McCRONE'S IRON OXIDE PAINTING HYPOTHESIS

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The late Walter McCrone (1916-2002), a formidable proponent of the artistic theory, was an internationally recognized microscopist and the director of the famous McCrone Associates Research Laboratory in Chicago.

After studying 32 sticky-tape samples from various areas of the Shroud using polarized light microscopy, scanning electron microscopy, energy dispersive X-ray analysis, electron microprobe analyzer, X-ray diffraction, and selected area electron diffraction, McCrone reported that the Shroud image was due to the application of red artist's pigment, which was intentionally added either to create the image or to enhance an earlier image. He further indicated that along with the red iron oxide, also known as RED OCHRE or Venetian red (an earth color), he found mercuric sulfide, another earth color known as vermillion, and a collagen tempera paint medium, all three of which have been used by artists throughout the centuries. McCrone also did not believe that the alleged blood images were blood but believes the difference of color between the blood images and the body-only image relates to the amount of iron pigment present. In support of this he said that his results for blood were negative on the same samples for which Adler and Heller and Bollone independently reported positive results.

COMMENT There are numerous arguments against McCrone's hypothesis: McCrone charges that the image areas on the Shroud were essentially painted with a dilute suspension of hematite in glair. GLAIR is a term for egg white, which is a colloidal solution of albumen used as an adhesive for gilding or as a painting medium. Several microchemical tests for protein and pyrolysis experiments proved that proteins were absent in image areas and reflectance spectrometry proved that the color could not be due to hematite in the image areas.

Traces of paint pigments, such as vermillion, found by McCrone have been confirmed by other investigators but their origination is a source of debate. The findings are unquestionably understandable because many shrouds have been copied by artists directly from the Shroud of Turin. This is a relatively laborious process that involves grinding and mixing their paints IN THE SAME ROOM as that containing the Shroud. Gusts of air and body movements could easily carry the pigments to the Shroud. Even more striking are the recent studies by Fossati of several famous shrouds that were actually laid flat upon the Shroud of Turin for some time in order to be recognized as a venerable relic. In particular the shrouds from the Spanish churches of Guadalupe and Navarette in 1568, Torres de la Alameda in 1620, La Cuesta in 1654, and Aglie in 1822, and in the United States in 1624 at Our Lady of the Rosary (Summit, New Jersey). All had been laid flat image to image, on the Shroud of Turin.

Some researchers have argued that the color on the fibrils does not arise from inorganic pigments. Adler has reported that "this straw yellow color of the body image fibers does not match the color of any of the known forms of ferric iron oxides. Moreover, Adler reports that there is no correspondence of the body-only images to the concentration of iron oxide since the spectral characteristics of the body-only image are different from those of iron oxide. The color of the fibers, due to the iron oxide, is also

precluded by the fact that oxidation or reduction converts the yellow fibers of the BODY-ONLY IMAGE to a white color. Only rare particles of iron oxide are noted on the BODY-ONLY IMAGE fibrils. Large amounts of iron bound to the cellulose of the Shroud (not iron oxide) and Calcium were both present throughout the Shroud. This is believed to be due to the ability of linen to bind iron and water by ion association during the retting process (manufacturing process by which linen is immersed in water during fermentation). An estimated 90 percent of the iron and Calcium exist in this form bound to the cellulose of the linen, and only a small amount is present as iron oxide. These iron oxide components probably arise from the conversion of some of the iron in the margins of the water stains to mineral khaki. Similar tests on samples taken from a 300-year-old piece of Spanish linen, from a Coptic funerary linen dating to about 350 A.D., and from a Pharaonic linen dating to about 1500 B.C. all gave similar results for calcium and iron. Finally, X-ray studies of the body-only image do not contain enough iron oxide to show up on the X-radiographs (opinion of McCrone).

To further argue against use of manmade paints, all of the iron from the Shroud, whether from iron oxide particles or from blood, proved to be about 99 percent chemically pure, with no discernable manganese, nickel or cobalt greater than 1 percent. Furthermore, if natural water-soluble dyes were present they would have migrated when the water-stain markings occurred. The amido black test, if used alone and without controls as McCrone did, however, may give misleading results because it may also stain oxidized cellulose.

Pollen studies have also contributed to the arguments against McCrone's theory. Dr. Max Frei found that none of the possible pollens were glued to the cloth or covered with tempera (collage tempera paint medium), thereby adding strong evidence against the Shroud's being a painted fake.