⁵At the 2019 International Conference on the Shroud, Michel A. Iacono of Montreal Canada suggested this text as a possible veiled statement to the Shroud.

⁶⁶Luke 17.24-25

⁶⁷Luke 11.16, 29-36

⁶⁸Luke 11.33-36. Jesus spoke of Himself as being “the Light of the world” who wants to impart light to His followers so they will “not remain in darkness” (John 8.12; 12.46).

The context of this statement found later in Luke's Gospel (perhaps drawn from the parallel context of Matthew 24) seems to be the destruction that would come upon Jerusalem in 70 A.D. Even so, in the immediate passage, "the flash of lightning" is presented as something connected to and arriving after the Passion. Knowing what we do about how the miraculous image on the Shroud was likely formed, this statement about a flash of lightning becomes very interesting.

Only one (unconventional) hypothesis begins to explain the formation of the inexplicable and mysterious image and also account for several perplexing enigmas associated with the image.⁶⁹ Dr. John Jackson (and other physicists) theorized that a very brief, intense burst of ultraviolet radiation might be the source behind the image.⁷⁰ The needed radiation would be in the form of "light" (protons), rather than in the form of "heat." A "flash of lightning" is certainly a good metaphor for depicting such a miracle.

4. CONCLUSION

Unfortunately, students of the Bible have tended to view the Turin Shroud as being either unimportant or unauthentic. However, Sindonological research over the last several decades has furnished a plethora of strong evidence witnessing to the Shroud's authenticity.

Many have rejected the Shroud on the premise that it is a forgery. Otherwise, why are there no clear references made to it by the writers of the New Testament? This paper has worked from the plausible inference that, because of the threat of persecution, there was good reason for the early Church to have been discreet and secretive about the existence of the Shroud. And this paper has uncovered several excellent statements from the New Testament, itself, that should be regarded as veiled references to the Holy Shroud.

A story about an unparalleled person named Jesus has been passed down through the centuries. Is there any tangible, extraordinary evidence corroborating what the Bible calls "the Gospel" story? Yes!

Today a visual witness exists affirming the authenticity of the Jesus story. It is, in fact, an artifact that has been studied by scientists more than any other artifact in history. An ancient burial cloth displays the faint image of a crucified man and shows the unique wounds mentioned in the Biblical narrative of Jesus' death. Yet, surprisingly, scientists have been unable to either fully replicate this image or to

⁶⁹For a detailed analysis of this theory and the enigmas associated with the image, see Spitzer, *Science and the Shroud*, 23-28.

⁷⁰John P. Jackson, "An Unconventional Hypothesis to Explain all Image Characteristics Found on the Shroud Image" in *History, Science, Theology and the Shroud* ed. by A. Berard (St. Louis: Symposium Proceedings) 1991, accessed July 10, 2019, <http://theshroudofturin.blogspot.com/2012/01/john-p-jackson-unconventional.html>.

explain how this remarkable image could have been naturally formed. In that regard, *"Its origin remains a mystery wrapped in an enigma."*⁷¹

The ghostly image has properties associated with being a high-definition, three dimensional, photographic negative. Therefore, the image bears witness to "Intelligent Design." Yet, it was not the work of an artist.⁷² How can that be?

"The man on the cloth" bears witness to only one man and to only one story known throughout all of history.⁷³ Does this cloth, known today as "the Shroud of Turin," provide evidence for both the Passion and the Resurrection of Jesus? Could this artifact have anything to do with the Father's witness – an "attesting miracle from heaven" – which Jesus promised before his death and labeled "The Sign of Jonah"?

The Turin Shroud has the potential to greatly impact the theologian's search for the historical Jesus. Since the Enlightenment there has been a tendency to demythologize the New Testament and to view the Resurrection as something that existed only in the minds of Jesus' followers. Consequently, the Christ of history is blurred and the Christian's assurance of hope beyond the grave is attacked. In both extremely important matters, the Shroud of Turin is a game changer. Next to love, the image on the Shroud should be embraced by the contemporary Church as today's supreme apologetic and as God's gracious gift to every doubter of the Gospel story.



⁷¹Viviano, "Why Shroud of Turin's Secrets Continue to Elude Science," National Geographic, April 17, 2015, accessed April 22, 2019, <https://news.nationalgeographic.com/2015/04/150417-shroud-turin-relics-jesus-catholic-church-religion-science.html>

⁷²See footnote 21 above

⁷³For an overview of the evidence for the Shroud being the genuine burial cloth of Jesus see Marc Borkan, "Ecce Homo? Science and the Authenticity of the Turin Shroud," Vertices: The Duke University Magazine of Science, Technology, and Medicine 10, no. 2 (Winter 1995) 18–51.

26. The Divine Light and the Shroud of Turin

Mark Oxley

Abstract

Numerous hypotheses have been advanced as to how the image on the Shroud was formed. However no one to date has been able to explain it in scientific terms, let alone replicate it. As one researcher put it, "Science can only do so much, and so far it tells us that the image is a wonder that remains unexplained." In 1989 Dr. John P Jackson asked the question, is the image on the Shroud due to a process unknown to modern science? He did not mention the term "supernatural" in his paper but phrased his question as follows, "...perhaps we need to be more flexible in our scientific approach and consider hypotheses that might not be found readily in conventional modern science." One such hypothesis could be derived from the Eastern Orthodox concept of the Divine and Uncreated Light which, according to Orthodox belief, is the light that surrounded Jesus at his Transfiguration. Such light can be viewed in numerous ways, for example as the first creation of God, as described in the Book of Genesis, and as a manifestation of God, as in the Transfiguration. An early Christian writer on the subject, known as Pseudo-Dionysius or Dionysus the Areopagite, described God the Father as "the light which is the source of all light" and Jesus as "the Light of the Father, the 'true light enlightening every man coming into the world'." One possible explanation for the image is that the body of Jesus emitted this Light at some point during the Resurrection and that this created the image on the Shroud. The Shroud itself thus becomes a light to enlighten every man who comes into the world, or at least those who care to look for the light.

INTRODUCTION

This paper addresses the question of how the image on the Shroud was formed, and seeks a deeper insight into the reason for the formation of the image. To this day nobody has been able to provide a full explanation in scientific terms of how the image was formed on the material of the Shroud, and certainly nobody has been able to replicate it, despite many efforts. One is therefore driven to give serious consideration to the question posed in 1989 by Dr. John Jackson in a paper presented to the International Scientific Symposium in Paris, "Is the image on the Shroud due to a process unknown to modern science?"¹ In this paper Dr. Jackson

¹Jackson J P, Is the Image on the Shroud due to a Process heretofore Unknown to Modern Science?, a paper presented to the International Scientific Symposium in Paris on 8 September 1989, and subsequently published in Shroud Spectrum International, no 34, March 1990.

presented the hypothesis that the Shroud image formed when the body dematerialized. Although this in itself does not explain the mechanism of the image formation, it does introduce the suggestion that some form of process not known to science took place.

Dr. Jackson wrote:

"... Perhaps the time has come to ask if we ought to start thinking about the Shroud in categories quite different from those that have been considered in the past. In particular, perhaps we need to be more flexible in our scientific approach and consider hypotheses that might not be found readily in conventional modern science, for it is conceivable that the Shroud image presents, if you will, some type of "new physics" that ultimately requires an extension or even revision of current concepts."

Once this door is opened then other processes that might be described as "supernatural" can be brought into consideration.

The Scientific Method

In pursuing this line of reasoning it is necessary to clearly define the Scientific Method. This can be described in the following terms:

"A method of procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses."

It is based therefore on observation, gathering of information and measurement, formation of a hypothesis that will explain the observations and testing of that hypothesis through experimentation. This does not preclude the study of events that might be described as representing "an extension or even revision of current concepts" or supernatural.

One must also consider the well-known dictum of the fictional English detective, Sherlock Holmes, that "when you have excluded the impossible whatever remains, however improbable, must be the truth."²

The Divine Light

Eastern Orthodox Christianity places great emphasis on the Divine and Uncreated Light which, according to Orthodox belief, is the light that surrounded Jesus at his Transfiguration.

One can take this a step further and suggest that the body of Christ, the Son of God, may have emitted this Light at the moment of Resurrection and that this created the image on the Shroud.

²Conan Doyle A, *The Sign of the Four*, Chapter 6, first published in 1890.

The fourteenth century Byzantine monk Gregory Palamas wrote at length on the subject of the Divine Light. He refers to the saints being glorified by the Divine Light and also how the glory of the Spirit shone upon the face of Moses.³ He described this as being the same light which illumined the chosen Apostles on the mountain and also that "it was as light that the divinity was manifested to the disciples on the mountain."⁴ He emphasized that this light is the light of the true divinity, not only the divinity of the Son, but that of the Father and Spirit too.

One can also refer to the Gospel of St. John: "The Word was the true light that enlightens all men." (John 1:9)

The Book of Genesis tells us that after creating the heavens and the earth, God said "Let there be light," and there was light. This was on the first day of creation. The physical manifestations of light, the sun and the moon, were only created on the fourth day.⁵ Light existed as part of the creation.

Light can be considered in both its physical and metaphysical forms. In metaphysical terms light has various meanings:

1. Light as the first manifestation of God, as described in the Book of Genesis.
2. Light as a metaphor for God, in a spiritual sense.
3. Light as a manifestation of God on further occasions, as in The Transfiguration.
4. Light as a representation of Goodness and the Truth. This is particularly an aspect of eastern religions.
5. Light as a description of God. The Gospel of St. John makes references to this.

The Divine Light encompasses all of the above.

The Physical Nature of the Divine Light

In order to investigate the Divine Light hypothesis we must ask the question, Does the Divine Light as seen by man on occasions such as the Transfiguration consist of physical forms of radiation as we know them, or is it some form of supernatural radiation that transcends natural physics. If the former, it may be possible to study it; if the latter it is beyond scientific comprehension.

The Divine Light has been seen by men. It therefore has a physical effect on the human optical system and may consist of natural forms of radiation. On the other hand its brilliance and divine origin may well suggest that it consists of different forms of natural radiation combined in ways beyond our experience. It may be a combination of many different forms of natural radiation. This would certainly explain why investigations of ultra-violet or other forms of radiation on their own have not provided any satisfactory answers to date.

³Exodus 34:29-35.

⁴Palamas G, *The Triads* (Paulist Press, New Jersey, 1983), Part E, paragraphs 10-12, pages 72-73.

⁵Genesis 1:1-19.

In his 2016 paper, *Role of Radiation in Image Formation on the Shroud of Turin*, Rucker makes the vital point that there is a need to think "outside the box" created by the constraints of naturalism.⁶ He makes the suggestion that it is necessary to follow the evidence on the Shroud where it leads through a process of "reverse engineering." The objective of this is to determine how the image was encoded onto the Shroud based on the characteristics of the image, rather than trying to re-create or reproduce the image in a laboratory. As Rucker points out, this is the process used in forensic science, in contrast to experimental science.

Physical Forms of Light

In the spectrum of electromagnetic radiation visible light occupies a very small portion of this spectrum. There is no reason to believe that the Divine Light, in view of its supernatural nature, might exclude any specific section of the spectrum. It could include radio waves, infrared light, visible light, ultraviolet light, X-rays and gamma rays or any combination of them. It is for this reason that experiments on image formation using solely ultraviolet or infrared light would be almost certain to be inadequate if it is assumed that some form of extraordinary combination of wavelengths caused the image.

Valuable research has been carried out by Paolo Di Lazzaro and others on the colouration of linen by ultra-violet radiation. In 2010 the researchers concluded that:

"Our results demonstrate that a short and intense burst of directional deep-UV radiation can provide a linen colouration having many peculiar features of the Turin Shroud image, including hue, colouration of only the outer-most fibres of the linen yarns and lack of fluorescence."⁷

In a 2012 paper the authors ended their paper as follows:

"The Shroud image has characteristics that we have been able to reproduce only in part.... Sophisticated diffractive optics could replicate these features, but this effort is far beyond our intention. Our main purpose was to perform accurate and reproducible experiments apt to understand the physical and chemical mechanisms that might have played a role in the generation of the Shroud body image.

