ARTICLES (3)

A SCHOOL SINDONOLOGY PROJECT

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It was the scientific research that had been carried out on the Turin Shroud that first caught my attention to it some twenty years ago. To be able to uncover so much information from pollen grains and weaving styles and liquid flows was a fascinating realisation. I wanted to share this intriguing aspect of Science with my students. The Turin Shroud is considered by many to be a bemusing subject, judging by the reaction of my own family, friends and teaching colleagues. It is often classed among the fringe areas of science and even 'non-sciences' so I thought I would do what I am supposed to do as a teacher and educate! The International Baccalaureate (IB) is a widely recognised high school diploma. The fourth of the six areas of study is Science. In order to obtain the IB diploma, students have to take part in a Group Four Project, a science research question where they are graded on their personal skills of cooperation and independent learning.

My first Shroud based project took place in 2000. It was a successful venture, so much so that a similar version has been given every four years since. The aim each time was definitely not to find the way that the real Turin Shroud image was formed, but was to give students the experience of what Shroud Science research was like.

I have experimented with two types of body images over the years. In the first version (Fig. 1) I take a cotton bed sheet, dowse myself in fluorescein sodium (the yellow colour found in marker pens) and make an image of myself sandwiched inside the bed sheet (thanks to the help of an over-enthusiastic wife and daughter applying enough external pressure to ensure good contact!). In a second version (Fig. 2) I lie inside a bed sheet and my son rubs iron hydroxide powder (i.e. rust) onto the outside as if doing a brass rubbing.

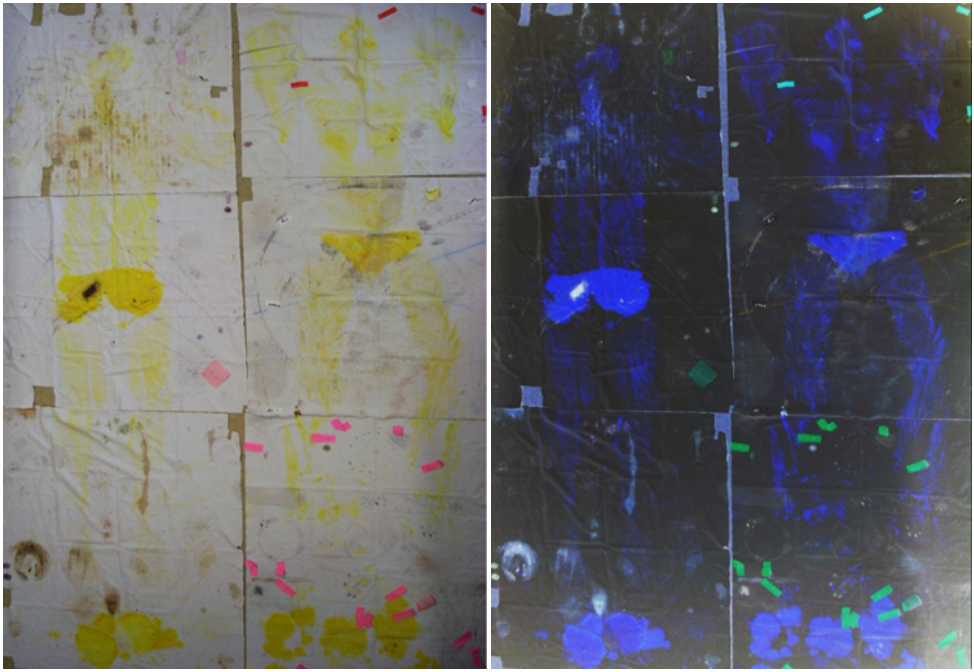


Figure 1. Fluorescein Sodium Yellow (positive and negative)

With my daughters' help we rub pollen grains from wild flowers into the cloth and add various stains, burns, imprints and debris. Finally some messages written in invisible UV ink in various languages are included to give clues. The cloth is then split into six sections, one for each of the groups of six students, but they are not told that they all come from the same original piece of material.

