

MAKING BRONZES

**A MODERN DAY ART
FOUNDRY AT WORK**



AND HOW TO CARE FOR BRONZE



PETER BURKE



BETH CARTER



ALEX DAVIES



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NEAL FRENCH



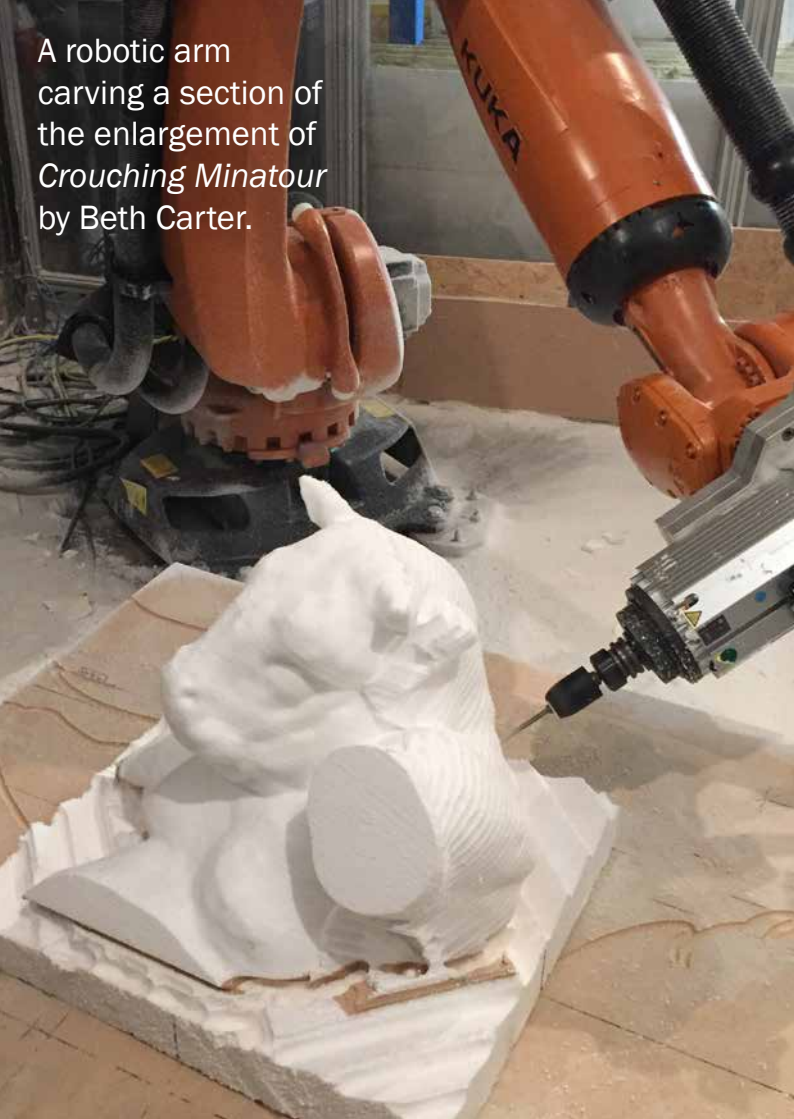
WILLIAM PYE



JON EDGAR

Making bronze art, from figurative to abstract to conceptual to functional – the modern day art foundry needs to be a master of ancient and modern casting to achieve the artist's vision. Using finished sculptures, film, photography, equipment, and work in progress, local foundry Milwyn Casting has put together the exhibition to showcase this magical and exciting art and craft.

A robotic arm carving a section of the enlargement of *Crouching Minatour* by Beth Carter.



ORIGINATION OF ARTWORK

An artist will produce a model by sculpting in clay, plaster, wood or any other material.

Digital modelling and scanning are being used today by artists. The solid pattern or model is made using a 3D printer or, for larger sculptures, robotic arms carve the pattern from high density foam. Using this technology and skilled sculptors, we have the ability to realise any project in any scale the artist desires.

The digital model for
Crouching Minatour by
Beth Carter



Beth Carter modelling
the plaster detail on
carved polystyrene



*Clothed Seated
Outline* by
Barbara Myers
being enlarged by
hand in clay

Moulding the
enlargement of
Crouching Minatour
by Beth Carter



MOULDING

A mould is made of the object or sculpture using silicon rubber. This can pick up detail as fine as a thumbprint. The rubber is then cased in fibre glass to keep it rigid.