"We are not the conclusion. We are composing pieces of a fascinating and complex scientific puzzle. The enigma of the body image of the Shroud of Turin is still 'a challenge to our intelligence'."⁸

⁶Rucker R A, *Role of Radiation in Image Formation on the Shroud of Turin*, 11 October 2016, page 3.

⁷P Di Lazzaro, D Murra, A Santoni, G Fanti, E Nichelatti and G Baldachini, *Deep Ultraviolet Radiation Simulates the Turin Shroud Image*, *Journal of Imaging Science and Technology* (JIST) July-Aug 2010.

⁸P Di Lazzaro, D Murra, A Santoni, E Nichelatti, G Baldacchini, *Shroud-Like Colouration of Linen by Nanosecond Laser Pulses in the Vacuum Ultraviolet*,

In April 2019 a paper in *Applied Optics* described how femtosecond pulse laser processing in the infrared came close to reproducing a 2-dimensional image of the face on the Shroud.⁹ It seems therefore that different radiation in different frequencies can produce some of the characteristics of the image, but to date there has been no successful attempt to produce the image in its entirety. This research has used radiation in frequencies close to that of visible light—the possible contribution of other frequencies in conjunction with these has not even been considered.

The Metaphysical Aspects of Light

The term "enlightenment" is usually used not in the physical sense of having a light turned on, but in the metaphysical sense of gaining knowledge. The Age of Enlightenment was the period in European history from the late 17th century to the turn of the 19th century, during which the concept of reason as the primary source of knowledge was developed. There was an increased emphasis on the scientific method. Science played an important role on the Age of Enlightenment with many major scientific discoveries being made. It was as if an intellectual light had been switched on. In this context light can be seen as a representation of Truth.

It is also a representation of Goodness and Beauty. William Shakespeare makes particular use of the symbolism of light in his play *Romeo and Juliet*. At the start of Act II, on seeing Juliet, Romeo exclaims, "What light through yonder window breaks? It is the east, and Juliet is the sun." In the final Act, on seeing what he assumed to be Juliet's dead body, he cries, "For here lies Juliet, and her beauty makes this vault a feasting presence full of light."¹⁰

The concept of light representing truth was also an integral part of Zoroastrianism, the religion of Persia. According to Zoroastrian belief, which had considerable influence on the development of Jewish belief, Ahura Mazda, who was the greatest of the gods, summoned time and creation into being and empowered Arta, who was Truth, to give order to the universe. But Arta was shadowed by Drauga, the Lie. Zoroaster taught that Ahura Mazda was the Lord of Life, Wisdom and Light and that Truth would annihilate all falsehoods to establish an eternal reign of peace.¹¹

Thus the identification of Light with Truth and Beauty is common to many cultures and to many ages. It is no great intellectual leap to identify light with the image on the Shroud and to see light as both the cause and the purpose of the image.

ENE(Agenzia Nazionale per le Nuove Tecnologie) Italy 2012.

⁹C Donnet, J Granier, G Verge, Y Bleu, S Reynaud, F Vocanson, *Applied Optics* Vol 58, Issue 9, page 2158 (2019)—Abstract.

¹⁰William Shakespeare, *Romeo and Juliet*, Act 2 Scene II and Act 5 Scene 3

¹¹Holland T, *Persian Fire* (Doubleday 2005), Chapter 1, pages 32-34.

The Light of the World

An early Christian writer on the subject of the Divine Light was the writer known as Pseudo-Dionysius or Dionysus the Areopagite, who described God the Father as "the light which is the source of all light" and Jesus as "the Light of the Father, the 'true light enlightening every man coming into the world'."¹² In this regard he was of course simply building on the words of St. John:

"I, the light, have come into the world, so that whoever believes in me need not stay in the dark any more." (John 12:46)

St. Thomas Aquinas discusses light in the context of God in *Summa Theologiae*. This work is divided into three Parts, with the second divided further into two parts, together with a Supplement. In the First Part Aquinas discusses the question of "How God is Known by Us."¹³ Aquinas makes the following statements as his own views in response to Objections that he quotes:

"Since the natural power of the created intellect does not avail to enable it to see the essence of God... it is necessary that the power of understanding should be added by divine grace. Now this increase of the intellectual powers is called the illumination of the intellect, as we also call the intelligible object itself by the name of light of illumination. And this is the light spoken of in the Apocalypse (21:23): 'The glory of God hath enlightened it.'"¹⁴

"Of those who see the essence of God, one sees the more perfectly than another.... The faculty of seeing God, however, does not belong to the created intellect naturally, but is given to it by the light of glory."¹⁵

What Aquinas appears to be saying is that God's grace is a source of light in the sense of comprehension or understanding, and that the ability of a person to see and understand God depends on the amount of Divine light granted by God to that person. Light in the sense of understanding God is a gift from God.

The Shroud may be seen in this context. It is a gift from God, given to humanity by divine grace to provide the ability to see and understand God. It is both the creation of the Divine Light and the inspiration of Divine Light in a person's intellect. It bears the image of the Light of the world and is itself a light to enlighten every human who comes into the world, or at least those who care to look for the light.



¹²This quotation is in notes that I made for an earlier paper but I am unable at present to find the exact reference.

¹³St. Thomas Aquinas, *Summa Theologiae*. I, Q 12.

¹⁴*Ibid.* I, Q 12. Art 5, Obj 3.

¹⁵*Ibid.* I, Q 12, Art 6, Obj 3.

27. Spirituality and the Shroud

Mark Oxley

Abstract

The image on the Shroud is an invitation to spiritual contemplation. In the words of Pope John Paul II, it is "an image of God's love as well as of human sin." It is also an image of silence, the silence of fruitfulness which allows us to delve to the roots of truth and life and to hear the voice of God. In the words of St. Teresa of Avila "the contemplative should regard himself as being within a definite space, God everywhere around, and himself absorbed in Him." Contemplation is the awareness of God. It is not necessary to know how the image was formed. It is enough to understand what it represents – the sacrifice of Jesus for the redemption of humankind. The detail on the image allows us to contemplate every aspect of the Passion of Jesus, from his treatment at the hands of the Temple guards to the scourging and finally to the Crucifixion itself. Yet the image also shows calmness and peace in death. The horror of the Passion has been succeeded by the peace of the tomb. This inner peace itself reflects the teaching of Jesus. Writers over the centuries, from Athanasius to Thomas Aquinas to the unknown author of the mediaeval English classic, *The Cloud of Unknowing*, have emphasised how distractions arise to disturb contemplation and inner peace. The early writers pictured these distractions as demons. Today they would be more worldly. In perfect contemplation everything less than God is forgotten. The Shroud enables us to contemplate in a perfect manner and without distraction the Passion, death and resurrection of our Saviour. That surely is its purpose, regardless of whether it is truly the burial cloth of Jesus or the product of human ingenuity.

Four Questions

There are four questions to which scientific researchers, historians and others interested in the Shroud of Turin seek an answer. They can be briefly stated as what, when, how and why?

The first question, what is the Shroud of Turin, has a simple answer. It is a cloth of certain known dimensions on which there is an image which appears to be that of the crucified Jesus Christ. More detail can be stated but the Shroud can easily be described in scientific terms.

The second question is probably the most contentious. When was the Shroud created? To many it is of 1st century origin and was the burial cloth of Jesus Christ. To others it is a mediaeval artifact dating to no earlier than the 14th century.

The third question is how – how was the image created? No satisfactory answer to this question has ever been produced. If it is indeed the burial cloth of

Jesus Christ, with the image being that of Jesus in the tomb, then what mechanism was involved in the creation of the image? There have been many hypotheses, involving chemical reactions, electromagnetic radiation, nuclear radiation or perhaps a combination of any of these. The obvious followup question in this context is, Was the image caused by a natural phenomenon or was it a miraculous or supernatural event? That is another question to which no conclusive answer currently exists.

The mediaevalists, or sceptics, also have a range of explanations. Lynn Picknett and Clive Prince in their book, *Turin Shroud: In Whose Image*,¹ suggest that the image we know today as that on the Shroud of Turin was created by some form of early photographic process as a self-image by Leonardo da Vinci. Christopher Knight and Robert Lomas connect the Shroud to the suppression of the Templars in France in the early 14th century and propose that the image is that of the last Grand Master of the Templars, Jacques de Molay². Other hypotheses for a mediaeval origin of the Shroud are less dramatic and suggest that the image-bearing cloth is simply a forged relic.

The fourth question, and the one least thought about, is, Why was the Shroud created? Leaving aside dramatic hypotheses such as the first "selfie" or masonic secrets, the most likely answer is that it was created to illustrate graphically the sufferings of Jesus Christ with the objective of inspiring religious and spiritual reflection and devotion. This answer would apply regardless of whether the image is of divine origin or the work of a highly skilled and creative artist.

The Address of Pope John Paul II in Turin on 24 May 1998³

Pope John Paul II visited Turin Cathedral on 24 May, 1998, during a public exposition of the Shroud, and gave a short address. He made it clear that the Church has no specific competence to pronounce on questions such as whether the Shroud is indeed the burial cloth of Jesus Christ, but he urged scientists to continue to investigate the Shroud without preestablished positions. He invited researchers to act with interior freedom and attentive respect for both scientific methodology and the sensibilities of believers. He noted that it was a traditional belief that the Shroud had wrapped the body of Jesus after he had been taken down from the cross.

On the subject of the image itself he said, "...if we reflect on the sacred Linen, we cannot escape the idea that the image it presents has such a profound

¹Picknett L, Prince C, *Turin Shroud: In Whose Image* (HarperCollins, USA, 1994), Chapter 5, pages 79 – 106.

² Knight C, Lomas R, *The Second Messiah* (Arrow Books, London, 1998), pages 221 – 225

³Pastoral Visit of His Holiness John Paul II to Vercelli and Turin, May 23-24 1998, Address of His Holiness Pope John Paul II, Sunday 24 May 1998, Libreria Editrice Vaticana 1998.

relationship with what the Gospels tell us of Jesus' passion and death, that every sensitive person feels inwardly touched and moved at beholding it."

He went on to say, "Therefore, it is right to foster an awareness of the precious value of this image, which everyone sees and no one at present can explain. For every thoughtful person it is a reason for deep reflection, which can even involve one's life...." The image of human suffering is reflected in the Shroud. It reminds modern man, often distracted by prosperity and technological achievements, of the tragic situation of his many brothers and sisters, and invites him to question himself about the mystery of suffering in order to explore its causes...." The Shroud is also an image of God's love as well as of human sin. It invites us to rediscover the ultimate reason for Jesus' redeeming death. In the incomparable suffering that it documents, the love of the One who 'so loved the world that he gave his only Son' (John 3:16) is made almost tangible and reveals its astonishing dimensions."

Finally, in a call for contemplation, the pope said, "The Shroud is an image of silence. There is a tragic silence of incommunicability, which finds its greatest expression in death, and there is the silence of fruitfulness, which belongs to whoever refrains from being heard outwardly in order to delve to the roots of truth and life. The Shroud expresses not only the silence of death but also the courageous and fruitful silence of triumph over the transitory, through total immersion in God's eternal present."

When reflecting on the pope's words it becomes necessary to think more deeply about Christian spirituality and how contemplation enhances such spirituality and spiritual belief.

Defining Spirituality

It is difficult to come by a precise definition of spirituality. Within early Christianity it was used to refer to a life oriented toward the Holy Spirit. In medieval times it was broadened to include mental and moral aspects of life – the realm of the inner life rather than that of material aspects of life. Today it seems to be centred on the deepest values and meanings by which people live. Spiritual practices may include meditation, contemplation, prayer, ethical development and spiritual retreats. In his *Summa Theologica* Thomas Aquinas discusses the question, "How God is known by us," which may be seen to be the basis of Christian spirituality. He refers to the "essence of God" and how man, a created intellect, can see or know this. Aquinas writes that, "It is impossible for any created being to comprehend God... "In proof of this we must consider that what is comprehended is perfectly known; and that is perfectly known which is known so far as it can be known.... No created intellect can attain to that perfect mode of knowledge of the Divine intellect whereof it is intellectually capable."⁴

⁴Thomas Aquinas, *Summa Theologia*, I, Q12, Art 7, Obj 3.

