Posthumous Bronzes And The Plasters From Which They Were Cast

A Case Study On Determining Authenticity Based on Physical Evidence

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In today's art world questions concerning the authenticity of bronzes, lifetime and posthumous, too often focus on secondary matters and ignore the most important aspect. Typically the first question posed by experts before inspecting a bronze is, "What is the Provenance?" If it is solid and verifiable with back-up documentation, the expert involved will then examine the object in a positive light. Barring something unforeseen, the authenticity is then almost automatically acknowledged.

Conversely, if the bronze has no provenance, suspicions are raised and often the expert will determine the authenticity is at best questionable regardless of its actual merit. In some instances, the expert involved will not even consider examining or authenticating a bronze unless it has a solid provenance.

Of course, a solid provenance is helpful. However, the most important factor in determining authenticity is the physical nature of the bronze itself, not the provenance. If the bronze conforms as it should in dimensional relationships, forms, surface details and in all other important aspects to the norm of others in the edition, then the bronze is authentic, even if it lacks any provenance whatsoever. If the bronze does not conform to others in the edition, no provenance can substantiate its authenticity.

Fig. 1

A case in point involves the posthumous bronzes of Honoré Victorin Daumier (1808-1879) who made his original sculptures in a water softened modeling clay[1] which he later painted in oil (fig. 1).[2] Daumier was aware his larger sculptures would deteriorate as the clay dried. Around 1850 his close friend, sculptor and molder Adolphe-Victor Geoffroy-Dechaume (1816-1892),[3] made plaster casts of *Ratapoil* (fig. 2) and *Les Emigrants* (fig. 3) for the artist.[4] No bronzes were cast from the plasters during Daumier's lifetime. The Parisian foundry Siot-Decauville[5] cast the first in the 1890s, approximately twelve years after the artist's death.[6]

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Subsequently, more than a thousand posthumous bronzes were made of his satirical character busts (fig. 4).[7] Many were sold for a pittance changing hands often without any documentation.[8] It is also well known that more than one plaster of some Daumier sculptures were made from the artist's clay.[9] Some were also sold without documentation or a provenance. One such plaster, now in the collection of the Musée d'Orsay, wasn't discovered until 1998 (fig. 5).[10] An unknown plaster of *Ratapoil* appeared in the mid-twentieth

Fig. 6

century and was used to cast a 1959 bronze edition. (fig. 6).[11] The plaster needed to be authenticated before legitimate bronzes could be cast. Since the plaster had no provenance or documentation, how could one determine its authenticity?

The same question that challenged those who had to authenticate the Daumier plasters had to be addressed in the case involving the large body of Degas' plasters uncovered at the Valsuani Foundry in Chevreuse, France between 2001 and 2004. As with the Daumier plasters, none were previously documented, known to exist or recognized for what they might be. Further compounding the problem, their only available provenance was provided by the previous owner of Valsuani to its current owner.[12]

Fig. 7

History records that Edgar Hilaire-Germain Degas (1834-1917) created some of his original sculptures in clay, while the majority were made mostly in beeswax sometimes mixed with plastiline (a soft modeling clay). Today they are known as his "waxes."[13] Degas only allowed one sculpture to be exhibited: the wax of his most significant sculpture, *La Petite Danseuse de Quatorze Ans* (henceforth: *"La Petite Danseuse"*) (fig. 7). The wax was exhibited in the 1881 Sixth Impressionist Exhibition in Paris.[14] As with Daumier, no bronzes were cast during Degas' lifetime.[15]

Fig. 8

After Degas' death on September 27, 1917, his heirs and executors found approximately one hundred fifty waxes scattered throughout his residence and studio (fig. 8).[16] The waxes were in various states, some fully formed while others were undeveloped.[17] Eighty waxes were complete enough to inventory, and from those eighty, it was determined seventy-four should be cast in bronze.[18]

In November or December 1919 the Hébrard foundry in Paris began the casting process.[19] The castings continued at Hébrard until 1936.[20] The foundry closed in 1937.[21] After the foundry closed there were several instances of what appeared to be authoritative historic documentation about Degas' posthumous bronzes that later proved to be absolutely and astoundingly wrong.

First, seven years later, in 1944, a catalog raisonné of the artist's sculptures was published.[22] The author, John Rewald (1912-1994), the most eminent Degas scholar of his time, wrote, "All the original wax and clay statuettes were destroyed after the casting."[23] In effect, Rewald stated, as might have been expected, Degas' originals were destroyed circa 1919-1920 when molds were taken from the waxes for the purpose of casting bronzes.

However, in 1955 the art world was surprised when seventy of the artist's original sculptures[24] emerged from the cellar of the Hébrard family's home.[25] They were exhibited at M. Knoedler & Company, Inc. in New York.[26] In the Knoedler exhibition catalog Rewald wrote:

> I erroneously stated [in 1944] that all the original wax statuettes were destroyed after the casting.... I do not hesitate to admit, that I am happy to have been wrong and to see gathered here, for the first time on public exhibition, all the original wax statuettes still in existence....[27]

Rewald later wrote it was, "...a startling and exciting revelation...."[28] The American collector, Paul Mellon (1907-1999) purchased the waxes in 1956.[29] Most are now in the National Gallery of Art, Washington, D.C.[30]

In 1976 the art world was again surprised when a second major body of Degas' sculptural work surfaced.[31] Nelly Hébrard (1904-1985)[32] announced that her father's foundry had made a master set of bronzes, known as the Modèles, from which the bronze editions had been cast (figs. 9 and 10). The only exception was the bronze edition of *La Petite Danseuse,* cast from a plaster.[33]

The Modèles were exhibited in 1976 at the Lefevre Gallery in London.[34] In the Lefevre exhibition catalog Rewald wrote:

> It is regrettable that, through sheer negligence, no mention was ever made of this set. This, like the discovery of the waxes, is an unexpected event....[35]

Fig. 9

Fig. 10

Sara Campbell reported that Martin Summers, who was with the Lefevre Gallery at the time, recalled in 1996 during an interview that, when he was first told about the set, "...we (Lefevre) thought this was impossible...."[36]

Norton Simon (1907-1993) purchased the Modèle set in January 1977.[37] The Modèles are now in the Norton Simon Museum of Art's collection in Pasadena, California.[38]

Fig. 11

Another unexpected event occurred in 2001 when an unknown plaster of *La Petite Danseuse* came to light (fig 11).[39] This was followed, in 2004, when seventy-four other Degas' plasters were revealed (fig. 12).[40] Previously, only eight Degas plasters had been known to exist, four of which have been confirmed to be lifetime to Degas.[41]

Just like the sixty-eight waxes that were not known to have survived until 1955,[42] and like the seventy-two bronze Modèles[43] that were not made public until 1976, these seventy-five[44] plasters were also not known to exist for decades. However, while the waxes and Modèles had a clear provenance link to Hébrard these plasters did not. Therefore, extensive research had to be undertaken to determine their origins and authenticity. While authenticity is the key, what might be learned from the origins could be useful in helping to establish the authenticity, and would, of course, be interesting and important for other art historical reasons.

Fig. 12

The critical question to determine the authenticity was, and is, "Were the plasters made from Degas' waxes?" If the answer is yes, the plasters are authentic. Other questions, such as, "Who made the plasters?" and "When were they made?" are secondary issues that might not determine, or even help determine their authenticity since a provenance might not be accurate or provable. In essence, if the physical evidence substantiates that the plasters were made from Degas' waxes they must be authentic, no matter if it can or can not be determined as to who made them or when.

To establish the plasters were made from Degas' waxes reasonable alternatives had to be considered. (1) Could the plasters have been cast from Hébrard bronzes? (2) Did someone in the Hébrard Foundry make plaster copies by hand as recreations of the waxes for some unexplained reason? (3) Did someone else make the plasters by hand to recreate the waxes? (4) Did someone find the old molds used by Hébrard and make plasters from the molds? (5) Was a computer device used to make the plasters?

Exploring each possibility in order:

First, if the plasters were made from the Modèles or the serialized Hébrard bronzes they would faithfully reproduce the dimensions, forms and details on the corresponding bronzes. They do not. The plasters are larger. Bronze shrinks in the casting process by approximately 2%. Plaster does not. Therefore, if one were to cast a bronze from a Degas wax and also cast a plaster from the same wax, the plaster would be larger (and the bronze smaller) by approximately 2%. Since these plasters are larger, they could not have been cast from the Modèles or from the serialized Hébrard bronzes.

