THE STORY OF NAPOLEON'S WALLPAPER

In 1815, after his defeat by the British at the battle of Waterloo, Napoleon Bonaparte was exiled to the remote island of St Helena. Just six miles by eight, St Helena is a tiny volcanic island south of the Equator, lost in the vastness of the South Atlantic Ocean. The nearest land is Ascension Island, 700 miles to the north. Africa lies a thousand miles to the east, South America a thousand to the west.

During most of his exile, Napoleon lived in Longwood House with his small retinue of about 20 people - as well as servants, some of his generals had chosen to go into exile with him. He passed the time by dictating his memoirs, and by playing billiards, which he did rather badly.

Although Napoleon often dreamed of escape, he was never to leave the island, and he died there six years later in 1821. Napoleon was initially buried on St Helena, but his body was later removed and re-buried in Paris on the banks of the Seine, as had been his wish.

The doctors who carried out the post-mortem on Napoleon were of the opinion that a perforated stomach ulcer which had turned cancerous was the main cause of his death. And there the matter might have rested, except that a number of his staff had kept locks of Napoleon's hair, which were subsequently passed down the generations, sometimes coming up at auction. Unbeknown to their owners, these treasured locks of hair contained something of a small historical time bomb.

One of those samples of Napoleon's hair, when analyzed using modern scientific techniques in the 1960s, was found to contain significant quantities of arsenic. Suddenly the cause of Napoleon's death was being debated all over again. 'The Murder of Napoleon' was the title of one book that was published. But had the British really poisoned their most famous prisoner? Or were the French Bourbons so unwilling for Napoleon to return that they had had him poisoned? Did one of his staff have a secret grudge?

True, Napoleon had got on very badly with the British Governor of St Helena, Sir Hudson Lowe. And in his will Napoleon claimed that he had been 'murdered by the British Oligarchy'. But was that claim just part of his long standing 'war of words' with Hudson Lowe? Certainly for a man who had conquered most of Europe it must have been very galling to be confined on a tiny island in the middle of nowhere. But for all the speculation, there was very little actual evidence of any murder plot other than the fact of the arsenic in the hair.

Arsenic Poisoning

Since the Middle Ages, arsenic had been a popular way of poisoning people. Arsenic itself is a grey metal, which is not very poisonous. It generally occurs in nature as a mineral, arsenic sulfide (arsenikon is the Latin word for yellow pigment), but another form is white arsenic, or arsenic oxide. This is extremely poisonous, although the symptoms of arsenic poisoning could be confused with those of many other illnesses, and it was also very difficult to detect arsenic after the death. All in all, a handy way to get rid of someone.
Politicians, popes and parents were all victims at different times. Indeed white arsenic became known as 'inheritance powder'. Arsenic poisoning happens because arsenic binds very strongly to sulfur groups. Many proteins contain one or more sulfur atoms, and enzymes (also proteins) are responsible for regulating the body's internal chemistry. An enzyme with an arsenic atom bound to the sulfur will not be able to function. Hair is interesting because the protein keratin contains sulfur atoms. If you ingest arsenic, then some of it will bind to the sulfur atoms in your hair, and a sample of hair will last a long time. Since hair is constantly growing, it can even show how the level of arsenic in someone's body can change over time. There was a poisoning case in the 1950s when a Sergeant Marymont murdered his wife. Modern analytical techniques found bands of arsenic in her hair, which corresponded to the times that he had been home on leave. He had increased the dose each time he was home, until finally he killed her. But these advances in forensic chemistry are relatively recent.

However in 1832, 11 years after Napoleon's death, there was an interesting and significant development for the followers of arsenic poisoning. A certain John Bodle was brought to trial in the UK, accused of poisoning his grandfather by putting arsenic in his coffee. James Marsh was the chemist called by the prosecution. He carried out the standard test of the time, which was to pass hydrogen sulfide gas (the one with the 'bad egg' smell) through the suspect solution. If arsenic was present, it would be shown by the appearance of a yellow precipitate of arsenic sulfide. Unfortunately, although James Marsh did find arsenic, the yellow precipitate doesn't keep very well, and by the time it was shown to the jury it had deteriorated. The jury was not convinced, and John Bodle was acquitted.

