Article: Preserving the mountain
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Source: *Objects Specialty Group Postprints, Volume Thirteen, 2006*
Pages: 85-99
Compilers: Virginia Greene, Patricia Griffin, and Christine Del Re

PRESERVING THE MOUNTAIN

Gerri Ann Strickler

Abstract

Outdoor sculpture in New England requires a financial commitment of annual maintenance that is difficult for some owners to bear. A unique sculpture in Lenox, Massachusetts, by Gaston Lachaise, *La Montagne*, is a good example of this kind of commitment. The larger than life concrete sculpture is the last in a series of reclining female figures by the artist.

Years of exposure have created a challenging multi-phase conservation project. Virtually no documentation about the original condition of the sculpture was available. The earliest phase consisted of an investigation into the artist's materials and methods, followed by stabilization of the delaminating and friable concrete material. The future of the sculpture is yet to be fully determined. Issues surrounding the treatment include restrictions of the site, the unique nature of the deterioration stemming from method of construction and the artist's intent, acceptable amount of annual maintenance, and degree of deterioration expected in a damp wooded environment. The most recent phase of treatment included designing a mount to both support the sculpture in-situ, as well as during transport if moved indoors in the future.

Figure 1. *La Montagne* as seen on the grounds of the Frelinghuysen Morris House and Studio, 2004.

1. Introduction

The outdoor concrete sculpture *La Montagne*, by sculptor Gaston Lachaise, is a reclining female nude. The hollow sculpture is larger than life, measuring approximately 9 x 4 x 3.5 feet and sits six feet high on six concrete pillars. The sculpture resides in Lenox, Massachusetts, on the forty-six acre estate of abstract American artists George L. K. Morris and Suzy Frelinghuysen. Lachaise established a friendship with Morris that led to discussions beginning in 1933 of a commission for a large outdoor figure cast for his country studio and house. Visits to the grounds together allowed Lachaise and Morris to both choose the exact location for *La Montagne*. The sculpture sits among tall pine trees and is separated from the house and studio by a stream (Fig.1).

There is considerable tree growth between the house and the sculpture. However, it is likely that the sculpture was originally more visible from the upper floor of the house. In his book *Gaston Lachaise,* Art Historian Gerald Nordland wrote, "Lachaise and Morris had intended the work to become a part of the forest like the great Indian temples, and so it has become" (Norland 1974, 117). This idea of the artist's intent and original setting remains a valid point, though debatable in terms of the ideal environment for this one-of-a-kind sculpture.

In 2001, the sculpture was to be moved from its present location to a holding area in the barn on the estate to prevent any further weathering. The conservation center was first included in the project discussion on the day of the move without clear information about the history or future of the sculpture. The owner had engaged a general contractor to move the sculpture by constructing a wood pallet fitting under the sculpture in between the pillars, after which a crane would lift the pallet from six points with strapping. The pillars were then to be cut away and the sculpture strapped down onto the bed of a truck. The service road which provided access to the sculpture was too narrow and the foundation too weak to accommodate the large truck, and the ground proved too wet and soft to successfully allow for the transport that day. The truck was embedded in the mud, unable to drive its own weight off the site.

Figure 2. *La Montagne*, Before treatment, October 2001.

Since the sculpture was in poor condition and could not withstand the amount of vibration and pressure proposed during travel, it was recommended that the client allow time for a thorough examination and stabilization of the sculpture before addressing the task of transport (Fig. 2). During this time, WACC conservators could investigate the history of the sculpture and its importance within the artist's body of work.

1.1 History

Letters that Lachaise wrote to his wife Isabel and her son Edward Nagle establish the inception of the sculpture for Morris and the importance of its location. Lachaise began to execute the model on September 4, 1934, on returning from Morris's Lenox estate to his New York City studio. He completed the plaster model by November 29 (Lachaise Papers). The concrete was cast sometime prior to the inclusion of the sculpture in the first retrospective given to a living sculptor at MoMA, held two months later from January 29 through March 7, 1935 (Nordland 1974, 54).