They are then asked: 'What is the history of the cloth and how does it link to the other pieces?' In order to focus the students and get them started they are asked to identify:

- a type of pollen from a set of 20 or so flowers.
- a white powder or powdered metal from a set of 12 or so samples.
- their cloth material from a set of 20 or so samples.

Figure 2. Iron Oxide Rubbing. (positive and negative)

The rest of the investigation is up to them as I put so many items in to find that they will never be able to find them all in the time given. They are encouraged to consult Shroud research references to find hints as to what they might do. I don't even tell my science teaching colleagues what is going on so that they remain as objective as possible. Then I sit back and watch.

The pollen is a challenge for most students; they don't have the patience to look for it, although making sample slides from flowers is no problem, Figure 3 shows a slide of daisy pollen made directly from a flower, while Figure 4 shows a sticky tape rubbing from their 'shroud sample' with a few pollen grains among the cotton fibrils.

Figure 3. Pollen from a Daisy

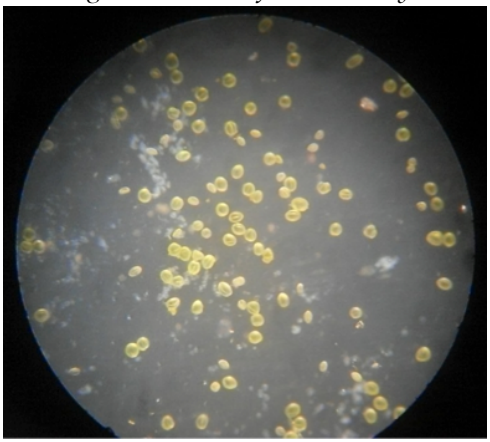
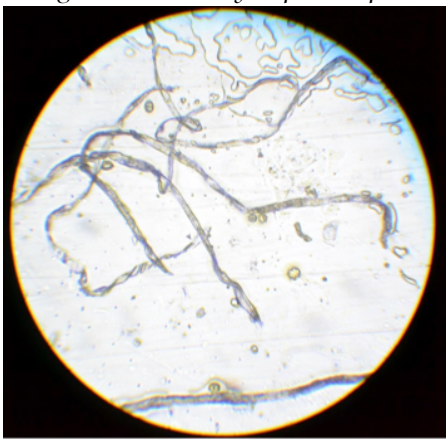


Figure 4. A Sticky Tape Sample



Some students took considerable trouble to research and then spend several hours over this, peering through their microscopes to find the odd grain and identify it.

Identifying the white powders and metal dust were much more successful ventures as our labs have micro-chemical kits and such tasks are part of the normal IB program (cation and anion tests and displacement reactions, for those in the know!). As for identifying the cloth itself, this was as demanding as the pollen search. Most students didn't bother to research the methods used by previous researchers and instead created their own. One tried actual density from mass/volume but measuring the cloth thickness (less than a millimetre!) with callipers just squashed the material. Finally one student cut off a small sample, photocopied an enlarged image onto graph paper, counted squares to find the area and with mass they calculated the mass per unit area. At the same time they counted the number of weft and warp threads per centimetre and successfully identified the cloth (in spite of my having deliberately aged the control sample to try and put them off).

It didn't take the six groups long to realise that their pieces of cloth fitted together like a jigsaw. Figure 1 shows the fluorescein sodium version after being cut and reassembled. It is slightly distorted having been orthogonally corrected in Photoshop by my colleague Dominique Dubois from a photo taken at an angle. The fluid flow marks and blank parts due to folds are all clearly visible as are such things as my wedding ring. There is a weak resemblance to the real shroud image to the untrained eye, but such things as the nose image gives away the method. Note (see Figure 5 as it is clearer) how the point of the nose has left an imprint but it is surrounded by a blank ring where the fluid did not touch the cloth because the cloth did not touch the skin. The students not only identified the image as me, but also tracked down the chemical, and one volunteer covered himself in the same fluorescent yellow and reproduced the image. They were very proud of that! They turned a UV light on the cloth after reading about it in the literature and were rewarded with the hidden messages written in invisible ink.

