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AN OPPORTUNITY TAKEN: THE PROJECT DESIGN FOR A TECHNICAL STUDY OF 26 BRONZES IN THE EXHIBITION ADRIAEN DE VRIES: IMPERIAL SCULPTOR AT THE J. PAUL GETTY MUSEUM

Jane Bassett

1. Introduction

Through scientific analysis, consideration of historic background, and most importantly through careful and thoughtful observation, the conservator can add considerably to the body of knowledge on a specific work, artist, or school. Our role as observer and interpreter can make an important contribution, one that has recently gained broad acceptance in the field of European bronze connoisseurship. This paper summarizes the design of such a project undertaken at The J. Paul Getty Museum in Los Angeles.

In December of 1999, a landmark exhibition of bronzes by the Dutch artist Adriaen de Vries opened in Los Angeles following earlier venues in Amsterdam and Stockholm [1]. The exhibition included 39 bronzes by de Vries, accompanied by a small number of drawings and comparative sculptures (Fig. 1). Although relatively unknown to all but a handful of specialist scholars until recently, Adriaen de Vries was highly sought-after in his day, working for some of the most powerful patrons in Northern Europe. Born in the Hague in 1556, by the age of 25, de Vries was employed in the Florentine workshop of Giovanni Bologna (better known as Giambologna). He then worked as Chief Assistant with Pompeo Leoni on a commission of larger than life-size bronze figures for the Escorial. De Vries then travelled to Turin, Rome, and Augsburg, finally settling in the artistically dynamic court of Emperor Rudolf II in Prague.

Large exhibitions of European bronzes are extremely rare; one devoted to a single artist even more so. Although a few museums have been examining their European bronzes in a more or less systematic way, the relatively small number of well provenanced sculptures by any one artist in these collections means that our resource of comparative data for studying the techniques and materials of a particular artist or workshop is limited. The exhibition presented the unusual opportunity of having a large number of bronzes by a single artist together in one place at the same time—the chance to examine a variety of bronzes from throughout a single artist's career, systematically and under uniform conditions.

2. Organization of the Study

Three goals were set at the beginning of the project. The first was to understand as fully as possible all aspects of de Vries' working techniques. Before the exhibition opened, Dr. Francesca Bewer, Associate Curator of Research at the Harvard University Art Museums had been
contracted by the Rijksmuseum to carry out examinations of a number of the bronzes at their home institutions in order to prepare technical notes and an essay for the exhibition catalogue [2]. Although some of the exams were quite thorough, access to analytical equipment was limited in many instances. The initial survey provided an outline of the sculptor's technique, yet raised many important questions. Many of these questions could only be answered through systematic examination including, most importantly, x-ray radiography. The second project goal was to clarify attribution questions posed by some of the bronzes. The hope was that by more fully understanding the materials that de Vries used, as well as the methods he used for building his models and casting his bronzes, it would be possible to clarify the attribution of some of the works. The final goal of the project was to disseminate the information gathered during the study. It was hoped that as the project progressed, an appropriate format and venue would become apparent. It was clear from the beginning that the time available for the exams would be extremely limited as the loan period could not be extended. Of the thirty-eight bronzes attributed to de Vries in the show, ten had already undergone thorough technical examinations, including bronzes from the Metropolitan Museum of Art in New York, the Nationalmuseum in Stockholm, The J. Paul Getty Museum in Los Angeles, and Lambach Abbey in Lambach, Austria. The remaining bronzes were prioritized based on those we knew the least about technically and on the art historical value of performing the exams. For instance, a very high art historical value was placed on any information that could be gained from comparing the technical details of the two Cain and Abel groups— the only signed compositions of which there are two versions [3]. Permission to carry out the exams was requested directly of the couriers. Without exception, each lending institution that was asked for permission agreed to the exams; in most cases the couriers themselves signed the permission forms. We found it advantageous to be able to explain the examination procedure in person, showing the facilities and describing the steps that would taken. In the end, 26 bronzes were examined: 10 were signed and dated, 9 were not signed but were attributed to de Vries, 2 were believed to have been cast from de Vries models, and 5 were aftercasts or works by other artists included in the show for comparison reasons. A full list of the bronzes included in the examination can be found in Fig. 3. The technical study of Renaissance and later bronzes began at the Getty in the 1980's with the encouragement of the former Curator of Sculpture, Peter Fusco. In 1992, Francesca Bewer was hired to develop an examination protocol and to carry out a detailed technical study of over 40 of the Getty's European bronze sculptures [4]. The examination form developed at that time was adapted for the de Vries technical exams and was used for the examination of each bronze. The form is included as Fig. 4. The examinations were carried out during the installation and deinstallation of the exhibition and during off-hours when the museum was closed, including early mornings and closed Mondays. The work was coordinated by the author with assistance throughout by Laramie Hickey-Friedman, Graduate Intern in Decorative Arts and Sculpture Conservation.
Each bronze was studied in phases including:

1. Interior and core. The large bronzes were examined while slung for installation or deinstallation; smaller bronzes were generally deinstalled and examined on Mondays when the museum is closed.

2. XRF and X-ray radiography. The analytical facilities are located in the Museum Research Laboratories of the Getty Conservation Institute. The large bronzes were examined during deinstallation immediately before crating. The smaller bronzes were generally taken to the analytical facilities on Mondays.

3. Visual exam of the exterior. Portable lights and a binocular microscope were kept in a closet adjacent to the exhibition gallery and were used for surface examinations during off-hours. Measurements were taken with a cloth tape, calipers, and wooden right-angle measuring sticks.

3. The Technical Study

3.1 Core Material

Many of the bronzes are open at the bottom, allowing for examination of the hollow interiors. Even when core and armature had been removed, more than sufficient core always remained in the recesses to yield a sample. Two core samples were removed whenever possible, one for petrographic and microchemical examination, and a second sample for thermoluminescence (TL) dating.

3.2 Petrographic and Microchemical analysis

Petrographic and microchemical analysis of the cores was undertaken in order to determine if de Vries was consistent in the materials that he used for making his cores, and to see if we could determine how his core materials were prepared. It was also hoped that a characterization of "typical" de Vries cores would further the attribution studies of some of the bronzes.

Ron Schmidtling, a consulting geologist to the Getty Conservation Institute, carried out the core analysis. Small core samples were prepared for petrographic analysis by mounting and polishing to 0.03 mm thickness. Components in the samples were then identified using the polarizing microscope. The relative amounts of each component were determined by the analysis of 200 random sites under 400x magnification. The quartz and feldspar grains were measured for mean average grain size and were examined for degree of angularity. The presence of calcite or gypsum was confirmed using microchemical tests. Finally, the cores were recorded with one photomicrograph of the powdered sample before preparation at 10x, and two photomicrographs
of the thin sections, one in transmitted light and one under crossed polars, both at 100x.

3.3 Thermoluminescence Dating

Thermoluminescence dating was undertaken for two reasons. The first was to help date the objects for which the date was uncertain, as one component in the attempt to determine whether or not they were modelled or cast by de Vries. The second reason was to understand more about the use of thermoluminescence dating for European casting cores. The Decorative Art and Sculpture Conservation laboratory has long used TL as an aid in the authentication of fired materials. The technique is complex and does not always yield clear results for European sculpture. The de Vries project presented an ideal opportunity for studying the usefulness of the technique for European casting cores. The sculptures presented three distinct groups: 1) signed and dated by de Vries 2) cast by de Vries at an unknown date 3) artist and date uncertain. Core samples from the first two groups were used for studying the accuracy of the technique. When calculating a date for relatively recent material, there will always be unknown quantities in the equation, leading to a degree of uncertainty expressed as a ± range in the results. In addition, the results from the TL lab which we generally use are reported with a standard deviation of one in which there is a 66% chance that the true date falls within the stated range. The dated bronzes and those long thought to have been cast during de Vries' lifetime were used to compare these calculated results to the known dates.

Whenever possible, at least 200 mg of core were removed for TL dating. The samples were either drilled out under safelight, or chunks of core were removed under ambient lighting conditions, to be further sampled later under proper lighting conditions by the TL lab. Some of the bronzes in the technical study did not contain enough core to warrant sampling. Samples of eighteen bronzes were sent to the Rathgen-Forschungslabor in Berlin. The analysis was undertaken by Ana Manzano under the direction of Dr. Christian Goedicke. A written report was prepared for each bronze that includes a table of measured quantities such as the accumulated dose, the alpha-count rate, and the potassium content. The report also gives details of the experimental procedure and the instruments used.

