

A Wet and Mouldy Chemistry Set.
MHS Inventory Number 92768

The Chemistry set (Fig.1) was manufactured by F. Kingsley of London and consists of a compartmentalised cardboard box with wool pads in the two small rectangular compartments and has cotton tape hinge supports. It contains 14 small round tubs of common chemicals, a glass test tube, blow tube, stirring rod and a cork bung, also four glass phials containing chemicals and two rectangular boxes also containing chemicals. The accompanying booklet of instructions describes



Fig. 1 Condition of object on receipt.

forty easy experiments. Chemical cabinets were commonplace by the middle of the nineteenth century, with this particular set dating from around the 1920's.

Due to the adverse conditions and a series of events this object had been subjected to, the cardboard box is in very poor condition. The cardboard is delaminating and falling apart with white mould growth between the lifting layers of cardboard and paper (see Figs 2-6). Added to this, one of the tubs containing carbon powder has leaked all over the interior; covering all the contents. The glass stirring rod has been broken with two pieces remaining but it would appear a small section of it is missing.



Fig. 2 Showing mould growth and carbon powder spillage.



Fig. 3 The base of the box showing the area of lifting paper and delaminating pasteboard.



Fig. 4 The box lid hinge showing extreme delamination of pasteboard and lifting paper.



Fig. 5 The right side of the box showing the large open split in the base.



Fig. 6 Showing the bowed base of the box and lifting paper.

The 14 round lidded cardboard tubs are covered in this carbon dust but are in a much better state than the box itself. Some are damaged to a greater extent but the majority of the problems with these tubs are in the fact that the bases have been pushed up and inwards and those, that still contain their contents, are losing them through the gaps created. The one in the worst condition is that containing 'Iron Filings'. It has suffered due to its contents corroding together to form a large mass. This has meant the lid is now 'stuck' in place and the base is bulging outwards. This has left small gaps in the base from which the few remaining loose filings are being lost. The two rectangular boxes are unopened the paper labels are peeling off. Three of the four glass phials still have their contents and with the cork stopper in place. Two of these three remaining corks have had the cork snapped off, so only half still remains in the phial opening. The third is still whole. The empty phial still has half the cork in place, but again, the top of the cork has been broken off; the glass is soiled and the label is unreadable. All the open ends to the glass phials are rough edged. The other glass apparatus and the cork bung are also soiled with the carbon powder.

Following the initial assessment the conservation procedure was drawn up. For both the box and its contents, as much loose carbon powder as possible needed to be removed after which, further cleaning and removal of mould could be carried out. Then the necessary repairs could be made to both the box, and the chemical tubs, to stabilise them from further disintegration. Both the glassware and the cork bung would need to be cleaned.

After the contents of the box were removed and put to one side, attention was given first of all to the box itself. Loose carbon dust was removed using a micro-vacuum pump with soft sable hair brushes being used where necessary to flick the loose particles into the micro-vacuum, after which, further cleaning of the soiled surfaces was carried out using vulcanised natural rubber sponge. Attention was then paid to the removal of the mould with the same method adopted as that for the removal of the carbon powder. A clean brush was selected and, whilst wearing a dust mask, the mould was dislodged with the brush into the micro-vacuum pump tube. Both the brushes and vacuum pump filter and tubes were cleaned thoroughly after this had been completed. **Figs. 7 and 8 show the box after cleaning.**



Fig. 7 During conservation: the two compartments after surface cleaning prior to repairs.

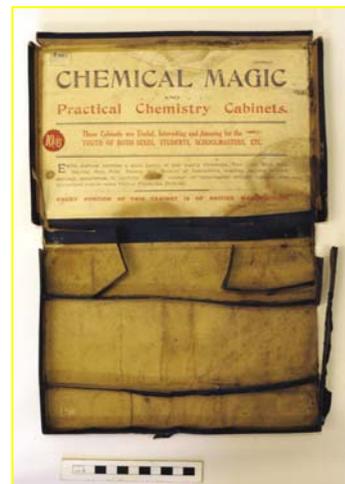


Fig. 8 During conservation: box cleaned but awaiting repairs.

As the box is made from board and paper the adhesive selected was rice starch paste. A fresh amount of the paste was cooked, cooled and sieved. Then, using the Japanese tissue, Tengujo 15gsm (a fine, hand-made Kozo fibre paper; pH7), repairs were carried out on the box where necessary.

Delaminating board and paper layers were also adhered together using the rice starch paste, with a combination of glass weights and lead shot weights being used to keep these repairs flat and in place until dry. The two inner compartments were repaired in the same manner and were then re-adhered back into their original positions using the rice starch paste. The two outer corners of the lid were repaired as much as possible using the Tengujo 15gsm and rice starch paste, then, when dry, the exposed tissue repairs were toned down using gouache pigments so they were not so obvious against surrounding paper (see Figs. 10-13). Finally, the loose piece of cotton tape was repositioned back into place on the right hand side of the box. First, the cotton tape was cleaned as much as possible prior to being inserted behind the original strip of paper (made to imitate a leather finish) that held it in place to begin with (see Fig. 9). This strip of paper had originally peeled away after becoming wet in storage. The box was then set aside and attention turned towards the contents.