James Marsh was somewhat angry, especially when John Bodle later confessed that he had poisoned his grandfather after all. And so James Marsh set out to devise a better test. The result was the 'Marsh Test', which worked by adding zinc metal and sulfuric acid to the sample suspected of containing arsenic. If arsenic is present, the resulting chemical reaction converts the arsenic into arsine (each arsenic atom has three hydrogen atoms attached) which is a (very poisonous) gas. This gas is then passed along a heated glass tube, which causes the arsine gas to decompose, and the arsenic metal is deposited as a silvery-black film on the sides of the tube. The tube can then be sealed, and kept as evidence. Not only could minute amounts of arsenic be detected, but the test was very specific, since virtually no other element behaves in this way. With a chemical test this good, the age of the arsenic poisoners was drawing to a close! The only problem with the chemical test is that your arsenic-containing sample is used up in the course of the test - in that sense it is a destructive test. And the Marsh Test is not sensitive enough to be able to detect arsenic in hair samples. In the 20th Century, techniques such as X-ray fluorescence spectroscopy replaced the Marsh Test. These non-destructive tests are incredibly sensitive, and can detect really tiny quantities of elements. James Marsh would have been amazed!

Of course Napoleon had died some years before the Marsh Test was devised, and in any case no-one had suspected arsenic poisoning at the time.

The Wallpaper

The story of Napoleon's wallpaper really begins in 1980 when Dr David Jones, a chemist at the University of Newcastle, was making a radio program that was broadcast on the BBC. 'I wonder
if anyone listening', David Jones asked the radio audience, 'knows the color of Napoleon's wallpaper on St Helena. Because if we knew, it might just help to clear up a scientific mystery'.

Why did David Jones want to know the color of Napoleon's wallpaper? He wanted to know if it could have contained arsenic!

The subject of the radio program had been vapor chemistry, and one of the stories that David Jones, himself a chemist, had told was the intriguing one of Gosio's Disease. During the 19th century there had been a number of cases of arsenic poisoning that had rather puzzled everyone. Some people just became sick, but others laid low with a lesser malady became sicker still, and died. Arsenic was found, using the Marsh Test, foul play was sometimes suspected, and relatives accused. But in many cases it just didn't seem possible that the person had been deliberately poisoned. Until in 1893 an Italian Biochemist called Gosio worked out what was happening.

Scheele's Green was a coloring pigment that had been used in fabrics and wallpapers from around 1770. It was named after the Swedish chemist Scheele who invented it. The pigment was easy to make, and was a bright green color. But Scheele's Green was copper arsenite. And under certain circumstances it could be deadly. Gosio discovered that if wallpaper containing Scheele's Green became damp, and then became moldy (this was in the days of animal glues) the mould could carry out a neat chemical trick to get rid of the copper arsenite. It converted it to a vapor form of arsenic. Normally a mixture of arsine, dimethyl and trimethyl arsine. This vapor was very poisonous indeed. Breathe in enough of the vapor, and you would go down with a nasty case of arsenic poisoning.

This was the reason for David Jones's question to the radio audience. David Jones knew of the arsenic found in Napoleon's hair. But if Napoleon's wallpaper had been green, it could possibly have contained arsenic, and this could have been the source of the arsenic in the hair sample. Napoleon might have been an early victim of Gosio's disease. It was rather a long shot, and David Jones didn't really expect anything to come of it.

But a few days after the broadcast David Jones received a letter from a woman called Shirley Bradley who lived in Norfolk, UK. The contents of her letter were to prove, according to David Jones, 'the greatest piece of scientific good fortune of my career'.

Shirley Bradley didn't have a theory or a story about the color of Napoleon's wallpaper. She had an actual piece of the wallpaper itself. In fact, what Shirley Bradley had was a scrapbook, which had been handed down to her. The person who had owned the scrapbook had filled it with little poems and religious reflections. All the pages were dated. And one page was all about St Helena. The author of the scrapbook appeared to have visited St Helena in 1823. There was a leaf, taken from the tree that stood above Napoleon's grave. There were various observations about the island. And there, stuck to the page, was a small scrap of paper.
Next to the scrap of wallpaper, the old fashioned copper-plate handwriting reads: ‘This small piece of paper was taken off the wall of the room in which the spirit of Napoleon returned to God who gave it’.

The wallpaper showed a single star. The principal colors of this star were green and brown. It is possible that the brown had faded, and had originally been gold. Gold and green were the Imperial colors. The first question David Jones had was whether the wallpaper did actually contain arsenic. Shirley Bradley gave permission for the fragment of paper to be removed from the book, and subjected to the same non-destructive scientific tests that had originally found the arsenic in the hair sample. And yes, the green pigment did contain arsenic. David Jones remembers clearly standing in the lab with a colleague watching the arsenic peak appear on the print-out. As he says, ‘It was a crazy, wonderful moment’.

So it began to look as if Napoleon might have been a victim of Gosio's disease, poisoned not by the British authorities, but inadvertently by the British wallpaper makers, with their drop-dead sense of decor. What other evidence was there for this hypothesis? Ten years after David Jones made his radio program, I had the pleasure of making a television program with him, all about this story. For the television program we were able to do something that David Jones had not been able to do before - travel to the scene of the crime, and visit St Helena itself.