Deep stuff indeed! What Aquinas is saying is that a finite mind cannot comprehend an infinite God. However, it is possible to establish a link between the finite and the infinite. In John's Gospel Christ himself is seen as that link: "No one has ever seen God; it is the only Son, who is nearest to the Father's heart, who has made him known." (John 1:18) In his farewell discourse Jesus says, "I am the Way, the Truth and the Life." (John 14:6) In other words he is the way to a full understanding of the truth and the guide to eternal life.

It is through spirituality that the link between the finite and the infinite, the human and the divine, is established. In Christian spirituality it is Christ, his teaching and his redemptive sacrifice that provide this link. Such spirituality can be described as theology in lived experience.

The question of spirituality is also addressed in St. Paul's Letter to the Romans where he writes, "...the law of the spirit of life in Christ Jesus has set you free from the law of sin and death...."

".... the spiritual are interested in spiritual things.... Your interests are... in the spiritual, since the Spirit of God has made his home in you.... If Christ is in you then your spirit is life itself because you have been justified; and if the Spirit of him who raised Jesus from the dead is living in you, then he who raised Jesus from the dead will give life to your own mortal bodies through his Spirit living in you." (Romans 8:1-11)

Paul thus describes how the Holy Spirit inspires the spiritual link between humans and God that is provided through Jesus Christ.

Contemplation

Contemplation is a major component of Christian spirituality. Aquinas refers to the objective or end of contemplation being truth⁵. He refers to the Scottish theologian Richard of St. Victor⁶ as distinguishing between "contemplation," "meditation" and "cogitation" and describes these as various actions pertaining to the contemplative life.⁷

He further quotes Richard describing contemplation as being "the soul's clear and free dwelling upon the object of its gaze," while meditation is "the survey of the mind while occupied in searching for the truth" and cogitation is "the mind's glance which is prone to wander."⁸ There appears to be a hierarchy of mental activity with contemplation at the top of this hierarchy.

From this it can be understood that contemplation involves a total focus on the spiritual object or event concerned, such as the Passion and death of Jesus. It

⁵Thomas Aquinas, *Summa Theologia*, II-II, Q180, Art 1, Obj 1.

⁶Richard of St. Victor was a mediaeval Scottish philosopher and theologian who was prior of the Augustinian Abbey of St. Victor from 1162 until his death in 1173.

⁷Thomas Aquinas, *Summa Theologia*, II-II, Q180, Art 3, Obj 1.

⁸Thomas Aquinas, *Summa Theologia*, II-II, Q 180, Art 3, Reply Obj 1.

is removed from material objects and distractions. The process of contemplation is described by the unknown author of *The Cloud of Unknowing*:

"Lift up your heart to God with humble love: and mean God himself, and not what you get out of him. Indeed hate to think of anything but God himself, so that nothing occupies your mind or will but only God. Try to forget all created things that he ever made, and the purpose behind them, so that your thought and longing do not turn or reach out to them. It is the work of the soul that pleases God most."⁹

Again emphasis is placed on focusing the whole mind on God and clearing away distractions. St. Teresa of Avila is one of the best-known contemplative saints of the Catholic Church. She was a Carmelite nun who devoted her life to prayer and contemplation. In her Autobiography she wrote:

"With so good a Friend and Captain ever present, Himself the first to suffer, everything can be borne. He helps, He strengthens, He never fails, He is the true friend...."

"Our Lord is He by whom all good things come to us; He will teach you. Consider His life; that is the best example. What more can we want than so good a friend at our side, Who will not forsake us when we are in trouble and distress, as they do who belong to the world! Blessed is he who truly loves Him, and who always has Him near him!"¹⁰

St. Teresa opens the door to contemplation of the suffering of Jesus and to the idea that through contemplating his suffering we can bear more easily our own suffering and difficulties.

Ignatian Spirituality¹¹

The founder of the Society of Jesus, St. Ignatius Loyola, is recognised as one of the great spiritual thinkers of the Catholic Church. One of the elements of his spiritual teaching is that God can be found in all things.

He developed his Spiritual Exercises on the principle that, just as physical exercise strengthens the body, so does spiritual exercise strengthen the soul. In

⁹The Cloud of Unknowing and Other Works (Penguin Classics 1978), Chapter 3, page 61. The author of these works is not known but it is considered likely that he was an English country parson of the late fourteenth century. It is considered one of the devotional classics of the Catholic Church.

¹⁰ The Autobiography of St. Teresa of Avila (TAN Books, Charlotte, North Carolina USA, 1997), Chapter 22, pages 188–189. St. Teresa of Avila was born at Avila in Spain in 1515. She was one of 12 children. Against her father's initial objections she left her home in 1533 (the year is not certain) to enter a Carmelite convent. She took her vows as a nun the following year. She was noted for her spirituality. She died in 1582.

¹¹Muldoon T P, Why Young Adults Need Ignatian Spirituality, an article printed in America, 26 February 2001.

these Exercises a person sets out to find for himself what God wants. They are conducted in silence, under the guidance of a spiritual director.

Another element of Ignatian spirituality is walking with Christ. Part of the Spiritual Exercises involves entering deeply into the stories of Jesus's life and using one's imagination to place oneself in the Gospel scenes. There is a spirituality about sharing in the story, not only by remembering it but also by taking part in it, so that one might more fully come to know and understand Jesus and his life and teaching.

This can be particularly applied to the image on the Shroud, by using one's imagination to be part of the first Easter morning. One can place oneself in the position of Peter or Mary of Magdala when faced with the empty tomb, terrified and amazed. Or as one of the Eleven, later that day, when Jesus appeared among them causing alarm and fright (Luke 24). Bearing in mind the appalling suffering depicted by the image on the Shroud and witnessed first-hand by the disciples, would terror, fright and amazement not be appropriate responses to the possibility that Jesus had somehow returned from the dead? In this way one obtains a greater understanding of the meaning of the image – of what it represents.

Consolation and Desolation

Yet another element of Ignatian spirituality is the concept of consolation and desolation. A person dwells in a state of consolation when he is moving toward God's active presence in the world. That person senses the growth of love, faith, mercy or hope.

Desolation happens when a person is moving away or distant from God's active presence in the world and experiences anger, resentment, a loss of hope, self-obsession. This frequently leads to efforts to alleviate the discomfort through distractions such as substance abuse or excessive work or social activity¹².

Conversion to belief, or a deeper belief, in God involves a journey from desolation to consolation. Contemplation can provide the basis for such conversion because it has as its objective the truth.

There are three types of conversion: consolation without previous cause, consolation through listening to the inner movements of one's spirit and reflecting on the experience of life, and intellectual conversion.

Consolation without previous cause is the form of conversion that Paul underwent on the road to Damascus, and Matthew experienced when Jesus said to him "Follow me," and he got up and followed him (Matthew 9:9).

I must include a personal testimony.

In chapter 5 of this book, Pam Moon discusses the Holy Blood of Bruges. My father was born in Bruges and brought up in Belgium, although his family was English. His father had a shipping business in Ghent. My father was raised as an

¹²Wright V H, Consolation and Desolation, www.IgnatianSpirituality.com.

Anglican. My mother was Catholic. My father seemed to have no particularly strong religious beliefs and he left the religious upbringing of my sister and me to my mother until in 1958, when we went on holiday to Europe (we were living in what was then Southern Rhodesia).

We visited Belgium, including his birthplace of Bruges, where we visited the Cathedral and saw an exposition of the Holy Blood. I remember seeing it although I was only eight years old at the time. Immediately after that my father decided to convert to Catholicism and, on our return home, he underwent instruction and was baptised into the Catholic Church on 1 December 1958. He became actively involved in the Church, serving for a number of years as Chairman of the Parish Council in our parish. Such conversions often arise from spiritual experiences and encounters with items of spiritual significance.

The present book also includes a chapter by Kristy Hernandez (chapter 30), on the subject of her journey from desolation to consolation which was completed by an encounter with the image on the Shroud. Consolation was the result of spiritual development and reflection on great unhappiness in life. In each case there was an intervention related to the graphically represented image of a crucified man on the Shroud.

Reflections on the Image

Pope John Paul II referred to "an image of silence." The image is also in itself a paradox, which was described by Cardinal Joseph Ratzinger (later Pope Benedict XVI) when he was Prefect for the Congregation of the Doctrine of the Faith. He described this paradox as being where we can say of Christ, "You are the fairest of all men" and "He had no beauty.... His appearance was so marred." He wrote as follows:

"The experience of the beautiful has received a new depth and a new realism. The One who is beauty itself let himself be struck on the face, spat upon, crowned with thorns—the Shroud of Turin can help us realise this in a moving way. Yet precisely in this Face that is so disfigured, there appears the genuine, the ultimate beauty: the beauty of love that 'goes to the very end' and thus proves to be mightier than falsehood and violence. Whoever has perceived this beauty knows that truth after all, and not falsehood, is the ultimate authority of the world."¹³

To return to the original question of why the Shroud was created, the answer clearly appears to be that it was created as a reflection of God's love and a source of inspiration for contemplation of this love as it was expressed through the Passion and death of Jesus. But the Shroud itself is not an object of contemplation. In true contemplation of the redeeming love of Jesus Christ, the physical artifact

¹³Ratzinger J, *On the Way to Jesus Christ* (Ignatius Press, San Francisco 2005), Chapter 2, page 39.

that is the Shroud becomes forgotten as a meaningless distraction. In this context the other questions of what, when and how become irrelevant. It is the image that draws us closer to God through its stark beauty, calmness and silence.

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28. Walking a Fine Line Between Science and Faith

Mark Oxley

Abstract

It should not matter to a Christian whether the Shroud of Turin is the genuine burial cloth of Jesus or a mediaeval forgery. For a Christian it bears the image of the crucified Christ, the salvation of mankind. It should not be critically important whether it is a genuine relic of the Crucifixion or not. We are past the age of relics. Of greater importance is what the image on the Shroud represents. The Shroud is an object of both scientific and religious interest. Religious interest is based on the image itself. It is the nature and detail of the image and how it was formed that is of interest to scientists, but there is a danger in combining scientific research with religious belief. When scientific investigation of the Shroud is seen to have religious objectives it loses credibility among secular researchers. Scientific investigation of the Shroud must therefore be seen to be purely scientific in nature—a search for the truth, however uncomfortable that truth might be. This means accepting the hypotheses of Shroud sceptics as being valid contributions toward finding the truth about the image. Those who believe the image to be that of the resurrected Christ and those who see the Shroud as a fake or forgery, as well as those in between, who merely find it an object of mystery, should see each other as colleagues and collaborators rather than antagonists in that search for the truth. In May 1998 Pope John Paul II emphasized that the Shroud should be studied without preestablished positions. He urged scientists to act with interior freedom and attentive respect for both scientific methodology and the sensitivities of believers. It is a fine line to walk.

INTRODUCTION

The theme of this paper is whether or not the Shroud is the genuine burial cloth of Jesus, and asks the questions, are there different approaches to this question from the perspectives of science and faith and should there be different approaches? Indeed can there be different approaches?

To start to address these questions, rigorous definitions of science and faith are provided in order to clearly differentiate between the two.

Science and the Scientific Method

The Scientific Method was defined in my previous paper (Chapter 27) in the following terms:

"A method or procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses."

Key terms here are "observation," "measurement" and "experiment." The word "science" itself is derived from the Latin verb *scire* "to know." The Oxford English Reference Dictionary defines science as "a branch of knowledge conducted on objective principles involving the systematised observation of and experiment with phenomena, especially concerned with the material and functions of the physical universe."¹

Science therefore refers to what can be observed and measured. It consists of knowledge obtained systematically, relating to the physical universe. Specifically it involves objectivity.

Faith

Faith, on the other hand, is defined in the Oxford English Reference Dictionary in several ways, including:

- "complete trust or confidence."
- "firm belief."
- "a system of religious belief, belief in religious doctrines, spiritual apprehension of divine truth apart from proof."²

Rather than being based on observation, measurement and objectivity, faith is based on internal belief, particularly belief of a religious or personal nature that does not require proof for it to be justified. It is subjective rather than objective. It is this aspect of faith that is frequently applied to studies of the Shroud of Turin.