Prior to his visit with Morris at his estate on August 30, 1934, Lachaise envisioned one cement sculpture of four possibilities. Upon his visit, he called the grounds "superb" and decided to cast a large "Mountain" sculpture surrounded by soaring pine trees and uplifted by six posts. The posts and foundation were to be placed by Morris. Lachaise made a full size sketch that he and Morris carried to the spot for consideration (Lachaise Papers; correspondence dated Aug. 14, 30, 31, 1934)**.** Goodall refers to a letter from Lachaise to Edward Nagle containing a smaller sketch of the proposed concrete figure among the pines (Goodall 1969, 667).

La Montagne was the last of a series of reclining female nudes entitled *Mountain*. There are eight documented *Mountain* sculptures in stone, bronze, and concrete, made during the years 1913-1934 consisting of four different poses (Goodall 1969). The pose of *La Montagne* is unique to the others, as she is the only one with an outstretched arm. A drawing in the artist's journal has an inscription: "La Montagne, sold in stone to Scofield Thayer" (Lachaise Papers). Intriguingly, the drawing has the proper left arm of the figure extended and the head fully turned in profile towards the feet, more similar to the concrete *La Montagne* than the actual table top Thayer stone sculpture.

Lachaise considered the large concrete figure one of his greatest pieces. "You may say that the model is my wife. It is a large, generous figure of great placidity, great tranquility" (New York Herald Tribune, Jan. 23, 1935). Lachaise is known for the voluptuous female figures inspired by his wife. He died October 21, 1935, and so this sculpture was one of his last completed commissions.

Lachaise worked primarily with stone and bronze. Though his female figures were controversial in conservative circles, he was admired for his carving and modeling skills during his lifetime. It is also worth nothing that few of his contemporaries were casting in cement. There are three documented cement projects by Lachaise: *La Montagne* (1934); *Garden Figure*, (1935; a series of five); and large cement reliefs titled *Four Seasons* (1923), for the house of the architect

Welles Bosworth, Locust Valley, Long Island NY (Goodall 1969, 86; Nordland 1975, 28). The first and second casts in the series *Garden Figure* have been preserved within museum collections (Smith College Museum of Art since 1982 and Portland Museum of Art, Maine, since 1961 respectively) and show less deterioration than *La Montagne*.

1.2 Fabrication

The method of the construction of *La Montagne* has been pieced together through visual examination of the sculpture and reviewing archives containing newspaper clippings and unpublished correspondence between Lachaise and his wife Isabel, and between Lachaise and Morris. In a telephone conversation with the author, the Lachaise Foundation knows of no existing model referenced in the artist's correspondence.

The sculpture was cast from the artist's model in Ettl Studios, New York City. It was then transported directly from Ettl Studios to the MoMA. This travel received some publicity along with the announcement of the retrospective in New York City newspapers. An article in the *New York Herald Tribune* stated that Ettl's studio was two miles from MoMA.

> Seven men with a three-ton truck labored from 10 a.m. until 6 p.m. to bring "The Mountain" to the museum…The casting had to be made in five sections and the center was cast hollow by use of a wire-lathe…The casting floor is in a basement, so block and tackle had to be used to hoist the piece thirty feet into the air and then winchers and rollers were employed to get it into the truck…The transfer was made with only the cracking of one corner of the pediment near the feet of "The Mountain."…He (Lachaise) explained that it was in a medium rare in this country, but frequently encountered in Europe. He finds it highly adaptable to sculptural purposes…(*Herald Tribune*, Jan. 23, 1935)