Second, between them, Adrien-A.Hébrard who owned the foundry, his daughter Nelly Hebrard who succeed him and the Hebrard Foundry's master caster, Albino Palazzolo had access to Degas' waxes from 1919 to 1955. Had they wished to make plasters, almost certainly they would have made them from the waxes. It would have been the logical method since the plasters would have been faithful to the waxes in all dimensions, forms and details. Conversely, there would have been no logical reason for the foundry to make copies by hand. Had they done so the plasters would not be very faithful to the waxes and the effort would have been extremely time consuming and difficult.

Third, the suggestion that someone else could make plasters by hand to recreate the waxes is not realistic. Unlike a two-dimensional drawing or painting which would be comparatively easy to copy, for these three-dimensional sculptures it would be virtually impossible. One would need physical possession of a complete set of Degas bronzes, as otherwise certain views and details would remain unknown. Only five sets exist, all in museums, and no institution would loan a set of bronzes for this purpose.

Even if one were able to secure all seventy-four sculptures, the person doing so would have taken molds from the bronzes to make the plasters. Had the plasters been made in this manner they would precisely match the forms, details and sizes of the Hébrard bronzes from which they were made. Since the plasters are larger by approximately 2% they could not have been made from the bronzes. The larger size also indicates the plasters were made from Degas' waxes.

Fig. 13

In any case, realistically, since a set of bronzes would not be available, someone would have to rely on photographs of the sculptures available in books and catalogs. Without exception, they illustrate one or perhaps two sides of a bronze (e.g. two sides of a figure). But the third dimension, such as the top of a head or top of a bronze base is rarely recorded, much less published (fig. 13). In theory, if one had access to a set of bronzes, such as those in the Metropolitan Museum of Art, close-up photographs could be taken. But only a museum employee would be authorized to take the bronze off its shelf or wood pedestal to photograph, for example, the underside of a horse's torso. Therefore it would be virtually impossible to make plasters by hand that would withstand close scrutiny and measurement comparisons.

Fourth, a sculpture specialist suggested that someone may have found the old molds used by Hébrard to cast bronzes and made plasters from those molds. If this were so the forms, details and the relative dimensions on the plasters would very precisely match the serialized Hébrard bronzes in all respects, which they do not. Furthermore and conclusively, since the dimensions on the plasters are closer to the Modèles, only the Modèle molds could have been used to cast the plasters. But the fragile gelatin molds used by Hébrard to cast the Modèles deteriorated circa 1920.[45]

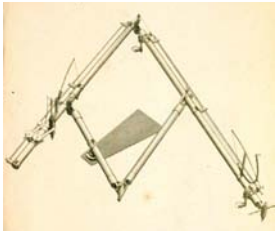

Fig. 14

Fifth, a Degas scholar proposed the plaster of *La Petite Danseuse* might be computer generated, indicating a pantograph might have been used (fig. 14).[46]

Had the plaster been made in this manner it would precisely match the bronzes cast by Hébrard. Yet many elements and details on the plaster do not match any Hébrard bronze. Therefore, the previously unknown plaster of *La Petite Danseuse* could not have been made using this method nor, for the same reasons could the smaller plasters have been made using a pantograph.

Furthermore, while modern computer scanning and computer numerically controlled (CNC) modeling techniques could conceivably reproduce the myriad exact forms and details of a wax or bronze and from those files produce a plaster, this technology has only been in existence since the mid to late 1980s whereas, as documented further herein, the plasters date from an earlier period. Moreover, one would need the original waxes or a complete set of bronzes to scan. Yet access to the waxes or a complete set of bronzes would not have been possible during the era in which such technology existed.

Taking all of the above into consideration and that no other alternative appears to be reasonable, the plasters were likely made from Degas' waxes.[47]

What Evidence Supports This Conclusion?

Among the most compelling components of evidence are the 300 internal measurement comparisons made between the Modèles and plasters. The Modèles were the first bronzes cast from Degas' waxes circa 1919-1920.[48]

The measurement study was undertaken to determine whether (a) the plasters were made directly from Degas' waxes, or (b) if they were cast from Hébrard bronzes that were made from the waxes. It is well known that bronze shrinks by an average of 2%[49] as it cools from its molten to solid state. Conversely, it is also well known that plaster does not shrink[50] and faithfully reproduces the artist's originals, the reason why foundries have been using plasters as masters to cast bronzes since the 15th century.[51] Therefore, to reiterate, if one were to make a plaster from a Degas wax and also cast a bronze from the same wax, the plaster would be larger (and the bronze smaller) by approximately 2%.

With this in mind, approximately 300 internal (point-to-point) measurements were taken on the Modèle (master) set of bronzes by Sara Campbell, Senior Curator, Norton Simon Museum of Art and Dr. Gregory Hedberg, Director of European Art, Hirschl & Adler Galleries.[52] For example, the distance from the tip of a dancer's extended right hand to the tip of the toe on her left foot was measured.

The 300 Modèle bronze measurements were then compared to the distances between the corresponding points on the plasters by the independent sculpture conservator, Steven Tatti.[53] In almost every case the measurements on the plasters proved to be larger than on the Modèles by the expected amounts or more (figs. 15, 16, 17 and 18).

These measurement comparisons provide strong physical evidence to conclude the plasters could not have been made from the Modèles (or from any of the other even smaller Hébrard serialized bronzes), for had they been, the plasters would be the same size as the corresponding bronzes. However, since the plasters are about 2% larger than the Modèles in every dimension they could have been made from Degas' waxes.

Tip of Right Hand to Tip of Toe on Left Foot: 64.2 cm

Fig. 15 Modèle Bronze N° 15

Tip of Right Hand to Tip of Toe on Left Foot: 66.1 cm

Fig. 16 Plaster N° 15

Tip of Ear to Tip of Tail: 27.9 cm

Fig. 17 Modèle Bronze N° 22

Tip of Ear to Tip of Tail: 29.0 cm

Fig. 18 Plaster N° 22

The proportional relationships on each figure also support the conclusion the plasters were made from the waxes. For example, the measurements from the tip of a horse's tail to the tip of its' front left hoof, and from a dancer's right finger to the tip of her nose correspond proportionally on the plasters to the same points on the Modèles. This is another indication the plasters were made from the waxes.

Comparing The Plasters To Early Photographs Of Degas' Waxes

Three months after Degas died, Gauthier began photographing the waxes in the artist's studio and apartment. Seventy-two multiple views of fifty-three waxes were photographed between December 29, 1917 and March 28, 1918.[54] Thus, there were approximately eighteen months between the time Gauthier finished photographing the waxes to the time Hébrard began the molding and casting process, which Rewald described " ...[as beginning] at the close of the year 1919."[55]

Comparing the 1917-1918 Gauthier photographs of the waxes with the plasters and Modèles, it is apparent that certain elements on some plasters match the corresponding elements on the waxes as shown in the early photographs, while the same elements on the bronze Modèles clearly do not match the early photographs of Degas' waxes. Therefore we know the waxes changed sometime between when Gauthier's photography was completed (March 1918) and when Hébrard took molds to cast bronzes beginning in late 1919.

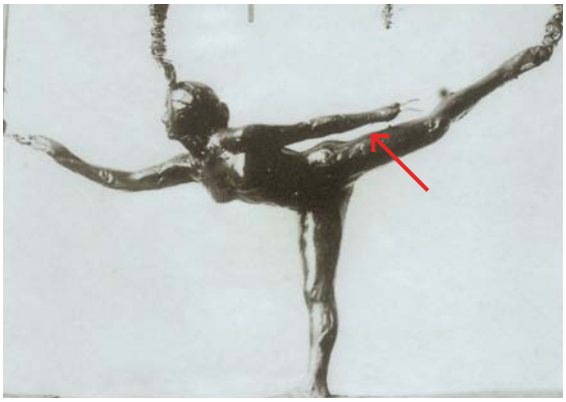

Fig. 19 Degas Wax N° 3 ca. 1918

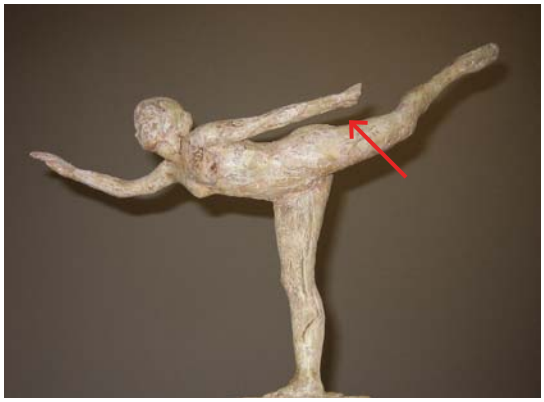

Fig. 20 Plaster N° 3

This is easily observed in figs. 19 and 20, and figs. 21 and 22. Note in fig. 19, when the wax was photographed in 1917-1918, the figure's left arm was extended outward (away from the body). In fig. 20 notice the arm's position on the plaster is the same (extended outward).

