

BRONZE SCULPTURE EXAMINATION SAMPLE WORKSHEET*

1. The Object

Record No.

Location

Accession No.

Title

Attribution

Provenance

1.1 Description

statuette group of statuettes utilitarian object
iconographic type

quality of the metal surface: of parts/ of overall composition
modeling: detailed rough in the round primary frontal view
cold working: cursory detailed all round finished on front/sides
undercuts/less visible areas finished
cursory description of coating accretions or coating inhibit reading
parts cast separately

1.2 Relationships

prototype:
one of a kind/relict cast part of group/iconographic program
one of a series
other replicas/copies/variants/aftercasts:

1.3 Marks and Inscriptions

signed inscription other marks stamped in wax in metal

2. External Features

2.1 Structure

2.1.1 Parts Cast Separately

** This worksheet was developed by Francesca Bewer as part of her dissertation research and the Renaissance Bronze Project, which was a collaboration between the Decorative Arts and Sculpture Conservation Department and the European Sculpture Department of the J. Paul Getty and the Getty Conservation Institute.*

2.1.2 Problem Areas , Flaws and Repairs

accretions

lacunae losses/not cast holes

thin metal thin in "high points"

shrinkage

porosity: large small overall patches dense

internal breaks through to surface "mauled" surface

pitting: from shrinkage chemical cleaning...

abrasion/wear scratches mold lines from surmoulage dents

breaks cracks radiating from plug or hole

flash: radiating from plug or hole chased/unchased

corresponds to mold line

other

repairs:

new part plug patch new join remounting

mechanical: tang pins rivets mortise and tenon cast-on run-on

screws nuts and bolts sleeve or scarf dove-tail solder

metallurgical: brazing welding

adhesive filler other

2.2 Metal Surface

modeling: rough detailed

polished matte textured concealed by accretions or coating metal visible

abraded microstructure of metal visible color of metal

rough cast cold worked

cold working: for decoration to conceal flaws cursory fine

detailed all round more finished on front/sides in undercuts

fingerprints brush marks modeling tool marks mold marks

chisel: on flashes in flat/rounded surfaces/recesses/fine detail

hammer: on flat/rounded surfaces density

punch: round/oval/square small textured

file: fine/coarse deep/shallow haphazard follow length of body

parallel to joins dense worn filled/covered with surface coating

overall/localized

scraper: dense overall localized chatter marks

wire brush: circular follows length of figures/parallel to joins localized

over entire surface

engraver other

2.3 Surface Coatings

1 2 3 4 toned no. of layers: difficult to ascertain

color opaque translucent un/even streaky splotchy mottled
 flaky cracked bubbled worn
 chemical patination lacquer varnish gold silver mercury amalgam
 drying oil pitch wax other
 corrosion products: iron copper lead zinc enriched depleted
 accretions and artifacts: pigments investment material sand dust/dirt
 organic remains surmoulage mold lines scratches brush strokes

description of layers

samples

2.4 Base and Mount

support: stable unstable extra support included in design composition
 exceeds tensile strength of the metal

integrally cast base figure mounted to: separate metal base mount
 metal base: none round/oval rectangular irregular flat
 high original later marriage
 bottom open filled/blocked with: lead plaster wax resin shellac other
 mount: marble stone wood style

method of attachment:

mechanical: sprues mortise and tenon sleeve or scarf pins rivets
 tang screws bolts dovetail cast-on run-on solder other
 adhesive filler shellac plaster cement resin other
 metallurgical: brazed welded

figure joined to base:

base join to mount:

figure joined to mount:

2.5 Measurements

centimeters/inches

location of measurement	string	calipers
height		
width		
depth		
between		
between		

between		
between		
between		
thickness of metal at...		
circumference of ...		

