

# THE SHROUD OF TURIN: A HISTORIOGRAPHICAL APPROACH

TRISTAN CASABIANCA  
*Université d'Aix-Marseille, France*

Criteria of historical assessment are applied to the Turin Shroud to determine which hypothesis relating to the image formation process is the most likely. To implement this, a 'Minimal Facts' approach is followed that takes into account only physicochemical and historical data receiving the widest consensus among contemporary scientists. The result indicates that the probability of the Shroud of Turin being the real shroud of Jesus of Nazareth is very high; historians and natural theologians should therefore pay it increased attention.

## I. THE TURIN SHROUD AND A 'MINIMAL FACTS' APPROACH

The Turin Shroud (TS) is an ancient linen cloth (approximately 4.4 m long and 1.1 m wide) on which is the image of a scourged and crucified man, kept in the cathedral of Turin, Italy; it is one of the most studied and controversial objects ever examined by science. Scientific studies, however, do not always take a sound methodological approach. In 2010 New Testament scholar Michael Licona published a book: *The Resurrection of Jesus: A New Historiographical Approach*.<sup>1</sup> Here he seeks to determine which hypothesis among all those put forward by scholars to explain the resurrection narratives is the most likely. The fundamental point of Licona's line of reasoning is a determination to assess the hypotheses pertaining to Jesus' resurrection relying exclusively on a bedrock of facts – that is to say, only on data that are nowadays unanimously or almost unanimously accepted by scholars.

What would happen if one applied the same approach to hypotheses put forward to explain the image formation of the TS? Could we quickly discard some of them? What about the others? The aim of this article is not to uncover new data about the TS that would support or argue against certain hypotheses; the goal is rather to assess which image formation hypothesis should now be called the most likely using the methodology commonly adopted in historical studies.

Historical criteria do not fall from the sky; they are part of a slowly-built-up methodology routinely used by historians, whatever may be their opinion on the subject being discussed. This article will use criteria specified by Christopher Behan McCullagh.<sup>2</sup> One can list these in order of priority from the most important to the least; this list, while not written in stone, provides a general idea of the most important conditions to satisfy. Thus one has:<sup>3</sup> 1) plausibility: does our knowledge in other well-known fields support or reinforce the hypothesis? 2) Explanatory scope: can the hypothesis do justice to all the facts? 3) Explanatory power: the hypothesis has to be specific and accurate, rather than ambiguous. 4) *Less ad hoc: ceteris paribus*, the hypothesis should not invoke or rely on unverified data (this includes the criterion of simplicity). 5) Illumination: does the hypothesis shed light on other widely accepted phenomena? This last criterion was added by Licona who believes it contributes further specification.<sup>4</sup>

Such a ‘Minimal Facts’ approach seems to be the most appropriate for the TS; the latter is one of the most studied artefacts and one of the most controversial.<sup>5</sup> Our goal is to uncover a bedrock of data on which agreement appears to exist among scholars. ‘Bedrock’ is not synonymous with truth, or even with unanimity; it is simply a term for the widest possible consensus among specialists. Such bedrock would have to take into account the most up-to-date facts about the TS, not necessarily because we believe our current scientific knowledge offers a better description of the world than we had 20 or 200 years ago (this would be self-refuting), but because this is a basic practice of science. We will observe it scrupulously.

To establish this bedrock, we are called to set aside our personal beliefs. As a result, if a majority of atheist scholars recognize the existence of Jesus and his crucifixion, the latter is likely to form part of our historical bedrock knowledge about first-century Palestine. The recognition of the presence of almost unavoidable personal bias seems necessary, especially regarding a topic as galvanizing, incendiary, and polarizing as the TS, which has become a battleground for competing interests, passions, and systems of belief over the years.

Our starting point will be the list established under the direction of the physicist Giulio Fanti.<sup>6</sup> This list is subdivided into Type A and Type B. Because we are adopting a Minimal Facts approach, we will not include ‘observations and conclusions’ classified as ‘confirmed’ (those classified B1, B2, B3), such as the double superficiality of the TS or even the hypothesis that the TS contained a human body. The bedrock will be made up exclusively of ‘unquestionable facts and observations’ (those classified A1, A2, A3, etc.). Of course we will focus only on the important data; for example, the exact size of the TS (A1) has little importance for our study.