Objectivity

Objectivity is the major difference between a science-based approach to a matter and a faith-based approach. The adjective "objective" is defined as "external to the mind, actually existing, real."³ However, many sincere believers might insist that their faith reflects reality, it is only their personal reality that is involved. A true scientist will consider differing hypotheses and points of view in arriving at

¹The Oxford English Reference Dictionary, 2nd Edition(Oxford University Press, 1996), page 1297.

²*Ibid*, page 502

³*Ibid*, page 1002

the facts. When faith becomes involved objectivity is lost and opposing points of view are seen as dangerous.

This applies very much to the Shroud of Turin. Because of its religious significance, many researchers allow their religious beliefs to take priority in their search for the truth about the Shroud. Suggestions or hypotheses that the Shroud is not the genuine burial cloth of Jesus Christ but some form of mediaeval forgery, are seen as dangerous and unacceptable. The following are recent quotations from leading Shroud researchers:

- "I see that you intend to invite (to the Conference) persons not favourable to the authenticity of the Shroud. I warn all of you that could be dangerous for the Truth and for the Shroud for many reasons."
- "I have some qualms about having any professional sceptic on the conference programme."

It is particularly with reference to the 1988 radiocarbon dating of the Shroud that objectivity frequently takes second place to personal belief. The purpose of dating the Shroud becomes a question of proving either that it is of first century origin or that it is medieval, depending on one's beliefs and with the intention of justifying them. There is no scientific detachment. This in turn affects the credibility of scientific examination of the Shroud with the broader scientific community. Research on the Shroud becomes viewed as a field for eccentrics, scientific cranks and religious extremists.

Well might Pope John Paul II have appealed that "the Shroud be studied without preestablished positions that take for granted results that are not such."⁴

The official announcement of the radiocarbon dating of the Shroud in 1988 is certainly not a study in scientific detachment, as can be seen from the photograph here of some of the scientists involved at the announcement. The date range found by the tests is emphasized with an exclamation mark and the three scientists appear to be challenging the world to take their word for it.



⁴Pastoral Visit of His Holiness John Paul II to Vercelli and Turin, May 23-24, 1998, Address of His Holiness Pope John Paul II, Sunday 24 May 1998, Libreria Editrice Vaticana 1998.

Separation of Belief and Science

With a subject as controversial as the Shroud it becomes extremely difficult to put aside preconceptions and to adopt an attitude of impartiality. The Shroud is an item of both scientific and religious interest. The first step in an impartial approach is to determine which facets of the Shroud are the legitimate subject of pure scientific investigation and which aspects have religious significance. This returns to the questions raised in another paper of mine – what, when, how and why.

The physical nature of the Shroud itself is clearly of purely scientific interest. There is no controversy over this question.

"When" is the big question. When was the Shroud created? It is at this point that faith and science must be separated and objective research emphasized. Faith cannot be allowed to direct scientific enquiry.

"How" is also a question of both scientific and religious significance. My other paper has sought to address this question from a religious perspective. It is in this question that science and faith become most intertwined. The image itself clearly has religious significance but this must somehow be put aside to allow its investigation from a purely scientific point of view.

The fourth question, "why," clearly lies beyond the realm of science.

It is therefore in the second and third questions that a conflict between science and faith is possible.

The Scientific Revolution

The Scientific Revolution is a term applied to a series of major discoveries and developments that took place over a relatively short period of time in the Middle Ages and which had an impact in particular on established religious and philosophical views. The Scientific Revolution can be said to have started with the publication of *De revolutionibus orbium coelestium* (On the Revolutions of the Heavenly Spheres) by Nicholas Copernicus in 1543 and to have been completed by Sir Isaac Newton with his *Principia* in 1687.

The resulting revolution in ideas threatened established views on nature, particularly those of the Catholic Church. This resulted in conflict between the opposing viewpoints and opposition by the Church to many of the new ideas and theories. Copernicus proposed that it was the sun that occupied the centre of the universe rather than the earth. Galileo in turn supported this heliocentric view of the universe and argued in his defence that the Bible was not intended to expound scientific theory and where it conflicted with common sense it should be read as allegory.

It has often been suggested that the Church is in perpetual conflict with science. It is more accurate to say that at times in history the Church opposed

particular scientific discoveries and theories that it felt challenged its authority and power. In fact the Church has been a major supporter of many sciences and scientists over the centuries and has produced many notable scientists. The Jesuits in particular have been active in scientific discovery and endeavour. They devised modern lunar nomenclature and stellar classification for example.

The Church itself rejects the notion of innate conflict. The First Vatican Council of 1869-1870 declared that "Faith and reason are of mutual help to each other." In his encyclical *Fides et Ratio* Pope John Paul II summarized the Catholic view of the relationship between faith and reason when he wrote:

"Faith and reason are like two wings on which the human spirit rises to the contemplation of the truth; and God has placed in the human heart a desire to know the truth...."⁵

The Pope emphasized that faith and reason are essential together – that faith without reason leads to superstition while reason without faith leads to nihilism and relativism. This leads to an uncomfortable question. When researchers investigate the Shroud without scientific detachment or objectivity are they indulging in some form of sindonic superstition?

To avoid accusations of this nature it is essential that all voices on the Shroud be heard and that all scientific research, which has been carried out within the parameters of sound science, be taken into account. The result of all such research needs to be subject to full scrutiny and peer review prior to publication. It is of course unavoidable that sensational claims about the Shroud, however unscientific they might be, will always receive wide publicity whereas more routine and less newsworthy results will remain less well-known. That is a fact of life. What is important is that true scientific research on the Shroud remains objective, "without preestablished positions that take for granted results that are not such...(and acting) with interior freedom and attentive respect for both scientific methodology and the sensibilities of believers."⁶

The Future of Scientific Research on the Shroud

Because of the continuing controversy over the date of the Shroud and the results of the 1988 radiocarbon dating, the need for new tests of this nature is at the forefront of the minds of many researchers. It is almost a point of dogma that until this question is resolved no other research is worthwhile. The barrier to such further testing is seen to be the Church.

⁵*Fides et Ratio*, Encyclical Letter of Pope John Paul II, 14 September 1998

⁶Pastoral Visit of His Holiness John Paul II to Vercelli and Turin, May 23- 24 1998, Address of His Holiness Pope John Paul II, Sunday 24 May 1998, Libreria Editrice Vaticana 1998.

Any reluctance by the Church to permit such testing can be put down to three main factors, none of which relate to any perceived "anti -science" bias on the part of the Church:

- From a spiritual perspective it is not necessary that the Shroud be the true burial cloth of Jesus. It is what the image depicts and represents that is of religious and spiritual importance.
- The Church does not want another publicity controversy similar to that surrounding the 1988 dating, as would inevitably be the case in the event of new tests whatever conclusions were reached. From the Church's perspective it is better to leave this question unanswered.
- The Church is undoubtedly concerned about whether a truly unbiased and objective testing process is possible in view of the diametrically opposed views of many scientists on the subject of the Shroud.

Dating the Shroud is not the only potential research project on the Shroud. Although less glamorous, research on the image would be of great scientific value. It is also unlikely to attract the same glare of publicity or controversy over conclusions reached. This topic has been addressed in one of my other papers. Such research should cover the mechanism of the image formation as well as peculiar and interesting features of the image itself. It could also provide greater insight into the age and nature of the Shroud itself than would be achieved by simply making further efforts to establish a reliable date for the cloth.

Potential Research on the Image

Paolo Di Lazzaro and others in a 2012 paper suggested how a short and intense burst of directional deep-UV radiation could possibly provide a linen colouration having many peculiar features of the Turin Shroud image. In these remarks the authors stated:

"We are not the conclusion, we are composing pieces of a fascinating and complex scientific puzzle. The enigma of the body image of the Shroud of Turin is still 'a challenge to our intelligence'."⁷

This is the opening to further research and study on this subject. It is also an area where faith and science join together. The image itself is physical in nature but its formation mechanism may lie beyond the limits of natural science, where faith would play a role in the design of any research programme.

Other areas of research involving the image could include the following:

- Further medical studies of the injuries shown on the image.
- Further investigation into the yet unconcluded matter of whether or not there are images of coins on the eyes of the facial image.

⁷P Di Lazzaro, D Murra, A Santoni, E Nichelatti, G Baldacchini, Shroud-Like Colouration of Linen by Nanosecond Laser Pulses in the Vacuum Ultraviolet, ENEA (Agenzia Nazionale per le Nuove Tecnologie) Italy 2012.

- Other aspects of the image that are still not fully understood. Are there, for example, images of flowers included in the overall image?

A complete scientific picture of all aspects of the image remains to be completed. This area of research has taken second place over the years since 1988 to the controversy over the dating of the Shroud, and yet it offers much greater scope and opportunity for scientific study. This is certainly an area where faith-based interest in the age of the Shroud has overshadowed the need for rigorous and wide-ranging scientific research on the image itself.

Certain peculiar characteristics of the image, as described by Prof Giulio Fanti in his book *The Shroud of Turin, First Century after Christ*,⁸ merit further study and research:

"The double, front and back, body image of the Man of the Shroud reveals such peculiar characteristics that, until now, modern sciences could not reproduce all together at one time on a single cloth. Currently it is therefore impossible to explain how the Shroud image has been created. Being considered a relic, it is understandable that someone would talk about a miracle referring to the formation of the image, but obviously, by the side of science, this justification cannot be reasonable. From the scientific point of view, the study of the sheet led to several formulations of hypotheses that try to produce quite reliable, even though not completely satisfactory explanations."

It is more accurate to say that it is impossible within the limits of established science to explain how the Shroud image has been created. It therefore becomes necessary to invoke faith and to move beyond these limits.

Moving Forward

The Shroud of Turin Research Project (STURP) was set up following the First US Conference of Research on the Shroud of Turin, held at Albuquerque in March 1977. The story of the establishment of STURP is a long and complex one.⁹ Without going into detail and certainly without replicating this process, consideration could be given to the establishment of an international Shroud Image Working Group (SIWG) that would be tasked with designing and co-ordinating a research programme on the image, taking into account Prof Fanti's concern expressed above. This would offer a way forward on Shroud research that could use science and scientific methods in a faith-related research project without any conflict or controversy.

⁸Fanti G, Malfi P, *The Shroud of Turin, First Century after Christ!* (Pan Stanford Publishing, Singapore 2015), pp 19-20.

⁹The story is told in G D Bracaglia, *Uncovering the Paradox within the Archives of the Holy Shroud Guild* (Holy Shroud Guild, New York 2019), pages 85 – 169.

The problem is simply that there is a very fine line between science and faith in studying the Shroud of Turin. It is easy to cross that line and to allow faith to cloud one's scientific impartiality, or alternatively to use science as an excuse to dismiss the faith and beliefs of others.



29. A Peculiar Number and Sign

Stephen & Nancy Bolettieri

We stood in St. Peter's Square.

It was the Great Jubilee Year 2000 as we watched a crippled man, body riddled with tremors, kneel down and consecrate to the Divine Mercy of God, not a nation, nor individuals, but something far greater – the 3rd Millennium.

As the door to the next 1,000 years opened, John Paul II was moving toward the end of his pontificate, a papacy that was continually bound up in his propagation of the Divine Mercy message of forgiveness, his belief in the Shroud, and honoring of Mary as Our Lady of Fatima, the woman he credited with saving his life one dark day in 1981.

It was the spiritual battle that surrounded this pope that made us realize certain events in his pontificate were not coincidences, but actually involved the same peculiar number and sign. That number is what many believe to be the "unlucky" number 13.

Our revelations about this much-maligned number were solidified when reviewing these three passions in John Paul's papacy and discovering that this sign was significant at least three times in his life: It was April 13, 1980 when the pontiff venerated the Shroud publicly for the first time in his role as the Vicar of Christ. Thirteen months later, he was shot in St. Peter's Square, on, oddly, May 13, 1981, the Feast of Our Lady of Fatima.

- The first 13 involved revealing to the world the pope's profound spiritual belief in recognizing the cloth on April 13 as he stated: "the Holy Shroud, a most singular record of Easter, the Passion, Death and Resurrection, a mute, yet surprisingly eloquent witness."¹
- The second involves the space of time of 13 months between two completely opposite events which no human can control.
- And the third involves the pope blessing the faithful when he is shot on May 13 in a failed assassination attempt.