3. Method of Manufacture

3.1 The Wax

3.1.1 Description of the Original Wax Surfaces

inner surface: smooth rough
 bubble/irregular accretions from air trapped in liquid core
 drip: from wax-wax join slush molding hot pin in wax other
 unidentified accretions
 brush marks fingerprints modeling tool marks corrections in the wax
 outer surface: evidence of modeling molding
 slush mold wax pressed/brushed into mold built up over preformed core

3.1.2 Separately Molded Parts

parts molded separately but cast together:
 parts cast hollow conformity between surfaces: good/little/none
 parts cast solid
 parts cast separately in metal

3.1.3 Joins

wax-to-wax
 thinner "ring" in x-ray denser "ring" in x-ray both
 change of density between parts in x-ray "step" on outer surface

metal-to-metal join:

mechanical:

mortise and tenon sleeve or scarf pins rivets tang screws bolts

cast-on run-on dovetail plug-like feature near cast-on join other

metallurgical:

soldered brazed welded

adhesive filler lead shellac plaster cement resin other

location and description

3.2 Core Material

3.2.1 Description of the Samples

partly/entirely removed mainly extant sample unavailable

inner surface cleaned no obvious access loose pieces

color: pink gray red salt and pepper yellow brown black

texture: coarse grains fine powder lumpy hard friable fibrous sandy
carbon

components: clay sand plaster organic matter brick other

organic: burnt out un/carbonized animal vegetable

location of access, provenance and description of core samples:

3.2.2 Configuration and Relationship to the Wax

profile of core: geometrical contours sharp/soft at extremities

thin/compact shapes conforms with outer surface

preformed carved liquid filled into wax other

3.3 The Metal Insertions

3.3.1 Armature

wire rod

bundle bent hook-shaped T-bar wire wrapped around rod other

pin/nail: round square irregular tapered

end exposed removed left hole pushed in and covered

covered/replaced by: plug patch resin lead other

before core and wax pushed/positioned into: hollow /core-filled wax

iron other material

3.3.2 Core Pins

many few patterns concentrated patches visible on surface

wire rod pin/nail: round square irregular tapered

pushed/positioned into: hollow wax core-filled wax
flashes/cracks radiating from plug or hole
traverses form left corresponding holes
removed pushed in and covered hole left
covered/filled/replaced by: plug patch resin lead other
material: iron (magnetic attraction) copper brass bronze other

location and description:

3.3.3 Internal Core Supports

wire rod nail bundle squiggly hook-shaped
through wax-wax joins inside core length of separately molded part
extends beyond one part goes through metal and core
pushed/positioned into: hollow wax core-filled wax
material: iron copper brass bronze other

3.3.4 Plugs and Patches

plug patch
round square irregular shape shallow long tapering
hammered in threaded
flashes/cracks radiating from plug or hole
material: iron copper brass bronze lead
color
repair of: porosity lacuna other
covering /filling: core pin armature

3.3.5 Other

core and internal material partly/entirely removed
wire/rod/pin in solid wax: wax support chill missed core pin

3.4 The Metal

3.4.1 Composition

bronze brass gun metal other tertiary alloy leaded traces of silver
varies from one part to another

3.4.2 Casting Orientation

sprue ends casting cup wax links cast upside down/right side up other

4. Analytical Studies

specify equipment, materials, settings, date, laboratory, operator
attach pages with results, spectra, graphs and photographic documentation

4.1 X-radiography

kV mA secs distance Pb cassette filters spot

4.2 Energy Dispersive X-ray Fluorescence Spectrometry (EDXRF)

4.3 Microscopy

4.3.1 Stereo- or Binocular Microscope

4.3.2 Polarized Light Microscope (PLM)

4.3.3 Metallographic Microscope

4.3.4 Scanning Electron Microscope (SEM) and Microprobe

4.4 Powder X-ray Diffraction Analysis (XRD)

4.5 Atomic Absorption Spectrometry (AAS)

4.6 Thermoluminescence Dating (TL)

4.7 Gas Chromatography/ Mass Spectrometry (GC/MS)

4.8 Ultra-violet Light

5. Observations and Conclusions

6. Bibliography