

Ideas for Research on the Shroud of Turin

by Robert A. Rucker, November 10, 2016

Abstract

This paper lists ideas for research that would be helpful to solve the main mysteries related to the Shroud of Turin. This suggested research includes questions to be considered, and ideas for calculations and experiments to be done. The ideas for this research come primarily from a review of the paper “Role of Radiation in Image Formation on the Shroud of Turin” (Ref. 1).

Introduction

The main mysteries regarding the Shroud of Turin are the following:

1. How was the image formed on the Shroud?
2. Why did C^{14} dating methodology date the Shroud to the middle ages when so much other information indicates that it is the authentic burial cloth of Jesus from the first century?
3. Except possibly for the side wound and the feet, the blood would have had plenty of time to dry on the body. So how was this dried blood moved from the body to the Shroud where it re-dried?

To solve these various mysteries related to the Shroud requires a diversity of types of research and covers many specialties thus requiring experts in many fields. The various types of research that will be required are an outgrowth of the various concepts for solving the above mysteries. The research ideas included here primarily came from a review of the paper “Role of Radiation in Image Formation on the Shroud of Turin” (Ref. 1).

The MCNP (Mont Carlo N-Particle) computer code discussed below is a common nuclear analysis computer code that calculates the distribution of neutrons or other particles within a defined geometry that is input into the code. As a “Monte Carlo” code, it follows one particle at a time until enough particles have been followed to reduce the statistical uncertainty of the desired answer below a chosen value. The MCNP code is referred to below but other nuclear analysis computer codes could be used as well. The PARTISN nuclear analysis code is also mentioned below. It does not solve the problem by a Monte Carlo process but rather solves a set of equations that define what the neutron or particle distribution must be for the input geometry.

Questions to be Considered

1. What chemical changes are required to cause the discoloration on the fibers in the image on the Shroud of Turin?

2. How much energy is needed to cause the change in the covalent bonds of the carbon atoms that have occurred in the discolored fibers?
3. Could positive and negative particles emitted from the body flow in opposite directions and yet produce front and back images with good resolution.
4. What would a particle physicist say about our hypothesis for image formation?

Ideas for Calculations

1. Run MCNP using a detailed model of the body or the head, often called a phantom in medical terminology, assuming charged particles/UV photons are emitted homogeneously from within the body and are emitted vertically collimated up and down. Taking into account appropriate vertical gaps between the body and the cloth, do a detailed tally of the energy deposited in the Shroud at various locations and depths within the Shroud. Display the results using a gradation of a single color, and compare to the Shroud. Will this process create a negative image with 3D information content in the image? Consider how the geometry modeled in these calculations can be simplified to make these calculations feasible.
2. Using MCNP, determine appropriate particles and energies to create the estimated decrease of the discoloration due to a thickness of air or linen.
3. Do the above two calculations to determine the possibility of communicating to the Shroud the presence of the bones near the surface of the skin.
4. Rerun the above calculations making other assumptions regarding the direction of the emitted particles, i.e. assume the particles are emitted uniformly in all directions instead of being emitted only in vertical directions.
5. Run MCNP to determine the natural tendency to collimate radiation that is emitted uniformly in all directions. Try to answer the following question: To what degree does the emitted radiation have to be vertically collimated to produce a good resolution image?
6. Run MCNP to determine how resolution is lost as a function of particle type, particle energy, depth of emission point within the body, thickness of the air between the body and the cloth, and location of the image – whether it is on the inside or the outside of the cloth.
7. Run MCNP to determine the effect of neutrons absorbed in blood at any location on the Shroud.
8. Run either MCNP or PARTISN to obtain finer resolution of predicted C^{14} dates across the sample area to correlate with the experimental values, similar to Figure 4.5 on page 158 of Ref. 2.
9. Run nuclear analysis computer codes to calculate the isotopes produced in the limestone due to neutron absorption. Would any of these still be present in detectable quantities today?

Ideas for Experiments

1. Attempt to create a corona discharge from a single fiber or thread in ionized air due to an electrical flow or a static discharge.
2. Confirm that adding a substance (paint, stain, dye, rubbing, dusting) to linen to create an image will always show that the substance is present when the linen is backlit.

3. Do a hot scorch test, i.e. test for the degree of fluorescence under UV light as a function of time and temperature of contact between a hot object and a piece of linen. Investigate the distribution of the discoloration through the thickness of the linen.
4. Do a cold scorch test, i.e. test for the degree of fluorescence under UV light as a function of time and type of radiation exposure to a piece of linen at room temperature. Investigate the distribution of the discoloration through the thickness of the linen.
5. Test the effect of a burst of protons, at various intensities and energies, on creating discoloration on linen. Do the same for electrons, UV photons, and other particles if possible. Examine the linen to determine if there is a shadow effect with a top thread/fiber being discolored but an underneath thread/fiber not discolored.
6. Do additional C¹⁴ dating tests for charred material already removed from other locations of the Shroud, and for uncharred material already removed from the Shroud, such as the small sample that was sent to the Tucson laboratory in 1988.
7. Do the above tests for blood.
8. Do tests of neutron absorption in blood to determine its effect on long term color.
9. Do other tests on blood to determine what could cause the blood to still have a reddish hue instead of being dark brown to black in color.
10. Do tests to determine what can cause corona discharges on linen that results in discoloration similar to what can be seen on the Shroud, including a discoloration thickness of less than 0.4 microns. Consider use of a Van de Graaff generator, a Tesla coil, a Marx generator (DC 20KV), or a cloth sample from a lightning strike. Also consider using a simple electron flow through a fiber.
11. Determine if a very brief pulse of radiation can lift dried blood off of a glass slide or other materials, then liquefy it, and thrust it onto and into linen or other materials. A laser might be necessary for this test.
12. Test whether a charge buildup would prevent a collimated pulse of charged particles from causing a discoloration on linen.
13. Closely inspect discolored fibers from the Shroud to determine whether the discoloration goes 360 degrees around the circumference of the fiber over the entire length of the discolored section of the fiber.

References

1. “Role of Radiation in Image Formation on the Shroud of Turin” by Robert A. Rucker, October 11, 2016, This paper is available at: https://www.academia.edu/28946606/Role_of_Radiation_in_Image_Formation_on_the_Shroud_of_Turin .
2. “The Shroud of Turin, First Century After Christ” by Giulio Fanti and Pierandrea Malfi, 2015, Pan Standard Publishing