A timeline of the construction can be made from the artist's correspondence. In a letter dated Sept. 4, 1934, Lachaise writes to Morris after returning to his New York City studio, inspired and proceeds directly to making card board models and an armature for the clay (Morris Papers). During the same time period that Lachaise is modeling the figure in his NYC studio, Morris is casting sculpture in Lenox with guidance from Lachaise. A letter from Morris to Lachaise (Oct. 25, 1934) regarding an armature made by his plumber should not be confused with the construction of *La Montagne.* One month later Morris visited the New York City studio to see the progress (Lachaise Papers; letter dated Oct. 11 or 12, 1934). Another letter to Isabelle dated Nov. 29, 1934, Lachaise wrote from his NYC studio, "I have the Mountain for Morris ready to mold in cement…"(Lachaise Papers). The casting at Ettl Studios occurred between the time of this letter and the day it was transported to MoMA, on January 22, 1935. Lachaise is known to have no assistance in his studio, though a letter to Mme. Lachaise refers to "Geegee who did all the hard preparations for constructing the armatures, etc." (Lachaise Papers; letter dated Oct. 19, 1934).

The Frelinghuysen-Morris Foundation has not confirmed the date of the Lenox installation,, but correspondence between Lachaise and Morris dated Sept.8, 1935, months after the retrospective, indicates it had yet to be installed. Lachaise recommended Alex Ettl to do the installation, making a concrete pad and pillars. "I have send to Mr. Ettl a drawing which give to him all the direction for the setting of La Montagne…". The September letter may be the last correspondence, as Lachaise died on October 18, 1935, in New York City. To date, there is no evidence in the Frelinghuysen-Morris Foundation archives of the letters or diagram from Lachaise to Ettl.

Ettl Studios moved from New York to Charlottesville, Virginia in 1940. Four years later Alex J. Ettl returned to New York City to establish Sculpture House Casting (Eriksen 1984). In an e-mail correspondence with the author on June 6, 2006, Sculpture House Casting stated no existing documentation about the fabrication of *La Montagne*.

Lachaise stated in a letter the use of a concrete "preservative" to be applied by Ettl for "durability" (Morris Papers; letter dated July 17, 1935). The use of a preservative or surface treatment was mentioned also in an unknown newspaper clipping among the documents contained in the AAA Gaston and Isabel Lachaise Papers. It is not known if or what treatment was done by Ettl or Lachaise to preserve the surface of the sculpture. Published literature concerning cement and concrete list possible applications of oil based coatings or thin washes of cement to fill in the pores of the surface to render it more water repellent (Ashurst 2002; Houghton 1911). The surfaces of the first two casts of the *Garden Figure* do not give clarification. The Portland *Figure* exhibits a discolored coating, however, the sculpture had been painted by the second owner of the Lachaise residence prior to its accession into the Museum (Barry 1995).

The method of concrete casting is limited to two options: dry tamping and a wet pourable method. The extent of weathering on the exterior surface of *La Montagne* lacks has removed manufacturing or casting information. The areas of loss exposed the layers of concrete, metal lathe and rebar used. An article in *Newsweek* reports that the "cement coat is only 2 inches thick" (*Newsweek*, Feb. 2, 1935). This likely refers to the top layer, as there are clearly several layers equaling more than two inches. A *New York Times* article described the sculpture as having an earth brown cement color (Jewell 1935). Today, the visible aggregate is of varying size and color. It is not known if a more brown colored top cement coat has weathered.

Lachaise preferred to finish his bronze sculptures himself and do all his own stone carving. Given his approach, it is very possible that he could have done some finishing to the cast cement sculpture once out of the mold. There are chisel marks visible along the backside of the figure. Though they are eroded to some extent, it is unlikely that such fine detail was cast-in. It is documented that Lachaise used an air chisel in 1930 (Goodall 1969, 148; Lachaise Papers, letter dated July 20, 1930); however, in the author's experience, these marks lack the characteristics of an air chisel used on cured concrete.

2. Conservation Project

The project included a phase for examination, repair of the concrete pillars, and removal of biological growth (2002); a second phase for structural repair of delaminating concrete layers and reconstruction of the feet (2003-4); and a final phase for long-term maintenance planning and possible mount design. Each phase was proposed separately, for incorporation into the budget for the following season. The proposal for the last phase is still being considered for approval. The rising cost of steel in our present economy has made this particular phase of treatment difficult to estimate.