The 1988 radiocarbon dating which gave a range of 1260–1390<sup>7</sup> is sometimes thought to have delivered an absolute and irrefutable time-frame for the production of the phenomenon.<sup>8</sup> However, more and more frequently in recent years, peer-reviewed studies have called into question the validity of this procedure, in historical studies<sup>9</sup> as well as in physical and statistical studies, directly<sup>10</sup> and indirectly.<sup>11</sup> Defenders of the validity of the 1988 radiocarbon dating concede that it is scientifically debatable and have brought forward new elements recently to support their position.<sup>12</sup> Because they are scientifically controversial, however, the conclusions published in 1989 in *Nature* do not form part of our bedrock knowledge for the TS.

‘Incontestable facts’ will be scrutinized from the point of view of scholars opposed *a priori* to Fanti’s hypothesis on the formation of the TS. Fanti has declared for ‘authenticity’, although this notion is difficult to define without ambiguity. We will present viewpoints from scholars opposed to his interpretation of the data and also from other specialists who have studied the data carefully. We also note that some shroud researchers who are explicitly opposed to authenticity consider as beyond reasonable doubt or highly probable some data classified as B.

The starting point for historical study is the consensus in published articles that the image on the Turin Shroud has existed since at least 1390 in Lirey (Champagne-Ardenne, France). We chose the year 1390 and not the frequently mentioned 1356–1357 after reading the article published in 2009 by the historian Emmanuel Poulle.<sup>13</sup> Because of our Minimal Facts approach, we do not take into account Poulle’s high level of certainty that at the end of the 12<sup>th</sup> century one picture in a Hungarian manuscript, the Pray Codex, depicts the TS.<sup>14</sup> This identification contradicts the range of 1260–1390 given by the radiocarbon dating; further, the year 1390 offers the advantage of being in agreement with the most recent year of the controversial dating.

## II. ASSESSMENT OF THE GARLASCHELLI HYPOTHESIS

The chemist Luigi Garlaschelli believes the image on the Shroud is the result of a forgery or the work of a medieval artist. We refer to this as the Garlaschelli Hypothesis (GH). Garlaschelli

tried to reproduce the main characteristics by using only objects and methods available to a medieval occidental artist. Unlike his predecessors, he tried to reproduce the entire shroud, that is, the image of a man, front and back. Following a wide consensus among shroud researchers, this is by far the best attempt at reproducing the TS image.<sup>15</sup>

#### *i) Plausibility*

There is no comparable example in the history of art: for example, we do not expect to discover a similar ‘shroud of Peter’ or ‘shroud of Paul’. Was any artist anywhere able to reproduce such an image around 1390? How did the artist discover this technique? Why did the use of this process not expand after that? How can we explain that 21<sup>st</sup> century scientists are unable to agree on a method by which medievals could reproduce the main features of the TS? The GH does not provide a satisfactory answer to these questions. Because of this, its plausibility is compromised.

#### *ii) Explanatory Scope*

Garlaschelli does not do justice to the fact that there is no image under the so-called blood stains (A35). He believes the blood stains were added after the image was formed. This way of proceeding results in an insufficient explanatory scope for the hypothesis. Indeed Garlaschelli has not explained or contested A35. Even apart from the fact that this reproduction has fuzzy contours or is insufficiently tridimensional<sup>16</sup> – objections Garlaschelli which could raise but until now has not – the explanatory scope of this hypothesis is too narrow.

Here we note that we do not even insist that it is real blood on the Shroud (from A65 to A82). The blood issue is a major controversy within the study, and contradictory analyses have been published in peer-reviewed journals since the 1980s.<sup>17</sup> Garlaschelli denies that the blood is real, although he invokes no new data to support this. If we had held ourselves to Fanti’s list, the explanatory scope of the hypothesis would be even narrower. The presence of real blood is confirmed by external observers such as the chemist Claude Gavach and others.<sup>18</sup>

#### *iii) Explanatory Power*

The GH lacks explanatory power. Garlaschelli has not, according to his own words, defended the superficiality of his image<sup>19</sup>, confirmed for example by Jacques Évin, a radiocarbon specialist and defender of the medieval hypothesis.<sup>20</sup> Garlaschelli has not tested the 3D features (a 3D effect classified B, but which Garlaschelli admits in his article). The fact that 3D features are very difficult to reproduce has again been confirmed by recent studies.<sup>21</sup>