Fig. 21 2009 Photograph of Degas Wax N° 3

Fig. 22 Hébrard Bronze N° 3 cast from the Modèle

One can also observe that on the wax as it appears today in fig. 21, and on the Hébrard bronze (fig. 22), the left arm is attached to the figure's buttock and thigh. This indicates the position of the arm was moved after the wax was photographed in 1917-1918, and before any bronzes were cast beginning in late 1919. The Hébrard Foundry's staff apparently changed the arm's position when making adjustments for casting.[56]

This indicates the plaster was apparently made from Degas' wax before the position of the arm was moved and before Hébrard began casting in late 1919. Otherwise the arm on the plaster would be attached to the body as it is today on the wax (fig. 21) and on the Hébrard bronze (fig. 22).

Fig. 23 Degas Wax N° 54 ca. 1918

Fig. 24 Degas Wax N° 54 with Head Reattached

Another example can be found in figs. 23 and 24. In Gauthier's 1917-1918 photograph of the wax (fig. 23) the head was missing. After the photograph was taken Hébrard reattached the head to the wax, so that the entire figure could be cast (fig. 24).

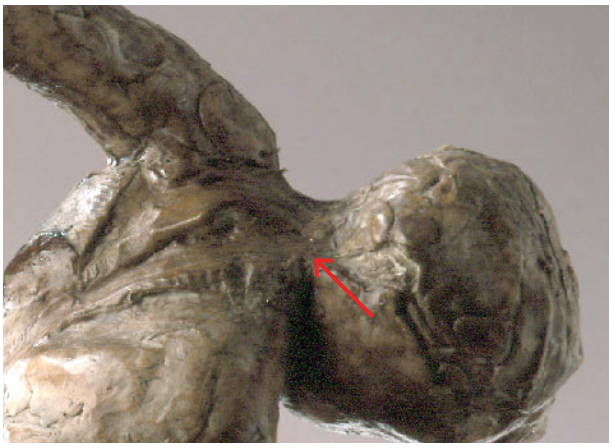

Fig. 25 Plaster N° 54 Detail

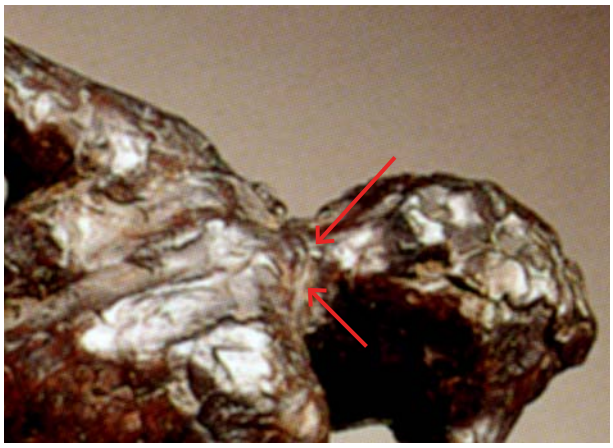

Fig. 26 Hébrard Bronze N° 54 Detail

Close-up details of the back of the head and neck area on the plaster are seen in fig. 25. The same details on a Hébrard bronze can be seen in fig. 26. Note that on the plaster (fig. 25) the forms, details and shapes are continuous across the neck. Yet on the Hébrard bronze (fig. 26) one can clearly see a break in the form and detail of the neck where the head was reattached. This indicates: (a) the plaster was likely made from Degas' wax before the head detached from the neck, (b) the plaster was made before 1917-1918 when Gauthier photographed the wax (without the head), and (c) therefore, it also seems likely the plaster was made before Hébrard reattached the head and began casting bronzes in late 1919.

Similarly, additional evidence can be noted in Gauthier's 1917-1918 photograph of the wax of sculpture number 42 (fig. 27): there is no break in the neck. The same is true on the plaster (fig. 28), no break in the neck. On the Hébrard bronze (fig. 29) a break is clearly evident, providing evidence to suggest this plaster was also likely made from Degas' wax before Hébrard began casting bronzes in late 1919.

Fig. 27 Degas Wax N° 42, ca. 1918

Fig. 28 Plaster N° 42

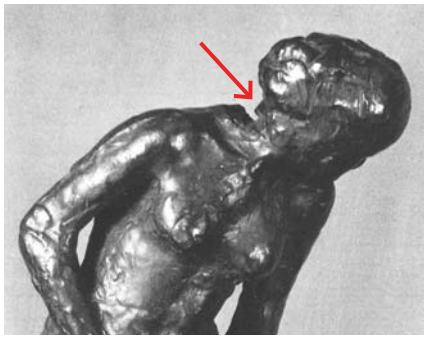

Fig. 29 Modèle Bronze N° 42

Many of the bases on the plasters also compare favorably to the early photographs but differ from those on the Hébrard bronzes. For example, the base on the plaster of sculpture number 34 is double-tiered (fig. 30) thereby matching the wax as photographed by Gauthier in 1917-1918 (fig. 31). The corresponding Hébrard bronze (fig. 32) has a single-tiered base. This provides further evidence to conclude this plaster could have been made from Degas' wax before Hébrard began casting bronzes in late 1919, and that it could not have been made from any of the bronzes cast by Hébrard.

Fig. 30 Plaster N° 34

Fig. 31 Degas Wax N° 34 ca. 1918

Fig. 32 Hébrard Bronze N° 34

Scientific Tests Performed

Early dating of the plasters was substantiated scientifically. While plaster material itself cannot be carbon-dated, fibers embedded in the plasters could. The University of Arizona laboratory performed tests on multiple fibers embedded in plaster number 26, *le Tub*. The results indicate the fibers pre-date 1955.[57]

Fig. 33

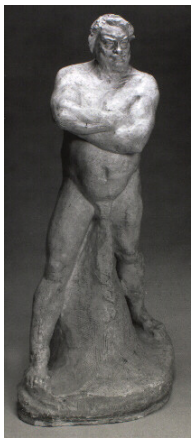

Fig. 34

An independent laboratory in St. Paul, Minnesota, American Petrographic Services performed significant additional tests. Its personnel analyzed the component materials in a Degas plaster (fig. 33) and compared them with the component materials in a certified lifetime (pre-1918) Rodin plaster (fig. 34). A modern plaster (circa 1995) was also tested.[58] The component materials and percentage ratios in the Rodin and Degas plasters were consistent.[59] The modern plaster contained materials not found in the Degas or Rodin plasters.[60] These results provide evidence to conclude the Degas plaster was made during the same period as the Rodin (before circa 1920).

In its analysis the laboratory also rebutted a key point raised by some museum conservators, who concluded the reason plasters are larger than bronzes is because, in part, "…. plaster expands upon setting."[61] While it is well known by foundries and most sculpture specialists that plaster does not expand, it was nonetheless important to scientifically test a Degas plaster for confirmation. The petrography laboratory reported: "None of the minerals observed in the Degas sample were susceptible to expansion" and "No evidence of expansion was observed."[62]

Could Some Plasters Have Been Made During Degas' Lifetime?

Some plasters are indeed known to have been made during his lifetime, four of which were previously documented.[63] The evidence leads to the conclusion more were made. This is based on the following facts.