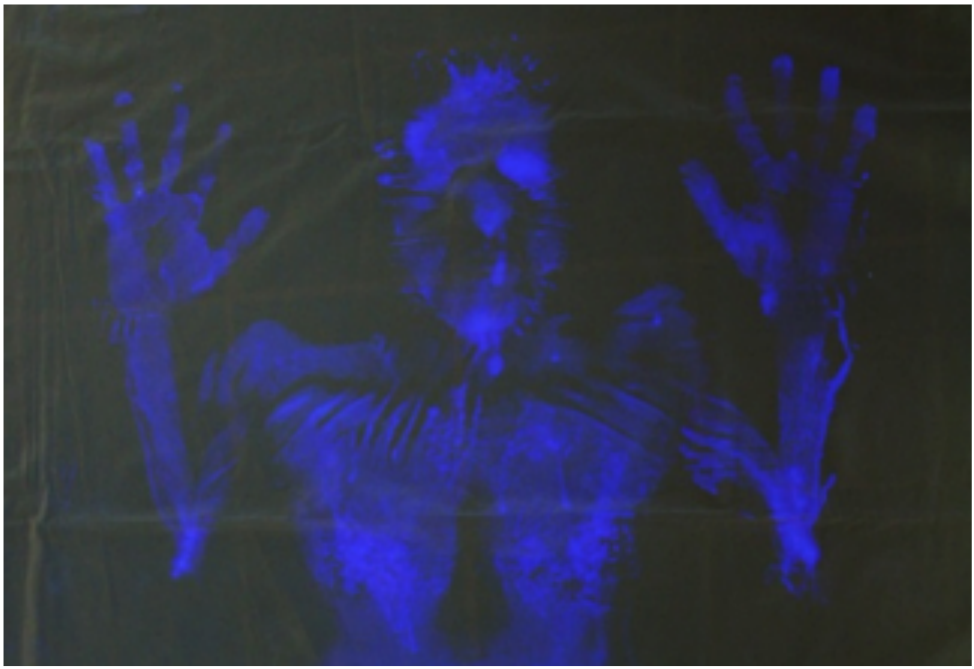


Figure 5. Enlargement of the negative of a fluorescein sodium version.

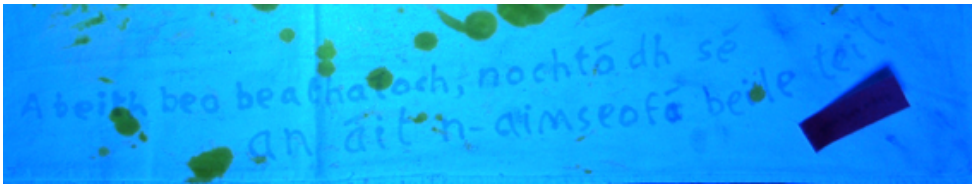


Figure 6. 'Secret message' revealed under ultraviolet light.

(see Figure 6 as an example). A dozen different languages were used and I think the students had most fun in this aspect trying to decipher them. One said it was like a real life Da Vinci Code.

The rust image, positive and negative, is shown in Figure 2. It was curious just how skeleton-like both images were. Note that you can also see my watch and as with such contact images, you also get the 'moon' face effect as the cloth on the sides of the face were rubbed. There are some

superficial similarities to the actual Shroud image but as I said this was not an experiment to find out how the real image was made, but more to expose students to genuine research techniques and hopefully recognise that sindonology is a serious science. Again the students correctly identified the rust powder and how the image was made.

I heard that one of my teaching colleagues had said they would not let their children take part in such a project due to its link with religion and one of my in-laws said that he would have refused to take part had he been a student for the same reason. Apart from those isolated opinions the general consensus was very positive. The students and teachers who took part gained more respect for the subject and the rest of the school, which came to visit their presentation, were suitably fascinated, especially as this young group of 'sindonologists' created many interactive stands allowing everyone a chance to experience the fun of Shroud research.

Following my previous practice with Hugh's ingenious experiments, here is what ImageJ makes of the images above. I shall leave readers to draw their own conclusions!

Image made by smearing a body with fluorescent ink.

Image made by rubbing a body with rust.