George III Silver Microscope

MHS Inventory No. 35086

Fig. 1 Detail of the microscope on receipt.

A very decorative silver combined compound and simple microscope, made by George Adams c. 1763 for King George III. The classical base and pillar support a revolving disc of eight objective lenses with each one having its own specific space. These lenses may be used as simple microscopes on one side or as part of a compound system on the other. There are two specimen stages with positioning screws, and the two mirrors serve the two methods of viewing. The compound body-tube carries a micrometer and there is a pointer between the oculars which can distinguish movement of a ten-thousandth of an inch to measure magnification. It comes with a number of accessories. These include: twelve ivory slides; fish-plate; talc-box; stage forceps; lieberkühn and simple magnifiers. The microscope had previously been cleaned, but unfortunately this was not done systematically and in a very poor fashion. From the amount of corrosion and cleaning fluid residues within the detailed decorative fittings, this was probably done using a water based silver cleaning fluid which had not been thoroughly rinsed nor dried (Figs. 1 and 2).

Fig. 2 Detail showing the degree of tarnishing and corrosion to iron alloy components.

The silver is tarnished very unevenly ranging from yellow, through to the violets and black and there is a vast amount of cleaning fluid residues in the fine details of the silver (Figs. 3 and 4). The iron components are corroded, those components that are meant to move do not due to build up of dirt and corrosion (in the case of iron components (Fig. 5). There are a number of old damages to the object – small buckles and losses in the silver with some re-soldering, especially on the cherubs. There are quite a number of scratches on the silver particularly around the screws, and damage to the screw heads. Quite a number of screws are missing especially to the two figures that surmount the microscope. There is some damage to the knop of one of the cherub pillars; it is dented and has gauge marks in the silver. There are some stress cracks in the silver.

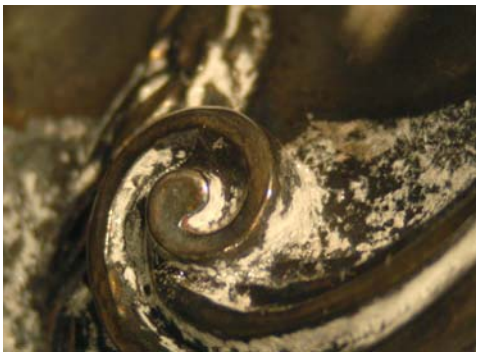

Fig. 3 Photomicrograph of cleaning product residues.

Fig. 4 Detail of cherub and urn before conservation.

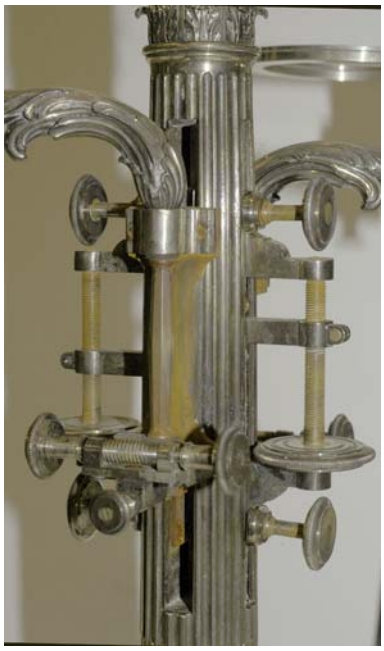

Fig. 5 Detail of corroded iron alloy components.

Fig. 6 Cleaning tests on a cherub.

Cleaning Tests.

Using one of the Cherubs, tests were carried out to determine the best method for cleaning the silver. After consulting conservation literature, this was narrowed down to two following possibilities:

- Goddard's Hotel Silver Dip™ [1], 5% aqueous solution (Fig. 6).
- Hagerty Silver Foam™ [2], a cleaning paste specifically for silver.

Results of Cleaning Tests.

5% aqueous solution of Goddard's Hotel Silver Dip™. This worked well, however given the scale of the project it was decided against for the following reasons:

- The odour: even working under local extraction, this made using the solution intolerable.
- The repeated application of water: using this method meant it was required to thoroughly neutralise the solution after application, which would mean repeated applications of clean de-ionised water.