Degas died on September 27, 1917 and Gauthier began photographing the waxes on December 29, 1917.[64] Thus, there was only a three month period in which someone could have modified the waxes between the

time Degas died and photography began. However, the heirs and executors mandated that no one should make any changes to the waxes until photographs were taken. Joseph Czestochowski reports:

> To eliminate any potential questions of authorship, [the executor] Durand-Ruel immediately hired the photographer Gauthier (dates unknown), to document the artist's original "unaltered" sculptures as found in his studio.[65]

Since it was ordered that no changes to the waxes could be made between the artist's death and when photography was completed, one can hypothesize a plaster with elements that do not match the 1917-1918 photograph must have been made before Degas died in the following sequence: (a) Degas made the wax, (b) a plaster was made from the wax, (c) after the plaster was made Degas modified the wax or it was damaged, so that (d) by the time the artist died some aspects on the earlier plaster no longer conformed to the corresponding aspects on the wax when photographed in 1917-1918. This would be evident by comparing a plaster to Gauthier's early photograph of a wax.

For example, consider sculpture number 26: a figure bathing in a tub.

Observe on the plaster (fig. 35) the top of the tub's rim is thin and continuous (without breaks) indicating, just like the figure inside, the rim was made with wax and plastiline. In the 1917-1918 photograph of the wax (fig. 36) and as it exists today (fig. 37) the rim is thicker, with breaks. Daphne S. Barbour and Shelley G. Sturman of the National Gallery of Art, Washington, D.C. report, "A 3-4 millimeter thick strip of lead broken in places, rather than a true metallic basin with sides and a bottom, was used to delineate the surround of the tub."[66] This demonstrates the tub element was changed from wax and plastiline to lead.

Fig. 35 Plaster N° 26

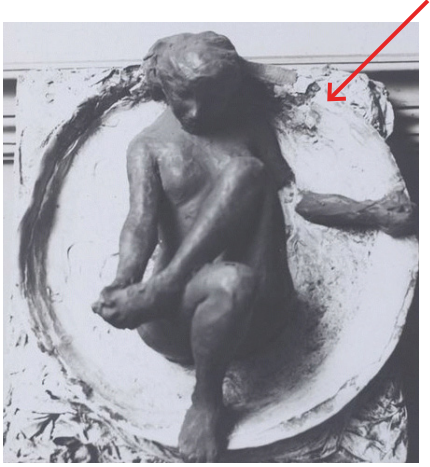

Fig. 36 Degas Wax N° 26 ca. 1918

Fig. 37 Degas Wax N° 26 ca. 1985

Also note that on the lower left section of the plaster's base (fig. 38) the various forms and shapes are less detailed with lower relief than the same area on the wax (fig. 39). Most apparent is the viewer's lower left corner, which, on the plaster has a 90-degree edge. On the wax the corner is rounded. This indicates that after the plaster was made, Degas either added additional materials to the top of the base or a new base was made.

Fig. 38 Plaster N° 26 Detail

Fig. 39 Degas Wax N° 26 Detail ca. 1985

Now refer to letters written by Degas about this sculpture. In one that Marcel Gurein dates to 1888, Degas wrote about the idea of sculpting a woman in a fountain.[67] A second letter, dated 13 June 1889, refers to changes Degas made to the sculpture, notably the base. Degas writes to Bartholomé (in translation) "...I have made it a base with linen dipped in a more or less well mixed plaster."[68]

Since the base on the plaster measures 46.2 x 48.3 whereas the base measurements of the Modèle bronze (cast from the current base) are 41.9 x 43.9, it is apparent Degas made a new base. Furthermore, because Degas' 1889 letter to Bartholomé refers to a change in the base that is also substantiated by the photographic and physical evidence along with measurements, and since the tub's perimeter is now shaped with pieces of lead rather than a continuous form originally made with wax and plastiline, one can logically conclude the plaster was made from the artist's wax in 1888 or during the first five months of 1889: before Degas (according to his letter) switched bases.

The photographic and physical evidence on sculpture number 55 (*la Masseuse*) also leads to the conclusion the plaster was made during Degas' lifetime. On the plaster (fig. 40) notice the side on the chaise's back is flat, whereas in the 1917-1918 photograph of the wax (fig. 41) the side is rounded. This clearly indicates the plaster was made before Degas added wax or clay materials over the flat surface to provide the appearance of cushioning (as one might find on a chaise). The 1917-1918 photograph records Degas' wax after the materials were added to round the side of the chaise.

Fig. 40 Plaster N° 55

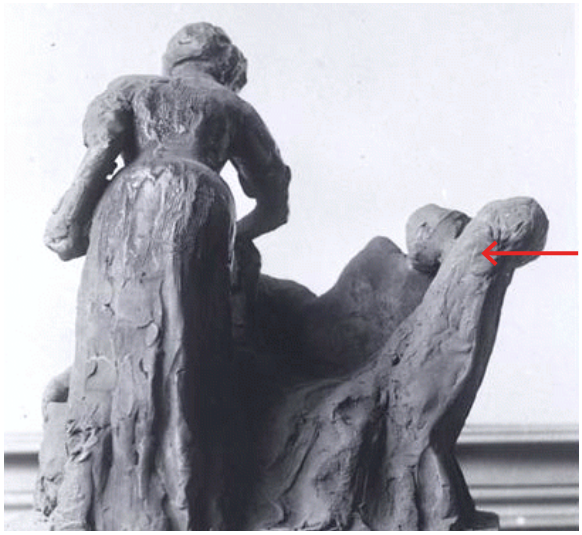

Fig. 41 Degas Wax N°55 ca. 1918

Since the proportional relationships on the plaster also compare favorably to the Modèle bronze, one could also logically conclude this plaster was made during Degas' lifetime. In essence, the sequence must have been: (a) Degas made the wax, (b) the plaster was then made from the wax at a relatively early stage when the side of the chaise's back was flat, (c) after the plaster was made Degas added materials to the wax (over the flat surface), and (d) shortly after his death the 1917-1918 photograph was taken recording the modifications.

This also provides evidence the plaster could not be a copy or made from a bronze. In either case the side of the chaise's back would not be flat. Instead it would be well rounded as it appears in the 1917-1918 photograph and on all the bronzes cast by Hébrard.

Could The Plasters Have Been Made Circa 1954-1955 Just Before The Waxes Left France For The United States?

As detailed above, very strong evidence also points to the conclusion the plasters could not have been made circa 1954-1955 as some scholars and specialists have proposed. Had the plasters been made from Degas' waxes around that time, they would match the forms and details on the Hébrard bronzes or possibly on the waxes as they appear today. They do not. Instead most either match the waxes as they existed when photographed in 1917-1918 or they record an earlier moment in time, indicating the plasters predate the early photographs.

Taking this into consideration along with the scientific test results, there is compelling evidence to conclude that except for two,[69] the plasters date from the early period, no later than 1919. Thus, the plasters could not have been made from the waxes circa 1954-1955.

Do The Plasters Match The Waxes As They Appear Today?

The plasters do not match the waxes as they appear today for many reasons. First, after Degas death and after the plasters were made the fragile waxes had to be secured, boxed and transported to either Hébrard's gallery or foundry where they remained in the cellar.[70] Likely the handling and transport changed some forms and details. Had they first been moved to the gallery as Millard indicates[71] a second transport of the waxes from Hébrard's gallery to the foundry could have also changed some forms and details.

Hébrard Foundry personnel then reworked the waxes and made some dramatic changes. In the catalog raisonné, Joseph Czestochowski reports "The most notable change [by the foundry] was the elimination of the armatures that for Degas were an integral part of each composition."[72] An armature can not be removed from a wax without changing forms.

Molds were then taken from the waxes further changing them. After that they were placed in storage at the foundry requiring further handling and potential changes. While in storage during those many years, dramatic seasonal temperature changes could have also affected the waxes.

Fig. 42 Albino Palazzolo, reworking Degas' wax No. 6 in 1955.

When the foundry closed in 1937, the waxes were again secured, boxed and transported to Adrien-A. Hébrard's home. In 1955, the waxes were removed from Hébrard's cellar and again reworked (strengthened) by Palazzolo (fig. 42) for shipment to Paul Mellon in the United States.

