

ANALYSIS AND RESTORATION OF AN ITALIAN CASSONE C. 1400

By Richard Higgins

The Renaissance was the great period of the Italian Cassone but the form continued to be made even into the 19th Century. Many examples exist of elaborately carved wood, sometimes inlaid with painted panels. Others, like this piece from Sienna and probably dating from around 1400, were constructed in fruitwood and overlaid with raised gesso patterns, some of which were highlighted with polychromed and occasionally gilded decoration. Depictions of military heroes or religious themes were prevalent.



The quality of craftsmanship evident in this piece has obviously contributed to its remarkable state of preservation and, with the exception of the lid, there is only superficial degradation of the gesso rather than large areas of loss and delamination. Gesso made from calcium sulphate was the standard preparation for Italian panels during the Middle Ages and the Renaissance and the method of applying it is famously described by Cennino Cennini in his fourteenth century handbook for painters. According to his instructions, the first coat should be 'gesso grosso' made from unprocessed calcium sulphate, but the final coats should be 'gesso sottile' i.e. using calcium sulphate that was first heated to produce the hemi-hydrate form, then slaked in copious water to form a precipitate of fine particled dihydrate.

The cassone is structurally fairly sound. The back left hand foot is loose and should be secured. Much of the timber around the base is worm damaged but none of the infestation is active. The convex lid has obviously split badly in the past and been filled with an unknown resin. Although somewhat unsightly, this is sound and serves to stabilise effectively the timbers of the lid. The convex surface has at some point started to flatten out and as such is coming away from its side members, particularly at the front. Unless environmental conditions alter radically, then further movement is improbable. Trying to reverse this condition is very likely to cause other damage to the lid and I would therefore recommend that the existing gaps that are evident be accepted as part of the overall character of the piece. It is unfortunate that, because of this movement and extensive worm attack, the vast majority of applied decoration to the lid has been lost.

The cassone is decorated with raised geometric patterns surrounding shields, guarded by winged beasts and the whole is enclosed by a Latin inscription of The Lords Prayer. The background has been textured and patterned using tools to produce tiny crosses and small circles. Unfortunately, the original gilded and coloured decoration has been lost and the cassone over-painted at a much later date with a thin layer of red brown pigment. There is an extensive fungal growth of a cloudy white appearance over the surface of the gesso which has arisen from adverse environmental conditions. Whilst this is fairly firmly attached to the brown paint, it has not yet penetrated deeply into the composition of the gesso.

ANALYSIS

Five tiny samples of the surface were taken, mounted in resin and cut and polished as a cross-section. Paint from the upper layers and ground layers was dispersed on glass slides and the pigments identified by polarised light microscopy at magnification x 1000. The identity of the metal leaf of sample 1 and the ground layers of sample 3 was confirmed by X-ray analysis using a scanning electron microscope. A chemical test for lead was carried out on sample 3.

Ground

This is calcium sulphate laid on in two or three thick applications of 'gesso' and the craftsmen appear to have followed Cennini's general rule, as the first gesso layer is coarse and made up of large fibrous crystals of dihydrate, while the upper gesso layers are compact and the crystals are very fine. The ground layers are compact and appear to be richly bound with animal glue. The high ratio of glue to calcium sulphate may be partly responsible for the cupping and cracking.

Paint Layers

Two of the five samples are missing the original paint layer, samples 1, 2 and 3 on the other hand, have the remains of seriously degraded decoration which is probably original.

Sample 1 shows the remains of silver leaf over a preparatory layer of reddish clay. The silver probably once had a coloured glaze over the top. The glaze is now dark brown and the metallic leaf has oxidised to black silver oxide.

Sample 2 has the same red clay as in sample 1, however there is no metal leaf visible.

Sample 3 contains particles of a lead pigment - either lead white or lead tin yellow - suspended in a translucent brown oil layer which may once have been coloured. The lead pigment has degraded, forming a grey layer on the outer surface; it has probably been reduced to lead sulphide.

Samples 4 and 5 retain no trace of the early decorative finish, but the gesso layers are the same.

Restoration

Over the top of sample 1 is a coat of red/brown paint. This is resting over degraded varnish and therefore cannot be original. The pigment is an iron oxide of natural origin, of which we are unable to determine the date..

Conclusion

The ground, and the surviving decoration in three of the samples have all the characteristics of genuinely old paint that has suffered badly over time.

CONSERVATION

It was decided that the three main aims of conservation treatment were:

- To remove fungal growth from the surface and to treat the piece throughout with a fungicidal agent in order to kill any spores and prevent re-infestation.
- To introduce a consolidant into the network of cracks and fissures in order to 'shore up' the more fragile gesso beneath to prevent future losses.
- To monitor its environment in order to establish whether conditions are suitable to reintroduce the piece without danger of damage and to advise on any changes necessary.

Treatment

The only structural work undertaken was to secure the back left hand foot which was loose using traditional scotch animal glue. Surfaces were cleaned prior to gluing using a water based gel. It was necessary to use a fungicidal agent which was not water based as this would cause extensive damage to both the overpaint and the gesso and animal glue. The treatment, however, would need to have a low viscosity in order to penetrate below the surface. We applied IMS (95% ethanol: 5% methanol) with cotton wool swabs which would instantly kill mould spores, flow into surface cracks and evaporate quickly without leaving harmful chemical residues. The entire surface and interior was treated and the growth removed. A surprisingly small amount of surface dirt came away.