Though the owner had maintained the sculpture to some extent, there were many structural problems. The significant problems identified were the loss of concrete to the pillars, edges, corners, and feet, surface erosion, failing previous repairs, cracking, delamination of layers, active iron armature corrosion, freeze thaw damage, disaggregation or weakening of concrete fabric, high moisture retention, and biological growth.

2.1 Phase One

2.1.1 Radiography

On-site radiography of the sculpture confirmed the presence of an interior armature for the otherwise hollow sculpture. Iron pipe with threaded ends, plumber's piping, exists inside along with iron rebar around the edges. Unfortunately, the radiography could not provide other pertinent information about its condition, such as hidden cracks or extent of delamination or movement of the interior layers. Other methods of monitoring are currently being investigated, such as ultra-sound mapping.

2.1.2 Examination

The temporary wooden support of posts and plywood platform, installed by the owner, were removed to allow examination of the underside and drying of the sculpture. The plywood provided a steady supply of moisture.

There are three visible layers of concrete, and a possible fourth. There exists a topcoat containing different size and color aggregate, a brown coat, and a scratch coat with the metal lathe. Though the figure is hollow, the extent of cement, if any, beyond the scratch coat surrounding the pipe armature is not known. The metal lathe appears to be welded at intersecting points versus a cast lathe. The top layer is delaminating allowing water retention and moss growth. The exposed metal lathe and rebar were corroding. Huge quantities of loose material, like sediment, were falling away at the feet (Fig. 3). Loose portions of the concrete around the perimeter and feet of the figure were collected. Most pieces were determined to be repair materials and kept in storage by the owner instead of being reattached to the figure during treatment

Pieces of lime migrated from the interior layers during carbonation of the concrete. As the cement in concrete cures, calcium hydroxide and calcium silicate hydrate form. As carbon dioxide, supplied by air and water, reacts with calcium hydroxide, calcium carbonate and water is produced. This is usually visible as efflorescence in new concrete. When calcium hydroxide is removed from the cement paste, then the remaining calcium silicate hydrate will liberate calcium oxide or lime.

Figure 3. Before treatment showing partial loss of feet with inner layers exposed, October 2001.

The weak top layer is weathered, clearly exposing the aggregate. A more sheltered are along the back of the figure more clearly retains chisel marks.

Disaggregation, or sugaring, occurred underneath most modern repairs. These repairs were made with modern harder cements, which are not nearly as porous, lowering the water transition rate at the interface so that water was retained (Fig. 4). This also occurred where certain edges of the sculpture were coated with an unknown sealant in a previous repair attempt.

The sculpture was further probed to determine the extent of moisture content and concrete stability. A concrete pad at least two feet deep under the pillars was detected by probing the soil with shovels. The topsoil and damaging plant growth contributing to rising damp and staining of the pillars were removed.

Figure 4. Clockwise from top left: back corner with previous concrete repair; back corner with previous repair removed exposing degraded original material; back corner with new repair mortar.

2.1.3 Pillar Repair

Repairs were made to the two damaged corner pillars. The areas were first keyed with stone chisels and repaired using Jahn M90 concrete repair mortar. A 12-inch diameter Sonotube was used to shape the proper left front pillar, under the feet. High points where a slight squeeze out occurred along the edge of the Sonotube were taken down with a carborundum stone after curing.

2.1.4 Cleaning

The sculpture was cleaned using a dimethyl ammonium chloride based biocide (D2 Antimicrobial). A dilute solution was sprayed onto the surface of the figure and pillars, concentrating where moss growth was visible, using a garden sprayer. The surface was brushed where safely possible, and rinsed thoroughly using a hose. The pillars were further cleaned using pressurized water at 1500-1800 psi.

A silicon carbide stone was used to remove calcium carbonate efflorescence, probably liberated during carbonation, from the front left pillar and around other cracks on the underside of the object. Removed salts were analyzed by FTIR after a series of solvent extractions and also confirmed the presence of unknown acrylics. The source of the salts previous repairs materials as well as calcium carbonate liberated during carbonation.