3.4 X-Radiography

X-ray radiographs were taken of the bronzes to allow a better understanding of their structures (Fig. 2). Francesca Bewer visited the museum twice during the exhibition to help with the interpretation of the radiographs. In all cases, the radiographs were taken after the interiors had been examined and core had been removed for thermoluminescence dating. Radiographs were taken with a Phillips 450 kV tube using Kodak Industrex M film in cassette holders with lead sheet measuring 0.01" in front of and 0.005" behind the film. The most descriptive radiographs were then digitized (grayscale at 304.8 DPI, file size approx. 50 MB), printed and annotated.
The high kV tube allowed penetration of the thicker sculptures that had not been successfully radiographed in the past. For example, in order to produce a good radiograph, it was necessary to shoot the torso sections of the Laocoon from the Nationalmuseum, Stockholm at 400 kV and 10 mA for three and a half minutes at a distance of 1.1 meters.

Positioning the x-ray film in the lead-lined cassettes behind the larger sculptures posed a challenge that was solved by constructing a film holder using tripod parts manufactured for photographers by Bogen Manfrotto. A tripod formed the main support, onto which a 24" horizontal arm was attached. A Bogen clamp on a swivel head was then attached to the arm. The clamp held a custom built u-shaped frame made of tubing onto which a sheet of aluminum was attached. The x-ray film cassette was then strapped to the aluminum sheet, and could be positioned at any angle at a height of approximately 16" to 70" from the floor. Photographer's lead weights were used at the base to keep the tripod from tipping.

3.5 Analysis of the Metal

Semi-quantitative x-ray fluorescence (XRF) was used to determine alloy content. XRF was chosen because it was available, and because it is non-destructive. Since samples do not need to be taken, it was possible to analyze the surface in numerous areas, including separately cast sections, cast-in repairs, plugs, and solder metal. XRF was done after the bronzes had been radiographed because the images indicated the location of features sometimes hidden on the surface. The analysis was undertaken using a Kevex instrument at 50 kV, 3.3mA, with a Ba/Sr secondary target and collimators of 3mm on the x-ray tube and 4mm on the detector with a 200 second acquisition time. The results were normalized to 100% by weight.

4. Results of the Study

The examination protocol developed for the Renaissance Bronze Project and adapted for this study has proven to be a thorough, viable method for examining European bronzes. The numerous categories in the examination form offer a consistent structure for the examination, yet the narrative format allows room for detailed descriptions where appropriate.

The technical study has told us much about the working techniques and materials used by Adriaen de Vries. In some cases, the data confirmed the earlier study done for the catalogue. In many instances though, new nuances were brought to light. The examinations have also furthered the attribution studies for one group of the bronzes.

The gathering of data for the technical study of the 26 bronzes was undertaken part-time during the run of the exhibition. Once permission for the exams had been acquired, the time taken for this aspect of the project was not overbearing. By far the most time-consuming aspect has been
writing the final reports. This has included following through with the analytical results, including such things as: proofing and revising the core reports; additional research into the TL results; and interpretation of the XRF results. In some cases, time has been spent researching the background of individual pieces including their original commissions or their collection history. Finally, in the closing “Conclusions and Comparative Analysis” section, an attempt has been made to compare or contrast each bronze technically to other pieces in the artist's oeuvre.

I feel that the project has been a great success, however one important aspect is as yet incomplete. The final, and ultimately the most important, step of the technical study will be the dissemination of the results. Each of the lending institutions has received a report on their bronze or bronzes, but all of the data should become available for broader use. At present, my hopes are riding on a proposal that has been submitted for publication of the individual reports accompanied by a small number of essays.

5. Conclusion

When an institution mounts a large exhibition of works of art, bringing them from around the world - always at potential risk to each object - it is necessary to step back and assess the goals of the exhibition. These goals will of course vary, but an important one is often to further scholarly research. Yet the scholarship relating to an exhibition is generally done before the opening in the form of a catalogue. During the exhibition itself, visitors gain an increased visual appreciation or understanding of an artist but no record of this aspect of the exhibition is created. In carrying out technical examinations of many of the bronzes while together on loan, we have made an important addition to the body of knowledge on the artist. It is hoped that in the future, technical studies may be considered a requisite to mounting a successful exhibition. In most cases, examinations as detailed as those undertaken for the de Vries exhibition will not be appropriate, yet steps as straight-forward as recording the conservator's visual observations in comparing and contrasting the works will add much to the legacy left behind once an exhibition closes.