#### *iv) Less Ad Hoc*

The hypothesis lacks simplicity. According to Garlaschelli, ‘full-size Shroud-like images can be produced by a rubbing technique on a human body; the face must be obtained from a bas relief to avoid the inescapable wrap-around distortion’.<sup>22</sup> Moreover Garlaschelli ‘completed the prints of the fingers by painting them subsequently’ because ‘the partially visible hand is a difficult feature to reproduce by rubbing’.<sup>23</sup> Why would the artist/forgery have chosen to do something so difficult when at the same time the process of identification of medieval relics was far from rigorous in a market with a strong demand?<sup>24</sup> Why would an artist/forgery have wanted to apply blood stains *before* creating the image, thereby losing precious visual guidance? A comparison with the shrouds of Cadouin (Aquitaine, France) and Besançon (Franche-Comté, France) does not provide any reason why this much more subtle image was created. His hypothesis is strongly *ad hoc*.

v) *Illumination*

The GH is unable to explain why French local bishop Pierre d’Arcis’ memorandum written around 1390 does not mention the name of the forger, and fails therefore to respect the juridical criteria. The GH fails also to explain the reaction of the Pope, who seems to discount the opinion of Pierre d’Arcis.<sup>25</sup> The extent of illumination is insufficient.

As shown in Table 1, the GH does not meet the criteria for being the best explanation of the unquestionable facts.

Table 1: Analysis of GH

	Plausibility	Explanatory scope	Explanatory power	Less <i>ad hoc</i>	Illumination
Garlaschelli Hypothesis	Fails	Fails	Fails	Fails	Fails

## III. ASSESSMENT OF THE RESURRECTION HYPOTHESIS

The Resurrection Hypothesis (RH) is the hypothesis that the image visible on the TS is the consequence of the bodily resurrection of Jesus of Nazareth.

i) *Plausibility*

The question of the likelihood of the bodily resurrection of Jesus of Nazareth has often been addressed. Perhaps the most frequently heard argument against the possible historicity of such an event is that corpses do not come back to life. It would constitute a contradiction because according to our scientific knowledge dead bodies start an irreversible process of decomposition. A powerful version of this argument is still routinely used by some historians. It is known as the ‘argument against miracles’ and became famous thanks to David Hume in the 18<sup>th</sup> century. Many contemporary arguments are simply a variation on Hume’s position.<sup>26</sup> In order to say that a miracle, that is to say an event against the ‘laws of nature’, occurred, historians would have to have in their possession an amount of evidences of exceptional quality. As a consequence, a historian could never affirm that such an event had occurred, because a naturalistic explanation would always be more likely. Of course a clear definition of ‘laws of nature’ is a difficult task; some major philosophers of science, such as Bas van Fraassen, think that ‘laws of nature’ do not exist. Nowadays it seems that Hume’s argument is no longer considered sound by a majority of philosophers of science and religion who have studied the question. It has even been described as an ‘abject failure’ by philosopher of science John Earman.<sup>27</sup> However many historians still pull out this argument when the life of Jesus comes under their scrutiny.<sup>28</sup> By doing so, they fail to take into account the developments in historiography due to Bayes’s theorem.<sup>29</sup>

Further, an infinitesimal possibility of a miraculous event is conceded, but this leads to an internal contradiction because the same historians claim that the existence of God is not part of their field of competence. How can they assign a possibility to something that is not part of their field of competence? One cannot see how this assertion could be correct if, at the same time, historians attempt to support their judgments by invoking contemporary philosophical trends, or the private opinions of biologists, cosmologists, etc., or their own personal convictions.

One can admit that without divine intervention the plausibility of the revivification of a human being (that is to say its coming back to life and its final death) is not adequately

grounded. However the resurrection of a human being is plausible once God is defined as omnipotent. This level of plausibility was assessed by Richard Swinburne, a leading philosopher of religion. According to Swinburne, there is a 97% probability that the resurrection event occurred, adopting a kind of Minimal Facts approach: Swinburne does not take into consideration the TS.<sup>30</sup> Of course, Swinburne's final result, as well as his methodology, are both contestable and contested.<sup>31</sup> But even if Swinburne is wrong by a factor of 10 (from 97% to 9.7%), RH becomes unlikely but not implausible. In recent years other philosophers of religion and science who have used the same Bayesian reasoning agree with Swinburne that the resurrection is likely.<sup>32</sup>

