

## Comment on Carlo Goldoni's blood stain paper and its slide presentation at a Shroud of Turin conference

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made at the request of Thomas J. McAvoy

Doctor Carlo Goldoni's paper "[The Shroud of Turin and the bilirubin blood stains](#)" of 2008 implies that the Shroud's blood stains are "the rust colour, commonly seen in old blood stains" in ordinary white light and that the Shroud's blood stains have a bright red colour when in sunlight (p. 5). Goldoni's paper also implies that his experiments with UV irradiation alone and with neutron irradiation followed by UV irradiation on blood stains containing bilirubin also caused a transition of the rust colour to bright red only visible while still observed in sunlight/UV light (p. 3 and 5).

"From these decals we obtained three sets of samples with increasing concentration of bilirubin: one was maintained as it was, one was aged 10 hours in a stove at the temperature of 120°C, and one was exposed to ultraviolet radiation (365 nm) for 6 hours and kept under continuous observation. The visual examination of the two first sets of samples was not able to catch any colour change on the many different concentrations of bilirubin. The visual inspection was confirmed by a spectrographic examination. In the third set of sample the blood stains of all decals, after 6 hours of irradiation, took a bright red colour. (Fig.1)" ([Goldoni's 2008 paper](#), p. 3)

"Therefore some blood samples with contents of bilirubin higher than the physiological limits, once again prepared by Carlo Goldoni, were irradiated with neutrons. The irradiation dose was the one related to the corresponding dose of protons necessary to obtain, after heat treatment in an oven, a colour that the spectrophotometric analysis indicated as comparable to that visible on the Shroud ( $2.59 \times 10^{13}$  n/cm<sup>2</sup>). Such a treatment did not cause any colour change in the blood stains. However, the following irradiation in the UV-next showed, after exposure of only 30 minutes, a sharp change towards the bright red colour regardless the bilirubin excess in each samples (Fig. 2)

Therefore we can assume that the neutron irradiation caused an upset in the blood at the molecular level that facilitates the subsequent penetration of the UV rays used after the neutron irradiation. The same physicalchemical situation could occur in the blood of the Shroud when it is exposed to sunlight (rich in UV rays) causing the transition from the rust colour, commonly seen in old blood stains, to the bright red colour." ([Goldoni's 2008 paper](#), p. 5)

But the Shroud's blood stains do not look rust in the first place: they are pinkish red in white light; this can be seen in the professional Shroud photos made by Haltadefinizione with calibrated lighting for faithful colour reproduction (e.g. in figure 5.2, 5.4 and 5.5 in [my 2014 paper](#) and figure 1 in [my 2015 paper](#)). In sunlight the Shroud's blood stains look redder; also pinkish red madder lake looks redder in sunlight/UV light due to red fluorescence (also described in my papers, e.g. in paragraph 2.1. of [my 2014 paper](#)).

Goldoni's paper did not include any figures/photos, although its text references "Fig. 1" and "Fig. 2". I have discussed his paper in 2014 in "[Authentic acid blood mordanted the madder-dyed Shroud of Turin pinkish red before image formation – Jesus was dead](#)", paragraphs 6.1.3., 2.1.2.4., 6.1.2.1. and 6.1.2.7. In 2008 during an international conference Giulio Fanti presented a slide presentation on behalf of Dr Carlo Goldoni (deceased in 2008) about this doctor's blood stain experiments. This slide presentation is not online yet and was e-mailed to me by Shroud researcher Thomas McAvoy this year with his request to consider an effect of neutron irradiation on the colour of blood stains in relation to the Turin Shroud.

The slide presentation does show several photos of blood stains, but close examination of these photos shows that these photos are all of the same set of blood stains (see page 3 below with slides 12 and 14 of the presentation reproduced by using just 'print screen' and 'paste'). The photos do not show three different sets of blood stains, but it is the same set in every photo, either photographed at the front side

of the cloth (“Set 1”, the not-aged blood stains) or at the reverse side of the cloth (“Set 2”, the aged blood stains; the cloth has been cut and the long strip has been flipped over) or photographed in an apparent overexposure of light (“Set 3”, the UV irradiated blood stains), since in the “Set 3” photo even the staples in the strip of cloth look more pale than in the “Set 2” photo. Note that the photo on slide 14, titled “7. Experiments with neutrons and UV” (see below) has no caption and looks the same as the “Set 3” photo on slide 12. Anyway, all blood stains of the photos “Set 2” and “Set 3” and in slide 14 do not look red but brown.

A comparison of the data is in the following table.

<b>The Shroud’s blood stains:</b>	are pinkish red in photos made in calibrated white light	look redder in sunlight (naturally containing UV light)
<b>red madder lake:</b>	is pinkish red in white light	looks redder in UV light (due to red fluorescence)
<b>Goldoni’s experimental blood stains after UV irradiation alone or after neutron irradiation followed by UV irradiation:</b>	look rust/brown in (white) visible light (text in paper/photographs in presentation)	are reported to look redder “after” (and perhaps only while still under) UV irradiation.  No photographs of any red-looking blood stains after UV irradiation or after neutron irradiation followed by UV irradiation have been presented.

## 5. Experiments with bilirubin

- Set 1 as described.
- Set 2 was aged for 10 hours in a stove at the temperature of 120°C
- Set 3 was exposed to ultraviolet radiation (365 nm) for 6 hours.

*No color change was detected for Sets 1 and 2.*

*Set 3 after 6 hours of UV irradiation, took a bright red colour, but this time seemed too in excess in reference to the observations made on the Shroud.*



Slide 12 of the 2008 presentation (with kind permission for publication from G. Fanti)

## 7. Experiments with neutrons and UV

Some blood samples with high contents of bilirubin, were irradiated with neutrons.

The irradiation dose was the one related to the corresponding dose of protons necessary to obtain a colour comparable to that visible on the Shroud ( $2.59 \times 10^{13} \text{ n/cm}^2$ ).

Such a treatment did not cause any colour change in the blood stains.

*However, the following irradiation in the UV-next showed, after exposure of only 30 minutes, a sharp change towards the bright red colour regardless the bilirubin excess in each samples. The time of 30 minutes is in agreement with the observations made on the Shroud.*



Slide 14 of the 2008 presentation (with kind permission for publication from G. Fanti)

My conclusion is that neither Goldoni's text nor the presented photos provide evidence that UV irradiation alone or neutron irradiation followed by UV irradiation can cause the permanent pinkish red colour as seen in the blood stains on the Shroud of Turin. In fact, the text and photos imply that Goldoni's experimental bilirubin-containing blood stains after UV irradiation alone and after neutron irradiation followed by UV irradiation still look brown in white light. ●