This third time the pope was scheduled to meet with several renowned sindonologists, including Dr. John Jackson. The pontiff never made it to that meeting.²

However, two years later, John Paul will meet with his attacker while the gunman was still in jail and, in his Christian witness to the world, the pope will forgive the man who tried to kill him, further enforcing the message of his pontificate—Divine Mercy. In the revelation of these peculiar signs we were

¹The American Confraternity of the Holy Shroud (John Paul II quote, 8):
<https://shroudconfraternity.org/Founding/papalcomments.html>

²Wilson, Ian (November/December 1996) British Society for the Turin Shroud, Issue No. 44, 14: <https://www.shroud.com/bsts4401.htm#about>

reminded that we found the same type of spiritual markers when we documented that the Shroud is surrounded by Saints.

In our paper entitled the *First Photographic Revelation of the Shroud: Accidental Discovery or Divine Providence*³, we realized that interacting events over long periods of time were an important way the Creator of the cloth was speaking to His creation.

In reviewing these interactions, it became obvious that a Hand was directing events toward the first photograph of the Shroud and that the event itself was not an accident but occurred through Divine Providence.

With this spiritual Light, we began to question what other ways the Creator of the Shroud might have spoken in the course of the cloth's history. That is when we discovered other intricate connections between dates and events that surround the Shroud – dates that went beyond those first discoveries involving John Paul.

Indeed, the number of events that kept involving this same peculiar number and sign make the use of the word "coincidence" nothing more than a skeptic's way to say they can't see the Big Picture.

These dates involving the number 13 were attached to important events in the history of the Church that kept recurring, again oddly, for more than a century and were peculiar to other popes, Saints, miraculous apparitions, and prophecies.

Yet all involved a number many believe is part of occult lore.

Was there a way to reconcile this? We were presented with this thought: Do we not believe that God is 1 Being in 3 Persons? Perhaps mankind has been misled and 13 is a holy number; and while God is not a numerologist, He does speak in symbolic ways, such as in the well-known number 666. In this, we began to realize that the number itself was ingrained in the cloth known as the Shroud of Turin.

The cloth is a 3x1 weave, the opposite of 1-3 and interchangeable since it can be called a 1x3 weave, and research has proven that 13 people can recline at a table around the Shroud (if it were, as theorized, the tablecloth to the Last Supper).

As we continued our study, we discovered again that many times in the history of this cloth this number continually played a significant and peculiar role.

Indeed, the conclave that elected Cardinal Wojtyla to the papacy began its deliberations on October 13, 1978, the very same day that the Shroud of Turin Research Project ended its direct examinations of the Shroud. The cardinal who would become John Paul II had venerated the Shroud for the first time in his life just three weeks prior in September.

Another October 13 was just one more unique event in the cloth's history, and this more well-known date solidified our quest. How well we remember the infamous day when the claim was made that the Shroud is a medieval fake. That date was October 13, 1988.

Despite this being another time this number is associated with the Shroud, how many coincidences can the skeptic proclaim?

³Presented (September 2005) at the 3rd International Dallas Conference on the Shroud.

Of course they will argue it is all a coincidence, but other dates kept piling up. Especially when reviewing a different event that happened 71 years before the Shroud was viciously maligned as a "fake," when, in reality, the carbon-dating news was the fake.^{4 5} This event that occurred in 1917 is known to Catholics as the "Miracle of the Sun."⁶ It is the day in which 70,000-plus witnesses saw the sun dance inexplicably in the sky as proof to them that the Virgin Mary had indeed been appearing to three shepherd children over the course of six months.

Seventy-one years before the carbon-dating test, on October 13, 1917, the Miracle of the Sun took place. Add 71 to 1917 brings us to 1988, the year the carbon-dating was initiated. But 71 is also a reversal of 17 which somehow relates to the Miracle of the Sun and the carbon-dating. These events have had reversed outcomes. In 1917, a miracle was confirmed; in 1988, tests initiated on the Shroud would declare the Shroud a fake. Further, the apparitions of the Virgin Mary began on May 13, 1917, which is the same monthly date on which John Paul II was shot on his way to discuss one of his favourite topics – the Shroud.

In this, we look to the Scriptures for further explanation and understand that when God describes His "enemy," we learn this fallen angel only has the power to mimic God. The enemy is unable to create. And wouldn't this enemy attack a cloth that has the power to convince people of the miraculous Resurrection of Christ?

As we noted above, on October 13, 1917, God created a miraculous sign for believers to have faith and hope in the future. Seventy-one years later, the enemy mimics God in a negative way by trying to extinguish the Shroud's light, burying it in a misleading and "unreliable" dating test.⁷

There's more to this connection in prophecy as well in what we believe can be seen in the spiritual battle between the forces of Light and Darkness that surrounds this cloth.

- May 13, 1917, Mary appears for the first time to three shepherd children. Among Her prophecies, the Virgin states the "pope will have much to suffer."
- This pope, according to the shepherdess/visionary who passed away in 2005 and is now known as Saint Lucia, was St. John Paul II.

⁴See transitive verb definition: "to alter, manipulate, or treat so as to give a spuriously genuine appearance to": <https://www.merriam-webster.com/dictionary/fake>

⁵T. Casabianca, E. Marinelli, G. Pernagallo and B. Torrisi (2019) Radiocarbon Dating of the Turin Shroud: New Evidence From Raw Data, *Archaeometry*, press release 5/24/19, Torrisi quote, page 2, 5, first checkmark: "No doubts should remain: the radiocarbon dating of the Turin Shroud reported in *Nature* was not correct due to the strong data heterogeneity": <https://shroud.com/pdfs/cataniaEng.pdf>

⁶For general information on the miracle:https://en.wikipedia.org/wiki/Miracle_of_the_Sun

⁷Turely, K.V. (August 5, 2019) Latest Study Deepens Mystery, *National Catholic Register*, entire article, plus "unreliable" quote, Rolfe, David, *British Society for the Turin Shroud*, 16:

<http://www.ncregister.com/daily-news/the-shroud-of-turin-latest-study-deepens-mystery>

- May 13, 1981, he is shot, suffering much, as he was on his way to a Shroud meeting, but miraculously survives and gives credit to the Virgin for saving his life.⁸

This peculiar number and its signs do not stop here as our research into the first photograph of the Shroud showed that the beginning of this modern spiritual battle that surrounds the cloth began even earlier on October 13, 1884.

October 13, 1884, a century before the carbon test results were announced, Pope Leo XIII has an end-times vision of the final battle between God and His enemy. In the vision, the pontiff, with the peculiar number 13 after his name, sees the future destruction of the Catholic Church. It is this vision, we discovered, which set the stage for what occurred 13 years and seven months later when the first photograph of the Shroud is taken revealing its miraculous nature (the connection to this vision and the photograph are the subject of another paper).

Again, the number 13 appears a pivotal sign in this battle between the Creator of the cloth and the Shroud's nemesis, the fallen angel.

- October 13, 1884, a final battle vision where the enemy challenges God, claiming he could destroy the Catholic Church if the Lord grants him more time and power over those who will give themselves in service to him. According to the vision, God grants His enemy that time and power.⁹
- Thirteen years later, the first revelation of the Shroud's miraculous nature becomes apparent: was this not God's return salvo as His enemy begins his moves to try to destroy the Catholic Church?
- October 13, 1988, the world is misled to believe the Shroud is a "medieval fake."

Since that vision, the attacks by the evil one—who asked God to grant him "more power over those who will serve" him—cannot be denied, especially when reviewing the current history of the Church itself.

In return, and to bolster the faithful and challenge the Doubting Thomas, the Creator of the Shroud responds with miraculous proofs of His Existence embedded in His burial cloth.

For those who find it hard to believe that God would grant His enemy such power, one needs only to refer to the Book of Job and the interaction between God and His enemy to see that this vision is scripturally sound.

But as humans, time to us is fleeting.

Remembering one event to another becomes overwhelming, especially as the media keeps changing faster and faster. Little does God's creation—particularly those in the media—review and look back at these important events, hidden from most and not to be found in secular history. As a result of this final battle that

⁸EWTN, 100 Years of Fatima, Interpretation of the Secret, 2nd heading, "Conversation with Sister Maria Lucia ... " 7:

<https://www.ewtn.com/fatima/interpretation-of-the-secret.asp>

⁹Tremblay, Joe (February 2013) The 100 Year Test, Catholic News Agency:

<https://www.catholicnewsagency.com/column/the-100-year-test-2454>

began in 1898, and after the first photo of the Shroud, the enemy of God has continually tried to convince the world it is not a miraculous cloth, eventually succeeding with a misleading radiocarbon dating test.¹⁰

Can we really say, then, it is a "coincidence" when major events in the Shroud's history involve this same peculiar number over the course of more than a century? Or shall we understand, with childlike faith, that these events revolving around the number 13 are an emphatic sign to us that there is a spiritual battle going on around the Shroud.

With the revelation of the next two number 13s, we were convinced this number is truly a sign of that spiritual battle.

One of these 13s involves remarks made by Dr. Michael Tite, one of the orchestrators of the "flawed" dating of the Shroud. Tite was publicly asked to state how he thought the Shroud was created since he professed the cloth to be a medieval "fake." Tite shockingly stated that he believed a knight of the 14th century was crucified and his vapors became the image we see on the cloth today.¹¹

A fourteenth-century knight? Someone who lived in the 1300s?

Isn't that a clandestine reference to well-known claims in masonic lore about Jacques de Molay, the infamous Knights Templar? And is he not among the saints of Masonry?

As their saint, Masonry has propagated a superstitious belief that Friday the 13th is an "unlucky day" because this combination of day and numbers corresponds to the knight's arrest in 1307.

Many in Masonry have also argued that the cloth is the image of its persecuted knight while misrepresenting evidence that the Shroud bears the Image of the Crucified Saviour of the world.

Is there a connection between this masonic belief and Dr. Tite's remarks?

In our next corresponding discovery to Dr. Tite's strange claim, it solidified our belief that the number 13 has always been a true spiritual sign of the Shroud and may be the principal reason this numeric marker occurs so often in its history. For the discovery involves the day when the cloth was first soaked in the Saviour's Blood, when as John testifies, the Blood and Water gushed forth as a Fountain of Mercy for us.

Many have claimed various dates for His Crucifixion. But are any of them correct? In many cases, the proposed dates ignore, or might be oblivious to, the

¹⁰Turely, K.V. (August 5, 2019) Latest Study Deepens Mystery, National Catholic Register, 8: "The subsequent examination of the data by the Franco/Italian team found evidence, now published in Oxford University's Archaeometry, which suggests that the methods employed by the 1988 scientists were flawed."

<http://www.ncregister.com/daily-news/the-shroud-of-turin-latest-study-deepens-mystery>

¹¹Boyce, David (March 1990) Catholic Counter-Reformation, 3rd headline Dr. Tite Throws Off the Mask, 4:

http://crc-internet.org/our-doctrine/catholic-counter-reformation/holy-shroud-turin/appendices/#DRTITE_THROWS_OFF_THE_MASK

realities of Jewish burial rites and Mosaic Law in the time of Christ, as well as the difference in calculations between ancient Israel's reckoning of time and the Gregorian calendar.

In taking stock of these realities, as we know from the Scriptures, the Apostle John clearly documents in his Gospel that the Lord was Crucified on the Parasceve,¹² a special day—the preparation day¹³ preceding a "great Sabbath"¹⁴—before Passover in the Jewish calendar. The Parasceve can only occur before the Sabbath, which, by law, is always, in our calendar, equivalent to Saturday.

In the time of Christ, the Passover date by Mosaic Law must be celebrated on the 14th in the Jewish month of Nisan¹⁵. Also from Jewish tradition, the lamb, prepared for ritual before, if not fully consumed, must be immolated¹⁶ by the end of the 14th of Nisan. Therefore, Jesus' Body (the Lamb of God), by Mosaic Law, must be immolated by the end of the 14th, not on the day of His Crucifixion and burial, ruling out that date.