Charles Millard writes:

> Having been stored in a basement for more than twenty years between the casting and their sale, the waxes required a considerable amount of restoration; this was undertaken by Palazzolo before the waxes were sent to the United States.[73]

Prior to the export of the waxes, on 22 September 1955, the curator of the Department of Sculpture at the Musée du Louvre told the French Government exportation department,

> I do not find it necessary to acquire all Degas's originals, specifically because apparently, those figurines are, for the most part, very worn out by the casting operation.[74]

After the waxes arrived in the United States Mr. Mellon's conservator, Joseph Turnbach, undertook further restoration, thereby again changing details and forms.[75] Ultimately most of the waxes then traveled to the National Gallery of Art in Washington, D.C. and some to other museums.[76]

This well documented series of events confirms that between all the handling and the many alterations made to the waxes over time, forms and details changed, accounting for the reason they do not always precisely match the plasters.

The bronze Modèles do not match the plasters for many of the same reasons. As previously described, Degas made modifications on some waxes after the plasters were made. Then handling by others changed elements on some waxes, and after Degas' death Palazzolo removed some internal armatures and modified the waxes in other ways before casting the Modèles.[77] Essentially, the plasters reflect the forms and details on Degas' waxes at an earlier moment in time (before the changes), whereas the Modèles record the waxes as they were after various subsequent events occurred.

In summation, based on the large corpus of gathered evidence, documentation and careful analysis, one can logically conclude that, except for two,[78] (a) the plasters uncovered at Valsuani were made from Degas' waxes before the Hébrard Foundry began casting bronzes in 1919, and (b) some were made during the artist's lifetime. Thus, despite the fact the plasters remained unknown and no solid documentation about them previously existed, based on all the physical and scientific evidence, there is every reason to conclude the plasters are authentic, and therefore the posthumous bronzes cast from the plasters are authentic as well.

Degas once told his dealer, Ambroise Vollard, "...this material (bronze) is for eternity."[79] Indeed we are fortunate that these posthumous bronzes were cast for eternity since they record Degas' complex creative process of this superb, if perhaps unfinished series of sculptures.

This case study has provided a classic opportunity to explore the ramifications of authenticating sculptures, even those that may lack an adequate or complete provenance.

Walter F. Maibaum

June 1, 2012

About the Author

Beginning his art world career in 1968, Walter Maibaum is known as an expert in sculpture and casting techniques. As a foremost authority on the subject, he is routinely called upon to authenticate sculptures and frequently lectures on this and other topics.

Mr. Maibaum has served as Curator for a number of Degas sculpture exhibitions, including those at the Institut Valencià d'Arte Modern (IVAM) in Spain and the Tel Aviv Museum of Art. His forthcoming book, *DEGAS: Sculptures Uncovered--History Revealed,* will document research on the plasters and catalog the Degas bronzes cast by the Valsuani Foundry.

In 2010 Mr. Maibaum was awarded the Gusi International Peace Prize for bringing to light the previously unknown Degas plasters and the research and scholarship that followed.

Timeline: The Sculptures of Edgar Degas

1834 Edgar Degas born 19 July.

ca. 1865 Degas begins sculpting in wax mixed with clay (his "waxes").

1881 Degas exhibits wax of *La Petite Danseuse de Quatorze Ans* (*"La Petite Danseuse"*) in Paris' 1881 Sixth Impressionist Exhibition. Critical reaction mixed. Degas never exhibits another sculpture.

Plasters made from Degas' waxes over time, most likely from circa 1881 to circa 1903.

1912 Degas loses eyesight and moves from Rue Victor Massé to Boulevard Clichy.

1917 Degas dies 27 September.

Degas' heirs find 150 waxes scattered around his apartment and studio. 80 waxes inventoried. From those 80, the artist's heirs and executors determine 74 should be cast in bronze.

29 December. Gauthier begins photographing the waxes.

1918 28 March. Gauthier completes photography.

Additional plasters made from Degas' waxes after completion of Gauthier's photography.

13 May. Contract signed between Degas' heirs and the Hébrard Foundry, under which 22 bronzes of each of the 74 wax figures were to be cast.

Waxes moved to the cellar of Hébrard's gallery or foundry pending the end of World War I (11 November).

1919 November/December: Hébrard begins casting the first set of bronzes, the Modèles, from which, expect for *La Petite Danseuse,* all the other serialized bronzes are cast.

1920-21 Hébrard makes two plaster casts of the *La Petite Danseuse,* one of which is used to cast the serialized bronze edition of that sculpture.

1936 Hébrard Foundry stops casting bronzes due to the world-wide depression.

1937 Hébrard Foundry closes.

The foundry's proprietor, Adrien-A. Hébrard, dies.

Daughter Nelly Hébrard inherits her father's estate.

Timeline: The Sculptures of Edgar Degas

1949 Nelly Hébrard purchases the remaining casting rights from the living heirs of Degas.

1955 Nelly Hébrard reveals 68 Degas' waxes survived along with two lifetime plasters (Nos. 29 and 62), all owned by her family. Paul Mellon purchases the plasters and waxes from M. Knoedler & Company in New York. Most are now in the National Gallery of Art, Washington, D.C.

Mme. Hébrard also publicly reveals two plasters of *La Petite Danseuse* were made. One is now in the National Gallery, Washington, D.C., and the other is in the Josyln Art Museum's collection, Omaha, Nebraska (USA).

Mme. Hébrard resumes the casting of the serialized bronze editions at the Valsuani Foundry. She continues to mark the bronzes with the old Hébrard stamp rather than Valsuani's.

1964 According to the foundry's located journals, the casting of the serialized Degas bronze editions at Valsuani ends.

1976 Nelly Hébrard publicly reveals the existence of the Modèle (master) set of bronzes and exhibits them at Lefevre Gallery in London. The Modèles are purchased by the Norton Simon Foundation and now in the Norton Simon Museum of Art, Pasadena, California.

1997 Valsuani begins casting bronzes from a previously unknown plaster of *La Petite Danseuse.*

2004 74 other plasters are uncovered at Valsuani, none of which had been previously used for casting. Valsuani begins casting bronze editions from the plasters.

Endnotes

[1] Arthur Beale, "Materials and Techniques: A Technical Examination of the Sculptures of Honoré Daumier; Modelling in Clay" *Daumier Sculpture, A Critical and Comparative Study,* Jeanne L. Wasserman, Fogg Art Museum, Harvard University, 1969, p. 9.

Édouard Papet, "He Also Does Sculpture," *Daumier: 1808-1879,* National Gallery of Canada, Ottowa; Musée d'Orsay, Paris and the Phillips Collection, Washington D.C., 1999, p 53: Papet reports: "...[Daumier made the sculptures] in smooth gray clay, of good quality, without limestone impurities and sometimes containing a few small grains of quartz."

[2] See Papet, note 1, also on p. 53, he writes: "But the oil colours were applied [by Daumier on his clays] without any primer coat...: "

Phillip Dennis Cate, "Breaking the Mold: Sculpture in Paris From Daumier to Rodin," Jane Voorhees Zimmerli Art Museum, Rutgers University, New Brunswick, New Jersey, p. 25, Cate writes about the clays to which Daumier applied oil paints: "Daumier created the series of satirical busts (collectively titled *Celebrities of the Juste Milieu*), thirty-six of which survive today, in direct response to the revolution of 1830." He continues: "From a historical perspective, the bust's unusual qualities make them some of the most radical examples of Romantic French art from the early days of the French Monarchy." On page 27 Cate states: "... Daumier's series of satirical busts anticipated Degas's *Little Dancer*...." Daumier's thirty-six surviving painted clay busts are now in the collection of the Zimmerli Art Museum in New Brunswick, New Jersey, USA.

[3] Ibid, p. 51. Papet states: "In fact, the bond between them can be compared to the later friendship between Degas and Bartholomé." He continues: "...[Geoffroy-Dechaume] was the restorer of the sculptures of Notre-Dame and the Sainte-Chapelle, future creator of the Musée de Sculpture comparée du Trocedro--[and] moulded [in plaster] *the Fugitives* and *Ratapoil.*"

[4] See Beale, note 1 "Materials and Techniques: A Technical Examination of the Sculptures of Honoré Daumier; Plaster Molds and Casts," p. 12.

Anne Pingeot, "Quand les Peintres Sculptent," *Degas Sculpteur,* Éditions Gallimard, Paris, 2010, p. 41. Pingeot dates the plaster relief of *Les Emigrants* to 1848-1850 and notes *Les Emigrants* is also known as *The Fugitives.*

[5] Élisabeth Lebon, "Dictionnaire des Foundeurs de Bronze d'Art," Marjon Éditions, Perth Australia, 2003, p. 233. According to the author, the Siot-Decauville Foundry was established in 1890-1891 at 8-10 rue Villehardouin in Paris' 3rd Arrondissement. The Foundry closed in 1929.

