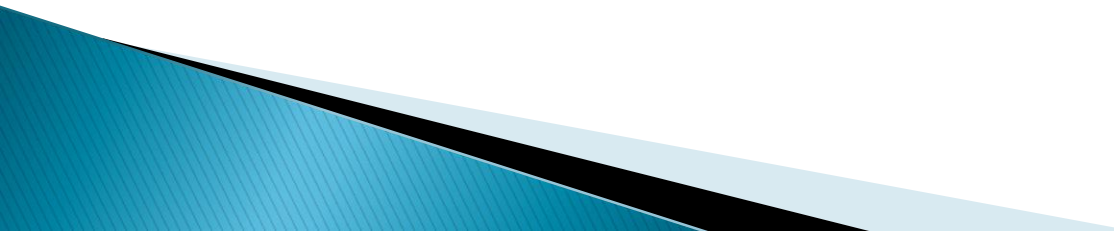


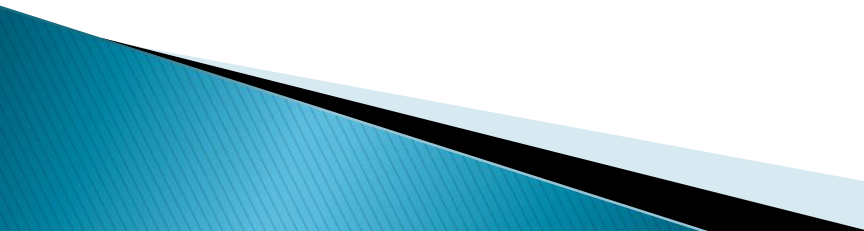
Speculations on the 14th Century Origins of the Turin Shroud

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Preliminaries

- ▶ Assumption that the circa 14th century radiocarbon date is valid
 - ▶ How far does this assumption take us in terms of extant 14th century technology
 - ▶ Maybe things you haven't heard before
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The Question of Authenticity

- ▶ Cannot be rigorously proven by extant methods
 - ▶ Even if 2000 years old, further rigorous proof as “The Shroud” is required
 - ▶ Difficult to impossible to account for image with known circa 30 AD technology
 - ▶ Requires unbroken chain of yet undiscovered authenticated documents or DNA evidence or technology yet to be developed(?)
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History

- ▶ First historical record 1356 in family of DeCharney in Lirey, France
- ▶ Bishop of Troyes letter to Pope declaring it a forgery and an alleged confession
- ▶ Fire in 1537 and application of cotton patches
- ▶ Moved to Turin in 1650
- ▶ Mention of linen burial cloth but no “image” in the Gospels



Major Visuals

- Highly detailed frontal and dorsal images of the Crucified Christ
- Marks resembling Roman flagrum, crown of thorns, spear and other wounds consistent with gospel and other written accounts
- Wounds in the wrists—not the hands
- Evidence of trauma
- Faint reversed image
- Representations of blood stains
- Cotton patches covering burns from 1537 fire
- Linen appears in good condition