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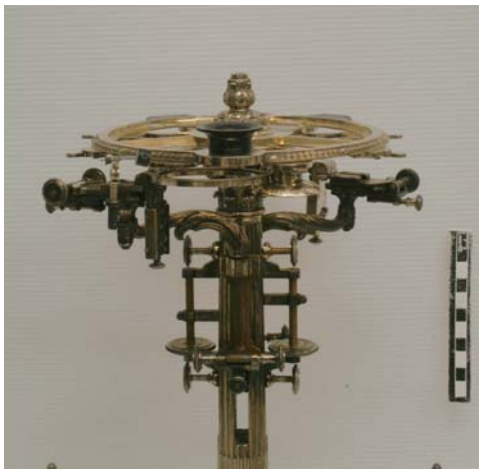
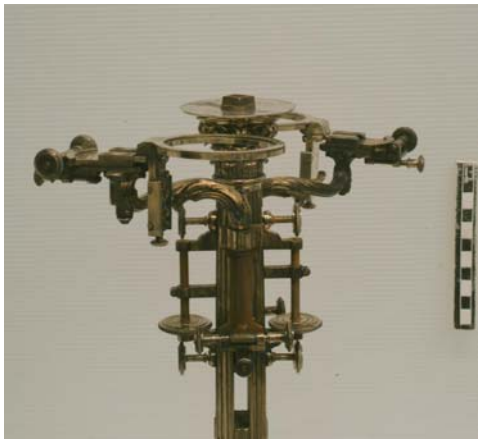
[1] Acidic silver cleaner containing Thiourea (mixture of Sulphuric and Hydrochloric acids).
[2] Contains 5-15% *tetrapotassium pyrophosphate* and < 5% *C12-18 primary alcohol sulphate, sodium salt.*

Hagarty Silver Foam™: this worked very well when applied in a controlled manner. The method of application was as follows. A small amount of paste was scooped out of the tub and deposited onto a watch glass. Then, cotton wool swabs wetted with de-ionised water, were rolled through the paste and then all excess water and paste removed from the swab onto absorbent tissue paper, before being applied to the silver.

The microscope was dis-assembled very carefully. Each section was labelled as they were removed and accompanying photographs were taken at each of these stages. Care was taken not to force any screws that would not move and the screws were kept separate, bagged and labelled to indicate which section they had come from (Figs. 7 - 11).

Figs. 7 – 11 Images show the visual record of the assemblage of the top section of the microscope.





Each piece of the silver microscope was then surface cleaned using Hagerty Silver Foam™ with the above method. This was repeated as necessary to obtain good level of tarnish removal. Intricate areas had to be cleaned with a combination of very fine swabs and also just the end of the cocktail stick dipped in a little of the cleaning paste. The end of the cocktail stick soon splayed out into separate fibres to form a small 'brush'. Small areas were cleaned at any one time, and, after obtaining the desired degree of tarnish removal, the residues of the foaming silver polish were removed using de-ionised water on cotton wool swabs or on soft haired brushes, and then thoroughly dried with absorbent paper towelling. Each area was then allowed to air dry further for at least 24 hours before a protective layer of microcrystalline wax was applied. This wax was applied using a short haired brush and buffed up with a soft, clean cotton cloth. Difficult areas required the cloth to be wrapped around the end of a cocktail stick to do this effectively.

Fe alloy components (excluding screws) were cleaned of corrosion using swabs of 0000 steel wool rolled through a little of the microcrystalline wax to act as a lubricant. This was repeated as necessary until a satisfactory level of corrosion removal had been achieved. Any remaining residues were removed using clean, dry cotton wool swabs. The screws were cleaned of any Fe corrosion using a copper wired brush dipped in a little of the microcrystalline wax. Residues were removed using absorbent paper towelling.

When completed the microscope was re-assembled using the labels and photographic record as a guide (Figs. 12 – 16).

Fig. 12 Overall view after conservation.

Fig. 13 Detail of figures after conservation.

Fig. 14 Detail of iron alloy components after conservation.

Fig. 15 Detail of the base after conservation.

Fig. 16 Detail of cherub after conservation.