McCullagh thinks that the RH, although within the bounds of credibility, is less likely than rival hypotheses. To support this, he relies on the notion of incommensurability developed by Paul Feyerabend. In his view historians should stop at the door of Jesus' tomb, because the assessment of the likelihood of a hypothesis is strongly correlated with a scholar's *Weltanschauung*. This forgets, however, that history itself is based on prejudices (or primary beliefs), a fact which make this claim incoherent.<sup>33</sup> And there is no good reason for accepting what Brad Gregory calls 'dogmatic metaphysical naturalism' as a default position for historians.<sup>34</sup>

From an historical point of view, the resurrection cannot be seen as implausible, and it has strong defenders in current scholarship.<sup>35</sup> Over the past decade the reliability of the Gospels and the credibility of miracles have been vigorously defended by scholars.<sup>36</sup> Of course if we had a high level of certainty that after his crucifixion Jesus' body was just 'a corpse for the wild beasts',<sup>37</sup> this would mean that the TS could not be the burial cloth of Jesus. But this interpretation is far from compelling to the majority of specialists. It therefore cannot be assumed that the resurrection is implausible.

Since the RH implies that the image visible on the TS is 'printed' on a first-century Palestine artifact, we now discuss the evidence for this given the historical data for the TS. Although historical bedrock only goes back as far as 1390, one cannot say that the probability of the existence of earlier sources is low.<sup>38</sup> We observe that the TS is made of good quality linen, and that it has survived at least since 1390 through many trials (fires, ostensions, etc.). These qualities seem compatible with the story of Joseph of Arimathea as written in the Gospels. The fact that textiles from Masada have been discovered shows that conservation from first-century Palestine is not impossible.<sup>39</sup> An improvement in our knowledge in this field of research would perhaps allow us to judge whether the manufacture of a similar shroud in the region of Jerusalem was possible.<sup>40</sup>

The plausibility of the Resurrection and the plausibility of the TS being a first-century Palestine artefact, put together in the RH, seem sufficient to the data.

## ii) Explanatory Scope

An uncontested fact that goes against RH is A33: '[although] anatomical details are generally in close agreement with standard human-body measurement, some measurements made on the Shroud image, such as hands, calves and torso, do not agree with anthropological standards'. An explanation of this fact could be given by including the B elements, specifically B24 ('Image distortions of hands, calves and torso on the TS of [*sic*] are very close to those obtained by a man enveloped on [*sic*] a sheet'), and also all the elements relating to the idea that the TS contained a dead body (from B8 to B32). The Minimal Facts approach we adopt here indicates at least a necessary call for new scientific studies. Since 2010 and the publication of Fanti's list, new peer-reviewed articles have confirmed this hypothesis.<sup>41</sup> We note that it is so likely that the TS contained a human body that Garlaschelli used one (but not for the head) in his own experiment. The RH, unlike the GH, takes fully into account the presence of blood on the TS.

iii) *Explanatory Power*

The process that would lead to a resurrection event is uncertain. If the TS is our only testimony from the instant of resurrection, our current knowledge does not allow us to indicate what kind of process created this image on the sheet, and when it appeared – that is to say, could it have been a latent image as some scholars suggest?<sup>42</sup>

iv) *Less Ad Hoc*

The RH is less *ad hoc* than the GH to the extent as the RH is not dependent on the ‘laws of nature’ and invokes directly an intervention by God. Therefore, once one admits that an intervention of God is not impossible *a priori*, and because Jesus, according to the consensus of scholarship, announced that he was an agent of God,<sup>43</sup> the RH appears less *ad hoc* than the GH.

v) *Illumination*

The RH is consistent with two facts widely accepted by New Testament scholars: the empty tomb and the pre-Pauline kerygma<sup>44</sup>, which appeared in the first decade after the crucifixion.<sup>45</sup> The presence of the image also is compatible with the rapid expansion of the early Church.

In short, of the five criteria, the RH passes four, including one with reservations (see Table 2).

