

## LETTER TO THE EDITOR

12 April 1993

Dear Editor,

I recently came across an abstract of H. E. Gove's article on the  $^{14}\text{C}$  dating of the Shroud of Turin in *Art and Archaeology Technical Abstracts*. Luckily, I retrieved a copy of the issue of *RADIOCARBON* in which it appeared (Gove 1990) just before it was off to the bindery. I enjoyed his review of the details of the whole process, especially after reading his earlier outline (Gove 1987). I noted that he had some questions about the art historical nature of painting and the possible image formation methods of the Shroud. An article that I and T. B. Kahle published in 1989 covers many of the questions he raised. I also would like to share some additional information that I have not yet published and which was not in our article.

This new information relates to the effect of deterioration products of various organic substances, including paint media and wood resins, which can produce similar images, such as the shroud. The interaction of peroxides and hydroperoxides on cellulosic materials can produce the type of discoloration seen on shroud fibers (Daniels 1988). The Conservation Analytical Laboratory (CAL) of the Smithsonian Institution has investigated the complexity of the transfer of images onto adjacent materials (Padfield, Erhardt & Hopwood, ms.). In images formed in frames by transfer from pictures of various kinds, one often notes on the glazing that a substance has formed on the surface of the glazing. This substance can be rubbed off with a finger. Padfield and others at the CAL analyzed one example of such an image transfer and found the substance to be mainly sodium chloride and an organic material with surfactant properties. The salt was present from the picture's salted silk. A liquid, mobile phase of deliquescence was apparently the main agent of transfer, aided by the surfactant. Relative humidity and even weave structure were transfer factors. As we noted in our study (Caldararo & Kahle 1989), textile fibers and finished textiles are often treated prior to manufacture to prepare the fibers for weaving or use. Chemical interactions of agents used in such treatment can be active in image transfer and image formation.

The CAL study involves only one type of image transfer in picture frames. Several very different types exist, for example, image transfer to back mats in matted works of art and photographic latent image transfer of un-neutralized reagents. I hope this information is of interest to your readers.

Sincerely,

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## REFERENCES

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