Fig. 9 During conservation: repairs made to the box. Paperclip “clamp” in place whilst adhesive dries.



Fig. 10 Tissue repair to the corner of the lid.



Fig. 11 Tissue repairs to the lid hinge prior to being toned down using powder pigments.

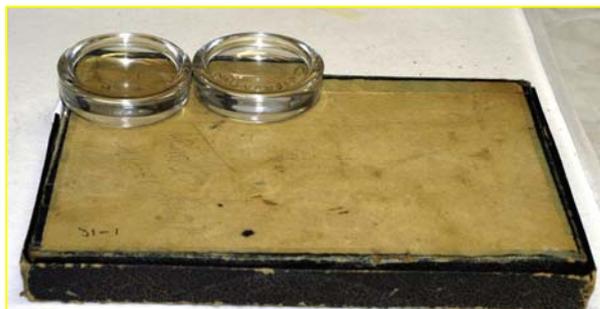


Fig. 12 Glass weights keep the re-laid paper flat whilst the adhesive dries.

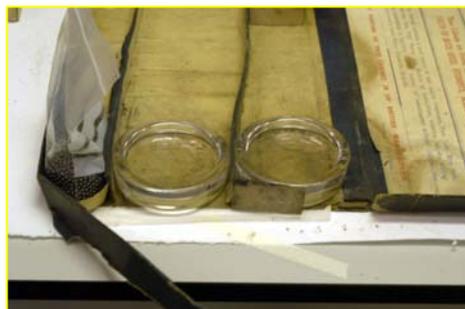


Fig. 13 The first stage of repair to the open split along the right side of the box.

To clean the glassware a solution of 1:1 Industrial Methylated Spirits (IMS) and de-ionised water was used. This was applied using cotton wool swabs with the interior of the tubes being cleaned by wrapping a small amount of cotton wool, dampened with the 1:1 IMS and de-ionised water, around a length of waxed cord and pulled through the tubes. This was repeated with fresh cotton wool that had been dampened with 1:1 IMS and de-ionised water. The exterior of the pots and the cork bung were vacuum cleaned using the micro-vacuum pump, and then cleaned again using vulcanised rubber sponge.



Fig. 14 Examples of chemical element tubs with small repairs made to lids and bases.

The damaged tubs with their chemicals still present had the contents temporarily removed and labelled whilst the interiors of these pots were cleaned first using the micro-vacuum pump and then the vulcanised rubber sponge (see above image). The base disc was and then re-aligned and held into position with small hinges of Tengujo 15gsm adhered into place with rice starch paste. Any delamination of the disc bases were re-adhered together using the starch paste and weighted with glass weights until dry, with the same procedure being used for any lids with the same problem (see Fig. 14). When it came down to the tub containing the corroded iron filings, the lid had to be removed very carefully (as it was stuck initially) and any loose fillings were emptied out leaving the bulk of the filings as one corroded mass stuck to the sides and base of the cardboard tub. The two holes around the circumference of the base were patched up as much as possible with small pieces of Tengujo tissue (15gsm) adhered into place with the starch paste. When this had dried, the loose filings were replaced into the tub.

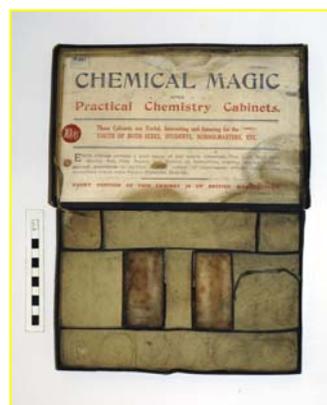


Fig. 15 The box after being cleaned and repaired.

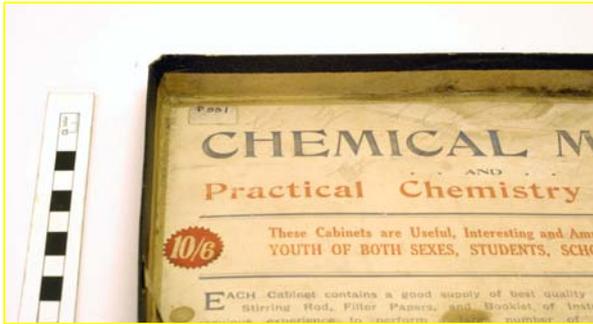


Fig. 16 The corner of the lid after conservation. **Fig. 17** The interior of the box after conservation.



Fig. 18 The delaminating pasteboard and lifting paper adhered back into position.



Fig. 19 Lifting paper and delaminating pasteboard re-laid (NB this is the same area as seen in Fig.3).



Fig. 20 The base of the box after repair to the split along the right side (NB this is the same area as seen in Fig.5).

Finally, to prevent further soiling from the carbon powder, the powder remaining in the appropriate tub was removed and placed within a twist of acid free tissue. The interior of the tub cleaned out, and the tissue twist inserted into the tub.

Figures 15-20 show the illustrated problems after conservation.

All the contents were replaced into the box and the object returned to storage.