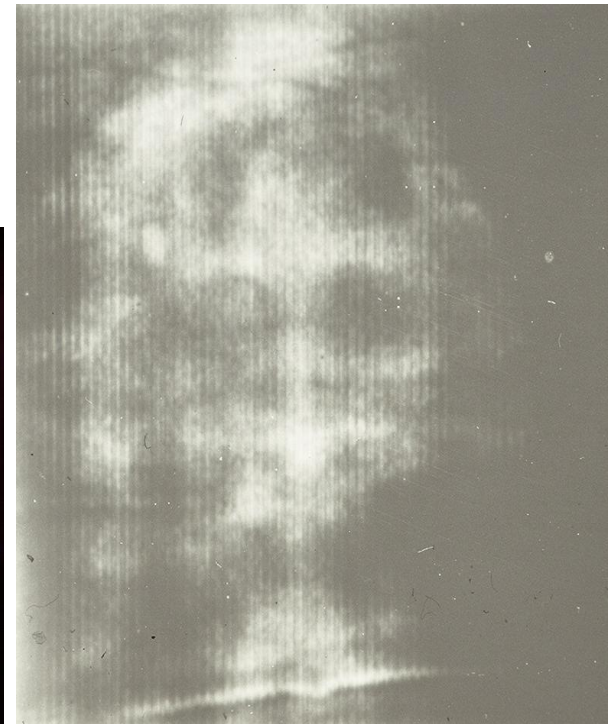
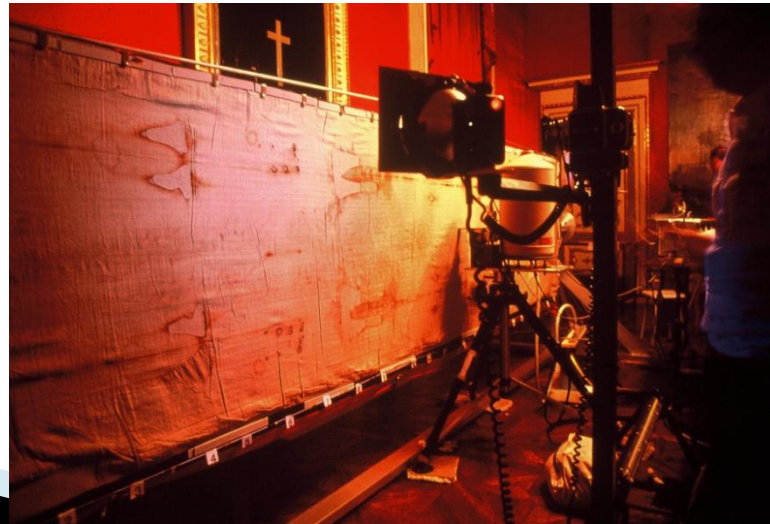
Detailed Visual Examinations

The background image shows a man in a dark suit and glasses, wearing white gloves, leaning over a table to examine a piece of light-colored fabric. He is holding a small red object, possibly a tool or a sample. In the background, several other people are gathered around the table, some looking at the fabric and others taking photographs. The scene appears to be a formal or scientific examination of a piece of evidence.

- Pollen from the mid-east found on cloth
- Blood stains contain hematite
- Image lies on surface of the fibers
- Optical resolution ~ 0.5 cm
- No evidence of pigments in image proper
- No evidence of brush strokes

1978 Detailed Scientific Investigations

- No heavy metals characteristic of pigment present
- Pervasive background of Iron
- IR image in MWIR/ LWIR consistent with visible image
- Nothing remarkable revealed in X-Ray
- No reverse side image

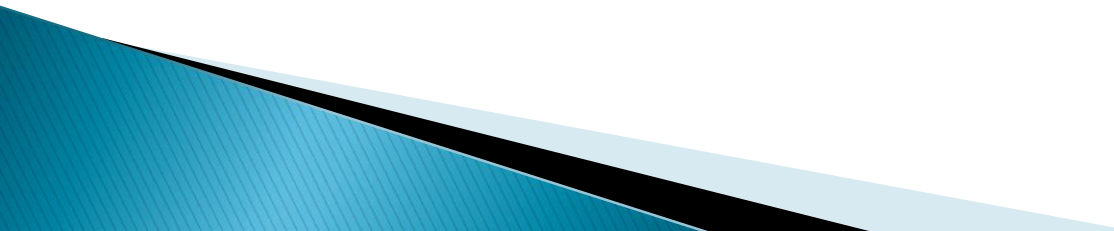


Speculative Theory

- The Shroud image is likely the **remnants** of a 14th century blockprint (woodcut etc.) printed with iron gall ink. WHY?
- The following are attributes of block-prints:
 - ✓ High and reasonably consistent resolution
 - ✓ 3-d like property in frontal perspective
 - ✓ Existing examples in size and quality from that era (14th –15th Century)
 - ✓ Negative image
 - ✓ No brush strokes or conventional pigments
 - ✓ Linen difficult to dye
 - ✓ Iron gall ink was in wide spread use at the time and is corrosive

Further.....