Table 2: Analysis of RH

	Plausibility	Explanatory scope	Explanatory power	Less <i>ad hoc</i>	Illumination
Resurrection Hypothesis	Passes	Passes (with reservations)	Fails	Passes	Passes

#### IV. ASSESSMENT OF THE NATURAL HYPOTHESIS

Our definition of the Natural Hypothesis (NH) is an image formation process without predominant human and divine intervention, in first-century Palestine.

i) *Plausibility*

The NH implies a combination of circumstances that does not give it *a priori* a satisfactory plausibility. Such hypotheses have been put forward by Serge Mouraviev, Raymond Rogers or Giulio Fanti.<sup>46</sup> No image of a human body formed in such a way has ever been discovered. The plausibility of the NH is therefore insufficient.

ii) *Explanatory Scope*

The NH is based on the fact that there was a human body in the TS. There is the same difficulty, therefore, as with the RH (disagreement with standard anthropological measurements). The Maillard Reaction proposed by Ray Rogers seems unable to explain the resolution of the image (A13).<sup>47</sup>

iii) *Explanatory Power*

The Maillard reaction and the Corona effect are well known in the scientific literature. The explanatory power can therefore do justice to them.



iv) *Less Ad Hoc*

The NH needs exceptional circumstances. The NH contains more *ad hoc* elements than the RH. Fanti thinks that a Corona effect, which could have been produced in Jesus' tomb during the earthquake described in the Gospels, is so unlikely that it would be the sign of a divine intervention. The Maillard Reaction and the Corona Hypothesis seem improbable if they do not include the intervention of a forger/artist or a supernatural intervention which used either one or both methods to create the image.

v) *Illumination*

If the image visible on the TS is not the image of Jesus, it does not shed any specific light on other matters and it does not explain why the image of a crucified body would have been kept secret for centuries. If the image visible on the TS is the image of Jesus, but created by some natural process, one cannot say what precisely occurred to the body or why the idea of a bodily resurrection spread so quickly among the apostles and the members of Jesus' family, like James who was likely opposed to Jesus during his ministry. The NH does not explain the empty tomb and the pre-Pauline kerygma. The illumination is therefore insufficient.

As shown in Table 3, the NH passes two criteria, including one with reservations, and fails three.

Table 3: Analysis of NH

	Plausibility	Explanatory scope	Explanatory power	Less <i>ad hoc</i>	Illumination
Natural Hypothesis	Fails	Passes (with reservations)	Passes	Fails	Fails

## V. CONCLUSION AND IMPLICATIONS

As judged by our current knowledge, RH is the most likely of the three hypotheses that have come under scrutiny. Its level of plausibility is high, which is not the case for the other two hypotheses. Its explanatory scope does not constitute a major obstacle, although its explanatory power could be improved. It is less *ad hoc* than its rivals and offers the possibility of a substantive illumination on related fields of research. This does not mean, however, that the RH is proven to be historical; it is simply the most likely hypothesis when we adopt a Minimal Facts approach to test for the best explanation. If we have good philosophical reasons for doubting that God could intervene on Earth, the plausibility of the RH is insufficient.<sup>48</sup>

The probability of the TS being a medieval artefact is extremely low when we compare the method and results of the best reproductions proposed by the two other major hypotheses (see Table 4). This criticism is far from being decisive, however; it could be removed by improvements in our knowledge of the medieval era and in our knowledge of the artefact. The current level of uncertainty for the 1988 radiocarbon dating prohibits us from giving it undue weight: radiocarbon testing cannot deliver a final verdict for science and cannot erase all other data, substantially better supported, from other areas of science. Further explorations in this field appear necessary.

In 1978 the title of an award-winning documentary on the Shroud of Turin was 'The Silent Witness'.<sup>49</sup> After the publication of the results of radiocarbon dating in 1989, however, the TS disappeared from discussions by leading New Testament scholars and Christian apologists.

Table 4: Analysis of the hypotheses

	Plausibility	Explanatory Scope	Explanatory Power	Less <i>ad hoc</i>	Illumination
Garlaschelli Hypothesis	F	F	F	F	F
Resurrection Hypothesis	P	P (with reservations)	F	P	P
Natural Hypothesis	F	P (with reservations)	P	F	F

F = Fails; P = Passes.