[6] Jeanne Wasserman, "Introduction," *Daumier Sculpture, A Critical and Comparative Study,* p. 6. Wasserman writes: "...Daumier never intended his sculpture for public exhibition," and ..."[he] modelled in clay for his own satisfaction and to know and study the subjects he treated in other media."

[7] See Beale, note 1, "Materials and Techniques: A Technical Examination of the Sculpture of Honoré Daumier, The Bronze Casts," p. 14. Beale states: "....a total of one thousand fifty-eight bronze casts [were] made of the caricature busts."

[8] See Papet, note 1, p. 47: " ...Jacques de Caso noted in 1983 that the popularity of inexpensive statuettes sold by peddlers was to last until the beginning of the twentieth century."

[9] See Beale, note 1, "Materials and Techniques, A Technical Examination of the Sculptures of Honoré Daumier, Ratapoil," p. 16. In summation, Beale suggests foundries made multiple plasters from Daumier's clays for casting purposes.

[10] See Papet, note 1, p. 46, who writes: " ...to these [known plasters] must be added a fragment from the left side of the reliefs [of *Fugitives*], a plaster that we [the Musée d'Orsay] discovered and acquired in 1998."

[11] See Beale, note 1, p.19. Beale reports: "The second plaster (now in Milan, Italy) was apparently cast from a piece mold made from the original [first] plaster."

[12] Leonardo Benatov, proprietor of the Valsuani Foundry provided an attestation dated March 21, 2006 that states, in translation: "I hereby confirm by this official document that Mr. Palazzolo, head of the Hébrard Foundry, worked on the casting of bronzes by Edgar Degas at the Valsuani Foundry, rue des Plantes, beginning in 1955," and, "According to the journals of the old manager of the Valsuani Foundry, Mr. J. Sokolowsky, Mr. Palazzolo made available to the Valsuani Foundry a group of Degas plasters...."

[13] Daphne S. Barbour and Shelley G. Sturman, "Degas The Sculptor And His Technique," *Edgar Degas Sculpture,* Suzanne Glover Lindsay, Daphne S. Barbour and Shelley G. Sturman, National Gallery of Art, Washington, D.C., 2010, p. 35. Barbour and Sturman

state: “Most of Degas’ were modeled from beeswax, some from air-dried clay, and others entirely from a sulfur-rich, nondrying clay commonly known as plastiline. Yet the preponderance of his surviving sculptural work is in beeswax, perhaps because the artist’s clays were prone to disintegration.”

[14] Joseph S. Czestochowski, “Degas’s Sculptures Reexamined: The Marketing of a Private Pursuit,” *Degas Sculptures, Catalog Raisonne of the Bronzes,* Joseph S. Czestochowski and Anne Pingeot, International Arts and Torch Press, Memphis, Tennessee, USA, 2002, p. 11.

[15] John Rewald, “Forward,” *Edgar Degas: 1834-1917: Original Wax Sculptures,* M. Knoedler & Company, Inc., New York, 1955, p. 2.

[16] John Rewald, “The Casting,” *Degas Works in Sculpture: A Complete Catalog,* Kegan Paul, Trench, Trubner & Co. Ltd., London, 1944, p. 14.

[17] See Czestochowski, note 14, p. 12, who writes: “...more than 150 wax sculptures and sculpture fragments, many in poor condition and deteriorating naturally, were scattered over three floors of his apartment at 6 Boulevard Clichy in Montmartre, where he had lived since 1912.”

In his soon to be published Festchrift article, Dr. Gregory Hedberg, Director of European Art of the Hirschl & Adler Gallery in New York, provides strong evidence to conclude that many of Degas’ waxes were not in pieces when Degas died nor, as many scholars seem to believe, did the wax figures that were ultimately cast in bronze have to be reconstructed.

[18] See note 14, Czestochowski/Pingeot Catalog Raisonné: Anne Pingeot, “Degas and His Castings,” p. 28: When writing about the eighty waxes that were inventoried, Pingeot states: “...only six of the eighty [that were inventoried] were not suitable for reproduction [not suitable for casting in bronze].”

[19] See Rewald, note 16, p. 14. Rewald reports, “Hébrard was to cast them [the bronzes] at the end of the war, and actually began to do so at the close of 1919.” This indicates the castings began in November/December 1919.

Adrian-A. Hébrard (1865-1937) established the Hébrard Foundry in 1907. The casting of the serialized bronze editions began at Hébrard in 1919 under the supervision of the foundry’s Milanese master caster, Albino Palazzolo (1883-1973). The castings continued there until 1936. The foundry closed in 1937 and Adrian-A. Hébrard died the same year. His daughter, Nelly Hébrard (1904-1985), inherited his estate.

[20] See Czestochowski/Pingeot Catalog Raisonné, note 14, “Introduction to the Collection,” p. 118, in reference to the dates of casting at Hébrard, Czestochowski reports: “ ...precise [casting] dates [are] from 1921 to 1936....”

[21] See Czestochowski, note 14, p. 16: “ ...the Hébrard Foundry went into liquidation in 1937....” and “ ...the original foundry building was soon torn down.”

[22] See Rewald, note 16 for publication details.

[23] Ibid, p. 15.

[24] The group of seventy was comprised of sixty-eight waxes and two plasters: numbers 28 and 62. The four missing originals, presumably destroyed in the molding/casting process, were numbers 69, 70, 71 and 72.

[25] The Hébrard family home was located on the Île de la Cité in Paris

See note 13. Suzanne Glover Lindsay, “Degas Sculpture After His Death,” p. 15. Lindsay reports that based on archival evidence, the National Gallery of Art was first offered the waxes in 1953, two years before the public announcement of their existence.

[26] The waxes were exhibited at M. Knoedler & Co., New York, from November 9 to December 3, 1955.

[27] See Rewald, note 15, p. 3.

[28] John Rewald, “Degas’s Bronzes-An Afterword,” *The Complete Sculptures of Degas,* The Lefevre Gallery, London, 1976, p. 7.

[29] See Czestochowski/Pingeot, note 14. Anne Pingeot, “Degas and his Castings,” p. 36.

[30] The National Gallery owns, or holds as a promised gift, wax numbers 1, 2, 4, 5, 7, 8, 9, 10, 13, 15, 16, 17, 18, 19, 22, 23, 24, 25, 26, 27, 29, 32, 33, 34, 35, 36, 37, 39, 40, 42, 43, 44, 45, 46, 47, 48, 49, 50, 52, 53, 54, 55, 56, 58, 61, 63, 64, 66, 68, 73 and 74 (plus plaster numbers 28 and 62). These waxes are well documented in the publication referenced in note 13.

The Fitzwilliam Museum of Art, Cambridge University, Cambridge, England, owns wax numbers 12, 14 and 31. The Musée d'Orsay, Paris, France, owns wax numbers 6, 20, 38, 60 and 67 and a plaster of number 74. The Virginia Museum of Fine Arts, Richmond, Virginia, USA, owns wax numbers 3, 11, 21, 30, 41, 51, 59 and 65. The Yale University Art Gallery, New Haven, Connecticut, USA, owns wax number 57. Wax numbers 69, 70, 71, and 72 are missing, presumably destroyed in the molding process.

[31] Arthur Beale, "Little Dancer Aged Fourteen: The Search For the lost Modèle," *Degas and the Little Dancer,* Richard Kendall, Yale University Press, New Haven, Connecticut, 1998, p. 98.

[32] Nelly Hébrard was the daughter of Adrian-A. Hébrard (1865-1937) whose foundry was responsible for casting the bronzes. She inherited her father's estate when he died in 1937.

[33] Hébrard made two plasters of the *Little Dancer* from Degas' wax circa 1920-1921. One is now in the collection of the National Gallery of Art, Washington, D.C., and the other in the Joslyn Art Museum in Omaha, Nebraska (USA). See note 30, p. 99, in which Arthur Beale, now Director Emeritus of Conservation, Museum of Fine Arts Boston, determined the plaster in the Joslyn Art Museum was used as the master from which to cast the serialized bronze edition.

[34] The Modèle bronzes were exhibited at the Lefevre Gallery, London, from November 18 to December 21, 1976.

[35] See Rewald, note 28, p. 7.