2.1.5 Drying

To reduce trapped moisture from the interior of the sculpture, eleven holes were drilled into the bottom using a Hilti drill and 3/4 in. bit: one hole between each pillar along the perimeter and several in the center. Two small battery powered fans were attached with temporary peel away caulk over the center holes, to pull moist air out of the interior and facilitate the drying process (Fig. 5). The sculpture was then sheltered from direct rainfall using a tarp supported by wood studs. The temporary shelter was in use for eight weeks. The combination of shelter and fans successfully dried the sculpture to the touch during the remaining three months of the season. The sculpture also was drier upon removal of the shelter the following spring.

Figure 5. Underside of sculpture showing ventilation holes and attached fans.

2.2 Phase Two

2.2.1 Repair of Delaminating Layers

Many delaminated layers were visible along edge losses and adjacent to cracks. After some initial in-lab testing of working properties, set time, and content, a suitable pre-made injection grout was chosen (Jahn M30). Examination of the dry material under the microscope revealed many glass micro-balloons or similar material. An even weaker grout could be made with the addition of more micro-balloons.

Simple knuckle tapping assisted with locating air pockets. Holes 1/4 inch in diameter were drilled into the air pockets of delaminated layers of the sculpture. These were used to both displace air and receive the grout. The grout was injected with large syringes starting from one end while observing its exit from adjacent holes. Rope caulk was used to dam areas and plug entry holes where needed. After some curing, the holes were plugged with new mortar. Some air pockets remained in less accessible areas. Other possible areas for future injection grouting were documented for future annual monitoring.

2.2.2 Loss Compensation

Areas to receive repair mortar were cleaned and prepared by squaring off edges with stone chisels, as needed, and removing loose debris with a stiff brush. Exposed iron armature was cleaned of loose corrosion using a steel wire brush, and then coated with Paraloid B-72. Because an iron armature within concrete in a damp environment is particularly vulnerable to corrosion beyond the expiration of an alkaline concrete fabric, the resin may provide some measure of protection. New mortar was added to all four corners and along the edges where losses of original material had occurred. The area of loss below the feet was packed as much as possible with new mortar before attaching replacement toes and sealing up the edge. A thin coat of new mortar slurry was added to eroded areas on the front torso surface near the chest and proper left hip near the hand in attempt to consolidate and better seal the surface.

In-lab testing of new mortar samples to match tone and surface was performed using dry pigments with the ratio 1:30 parts by weight to dry mortar. Sand was pressed into the final surface with a float.

More reference material was needed in order to reconstruct the toes. In 1989, a rubber mold of the sculpture was commissioned jointly by the Frelinghuysen-Morris Foundation and the Lachaise Foundation. Later in 1991, Modern Art Foundry cast a series of five copies of the sculpture in bronze using the rubber mold commissioned by the Lachaise Foundation. One cast resides on the campus of Cedar Crest College, Allentown, Pennsylvania. A plaster cast of the figure’s toes using the 1989 mold was acquired from Modern Art Foundry by the Frelinghuysen-Morris Foundation to aid in the reconstruction. Unfortunately, an aging mold could not give a good profile. The first four toes on the figure’s right foot were further built out and reshaped using published photographs of the original, as much as possible. A new flexible polyurethane mold was made at the conservation laboratory from the new plaster cast. A plaster piece-mold and a wooden frame casting box were constructed for a final cast in new mortar.

Initial attempts to cast the toes in-situ were unsuccessful, as the flexible mold could not be keyed into the plaster cast enough to support the weight of the wet mortar. Instead, the toes were cast separately and attached to the sculpture with new mortar within twenty-four hours of curing. The new proper right large toe was attached with a horizontal 3/8" type 316 stainless steel tube.

Minimal shaping was done after curing per client consultation using stone chisels and a silicon carbide stone (Fig. 6).

Figure 6. After treatment showing reconstructed feet, September 2003.