Nowadays it is not or no longer included in evidence offered by N.T. Wright, Craig Keener, Richard Swinburne or William Lane Craig.<sup>50</sup> When Timothy and Lydia McGrew study the probability of the Jesus' Resurrection, they limit themselves to the testimony of the eyewitnesses mentioned by Paul in the earliest reports of Jesus' death. They have closed their ears to the testimony of the Shroud of Turin.<sup>51</sup>

A consequence of our historiographical approach is that the probability of this linen sheet being the real shroud of Jesus of Nazareth (compared to probabilities for the RH and the NH) is very high. Historians and natural theologians should therefore treat the TS seriously, if ever cautiously, when the life and death of Jesus comes up for discussion.

## Notes

1 Michael R. Licona, *The Resurrection of Jesus: A New Historiographical Approach* (Downers Grove: IVP, 2010).

2 Christopher B. McCullagh, *Justifying Historical Descriptions* (Cambridge: Cambridge University Press, 1984).

3 *Ibid.*, p. 28.

4 Licona, *The Resurrection of Jesus*, p. 114.

5 Lloyd A. Currie, 'The Remarkable Metrological History of Radiocarbon Dating [II]', *Journal of Research of National Institute of Standard Technology* 109 (2004), p. 200; Gary R. Habermas, 'Shroud of Turin' in George T. Kurian (ed.), *The Encyclopedia of Christian Civilization* (Chichester: Wiley-Blackwell, 2011), p. 2161.

6 Giulio Fanti, et al., 'List of Evidences of the Turin Shroud' in Paolo di Lazzaro (ed.), *Proceedings of the International Workshop on the Scientific Approach to the Acheiropoietyos Images* (Frascati: ENEA, 2010).

7 Paul E. Damon, et al., 'Radiocarbon Dating of the Shroud of Turin', *Nature* 337/6208 (1989), pp. 611–5.

8 See for example Douglas T. Price, James H. Burton, *An Introduction to Archaeological Chemistry* (New York: Springer, 2011), pp. 151–3.

9 Emmanuel Pouille, 'Le linceul de Turin victime d'Ulysse Chevalier', *Revue d'histoire de l'Eglise de France* 92/229 (2006), pp. 343–58; Emmanuel Pouille, 'Les sources de l'histoire du linceul de Turin. Revue critique', *Revue d'histoire ecclésiastique* 104/3–4 (2009), pp. 747–82.

10 The most important articles are: Raymond N. Rogers, 'Studies on the Radiocarbon Sample from the Shroud of Turin', *Thermochimica Acta* 425 (2005), pp. 189–94; Sue M. Benford, Joseph G. Marino, 'Discrepancies in the Radiocarbon Dating Area of the Turin Shroud', *Chemistry Today* 26/4 (2008), pp. 4–12; Marco Riani, et al., 'Regression Analysis with Partially Labelled Regressors: Carbon Dating of the Shroud of Turin', *Statistics and Computing* (forthcoming), DOI: 10.1007/s11222-012-9329-5.

11 Giulio Fanti, 'Hypotheses Regarding the Formation of the Body Image on the Turin Shroud. A Critical Compendium', *Journal of Imaging Science of Technology* 55 (2011), 060507; Francesca Curciarello, et al., 'The Abrupt Changes in the Yellowed Fibril Density in the Linen of Turin', *Radiation Effects and Defects in Solids* 167/3 (2012), pp. 224–8.

12 Rachel A. Freer-Waters, Timothy A. J. Jull, 'Investigating a Dated Piece of the Shroud of Turin', *Radiocarbon* 52/4 (2010), pp. 1521–7.



13 Poulle, 'Les sources', p. 780.

14 Ibid, p. 773.

15 Luigi Garlaschelli, 'Life-Size Reproduction of the Shroud of Turin and its Image', *Journal of Imaging Science and Technology* 54 (2010), 040301.

16 Giulio Fanti, Thibault Heimburger, 'Letter to the Editor: Comments on "Life-Size Reproduction of the Shroud of Turin and its Image" by L. Garlaschelli', *Journal of Imaging Science of Technology* 55 (2011), 020102.

17 John H. Heller, Alan D. Adler, 'Blood on the Shroud of Turin', *Applied Optics* 19 (1980), pp. 2742–4; Walter C. McCrone, 'The Shroud of Turin: Blood or Artist's Pigment?', *Account of Chemical Research* 23/3 (1990), pp. 77–83; Alan D. Adler, 'Updating Recent Studies on the Shroud of Turin', *Archaeological Chemistry* 625 (1996), pp. 223–8.