[36] Sara Campbell, "The Evolution of Norton Simon's Degas Collection," *Degas in the Norton Simon Museum: Nineteenth Century Art, Volume II,* Norton Simon Museum of Art, Pasadena, California, 2010, p. 18.

[37] Ibid. In her reference to Simon's purchase of the Modèle set, note 38 on page 25, Campbell writes: "The exceptions are cats. 38 and 98, which were brought separately." (sculpture numbers 49 and 74 were purchased by Simon separately).

[38] The bronze Modèles are fully documented in the Norton Simon publication referred to in note 36.

[39] The *Little Dancer* plaster was first viewed at Galerie Carpentier, Paris, on June 15, 2001 by Walter Maibaum and Carol Conn along with art historian Lawrence Saphire.

[40] The seventy-four plasters were in storage at the Valsuani Foundry in Chevreuse, France. They were revealed by the proprietor, Leonardo Benatov to Walter Maibaum and Carol Conn on December 22, 2004.

Valsuani was established in 1908 by Claude Valsuani at 74, rue des Plantes in Paris' 14th Arrondissement. Over the years Valsuani cast bronzes by, among others, Brancusi, Giacometti, Matisse and Picasso. When Nelly Hébrard resumed the casting of the Degas bronze editions she chose Valsuani. She had to cast elsewhere since her family's foundry closed and was torn down years earlier. The resumption of casting the Degas bronze editions took place at Valsuani in 1955, the same year during which the plasters arrived at the foundry. The Degas' bronzes cast at Valsuani from 1955 to 1964 have the same (Hébrard) cache that was stamped on the bronzes that were cast at the Hébrard Foundry between 1919 and 1936.

Mr. Benatov purchased the foundry's equipment, inventory and trademark in 1980 and moved the contents from Paris to its present location in Chevreuse.

[41] Four of the previously known eight plasters are confirmed to be lifetime to Degas: sculpture number 28, collection National Gallery of Art, Washington, D.C.: number 40, private collection (sold by the Lefevre Gallery, London in 1998): number 62, collection National Gallery of Art, Washington, D.C. and number 45, present whereabouts unknown. Plaster number 45 was photographed by Gauthier in Degas' studio in 1917-1918 along with numbers. 28 and 40.

While not normally referred to as a plaster, number 56 has a plaster core over which Degas applied wax. Barbour and Sturman report the artist also made an unsuccessful attempt to make a plaster cast from his clay portrait of Hortense Valpinçon ("Degas and his Castings: A Tribute to Anne Pingeot," *La Sculpture au XIX Siècle: Melanges pour Anne Pingeot,* Nicolas Chaudin [ed.], Paris 2008, p. 214).

Among the other four previously known plasters is number 45; casting date unknown, but with a provenance beginning with Nelly Hébrard in 1955. Unlike any other known plaster this one has the signature stamp of Degas. Therefore (a) it is presumed

to have been cast posthumously, and (b) it is not the same plaster of the same subject photographed by Gauthier in Degas' studio in 1918. This plaster (with the signature stamp) was sold by the Lefevre Gallery, London in 1998 and it remains in a private collection.

Two posthumous plasters of number 73 (the *Little Dancer*) were cast by the Hébrard Foundry circa 1920-1921. One plaster is in now the National Gallery of Art, Washington, D.C. The other plaster is in the collection of the Josyln Art Museum, Omaha, Nebraska, USA (also see note 30).

Number 74: collection Musée d'Orsay, Paris. Presumably this plaster was made from Degas' wax circa 1955 by the Valsuani Foundry to cast the Hébrard bronze edition of 20. The plaster was gifted to the museum by Gregorie Triet (grandson of Nelly Hébrard).

[42] See note 24 in reference to the number of waxes that survived.

[43] There are two missing bronzes in the Modèle set: numbers 1 and 13. The set also has a bronze cast of *La Petite Danseuse* (number 73) that is stamped "Modèle." On page 119 of the catalog raisonné (note 14) Czestochowski writes: "Arthur Beale demonstrates that *Little Dancer, Aged Fourteen,* in the Norton Simon Museum was incorrectly marked and that the actual modèle was the plaster in the Josyln Art Museum Collection."

[44] There are two plasters of sculpture number 3 which accounts for the total of seventy-five (not seventy-four). One plaster, 3a, was made from Degas' wax no later than 1919. The other plaster, 3b, was apparently made from a Hébrard bronze since the size, forms and details correspond. Had the plaster (3b) been made from Degas' wax it would be approximately 2% larger than the corresponding Hébrard bronze and the forms and details would be somewhat different.

[45] John W. Mills, "Encyclopedia of Sculpture Techniques," B T Bradsdford/Chrysalis Books Group, London, 2005, p. 105. Mills writes, "The shelf life of a [gelatin] mold is very short; it is only a matter of days before this organic material shrinks, dries and cracks."

Jack C. Rich, "The Materials and Methods of Sculpture," Dover Publications Inc, Mineola, New York, p. 101. Rich reports, "Flexible gelatin or glue molds are a comparatively recent casting media, dating back to 1865." Foundries generally discontinued using gelatin molds circa 1970. Hard rubber has been routinely used since then.

See also Beale, note 31, p. 106. On the subject of Hébrard's utilization of gelatin molds in casting the serialized bronzes from the Modèles, Beale states, "Finally, another interesting but puzzling observation when examining the Simon bronze modèles was that the gelatin cut mold lines were sometimes under and sometimes on top of the chemical patina." This provides very strong evidence to conclude gelatin molds continued to be used when Nelly Hébrard resumed the casting of the bronze editions at the Valsuani Foundry beginning circa 1955. Information about the resumption of casting can be found in this author's essay, "Degas: The Sculptor," published in various exhibition catalogs.

[46] Foundries routinely use three-dimensional pantographs for enlargements. For example, if an artist made a 20 cm model which was to be enlarged into monumental scale, the pantograph could be used to make proportional calibrations from fixed points, so that the relationships between those points could be proportionally scaled-up to a monumental size. A pantograph could also be used to make sculptural duplications in plaster, in the same way that keys can be duplicated on simple devices of this type.

[47] Logically the plasters were made directly from Degas' waxes. However, since it was documented that Hébrard cast the serialized bronzes from the Modèle bronzes rather than from plasters, the question became; "Why then were the plasters made?" Like others, this author initially believed that perhaps these plasters were made by Hébrard's master caster, Albino Palazzolo and used to cast bronzes, and that the Modèles may not have been used for that purpose. Dr. Hedberg later pointed out some details on the plasters that indicate Hébrard bronzes could not have been cast from them. After due consideration my position changed to his: (a) the plasters were made by Bartholomé (not Palazzolo), and (b) they could have been made during Degas' lifetime. I now subscribe to the current thesis described herein.

[48] In 1955 the art historian, Jean Adhémar (1908-1987) interviewed Hébrard's master caster, Albino Palazzolo (1883-1973). The interview was published in an article: "Before the Degas bronzes" in the November 1955 issue of *ARTnews* magazine, p. 18, in which Palazzolo revealed, for the first time: "They (the foundry) decided to make a bronze master cast of each figurine...." (i.e., a master set of bronzes from which to cast the bronze editions). Apparently no one at the time bothered to investigate Palazzolo's statement, perhaps the reason why the Modèle bronzes remained unknown for another twenty years.

[49] See Beale, note 31, p. 99.

[50] See herein: "Scientific Tests Performed" and note 59.

[51] See Mills, note 45, p. 169. Mills reports: "The use of plaster in some form or another can be traced back to ancient Egypt, though presumably it must have existed before then."

See also Rich, note 45 who, on p. 67 confirms, and states: "The use of gypsum [plaster] as a sculptural material dates back to Antiquity."...."During early periods of Egyptian culture, particularly during the reign of Akh-en-Aten [circa 1336-1350 B.C.], parts of the human body, or of statues, were cast in plaster and used as models."...."The art of casting in plaster declined with the fall of Rome, and literature makes no reference to it again until the time of Andrea Verrocchio (1432-88)."