2.3 Phase Three

After stabilization was addressed, long-term care including annual maintenance was outlined. The client had new foundation laid from the service road leading down to the sculpture prior to Phase 2. Regular clearing of plant growth from the ground pad was recommended to reduce staining on the pillars and rising damp. Addressing better drainage around the concrete pad by re-grading the slope from the service road and adding gravel was also recommended. It is clear that moisture will always be present on the site and within the sculpture. The goal is to allow the sculpture to dry itself more easily. Annual maintenance is necessary to check stability of repairs, new erosion or cracking, amount of retained moisture, and reappearance of biological growth to be removed. Though annual maintenance has been strongly recommended, the owner has yet to implement a plan.

The larger issues of the inherent limitations of the artist's materials, combined with continual weathering, has led to the design of an external support. The concrete lacks tensile strength along the bottom of the hollow sculpture, resulting in cracks and distortion between pillars. With a minimal amount of material, a strong steel support can greatly reduce further movement. A mount will not attempt to correct prior movement of the concrete, but prevent further slumping and cracks.

The mount consists of the following (Fig. 7): a conforming (perforated) support next to the bottom of the sculpture; 1 ½" x ½" type 304 stainless steel grating, cut to fit between and anchor to pillars; 4” type 304 stainless steel I-beams (15.25 lbs/ft), 2 down the long length with four intersecting short beams; 8 type 304 stainless steel pipes 2” diameter, with adjustable threaded nuts and ½” stainless steel base plates, supporting the I-beams at each intersection, resting on the concrete ground pad. The mount can be keyed to the tops of the pillars and perforated to allow for air circulation and moisture release. Because the sculpture has some distortion, an additional removable conforming support (epoxy putty or similar material) will be used between the perforated plate and the bottom. The idea of a perforated plate and perforated epoxy putty must be further considered to allow air circulation. There will be four stainless steel adjustable pipes supporting the steel beams of the mount. The visible metal can be painted a similar color as the concrete to hide it as much as possible (Fig.8). The ground-to-sculpture supporting elements will be partially hidden by the pillars from certain viewpoints.

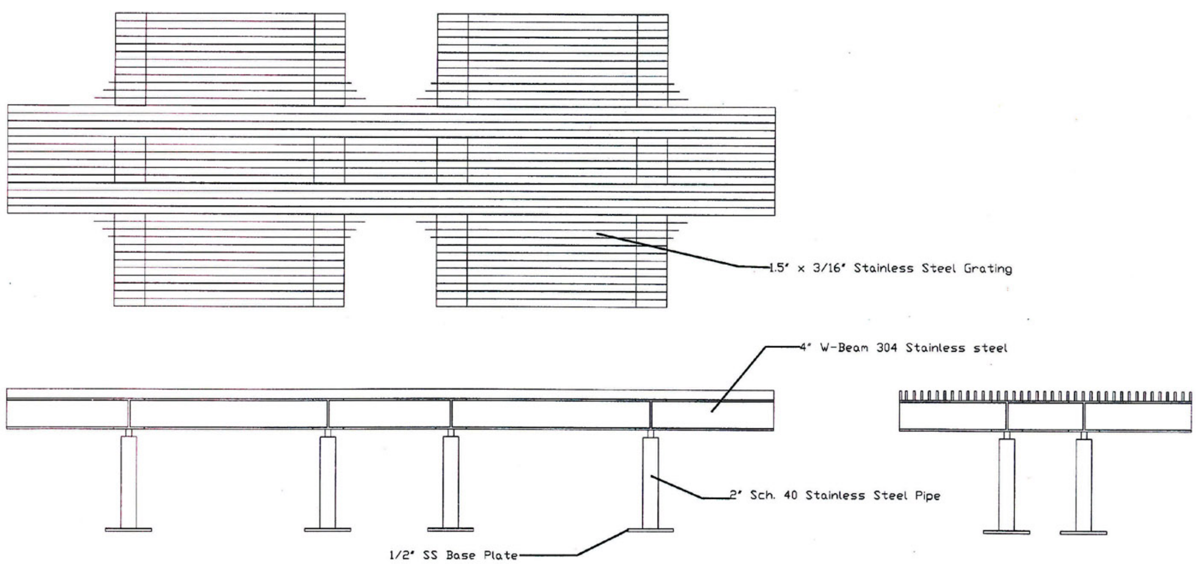

Figure 7 (above). Diagram of the mount. Two views of the plate underneath the sculpture and adjustable pipes supporting the plate. Not to scale.