In the Gospel regarding the time of His Crucifixion, the Apostle John clearly tells us that Jesus died the day before the Passover celebration. We also know the day of the Crucifixion was the day before the Jewish Sabbath, and since that day is obviously a Saturday, the Apostle's Gospel documents that Jesus died on a Friday, as is well known from the tradition of Good Friday.

Since Passover at the time of the Crucifixion was being observed on a Saturday that day must, by law, be Nisan the 14th. And again, by law, no Jewish person would be involved in any activity that is seen on Good Friday before sunset, which begins the Sabbath, leaving the only day left for the Crucifixion to occur—the 13th of Nisan.

In fact, the early Church called Good Friday the "Pasch of the Crucifixion."¹⁷

The Shroud then is created and stained with the Blood of Jesus on Friday which leaves no other possibility but that day is the 13th in the Jewish month of Nisan. On Saturday, the 14th, His Body will be miraculously immolated, leaving its unmistakable Image.

If our inspired belief and review of Jewish law and early Christian traditions prove that Friday the 13th is the actual Crucifixion date, then this is one of the

¹²Souvay, Charles, Catholic Encyclopedia, Vol. 11 (1913) Parasceve, Wikisource: [https://en.wikisource.org/wiki/Catholic_Encyclopedia_\(1913\)/Parasceve](https://en.wikisource.org/wiki/Catholic_Encyclopedia_(1913)/Parasceve)

¹³Douay-Rheims Bible (1582) various Scriptures:
<http://www.drbo.org/cgi-bin/s?q=parasceve&b=drb&t=0>

¹⁴Douay-Rheims Bible (1582) John 19:31:
<http://www.drbo.org/cgi-bin/s?q=john+19%3A31&b=drb&t=0>

¹⁵Douay-Rheims Bible (1582) Exodus 12:6:
<http://www.drbo.org/cgi-bin/s?q=exodus+12+6&b=drb&t=0>

¹⁶Douay-Rheims Bible (1582) Exodus 12:10: <http://www.drbo.org/cgi-bin/s?q=exodus+12+10&b=drb&t=0>

¹⁷Catholic Culture, Dictionary:
<https://www.catholicculture.org/culture/library/dictionary/index.cfm?id=35422>

greatest deceptions perpetuated on humankind by the evil one, the enemy of God. We are part of the ultimate battle between the forces of Light and those who knowingly or unknowingly follow darkness, with the Shroud as a centerpiece between the two in this war.

For Friday the 13th is not the unluckiest day in which bad luck can befall individuals at a moment's notice, nor a day for black cats and other occult lore, as perpetuated by those who hate this miraculous cloth. In reality, it is the day of days in which the Saviour of the world left us a memorial of His Passion, Death and Resurrection, and a sign of His Mercy on the cloth the world now calls the Shroud of Turin. This day is none other than the luckiest of days for humankind – the most blessed. For that day is Friday the 13th, 33 AD, the day the Shroud first wrapped Christ's Crucified body and became the enigmatic burial cloth that continues to confound science.

In adding these 13 13s together, the historical reality of this peculiar number to the history of the Shroud, Mary and the Church becomes a clear sign from the Lord of Time. And in this history, He has used His Shroud as a centerpiece in His final battle for souls.

Appendix: The 13 (#1 to #13) 13s in chronological order

1. In the year of the Crucifixion, perhaps on the Parasceve or earlier, an expensive linen cloth is purchased. It will unwittingly be prepared for what will become known as the Last Supper. The cloth is capable of seating 13 people around it for a Passover celebration and is a 1x3 weave.
2. Friday the 13th, 33 AD, this cloth becomes a winding sheet for a quick and unexpected burial of a Man named Jesus of Nazareth.
3. Friday the 13th, 1307, the date Jacques de Molay is arrested and a superstitious belief is born, burying the reality in the modern world of the true Crucifixion date.
4. October 13, 1884, a final vision of the destruction of the Catholic Church is given to:
5. Pope Leo XIII, who will compose a prayer against the enemy of God after his apocalyptic vision.
6. Thirteen years later, the first photograph of the Shroud is taken in 1898.
7. May 13, 1917 and 33 years after Leo XIII's apocalyptic vision, the first apparition of Mary as Our Lady of Fatima occurs. Six months later, on
8. October 13, 1917, the Miracle of the Sun is experienced by 70,000 witnesses.
9. October 13, 1978, another Friday, a conclave begins deliberations to elect a pope (John Paul II). It is the same day that the Shroud of Turin Research Project concluded its direct examinations of the cloth with the definitive discovery that the Image is "not a painting."

10. April 13, 1980, John Paul II venerates the Shroud publicly for the first time as pontiff.
11. Thirteen months later, he is shot, on
12. May 13, 1981, in St. Peter's Square, as he bends over to acknowledge a young girl wearing an icon pin of Our Lady of Fatima.
13. October 13, 1988, the misleading carbon-dating test claims the Shroud is a fake.



30. My Personal Experience with The Holy Shroud, The Holy Spirit, and My Return to Jesus Christ

Kristy Moore Hernandez

Thesis Statement: A thin line exists between science and faith, and the evidence resulting from the study of the Shroud is a huge part in bridging that gap.

My thesis took fifty years to live and experience before I could come to a wiser understanding of the ways of God and to see the clarity of my own less-traveled path. In the first five years of my life, I was exposed to loving parents and two sets of attentive loving grandparents. Jesus Christ was a big part of my life as I was taken to Sunday School often and Bible School every summer, even though the adults in my life often did not always attend church with me. I was simply led to develop my own relationship with Jesus, God and the Holy Spirit. It was a good foundation for the life God knew I was going to be living, even though at the time, I had made other plans.

In my young adult life I embraced faith as a concept that "everything is a blessing." This attitude helped me with the overwhelming life changes that eventually came my way due to a health crisis. It was science that attempted to solve the health mystery that had no treatment. As I was left to die, with unanswered questions, I was forced to turn to my faith. Science was finite, a closed door, whereas faith allowed an infinite possibility of solutions. It was the inner guidance of the Holy Spirit that has led me to share four intimate life moments, each which involved science, faith, or both. It was through these experiences that eventually formed my thesis that the Holy Shroud can help us bridge the gap between science and faith.

I am a retired film maker, and spent more than 33 years working every aspect of costuming for movies, TV and live productions from 1972 up until 2005. In 2005, while working on the TV show, *Miami Vice*, I became so over exposed to chemicals that I nearly died.

I was diagnosed with Chemical Intolerance and advised to avoid all chemicals including most pharmaceuticals. I was very sick. This diagnosis forced me to retire from the entertainment industry prematurely. The experience led me to Quantum Biofeedback, a chemical free medicine born out of quantum physics. This led me to become a Quantum Biofeedback Specialist. Now I am in the process of completing my PhD in Quantum Biofeedback.

On the surface, these pursuits do not necessarily give me the credentials to be present at a Holy Shroud conference, for I am not a shroud scholar. Yet I wish to share an experience I have had with the Holy Shroud and the Holy Spirit, an experience that has led me to the healing science of Quantum Biofeedback and my

return to Christ. Although there are physical and historical facts surrounding the study of the shroud, we must also realize the impact that this cloth has on faith. I believe that the knowledge offered by science, and the personal experiences of faith, are not separate, but rather two sides of the same closed door.

The facts presented by Shroud enthusiasts are like glorious lighthouses, steering people like myself toward a relationship with Jesus Christ. I experienced four events that solidified the evidence that the Holy Spirit is real, speaks without sound, and is an unseen guide for those who can hear with the ear in their heart.

My experience with the Holy Shroud began in 1988 when I was working as the Costume Supervisor for *Miami Vice*. My main duties were research of characters and costume continuity. I was researching two things—pictures of catholic priests and a picture of a photographer in action. An Italian magazine caught my attention.

While flipping through it I found a great picture of a photographer in a vest! (See Figure 1) But there was another image that stopped me in my tracks. For the first time, I was looking upon the images of the Holy Shroud (Figure 2). It took my breath away and made my heart race. I didn't understand why I couldn't put the periodical down. I also couldn't read Italian, so I headed to the local library to learn more.

Back in 1981, when I was diagnosed with a deadly allergy to toluene, I became an avid researcher on the subject. Now with my personal discovery of the Shroud, whenever I went off to the library for my toluene research, I added the Holy Shroud to my research "To Do" list. I would eventually use my toluene research to write a book, and my Holy Shroud research was just a delicious secret between me and the Holy Spirit.

Unfortunately, for many years the only research I could find on the Holy Shroud was the radiocarbon dating which showed the Shroud to be medieval. But I held my faith that this cloth was more than what the science of the day had to say about it. It is amazing how that one picture in a magazine (Figure 2) led me to discover a whole world of scientific inquiry, and opened the door to a lifetime of interest in the shroud. When faith and science come together, people take notice. People like me are moved and awestruck. Lives are changed. Scientific research combined with one's personal walk in faith can impact lives on many dimensions.

By definition Faith is the very opposite of scientific study. It is a belief not based on proof. While Science requires measurable evidence, Faith is a belief in the unseen. In Florida we know and understand unseen evidence when hurricane winds blow down palm trees and our neighbor's tool shed flies by our window. You could clearly see evidence of that wind's existence, but no matter how fiercely those winds blow, we never actually see the wind itself.

In 1992, after Hurricane Andrew, my mental and emotional state at that time was grief stricken from not only this destructive storm, but from a personal storm months before with the death of a loved one. As Miami rebuilt, I grieved. Over the

next few weeks I became agitated and upset because people around me were so obtuse and could not understand the hand of God in this storm. What they called being "lucky," I called being blessed.

I was in physical pain due to extreme mental despair and emotional grief, and in this moment, I cried out in anguish: "This must be how God feels when people say he doesn't exist!"

As those words left my lips, I felt my heart would implode with grief, but then a light split through the fabric of the environment. This light was focused and intensely bright. It paused briefly as if to take better aim at me, and then, in a nano second, that light shot right into my heart and knocked me to my knees, down to the concrete floor. In that instance, all my pain, emotional and mental anguish, evaporated. It has never returned. I was stunned, humbled and blessed all at the same time. I was 100% pain free. I didn't even skin my knees or have any bruising. To date that light has not been duplicated, by God or any special effect. Thanks to that experience there is no doubt in my mind of an unseen world, an unseen world that can rock you like a hurricane.

Just as life was becoming comfortable again, it was 1998 and my little 5-year-old son had begun presenting symptoms of extreme digestive stress (Figure 3). He would cry and scream in pain for hours after eating. Pain medication aggravated the problem. He stopped gaining weight and was deteriorating before our eyes.

There was no medical explanation for his abrupt illness, and after five months of doctors' visits, conventional medicine failed to give an answer or a solution for his suffering. As the doctor took more blood for more tests, I turned to prayer and guidance in my every waking moment, trusting the unseen force, I believed answers would come. This time there were no words in my heart, no flash of light. Instead the guidance was intuitive. I decided to embrace my faith and follow these feelings, and lo and behold, I was guided to one of the first rudimentary quantum frequency devices.

Seemingly overnight, my deteriorating child was transformed. Faith, science and one determined Mom kicked open that closed door of science and faith.

This two sided door, where faith and science exist on either side, can be a barrier to the unseen evidence for those stuck in today's science of Reductionism. Reductionism has been too enamored with the doorknob on the science side to actually turn it and step over the threshold into the quantum field of possibilities.

Faith in my opinion, is the act of observing with intention on the best possible outcome, and nothing less. The idea we can influence outcomes with observations is proven with quantum physics. Einstein postulated about the "spooky" stuff and now we know that spooky stuff is activated with observation. In this report of my experience, I am also giving data to support the opinions of quantum physicists. The act of observing with focused intention does allow the consciousness to bloom into a possibility. The possibility most likely to be seen is the one configured by

your belief. And with that piece of news the old idea of "We'll believe it when we see it," transforms into "We'll see it when we believe it."

The quantum field of possibilities is ordered by belief, and delivered by observation. With quantum physics we learn that healing is not linear, nor is it local, and that the small and subtle can bring big changes, changes often considered being miraculous.

For my deteriorating child to be transformed overnight, it was a miraculous moment, a reward beyond me assured simply by following every prompt and inner message. I had been on a scavenger hunt for my son's life, and I won the game with intuition and dedicated faith. It was scary to let go of my trust in today's medicine and step into the sacred world of faith, but I had experienced for myself from my chemical intolerance that today's science doesn't always have all the answers all of the time.