▶ Circumstantial Issues

- ✓ End of black death enriched survivors who became wealthy and desired luxurious goods
 - ✓ Champagne Region, France big trading center
 - ✓ Flanders, nearby to the north, was a center for textile manufacture using block printing technique
 - ✓ Wounds in wrist are rare but found elsewhere
 - ✓ Pronounced a forgery by confessor
 - ✓ Apparently tourist attraction
 - ✓ Optical characteristics not supported by radiative theories
- 

5th Century Roman Engraving

Engraving art form well developed



Palace of the Doges Museum, Venice

Linen is Difficult to Dye

- ▶ Reason why cotton patches were used
- ▶ Reason why original ink flaked off and residuals show up as iron background
- ▶ Image must have been much more prominent in earlier time or would not have been a particularly great tourist attraction.

A comment on dyeing linen

- ▶ *Due to the structural binding of the cellulose fibers in linen, the pigments will only adhere to the surface of the fibers. While linen will dye just as vibrant and deeply as other fibers, it will not retain its color as long. Exposure to air, light and chemicals speed the deterioration process*

15th Century Blockprints

Large high resolution print

~ 7'



Palace of the Doges Museum, Venice

Sectional Blocks for Large Images



Wrist Wounds

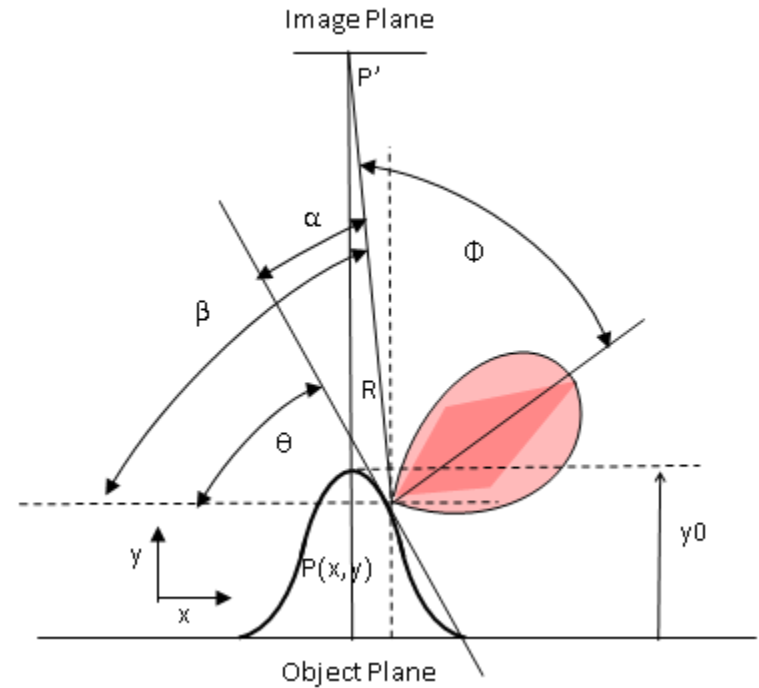
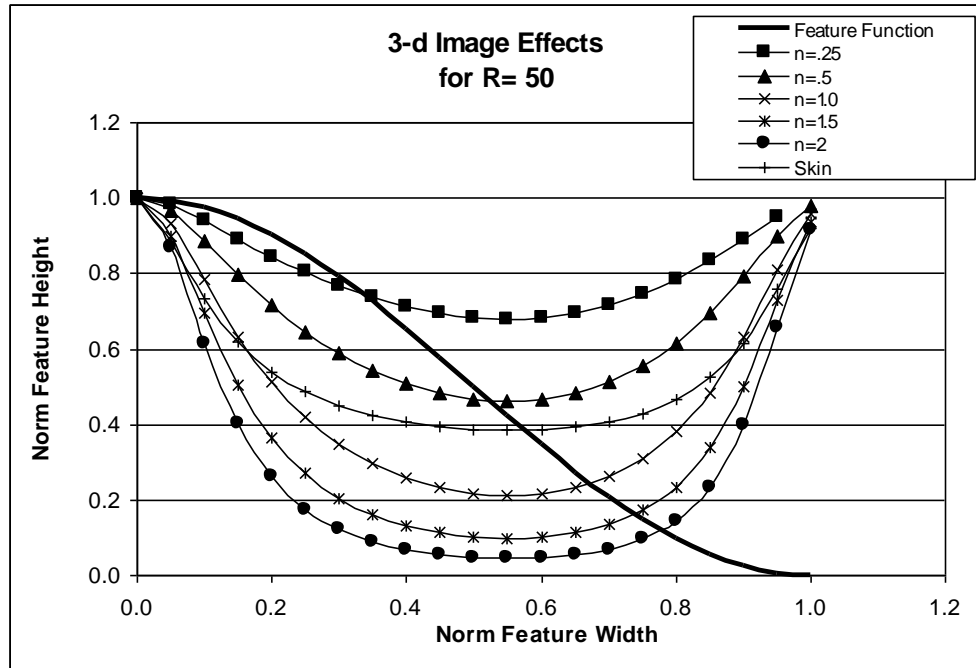
Church in Regensburg