**St Helena**

St Helena is, if anything, even more remote today than it was in Napoleon's time. Then, it lay on the route of the tall ships sailing around the Horn, and there could sometimes be as many as fifty ships anchored in James Bay, on the way out around the Horn, or on the way home.

But the sailing ships stopped calling a long time ago. Now almost the only visitor is a single ship that makes the two-month round trip from the UK, via Ascension and St Helena, down to Capetown, and then back again to the UK. There are five and a half thousand residents on St Helena, which is a British island, and the only way on to the island or off it is by sea. There is no airport.
Our filming trip was more adventurous than we expected, since we got stuck on Ascension Island because of problems with one of the engines of the ship. But we did eventually arrive at St Helena, after various adventures, 3 weeks after we had left the UK.

What did we find at Longwood House? Well, Longwood is quite high up near the middle of the island and is certainly very damp. As soon as you walk inside, you can smell the dampness. Now dampness was one of the important factors in Gosio's disease, since this promotes the growth of the mould. While we were filming there was a sudden tropical downpour outside. Afterwards, the warm humidity and fresh smells in the garden were wonderful. But it was clear that this was a damp atmosphere to live in. Longwood has to be redecorated every other year. We noticed that the modern wallpaper in the drawing room was already peeling off in places.

This modern wallpaper also had a pattern of stars on it, although these were blue stars, not green. But how much time did Napoleon spend in the drawing room? And had there really been arsenical wallpaper on the walls of the drawing room 175 years previously?

When Napoleon first arrived on St Helena he had had a lot of freedom, and could ride around the island, go into Georgetown, and talk to the local people more or less at will.

But then a new Governor arrived, Sir Hudson Lowe, who was really worried that Napoleon might try to escape. So he surrounded Longwood with sentries, who had orders to try and keep Napoleon in their sight at all times. Napoleon retaliated by keeping out of the sight of the guards as much as possible, in order to keep the Governor guessing. Around the house were sunken footpaths that Napoleon had ordered to be dug, so that he might walk about unobserved by the guards.

But gradually Napoleon spent more and more time indoors. There was one period of several months when the sentries failed to catch a single glimpse of him. Hudson Lowe must have been having kittens, but he didn't have the nerve to break down the door at Longwood and demand to see Napoleon for himself.
Apparently Napoleon used to keep the shutters in the drawing room closed much of the time. We saw that one of the shutters in the drawing room had two small holes in it, at different heights. Apparently these were used by Napoleon to look outside, without being seen himself. The higher hole was for when he was standing up, the other was for if he chose to sit. Now spending a lot of time indoors is not really a good thing if your wallpaper is poisonous.

**Conclusions**

If the wallpaper was so poisonous, why wasn't everyone else that was there at the same time as Napoleon also poisoned? Well, it may be that they were, since many of the people in Napoleon's retinue at Longwood complained of the 'bad air', and of feeling ill. If you are a healthy adult to begin with, arsenic poisoning will make you a bit sick. Arsenic poisoning causes stomach pains, diarrhea, shivering and swollen limbs. And Napoleon's butler did actually die. Unfortunately no hair samples have come to light of the other people staying in Longwood at that time. It would be very interesting to test their hair for arsenic.

But just how poisonous was Napoleon's wallpaper? The sample in Shirley Bradley's book could be accurately analyzed, but that would not tell you exactly how much arsenic had been in the wallpaper originally of course. Certainly David Jones had seen some samples during the course of his research that were thick with arsenic. His conclusion in this case though, was that the amount of arsenic in Napoleon's wallpaper was not that great, and consequently the amount of arsenic vapor in the air would not have been too bad, otherwise maybe more people would have become sick or died. So the arsenic was not enough to have killed Napoleon. But once he was already ill with a stomach ulcer, the arsenic would have made him sicker. Certainly some of the symptoms he complained about do correspond to those of arsenic poisoning.

But what David Jones's research does suggest is a plausible explanation of why large amounts of arsenic were found in Napoleon's hair. And this weakens the case for suggesting that Napoleon was deliberately poisoned. More evidence could yet come to light that may support one side of the argument or the other. Certainly we only have the word of the author of the scrapbook that the wallpaper did really come from the 'wall of the room in which the spirit of Napoleon returned to God who gave it'. Did they take it off the wall themselves, or did someone give it to them? No other samples of this particular design of wallpaper have ever come to light. But there is one little fact that I find quite intriguing. We know that Napoleon died in the drawing room of Longwood House. When he was very ill he was moved there from his rather small bedroom.

An engraving was made of the scene in the drawing room, with everyone around the death bed. The engraving is supposed to be an extremely accurate likeness of everyone that was present. The nearest thing to a photograph that could be created in 1821. The image is only a low resolution scan, but if you look closely at the engraving itself you can see that the back wall of the drawing room has wallpaper on it. And on that wallpaper there is a pattern of stars...