Sometimes when you're backed into a corner with no other options, you have nothing left to do but to put faith into action. I have come to learn that when I do this, miracles are possible. This is exactly what happened nearly forty years ago, with my very first experience of hearing with my heart.

It was a hot summer's day in 1981, shortly after a coma and the toluene allergy diagnosis. That, combined with an unhappy marriage, I sought comfort and guidance through local churches. Sadly, I was rejected by each church I approached. It was so humbling that all I could do was sit in the grass of the last church and cry. There was no one to comfort me, no one to provide encouragement through my health issues, no one to tell that it was perfectly fine to leave a husband who only needed a wife to support his drug addictions. Upon returning home, I stood in my kitchen, sobbing and praying. I asked God, "Where is Jesus? Is He real? Or did I imagine all that love I felt as a child?!"

And then there came into my heart the most interesting messages: "There will come a time when scientists will bring forth proof that Jesus did live, was resurrected from the dead and ascended to heaven."

The message was clear. The comfort was real. I suddenly felt refreshed. Yet it would take another 7 years before I gazed upon the images of the Holy Shroud in that Italian magazine and knew that Jesus was with me.

When I observed the image of the Shroud for the first time in 1988, I knew this was the promise that was given to me long ago on that hot summer day in 1981.

Recently, one day in prayer, I asked the Holy Spirit what was my next purpose in my life? The answer was envisioned in my mind's eye, a piece of farm equipment—a "Harvester." The next morning one of those harvesters came down my street. The Holy Spirit wanted to make sure I saw the physical proof of what was in my mind's eye. Jesus said that harvest is great, the laborers are few.

God has given you a mighty labor, to provide the science that gives proof of the existence of Christ, to bring us to the door of Science and Faith, and open it, to be the Scientist that increases the harvest of souls.

In truth, when I opened that door of Science and crossed over to the side of Faith, I stood with Jesus. Allowing our hearts to hear the Holy Spirit and sharing what we know about Jesus's life, crucifixion, death and resurrection, enlivens our connection with the Divine, with who we are and with the grand possibilities of achieving true health and harmony in our lives, and our souls.

We are honored to be harvesters, the labors bringing awareness and appreciation of the Master Jesus, His death and life, His captured photons left upon a cloth two thousand years ago, now impacting multitudes of people.

Now is the time, the season to harvest is upon us, we are the people who will open the door.

CONCLUSION

The Holy Shroud can impact the faithful, moving them to a richer, more intimate, relationship with our Lord Jesus Christ. The science brought forth by the Shroud scholars will return many who were lost from Christ, those who may have stumbled at the narrow gate, those who need science. These scientific proofs of the existence of Christ will bring multitudes to the one truth that cannot be refuted – the life of the Son of God was real, the Lord Jesus Christ lives.

My experiences may not stand out as academic or specific to shroud study. However, it is my hope that its value will be found when a Shroud academic feels depleted or discouraged. May my awestruck life changing moment with the Shroud boost their morale and strengthen their resolve. May my experience spur them into new found inspiration for producing their work on as many platforms as is possible. Any personal experience in faith, feeds and strengthens that one soul to the path of Jesus. When the experience is shared, it has the potential to nourish and strengthen a city of souls to follow Christ. It would be a worthy study to research and collect the stories of those, like myself, whose faith has been impacted by the Shroud, either by actually viewing the shroud itself, or by viewing Shroud research. Further study should be done on the Shroud's impact on those people of faith, as well as those of agnostics and atheists whose mindsets have been swayed by the evidence garnered by the scientific study of the Holy Shroud.

Fig. 1. The Italian magazine's image of the Photographer in Action and the strange image I couldn't take my eyes off.

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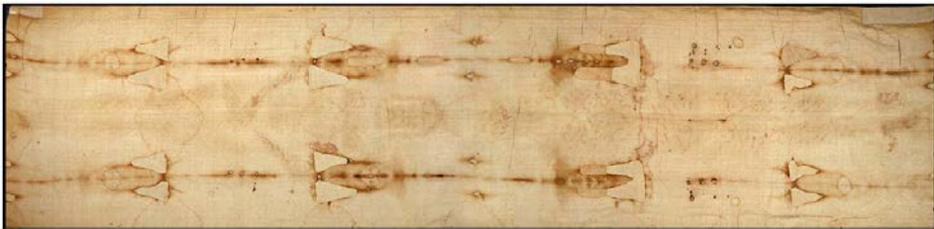
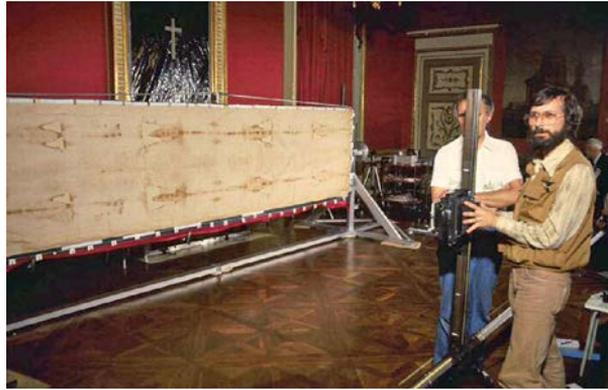


Fig. 2. The Holy Shroud in La Stampa Magazine. Used with permission ©1978 Barrie M. Schwartz Collection, STERA, Inc.

Fig. 3. Jared, my son at age 5 attempting to eat birthday cake at his cousin's birthday party. This photo caught the moment his bite of cake brought on the intense stomach pain he would suffer from for hours. From family.



31. Fresh Insights into His Wounds

Cathy Jarrett

Abstract

This paper describes previously unpublished details of Jesus' Passion. The study of the Greek words used in the Gospels and experiences in my own life help explain some of the evidence found in the body image, dirt and blood stains on the Shroud of Turin. This paper proposes answers to questions about the reasons for the triangular shaped wound on the right cheek, the different blood flows on the forearms, the lack of marks from the thongs of the whips, and some additional details related to Jesus' passion.

INTRODUCTION

The reason for writing this paper is to add to the available information about Jesus' passion and death. It includes information that I have not seen published elsewhere.

For more than 50 years I have been reading books on Jesus' life, as well as the history and customs of the times. I have also been studying information on the Shroud of Turin since I first read *A Doctor at Calvary* by Pierre Barbet in about 1967. In recent years I have watched many videos on the Shroud. I agreed with much of the information, but some scenarios did not make sense to me. After praying about some of them, I believe that Jesus gave me some insights that did make sense. In addition, my own lifetime experiences and some experiments have added to my understanding of how some previously unexplained wounds and blood flows could have been formed. These include having the wind knocked out of me, hanging from my horizontally extended hands, and receiving a rope burn (abrasion) while learning to do a dynamic belay (a technique used in the sport of rock climbing).

Authors of the various Bible translations often had to choose just one English word for each Greek word in the text. By looking at the definitions of the original Greek words in *Strong's Concordance* or other reference books, I have found previously unpublished insights into words used to describe the details of Jesus' physical suffering. Many of these are included in this paper.

Gethsemane

Jesus asked his three closest disciples to watch and pray. He wanted them to pray so that they would not give in to temptation.¹

Perhaps he also wanted them to watch for the men approaching the garden and to warn him when they saw them coming. That did not happen. Jesus woke them up and warned them that he was about to be betrayed. The Greek word can mean *betrayed* or *delivered* and is used later when Jesus was delivered to Pilate.²

The bloody sweat or hemosiderosis is caused by intense emotional pain. The capillaries are very close to the sweat glands. I believe that his blood pressure was very high. The capillaries burst and the blood flowed onto his skin through the sweat glands. There it *thickened* and perhaps *clotted* and then fell to the ground as he continued to sweat.³ This resulted in his skin becoming tender which would increase the pain from the blows to come.

Jesus' last miracle of healing was done on a bond servant of the high priest whose "little ear" (possibly his ear lobe)⁴ was cut off by Peter.

Scourging

Twice in Luke's gospel Pilate says that he will *chasten* or *discipline* (by punishment)⁵ Jesus. In their gospels, Matthew and Mark use the verb for *scourged* which means to whip as a public punishment.⁶ The Gospel of John uses the verb for *scourged* that comes from a word that means to chew up.⁷

Jesus was nude during scourging since scourge wounds appear on His buttocks, lower abdomen and upper thighs. These wounds are no different from

¹Luke 22:40 And when he was at the place, he said unto them, "Pray that ye enter not into temptation." (American Standard Version)

²Strong's Concordance word G3860 ὁ παραδίδωμι ἵ ἐ παραδίδωμι, *par-ad-id'-o-mee*. From G3844 and G1325; to *surrender*, that is, *yield up, intrust* (sic), *transmit*: -betray, bring forth, cast, commit, deliver (up), give (over, up), hazard, put in prison, recommend.

³Strong's Concordance word G2361 ἐπὶ τὸ θρόμβος, *throm'-bos*. Perhaps from G5142 (in the sense of *thickening*); a *clot*: - great drop.

⁴Strong's Concordance word G5621 ὠτίον, *o-tion, o-tee'-on*. Diminutive of G3775 (ear); an *earlet*, that is, *one of the ears*, or perhaps the *lobe of the ear*: - ear.

⁵Luke 23: 16 and 22, Strong's Concordance word G3811 δάσκαλον, *paideuo-paheed-yoo'-o*. From G3816; to *train up a child*, that is, *educate*, or (by implication) *discipline* (by punishment): - chasten (-ise), instruct, learn, teach.

⁶Matt 27:26, Mark 15:15, Strong's Concordance word G5417 ὄφρα ἵνα φραγέλλω, *phragelloo-, frag-el-lo'-o*. From a presumed equivalent of the Latin *flagellum*; to *whip*, that is, *lash* as a public punishment: - scourge.

⁷John 19:1, Strong's Concordance word G3146 ἵνα μάστιγι, *mastigoo-, mas-tig-o'-o*. From G3148 to *flog* (literally or figuratively): - scourge. G3148 is ἵνα μάστιγι, *mastix, mas'-tix*. Probably from the base of G3145 (through the idea of *contact*); a *whip* (literally the Roman *flagellum* for criminals; figuratively a *disease*): - plague, scourging. G3145 is ἵνα μάστιγι ἵνα ἴσσω, *massaomai, mas-sah'-om-ahee*. From a primary word ἵνα ἴσσω, *masso-* (to *handle* or *squeeze*); to *chew*: - gnaw.

the ones which cover the front and back of his body from his shoulders to the calves of his legs.

The soldiers who were scourging him flicked the whips so that only the two spiked balls⁸ on the ends of each of the lashes hit his body. Most of the dumbbell-shaped scourge wounds do not show the leather thongs of the whips. The twin balls embedded themselves into his flesh and then were immediately pulled out taking skin and perhaps bits of muscle with them.⁹

Mocking

The Gospel of Matthew states that the soldiers took Jesus inside the Praetorium after the scourging. If they took him inside, he had to have been outside. If he was dressed in his own clothes after the scourging, he was stripped again and dressed in a purplish scarlet *military cloak*¹⁰. They were not as precise on colour as we are.

Jesus was crowned with a “stephanos¹¹,” a victor's crown in sporting events, but his was made of flexible thorn branches. Then a reed was placed in his right hand. One after another the soldiers bent their knees to “worship” him and then rose to grab the reed, hit him on the head and spit on him.

The thorns injured the trigeminal and greater occipital nerves of the scalp which caused great pain from even a breeze.¹² He was *hit* on his head repeatedly¹³ with the reed.

Falling

Abrasions on His face and knees indicate falling without the use of His hands to break the fall because they were likely tied to the patibulum, the horizontal part of the cross, that lay across His upper back.

It is likely that the soldiers “girded up his loins” which means that they pulled the back hem of his robe through his legs and tucked it into his belt. This

⁸Weaver, Kenneth F., *The Mystery of the Shroud*, National Geographic, June 1980, Vol. 157, No. 6, p. 743. The drawing of a flagrum shows small spikes on each metal ball. There are also fine diagonal scratches among the scourge wounds.