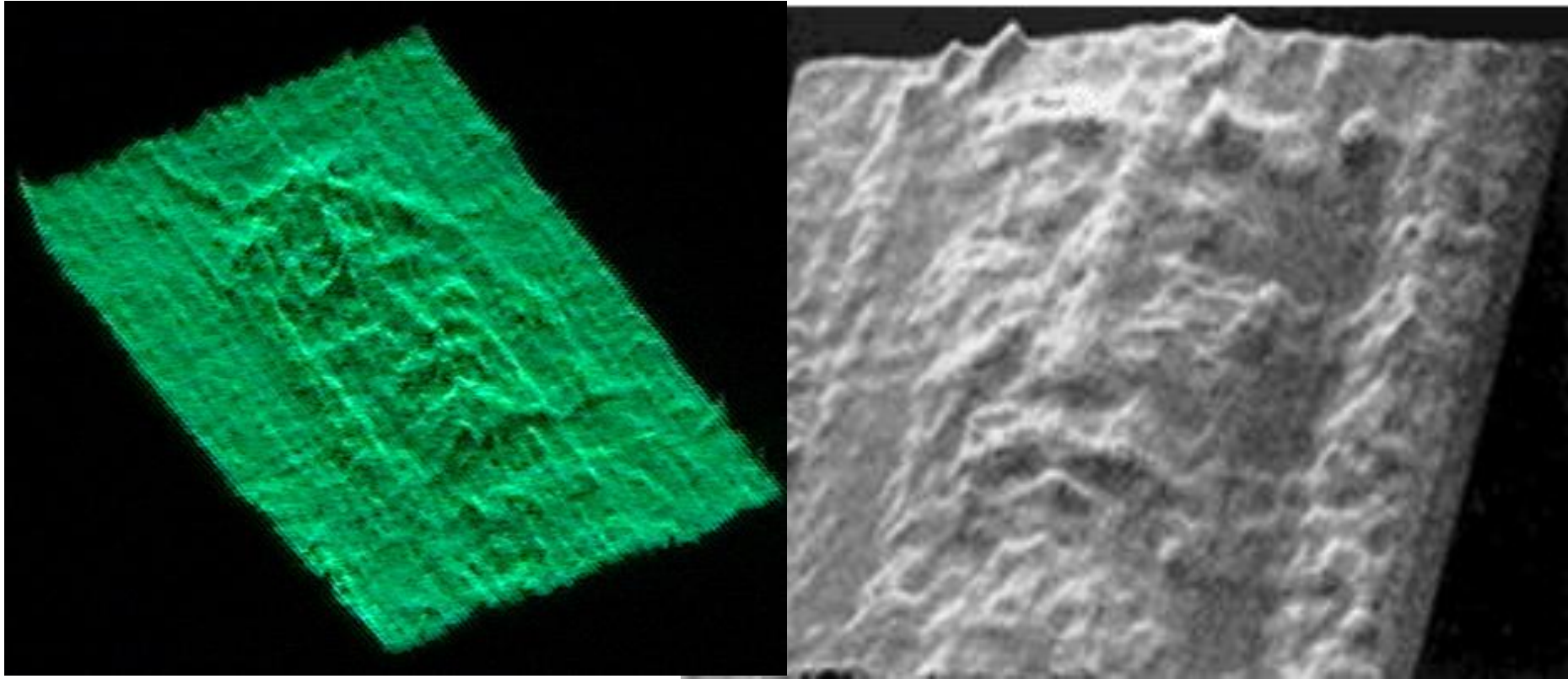
Iron Gall Ink is Corrosive

- ▶ FTIR techniques applied to iron gall inked damaged paper
- ▶ REMAZEILLES Céline, QUILLET Véronique, BERNARD Jacky
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- ▶ Key words: ink – irongall – FTIR – degradation – cellulose.
- ▶ **INTRODUCTION**
- ▶ *Iron gall ink corrosion of paper is one of the largest threat for our graphic patrimony. A great work has been done in this field to explain the possible mechanism of paper degradation* and to propose curative methods [1,2,3,4]. The main degradation mechanism proposed in the literature is the following : iron gall ink prepared with different ingredients including tannins and vitriol causes both acidic hydrolysis and Fe^{2+} catalysed oxidation of cellulose. Paper turns brown and loses its mechanical properties. Yet the great variety of iron gall ink recipes [5,6], and the great variety of visual aspects of manuscripts suggest that many side effects could occur and contribute to the different aspects of paper degradation (colour changes, halos, mechanical properties).