18 Jean-Baptiste Rinaudo, Claude Gavach, *Le linceul de Jésus enfin authentifié?* (Paris: François-Xavier de Guibert, 2010), pp. 131–82; Brice Perrier, *Qui a peur du saint suaire?* (Paris: Florent Massot, 2011), p. 240.

19 'A7: The body image color resides only on the topmost fibers at the highest parts of the weave'; 'A8: Body image color resides only on the thin layer that is probably the primary cell wall [. . .] of outer surfaces of the fibers'; 'A25: The image of the dorsal side does not penetrate the cloth any more deeply than the image of the ventral side of the body'.

20 Perrier, *Qui a peur*, p. 240.

21 Jean-Christophe Mignot, 'De l'aspect tridimensionnel comparé du Linceul de Turin et des faux suaires réalisés expérimentalement' ([www.suaire-science.com/documents/3D\\_mignot.pdf](http://www.suaire-science.com/documents/3D_mignot.pdf), 2005), accessed 2012-09-29; Maureen White, Suzan Clarke, 'Is Face of Jesus Christ Revealed?' (<http://abcnews.go.com/GMA/jesus-christ-face-appears-history-channel/story?id=10246233>, 2010), accessed 2013-01-11.

22 Garlaschelli, 'Life-Size', pp. 11–2.

23 Ibid, p. 8.

24 Pierre-Vincent Claverie, 'Les acteurs du commerce des reliques à la fin des croisades', *Le Moyen Âge* 114/3 (2008), pp. 589–602.

25 Poulle, 'Les sources', pp. 779–80.

26 Craig S. Keener, *Miracles: The Credibility of New Testament Accounts* (Grand Rapids: Baker Academic, 2011), pp. 119–20. See also James F. Sennett, Douglas Groothuis, 'Hume's Legacy and Natural Theology' in James F. Sennett, Douglas Groothuis (eds.), *In Defense of Natural Theology: A Post-Humean Assessment* (IVP: Downers Grove, 2005), p. 9.

27 John Earman, *Hume's Abject Failure: The Argument against Miracles* (Oxford: Oxford University Press, 2000).

28 Bart D. Ehrman, *The New Testament: A Historical Introduction to the Early Christian Writings* (Oxford: Oxford University Press, 2008), pp. 228–9.

29 Aviezer Tucker, *Our Knowledge of the Past: A Philosophy of Historiography* (Cambridge: Cambridge University Press, 2004).

30 Richard Swinburne, *The Resurrection of God Incarnate* (Oxford: Oxford University Press, 2003), p. 27.

31 Alvin Plantinga, *Warranted Christian Belief* (Oxford: Oxford University Press, 2000), pp. 272–80; Michael Martin, 'Skeptical Perspectives on Jesus' Resurrection' in Delbert Burkett (ed.), *The Blackwell Companion to Jesus* (Chichester: Wiley-Blackwell, 2010), pp. 285–300; Domingos de Sousa, 'Epistemic Probability and the Existence of God: A Kierkegaardian Critique of Swinburne's Apologetic', *The Heythrop Journal* (forthcoming), DOI: 10.1111/j.1468-2265.2012.00772.x

32 Timothy McGrew, Lydia McGrew, 'The Argument from Miracles: A Cumulative Case for the Resurrection of Jesus of Nazareth' in William L. Craig, James P. Moreland (eds.), *The Blackwell Companion to Natural Theology* (Chichester: Wiley-Blackwell, 2009), pp. 593–662; Daniel Bonevac, 'The Argument from Miracles', *Oxford Studies in Philosophy of Religion* 3 (2011), pp. 16–40.

33 William Lane Craig, 'Noli Me Tangere: Why John Meier Won't Touch the Risen Lord', *The Heythrop Journal* 50/1 (2009), pp. 91–7; Michael R. Licona, Jan G. van der Watt, 'The Adjudication of Miracles: Rethinking the Criteria of Historicity', *HTS Teologiese Studies/Theological Studies* 65/1 (2009), pp. 1–7; Glenn B. Siniscalchi, 'Resurrecting Jesus and Critical Historiography: William Lane Craig and Dale Allison in Dialogue', *The Heythrop Journal* 52/3 (2011), pp. 362–73; Michael R. Licona, 'In Reply to Habermas, McGrew, and McCullagh', *Southeastern Theological Review* 3/1 (2012), pp. 55–69.