Dario A. Covi, "Andrea Del Verrocchio 1435-1488," *The Encyclopedia of Sculpture, Volume Three,* Antonia Boström Editor, Fitzroy Dearborn, New York & London, 2004, pgs. 1718-1719. Covi wirites: "Known almost invariably since his own day as Andrea del Verrocchio, Andrea di Michele di Francesco Cioni was undoubtedly the leading Florentine sculptor in the later years of the 15th century and the master of one of the most active, multifaceted workshops of the Renaissance."...."Probably Verrocchio's foremost sculpture is the bronze group the *Incredulity of Thomas,* commissioned by the Università della Mercanzia (the Florentine Merchants Tribunal) for an outside tabernacle at the Church of Orsanmichele acquired from the Parte Guelfa (Guelfa Party). Ordered toward the end of 1466 or the beginning of 1467 and unveiled in 1483, *Incredulity of Thomas* was immediately acclaimed as a work of the greatest distinction."

[52] Modèle measurements were taken on October 3, 2007 at the Norton Simon Museum of Art, Pasadena, California by Sara Campbell, Senior Curator and Dr. Hedberg.

[53] Plaster measurements were taken on October 16, 2007 in New York at Cirker's City Center Security Warehouse by Steven Tatti, independent sculpture conservator (formerly of the Hirshhorn Museum and the Smithsonian Institution, Washington, D.C.), assisted by Dr. Hedberg and this author.

[54] See Czestochoswki/Pingeot, note 14: Joseph S. Czestochowski, "Degas's Sculptures Re-examined: The Marketing of a Private Pursuit," pp. 12-13.

See also Rewald, Note 16. In the publication *Degas Works in Sculpture: A Compete Catalog,* Rewald published Gauthier's photographs of wax numbers 1, 3, 11, 18, 26, 46, 50, 54 , 55, 58, 72 and 73. The complete Gauthier photographs first appeared in the publication authored by Pierre Borel: *Les Sculptures Inédities de Degas,* Éditions Pierre Cailler, Geneva, 1949.

[55] See Rewald, note 16, p. 14. Rewald writes, "After Paul Durand-Ruel made the inventory [of the waxes], these were deposited under Bartholomé's supervision in the cellar of the founder Hébrard..." Yet the waxes could not have been moved as Rewald suggests immediately after completion of inventory. It is well documented that after the inventory was completed Gauthier photographed the waxes, completing the task on March 28, 1918. Thus at the earliest the waxes could not have been moved to Hébrard's cellar until April or possibly May of 1918, and likely they were moved months later, perhaps as late as October 1918.

Charles Millard, "Exhibition, Casting, And Technique," *The Sculpture of Edgar Degas,* Princeton University Press, Princeton, New Jersey, 1976, p. 31. Millard writes, "Pending the end of the war [November 11, 1918] the waxes were removed [from Degas' studio and apartment] to Hébrard's basement, whether to the basement of the Galerie Hébrard at 8 rue Royale or to that of the foundry on the Avenue de Versailles is not entirely clear." Millard footnotes his source as "... an unpublished letter from Dikrin Kelekian to Mary Cassatt dated 5 August 1919..." According to various dictionaries, "pending" in this context could be interpreted as nearing, imminent and close at hand. Thus there could have been approximately six to seven months from the time Gauthier completed photography (March 28, 1918) to the time the waxes were moved, that being around the time World War I ended (November 11, 1918). Considering that three to four plasters could be made in a day, even if the waxes had been moved by August 1918 as the Kelekian letter may indicate there would have been ample time in which plasters could have been made from the waxes before they were moved from Degas' apartment and studio to Hébrard's gallery or foundry.

[56] Patricia Failing, "The Degas bronzes Degas never knew," *ARTnews,* April 1979, p. 40. Arthur Beale is quoted about changes made to the armatures and waxes by Hébrard before the foundry began casting bronzes, "A lot of decisions, esthetic decisions, were made by the founder and most specifically Palazzolo, who did the actual work [to 'fix' the waxes]," and "...particularly with regard to separating the waxes from their armatures and where to leave areas of armature exposed..."

[57] Report AA83278-9 issued on February 17, 2009 by the University of Arizona laboratory, Phoenix, Arizona, p. 2.

[58] Samples from Degas plaster number 28, *Torso,* were taken on March 26, 2011 by independent sculpture conservator, Steven Tatti (see also note 53 in reference to Mr. Tatti). Samples from the Rodin plaster, *Balzac Nu,* which measures 76 cm in height, were also taken on March 26, 2011 by Mr. Tatti. The Rodin plaster, long considered lifetime, is one of two of the same subject previously in the collection of the artist's dedicated assistant, Judith Cladel. Both plasters went to Jean Lyonel d'Estrie. One was subsequently purchased privately from Sotheby's London in 1982 by its current owner, Lawrence Saphire (USA) who kindly allowed for the sample to be taken.

[59] Report 10-06898.1 issued on May 5, 2011 by American Petrographic Services Inc., St. Paul, Minnesota, p. 2.

[60] Ibid.

[61] See Norton Simon publication, note 36. Daphne Barbour (Object Conservator, National Gallery of Art, Washington, D.C.) and Shelley Sturman (Head of Object Conservation, National Gallery), "The Modèle Bronzes," p. 296.

See also Rich, note 45 who, in reference to plaster expansion on p. 61 states: "It [plaster] expands slightly on setting and fills out the form of the negative mold perfectly." However, as pointed out in a January 24, 2006 telephone interview with Loren Miller, plaster scientist at U.S. Gypsum: "Depending upon the experience and skill of the person making the mix, plaster can expand up to point two percent (.2%), a micrometer, not two percent (not 2%). Thus the expansion of plaster would have to be (at a minimum) ten times greater to support the theory that the reason the plasters are 2% larger than the Modèles is because of plaster expansion. Cleary this is not the case.

[62] See American Petrographic, note 59, p. 2.

[63] See note 41.

[64] See note 54, Czestochoswki, p.12-13.

[65] Ibid, p. 12.

[66] See Barbour and Sturman, note 13, p. 253.

[67] Marcel Guerin, "*Degas Letters,*" Bruno Cassirer, Oxford, 1947, p. 124, footnote 3.

[68] Ibid, p. 132. However, Guerin mistakenly referred to the modifications having been made on the wax of the *Little Dancer, Aged Fourteen,* whereas Degas' letter to Bartholomé actually referred to changes on the wax of *The Tub.* This was correctly noted by Gary Tinterow, (who at the time was) Associate Curator of Paintings, Metropolitan Museum of Art, as published in "Degas" by the Metropolitan Museum in 1988, page 470, footnote 2.

[69] Based on the physical evidence, plaster numbers 3b and 59 could have been made as late as 1955.

[70] See Millard, note 55.

[71] Ibid

[72] See Czestochowski, note 14, p. 13.

See Failing, note 56, who also reports that Palazzolo separated the waxes from their armatures.

[73] See Millard, note 55, p. 35.

[74] See Czestochowski/Pingeot, note 14. Anne Pingeot, "Degas and His Castings," *What Happened to the Originals?*, p. 34.

[75] See note 36, *Degas in the Norton Simon Museum.* Daphne Barbour and Shelley Sturman, "The Modèle Bronzes," p. 434. Barbour and Sturman state that Turnbach's notes reveal he made changes to the waxes including, on sculpture number 42: "..[he] filled [the] open seam in [the] base."

[76] See note 30.

[77] See Czestochowski, note 14, p. 13.

[78] See note 69.

[79] Ambroise Vollard, *En Écoutant Cézanne, Degas, Renoir,* Éditions Bernard Grasset, Paris, 1938, p. 131. The full quote: "C'est trop de responsabilité de laisser derrière soi quelque chose en bronze, cet matière qui est pour l'éternité!"

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Fig. 42

Fogg Art Museum, Harvard University, Cambridge, Massachusetts USA
Fig. 2, 34

Fondation Pierre Gianada, Martigny, Switzerland
Figs. 22, 26, 32

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Figs. 7, 24, 37, 39

Réunion des Musées Nationaux, Paris, France
Figs. 8, 19, 23, 27, 31, 36, 41

National Gallery of Canada, Ottowa, Canada
Figs. 1, 3, 4, 5, 6

Norton Simon Museum of Art, Pasadena, California
Figs. 9, 10, 15, 17, 29

The Degas Sculpture Project Ltd, USA
Figs. 11, 12, 13, 14, 16, 18, 20, 25, 28, 30, 33, 35, 38, 40

Virginia Museum of Fine Art, Richmond, Virginia USA
Fig. 21