Optical characteristics do not support any radiative theory

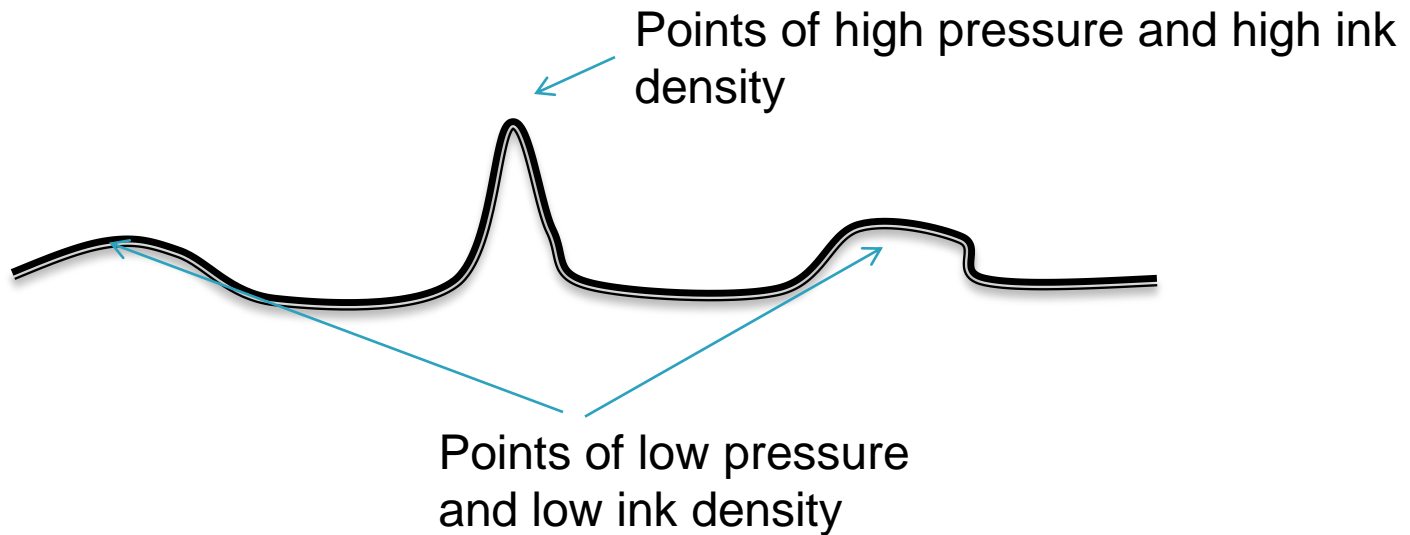


3-d Characteristics



The Relief Printing Process

- ▶ “We could reasonably expect that the relief transfers coloring matter in proportional to its local curvature and pressure”

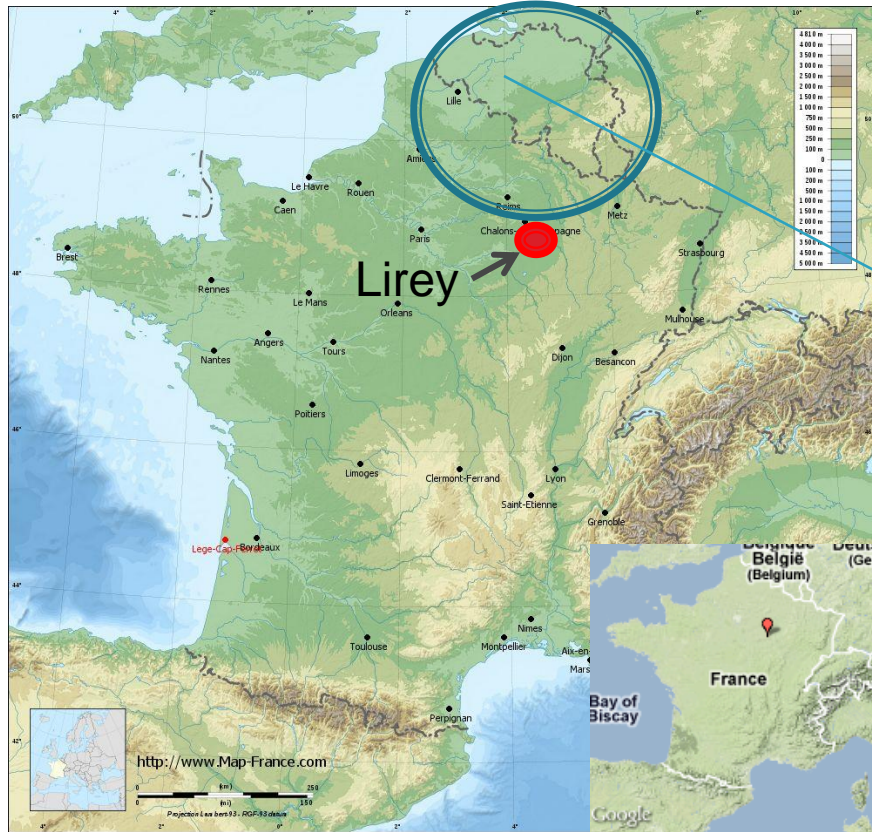


History of Woodcuts

- ▶ *Woodcuts are a technique of printing designs from planks of wood*
- ▶ *It is one of the oldest methods of making prints from a relief surface, having been used in China to decorate textiles since the 5th century ad.*
- ▶ *In Europe, printing from wood blocks on textiles was known from the early 14th century, but it had little development until paper began to be manufactured in France and Germany at the end of the 14th century.*
- ▶ *Textile printing was known in Europe, via the Islamic world, from about the 12th century, and widely used*
- ▶ *Thriving linen industry in Flanders from the 11th century on*

Flanders

Center for Printmaking



Conclusion

- ▶ *.....Confluence of historical and social circumstances with scientific data and observations make a plausible case for a 14th century Shroud using extant techniques.*