It is hoped that this brief report of the logistics of the project can be of use to another institution at some other time, contemplating such an undertaking. We found that the lenders were grateful to receive the technical reports on their bronzes, suggesting that in the future institutions may consider the prospect of such studies a compelling reason to lend to exhibitions where such examinations are planned.

Acknowledgments

This project could not have been carried out without the help of Laramie Hickey-Friedman who offered keen insight in describing the bronzes, lasted through many long days of x-radiography, and oversaw the XRF analysis and alloy data management for each sculpture. I would also like to
thank my colleagues in Decorative Arts and Sculpture Conservation for their constant support during the exams and afterwards as the reports were written. I am grateful to Kevin Marshall and to all of the museum Preparators for their good-natured help and patience in allowing us the time and opportunities to safely carry out the exams. I am indebted to Peter Fusco, Peggy Fogelman, Francesca Bewer, David Scott, and Brian Considine for their open spirit of shared scholarship and collaboration, as well as their unwavering support of my continuing this work.

Endnotes

1. The exhibition was organized by Frits Scholten, Curator of Sculpture at the Rijksmuseum, Amsterdam. The exhibition dates were as follows: Amsterdam Dec. 12, 1998 through March 14, 1999; Nationalmuseum, Stockholm April 15 through August 29, 1999; The J. Paul Getty Museum, Los Angeles October 12, 1999 through January 9, 2000.


3. One resides in The Torrie Collection, The University of Edinburgh, inventory #49. The second resides in the Statens Museum for Kunst, Copenhagen, inventory #5492.

4. Referred to as The Renaissance Bronze Project, each of the Getty bronzes was examined using a form similar to that discussed in this paper. The data has not yet been published but individual inquiries from other institutions for the purpose of comparison are welcome.

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Decorative Arts and Sculpture Conservation, The J. Paul Getty Museum, 1200 Getty Center Drive, Suite 1000, Los Angeles, 90049-1687 (310-440-7177)
Figure 1. The exhibition *Adriaen de Vries: Imperial Sculptor* installed at The J. Paul Getty Museum.
Figure 2. Laramie Hickey-Friedman in the x-ray radiography lab with *Psyche Borne Aloft by Putti* from the Nationalmuseum, Stockholm. Note the tripod adapted to hold the film cassette.
Figure 3. Bronzes examined at the J. Paul Getty Museum during the exhibition *Adriaen de Vries: Imperial Sculptor*

<table>
<thead>
<tr>
<th>TITLE</th>
<th>ATTRIBUTION</th>
<th>INSTITUTION/CITY</th>
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<td>Adriaen de Vries</td>
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<td>Adriaen de Vries</td>
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<td>Charles Crozatier (1795 – 1855)</td>
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<td>Adriaen de Vries (signed and dated)</td>
<td>Kunsthistorisches Museum, Vienna</td>
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<td>Williem Tetrode (ca.1525 – ca.1588)</td>
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<tr>
<td>Christ Mocked</td>
<td>17* C. Italo-Flemish</td>
<td>Los Angeles County Museum of Art</td>
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Figure 4. Examination form used during the study

The J. Paul Getty Museum
Decorative Arts and Sculpture Conservation

BRONZE EXAMINATION REPORT

Title:
Artist:
Lender:
Lender’s Inv. #:
Exhibition Catalogue #:
Date:
Dimensions: H.: cm x W.: cm x D.: cm
Marks and Inscriptions:

Summary Description:

* * *

EXAMINATION

1. Mount

2. Alloy

3. Evidence of the technique of fabrication
   a. Internal metal armature and core supports
   b. Core pins
   c. Core material
   d. Internal surface of the bronze
   e. Method of assembly and joining of individual wax or cast bronze components
   f. External surface of the bronze: evidence of the wax model and of final surface chasing
   g. Surface Coatings

4. Casting defects and foundry repairs

5. Later modifications/restorations

* * *

CONCLUSIONS AND COMPARATIVE ANALYSIS

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