⁹<http://factsplusfacts.com/pathology.htm>

¹⁰Matt. 27:28, Strong's Concordance word G5511 ἑἄϊ ὀδ̄, chlamus, *khlam-ooce'*. Of uncertain derivation; a military *cloak*: - robe.

¹¹Strong's Concordance word G4735 ὀδ̄ἄϊ ἰ ὀ, stephanos, *stef'-an-os*. From an apparently primary “stepho” (to *twine* or *wreath*); a *chaplet* (as a badge of royalty, a prize in the public games or a symbol of honor generally; but more conspicuous and elaborate than the simple *fillet*, G1238), literally or figuratively: - crown.

¹²Dr. Frederick Zugibe: https://www.youtube.com/watch?v=0IokQgiGz_I, Oct 22, 2007, FirstscienceTV.

¹³Strong's Concordance word G5180 ὀδ̄δ̄ὸῦ, tupto-, *toop'-to*. A primary verb (in a strengthened form); to “thump”, that is, *cudgel* or *pummel* (properly with a stick or *bastinado*), but in any case by *repeated* blows.

was done when a person wanted to run or work without his robe getting in the way.¹⁴

In those days people wore a rectangular outer garment draped over the left shoulder and under the right arm. It was used at night as a blanket and during the day as a coat when it was cold. This garment provided some extra padding between the patibulum and his left shoulder blade. Thus, the patibulum caused the scourge wounds covering his right shoulder blade to be rubbed more than those covering his left shoulder blade.

Then the soldiers *tied a rope* around his waist to lead him to Calvary.¹⁵ His four guards¹⁶ formed a box around him. One of the soldiers in front of him held the rope.

Jerusalem is not flat. Even today, many streets have steps. Jesus' right eye was swollen shut. This would have affected his depth perception as he walked on the stepped streets. I think that as they walked through the streets, the soldier holding the rope tugged on it when Jesus was not going as fast as he wanted him to go.

As they approached the Damascus Gate, the soldier tugged on the rope. Jesus lost his balance and fell forward and may have landed on his face on the edge of one of the steps with the rope between his right cheek and the step. As he landed, the soldier tugged on the rope and gave Jesus the "rope burn" abrasion on his right cheek next to his nose¹⁷. He was pinned to the ground by the weight of the patibulum and unable to use his tied hands to get up.

Since his robe was "girded up," his knees were uncovered receiving abrasions as well. The rare travertine aragonite limestone on Jesus' nose, knees, and feet matches the Jerusalem dirt near the Damascus Gate¹⁸.

In addition, I believe that as he fell on his face, chest and knees, the "wind was knocked out of him."¹⁹ In other words, he could not inhale, and he stopped

¹⁴Freeman, James M., *Manners and Customs of the Bible*, Logos International, Plainfield, New Jersey. 1972, pp. 162-163

¹⁵When Jesus told Peter how he was going to die (by crucifixion) in John 21:18, he said that someone else would gird him and bring or carry him where he would not want to go. The word translated as gird means "to bind about (especially with a belt)" according to Strong's Concordance word G2223 αἰῶς, zo-ne-, dzo'-nay. Probably akin to the base of G2218; a *belt*; by implication a *pocket*: - girdle, purse.

¹⁶John 19:23. After Jesus was crucified, the soldiers assigned to Jesus divided his clothes into four parts, one for each soldier. They also gambled for the seamless inner tunic which was worth more than the other pieces.

¹⁷Barbet, Pierre, *A Doctor at Calvary*, Image Books Edition, Garden City, New York, 1963, p. 91 available at <http://www.twowingstogod.com/wp-content/uploads/2016/06/Barbet-DoctoratCalvary.pdf>

¹⁸<https://shroudstory.com/2011/09/16/more-on-the-dirt-of-the-shroud-of-turin/> and <http://factsplusfacts.com/resources/Travertine.htm>

¹⁹I had the wind knocked out of me as a child. I was walking on an old telephone pole which was lying on the ground, and I slipped. I fell on my chest and face, and the impact forced the air out of my lungs. I could not inhale for a little while.

breathing for a time. The soldiers might have thought that he had died. Their orders were to crucify him alive. When he finally inhaled, they were relieved. However, they did not want him to die before being crucified, so they looked around for someone to carry the patibulum the rest of the way to Golgotha. Simon of Cyrene was just coming into the city “from the country,”²⁰ probably through the Damascus Gate. They took the patibulum from Jesus and forced Simon to carry it following behind²¹ him. Then two of the soldiers lifted Jesus to his feet and *helped* him to walk the rest of the way to Golgotha.²²

Crucifixion

Jesus was stripped totally naked and laid with his upper back on the round patibulum which was on the ground.

The executioner nailed his left wrist to the patibulum. As he did so, Jesus arched his back and the patibulum rolled back slightly. When the executioner nailed his right wrist to the top of the patibulum, that wrist was then slightly lower on the patibulum when it was placed on the stipes,²³ the upright part of the cross, which was already planted in the ground.

Then the four soldiers lifted the patibulum with Jesus hanging from it onto the stipes. I believe that it could have been a cross in the shape of a capital T, not the commonly seen Latin cross. A mortice in the center of the patibulum could fit onto a tenon on the top of the stipes.

After the patibulum was placed on the top of the stipes, Jesus’ knees were bent, and his feet were nailed flat to the stipes. The left foot appears to be placed on top of the right foot. His feet were only a little distance above the ground.

Since his left arm was nailed slightly higher on the patibulum than the right arm, the blood flowed differently from his wrists and along his forearms. On the left forearm the blood dropped to the ground in several places along his forearm. On the right forearm the blood flowed farther along the arm before dropping to the ground closer to the elbow. The left shoulder also appears to be higher than the right on the shroud.

²⁰Luke 23:26

²¹Strong’s Concordance word G3693 ἰ’ ὀπίσθεν, *op’-is-then*. From ἰ’ ὀπίσθεν (*regard*; from G3700) with enclitic of source; *from the rear* (as a secure aspect), that is, *at the back* (adverb and preposition of place or time): - after, backside, behind.

²²The Greek word in Thayer’s Greek-English Lexicon of the New Testament and Strong’s Concordance G5342 is ἄνω, *phero-*, *fer’-o*. A primary verb meaning to “bear” or *carry* (in a very wide application, literally and figuratively): - be, bear, bring (forth), carry, come, + let her drive, be driven, endure, go on, lay, lead, move, reach, rushing, uphold. It is most often used to bring or carry a burden but is less frequently used to bring people. In Mark 15:22 it is used for bringing Jesus to Golgotha.

²³This method makes sense. The crucifixes showing Jesus’ right arm nailed closer to his head with the arm bent at the right elbow at a 90-degree angle does not make sense because gravity would cause his body to hang to the left side of the stipes.

It appears that only the sole of his right foot touched the cross once he was crucified. The wrists may have slid toward the heads of the nails and no longer touched the patibulum. The blood from the wrist wounds flowed down the back of the forearms unimpededly. On the Shroud there is a space between the blood from the wrist wound and blood on the forearm. This could have been caused by a strip of cloth or a cord which tied his arms together across his body.²⁴ It would also keep them from returning to the position that they were in on the cross when rigor mortis set in.

As a crucified criminal he owned absolutely nothing. Even his own body did not belong to him. It belonged to the Roman government. Thus, Joseph of Arimathea needed to go to Pilate and get his permission to take his body down and bury it. Otherwise, it would have been buried in a common grave with the other criminals or thrown into the fire that was kept burning in the trash dump in the Hinnom Valley.

Death

Previously Jesus had said that no one could take his life from him, and that he laid it down of his own will.²⁵

Crucified people became weaker and weaker until they died. At the end they could not talk loudly, if at all. However, before his death Jesus cried out the first verse of Psalm 22 with a loud voice, "My God, my God, why have you forsaken me?" Perhaps Jesus continued to recite the psalm to himself. This Psalm describes details of his crucifixion and ends on a note of triumph.

A little while later Jesus cried out with a loud voice again before he died. I believe that the Greek word translated, "It is finished" could be the last word of Psalm 22 which is usually translated "He has done *it*." or "He has accomplished *it*." (The word *it* is not in the Hebrew verse.) As I understand the grammar in both Hebrew and in Greek, pronouns, including third person singular, are not usually pronounced or written separately unless it is done for emphasis. In this case it is included in the form of the Greek verb²⁶ which indicates that it is third person singular (he, she or it) and passive voice. Thus, the form of the verb could be translated "It is finished or accomplished," or "He has done or accomplished *it*."

²⁴ Wilson, Ian: *The Shroud of Turin*. Doubleday & Company, Inc., Garden City, New York. 1978, p. 39. Some burials of the Essene sect have the hands across the pelvis. John 11:44 states that Lazarus' hands and feet had been bound when Jesus raised him from the dead.

²⁵ John 10:18

²⁶ Strong's Concordance word G5055 ἔτελεσεν, teleo-, *tel-eh'-o*. From G5056; to *end*, that is, *complete, execute, conclude, discharge* (a debt): - accomplish, make an end, expire, fill up, finish, go over, pay, perform.

That Greek word was also written on a bill that was paid in full. Jesus died crucified, but he did not die of crucifixion. He died when he dismissed his spirit.²⁷

It is possible that the legs of the other two criminals were broken, not to prevent exhalation as Barbet surmised²⁸, but to increase their pain because they would soon be stabbed to death with a lance and thus not continue to endure the lingering death of crucifixion. Jesus legs were not broken because he was already dead and could no longer feel pain. However, the soldiers did stab him with the lance through his right lung and probably into his heart just to make sure that he was dead.



²⁷For a full description of the sort of death Christ experienced, see A.C. Custance, *The Triumph Over Death*, Part IV, in *Two Men Called Adam*, 4th Edition, 2010, Doorway Publications at www.custance.org.

²⁸Barbet, Pierre, *A Doctor at Calvary*, Image Books Edition, Garden City, New York, 1963, pp. 80-85 available at <http://www.twowingstogod.com/wp-content/uploads/2016/06/Barbet-DoctoratCalvary.pdf>

In Dr. Frederick Zugibe's experiments the volunteers who hung by their hands (with special gauntlets) did not have trouble breathing. About 35 years ago when I tried similar experiments on myself by hanging with arm extended on playground equipment or by holding ropes wrapped around the back of my wrists, I had no trouble breathing.

Dear Reader,

It seems appropriate for us, the editors, at the end this book to reflect on the death of Christ. Much has been written about his death and resurrection, and if you are convinced that the Holy Shroud is authentic, then this cloth provides the physical evidence for both events. Arthur Custance never wrote on the Holy Shroud, but his scientific experience in human physiology and his in depth study of Scripture, gave him many insights into the biological and spiritual death of Christ. Custance was particularly interested in why the God who became human could give up his own life to redeem all humankind. If Jesus spoke the truth, then his death is the pivotal point in all of reality, and if he were truly divine, his death was no ordinary event. Knowing what his death means reinforces the significance of the Holy Shroud. Find out more by reading Part IV (sections listed below) in the last book Custance was to write, *Two Men Called Adam*. It can be read online at www.custance.org.

Blessings

Gary and Evelyn

Part IV

TRIUMPH OVER DEATH, REDEMPTION OF FALLEN MAN BY UNFALLEN MAN

Chapter 14: THE TRAGIC DYING OF FALLEN MAN

- Why man dies: science and theology
- Death a necessary design? Translation an alternative?
- Death: physical and spiritual
- Death of man and animals contrasted
- Death: defined by Evolution vs. Christianity

Chapter 15: THE SACRIFICIAL DYING OF UNFALLEN MAN

1. The Spiritual Dying of Jesus Christ
 - The moment and experience of being “made sin”
 - How long did He suffer separation from the Father?
 - His and our spiritual deaths compared
2. The Physical Dying of Jesus Christ
 - His physical death a choice: truly vicarious
 - The historical fact
 - The moral fact
 - The theological fact
 - This unique death noted by early commentators
 - A vicarious, substitutionary, sufficient sacrifice

Chapter 16: THE DEATH OF DEATH

- The biblical data on Christ’s resurrected body
- Bodily resurrection verified
- Bodily transformation verified
- Bodily immortality – triumph over death forever