34 Brad S. Gregory, 'The Other Confessional History: On Secular Bias in the Study of Religion', *History and Theory* 45/4 (2006), p. 138. We agree with Keener (*Miracles*, p. 207) when he writes that '[an] inflexible prejudice against the possibility of supranatural activity is no more neutral than a prior commitment to that possibility is.'

35 N.T. Wright, *The Resurrection of the Son of God: Christian Origins and the Question of God, Volume 3* (Minneapolis: Fortress Press, 2003).

36 Richard Bauckham, *Jesus and the Eyewitnesses: The Gospels as Eyewitness Testimony* (Grand Rapids: Eerdmans, 2006); Keener, *Miracles*.

37 John D. Crossan, *Jesus: A Revolutionary Biography* (San Francisco: HarperCollins, 1994), p. 140.

38 Poulle, 'Les sources', pp. 779–80. See also Mark Guscini, *The Image of Edessa* (Leiden: Brill, 2009), pp. 201–9.

39 Avigail Sheffer, Hero Granger-Taylor, 'Textiles from Masada: A Preliminary Selection' in Joseph Aviram, Gideon Foerster, Ehud Netzer (eds.), *Masada IV: The Yigael Yadin Excavations 1963–1965 Final Reports: Lamps, Textiles, Basketry, Cordage and Related Artifacts; Wood Remains; Ballista Balls; Addendum: Human Skeletal Remains* (Jerusalem: Israel Exploration Society-The Hebrew University of Jerusalem, 1994), pp. 152–282.

40 Diana Fulbright, 'Akeldama Repudiation of Turin Shroud Omits Evidence from the Judean Desert' in di Lazzaro (ed.), *Proceedings*.

41 Fanti, 'Hypotheses Regarding the Formation'; Curciarello, 'The Abrupt Changes'.

42 Giulio Fanti, 'Can a Corona Discharge Explain the Body Image on the Turin Shroud?', *Journal of Imaging Science and Technology* 54 (2010), 020508; Giovanni Fazio, Giuseppe Mandaglio, 'Stochastic Distribution of the Fibrils that Yielded the Shroud of Turin Body Image', *Radiation Effects and Defects in Solids* 166/7 (2011), pp. 476–9; Giovanni Fazio, Giuseppe Mandaglio, 'Can a Latent Image Explain the Characteristics of the Shroud Body Image?', *Radiation Effects and Defects in Solids* 167/3 (2012), pp. 220–3.

43 Licona, *The Resurrection of Jesus*, pp. 283–4.

44 1 Cor. 15, 3–7.

45 Gary R. Habermas, 'Resurrection Research from 1975 to the Present: What Are Critical Scholars Saying?', *Journal for the Study of the Historical Jesus* 3/2 (2005), pp. 135–53.

46 Serge N. Mouraviev, 'Image Formation Mechanism on the Shroud of Turin: A Solar Reflex Radiation Model (the Optical Aspect)', *Applied Optics* 36/34 (1997), pp. 8976–81; Raymond N. Rogers, Anna Arnoldi, 'The Shroud of Turin: An Amino-Carbonyl Reaction (Maillard Reaction) May Explain the Image Formation', *Melanoidins in Food and Health* 4 (2003), pp. 106–13; Fanti, 'Can a Corona Discharge'.

47 Giulio Fanti, et al., 'Microscopic and Macroscopic Characteristic of the Shroud of Turin Image Superficiality', *Journal of Imaging Science and Technology* 54 (2010), 040201, p. 6.

48 See Alvin Plantinga, *Where the Conflict Really Lies: Science, Religion and Naturalism* (Oxford: Oxford University Press, 2011), p. 223.

49 David W. Rolfe, *The Silent Witness*, 1978.

50 For example N.T. Wright who writes in his preface (Wright, *The Resurrection*, p. xvii): 'Those who continue to work on the Turin Shroud, for instance, may be disappointed to find no other mention of it here.' Gary Habermas frequently mentions the TS: see Gary R. Habermas, Michael R. Licona, *The Case for the Resurrection of Jesus* (Grand Rapids: Kregel, 2004), pp. 313–4.

51 McGrew, McGrew, 'The Argument from Miracles'.