Subsequently a dilute mixture of paraloid B72 crystals, (B72 20%: Propanone 70%: IMS 10%) was prepared for consolidation of the gesso. Using the same method of application, the brown surface was then wiped down with Propanone/IMS during the process to leave it free of consolidant. Paraloid was chosen because it is easily removable using its carrying agent so that, should future conservators wish to carry out further excavations of the painted surface, they can do so easily and without damage.

Finally, a light coating of microcrystalline wax was applied in order to further protect the surface and revive the red/brown pigment.

We have not been instructed at this stage to remove the later red/brown paint, of which we are unable to establish the date, but on consideration of the analysis results we would not recommend that this be done. Areas where the colour is worn away reveal medieval material, although any remaining original pigments and metal leaf are so degraded that no discernible colours or design would be apparent were it to be totally removed. Although quite contrary to the original gilded and polychromed surface, the water soluble red/brown paint is deemed aesthetically acceptable.

ENVIRONMENTAL MONITORING

The environment of the Chapel at Wenlock Priory was monitored for a three month period between 17th March 1999 and 16th May 1999. Light levels are always low and as such it was not deemed necessary to measure these over an extended period. Sensors for both temperature and relative humidity (RH) were located on the floor immediately beneath, inside and on top of the cassone.

Readings from all three sets of monitors were remarkably similar, which would indicate that the variations in temperature and particularly RH were most dependent upon prevailing atmospheric conditions rather than problems such as damp rising through the floor. If the graphs displaying the readings, which were taken and recorded every 44 minutes, are examined closely, it will be evident also that temperature and RH are fluctuating in line with each other, rather than a change in temperature having an opposite effect upon the RH as one might expect if there were temperature fluctuations caused by the switching on or off of central heating. This would further suggest that the local environmental changes are due to the ambient climactic variation. That being said, we do at times see the RH rising to the 75% region which, if held there for any prolonged length of time, is likely to promote fungal growths.

Given that the Chapel contains other gessoed items, I would recommend that an attempt is made to prevent the RH rising above 65%, (60% would be an ideal upper limit but pragmatism being taken into account would make 65% an acceptable and more realistic limit to achieve). The lower RH recorded of approximately 50% will not cause any problems at all. I would recommend that the simplest and most likely way to achieve the limiting of the highest point in RH is to introduce into the chapel an electrically powered oil filled radiator, controlled with a hydrostat set to operate at 65% RH. Running costs would be relatively low as it would only come into operation for the short periods when the RH rises.



SAMPLE 1.

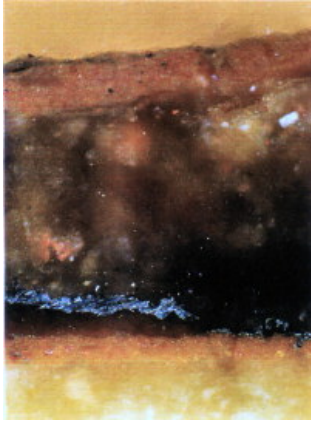
Showing the coarse gesso at the bottom, followed by the finer material above it in several coats.

The yellowish colour is partly due to staining from paint and varnish, and partly due to glue content.

The brown restoration at the top is sinking deep into cracks in the original decoration.



[x 100 magnification]

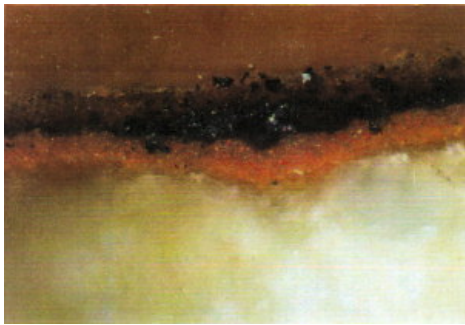


SAMPLE 1.

At the higher magnification showing the oxidised silver leaf, resting on a reddish clay.

Above the silver is a degraded glaze layer, and over that is brown overpaint.

[x 500 magnification]



SAMPLE 2.

The same reddish clay as in sample 1, but the black over the top has the characteristics of charcoal black.

[x 500 magnification]

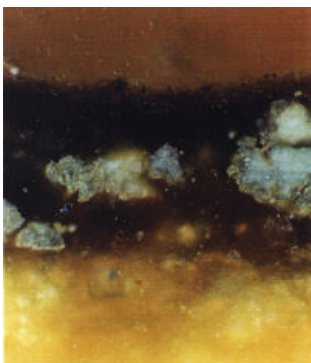


SAMPLE 3.

There is no restoration on this fragment, but the original decoration has become very dark.

The whiteish particles are based on lead, and may be lead white, but traces of tin detected by the SEM suggests that it could be lead tin yellow.

[x 100 magnification]



SAMPLE 3.

At higher magnification one can see that the outer edges of the lead pigment particles have oxidised and gone grey.

[x 500 magnification]



SAMPLE 4.

In this rather broken fragment there are just the gesso layers, with a few brown particles on the surface.

[x 500 magnification]



SAMPLE 5.

Surface of the wood with traces of gesso and paint.

The gesso is very thin compared to the layers seen on the other samples, and what one sees here is probably a damaged area.



The gesso is the same calcium sulphate found in all the fragments.

[x 500 magnification]