If taken care of, this mould can be reused many times and last for years.





WAX MAKING

Molten hot wax is painted and slushed into the silicon mould to produce an exact hollow copy of the casting at a thickness of 6mm.

Once cooled, the wax copy is gently removed from the mould and any seams are cleaned. The wax is then inspected and signed by the artist.

GATING, SPRUING OR RUNNING

are terms used for the network of wax pipes connected to the artwork. Firstly, these allow the wax to melt out and secondly, allow air to escape as the molten bronze flows evenly into the casting.



INVESTING & CERAMIC SHELL

This is a heat proof mould created around the whole wax assembly that can take the heat and pressure of the wax melting out and the molten bronze being poured in.

Historically, materials such as clay, manure, plaster and grog have been used for this process. Ceramic shell is now the most common method, originally developed by the industrial casting sector using silica, zirconia and other refractory materials. This involves a successive wet dipping and dry powder coating or stucco to build up the mould shell layer.



BURNOUT & CASTING

Once the ceramic has dried for a few days in a temperature and humidity controlled drying room, the burnout happens.

This is the process to remove 80% of the wax in the ceramic mould, which is recycled and used for other castings. The other 20% soaks into the ceramic and needs to be heated in a kiln to 800°C for 2-5 hours to burn off any wax or carbon residue and harden the mould. The mould is allowed to cool down to 200°C, and placed into a sand pit to support, insulate and isolate it. Meanwhile, the bronze is melted to a temperature of 1100°C and poured into the mould cavity.





SAND CASTING & VACUUM CASTING

This is a different process to lost wax casting but still a useful skill for the art foundry. It is often used for casting large sections of sculptures such as horse bodies. This can also be used for simple small shapes and forms such as bases.

Sometimes an artist wants the more industrial surface finish you get from sand moulding, as with this sculpture *Janus Heads* by Peter Burke.

Lost wax vacuum casting is used for smaller, finer work, similar to processes used in the jewellery industry.



FETTLING & CHASING

Once cast and allowed to cool over night, the ceramic shell is removed and the network of sprues are removed.

Finer metalwork and joining, by welding, is now done to the surface of the bronze. This process of hand-finishing the bronze to perfection is called chasing.

PATINATION

Now the bronze work is finished the final stage is to patinate or colour the bronze to the artists' desired finish. In an experienced patinator's hands, the surface of the bronze can be made into almost any colour using acids, oxides and heat.



Polished detail for Grenville Davey sculpture, Olympic Park

RESTORATION & MAINTENANCE

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Restoration of X2 Shogun,
by Philip King





CARE OF BRONZE

Bronze is the preferred metal of many artists due to its longevity, casting properties and the rich colour that comes from the oxidation of the surface, the patina. With the use of chemicals (acids and oxides), the artist or art foundry technician can achieve almost any colour and effect on the surface of the bronze by forcing the oxidation process.

Without protection, green oxides will build up on the surface of this copper rich alloy. To protect and seal the patina, wax or lacquer is applied using a brush. Depending on the conditions and handling of the bronze, this thin coat may need to be reapplied to maintain the artwork's appearance.



HOW TO CARE FOR BRONZE

Here are a few tips on how best to care for your bronze and its patina.

MATERIALS REQUIRED

Wax - Renaissance Wax or Beeswax (clear shoe polish is also good)

Brushes - Soft, clean, natural brushes

Buffing cloths - Clean cotton rags to polish the bronze

CLEANING THE BRONZE

Wipe the bronze free of dirt using a clean cotton cloth. If the surface is very dirty, dampen the cloth and gently rub the surface before drying it with paper towel. Ensure the surface is dry prior to waxing.

WAXING

1. Apply wax to the brush using a sweeping back and forth motion. Do not overload the brush.
2. Apply a thin layer of wax onto the sculpture using a circular motion. The surface will begin to look matte. If you are working on a large sculpture, divide it into areas and work on each section separately.
3. Once the wax has dried to a haze, use a soft shoe cleaning brush or clean cotton cloth to gently rub the surface in circular motions until the desired shine appears. Work the cloth in a circular motion.
4. If a better protective coating is required, you can apply a second coat of wax.



DON'TS

- Never use solvents such as xylene or turpentine to clean bronzes as they will strip the wax coating off and damage the patina on the bronze
- Never use car waxes as they may contain abrasives
- If a mild detergent is used to clean the surface ensure it is well rinsed afterwards



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