Figure 8 (left). Simulation of proposed created with Adobe Photoshop. Not to scale.

The mount will be modified to a more efficient design with the smallest amount of raw material, and the smallest number of stainless steel welds, that can be used without compromising the strength and dual purpose of its intended use. A team has been assembled to address the final design, fabrication, and installation, consisting of WACC conservators, a metal fabricator, a consultant specializing in the preservation of historic structures, and a consulting structural engineer well versed in preservation.

Prior to the design of the mount, discussions with the owner and other professionals regarding an external mount versus internal strengthening were carried out. The weight of the figure requires a strong and durable support material without further straining the precarious concrete fabric. Adding irreversible material to the interior would be intrusive and was therefore not proposed. The support during installation will also increase visitor safety, as the sculpture is completely accessible for visitors to walk under it between the pillars as well as around it.

If the preservation of the sculpture is compromised to the point that it must be relocated indoors, the sculpture must be well supported during transport. The danger of collapse of the hollow figure is great during transport, caused by vibration and lifting. The lifting of the figure can be done either by crane and/or forklift via the steel beams in the proposed mounting support that would be keyed between the pillars and base. A replica made from a lighter weight material with the visual surface characteristics (which are lacking in the 1990 bronze cast) is recommended to replace the sculpture if moved indoors.

The cost of stainless steel has more than tripled since 2002 when conservation treatment of the sculpture was first started by WACC. The inclusion of type 304 stainless steel has therefore been reduced to type 304, which is less expensive. Though the design is likely to be modified, the most appropriate material continues to be stainless steel. The cost of this mount is therefore subject to the cost of stainless steel at the time of fabrication.

3. Conclusion

The sculpture resides in a damp area and retains a large amount of moisture year round, which perpetuates or causes some of its structural problems. It did not have a winter shelter for many years and suffered from freeze thaw damage. The maintenance of the sculpture had been, for years, more of a general approach to grounds maintenance. Low cost minimal concrete repair with readily available materials by the owner was done with good intentions, but without taking into account other important needs.

Though Lachaise thought highly of the preservation of cast concrete sculpture outdoors, William Zorach, friend and sculptor did not share his view. He wrote in his monograph *Zorach Explains Sculpture*, “Cast stone (crushed stone, sand, and Portland cement) can be permanent indoors but out of doors it has a tendency to crack and disintegrate” (Zorach 1947, 149).

The author suggests a limitation of artist’s materials in this environment in addition to the added responsibility that perhaps the owner was not prepared to handle. The preservation of this sculpture extends beyond the cost of most single outdoor metal or stone sculpture. Did the artist really intend for it to degrade in-situ? Though he had a great appreciation for classical ruins, he also thought the concrete would be durable. Around this same time in America, major structures had been erected using concrete. In addition, Lachaise had been receiving more architectural commissions.

Because it is quite an important work for this artist, a compromise between the two specialties of historic preservation and sculpture conservation is needed to maintain *La Montagne*. The goal of annual maintenance is to replace as little as possible. This will allow its life outdoors, as the artist intended, to be prolonged. The conservation center will continue to work with the owner to provide the best possible solutions for this unique sculpture.

Acknowledgements

The author would like to thank the assistance of colleagues at the Williamstown Art Conservation Center during the conservation treatment and the Lachaise Foundation for assisting with historical research. The author would also like to thank the guidance of consultants, most importantly Bill Foulks, consulting historic preservation professional and adjunct professor at Rensselaer Polytech Institute, Troy, NY.

Suppliers

D2 Antimicrobial (active ingredients of dimethyl ammonium chloride and alkyl dimethyl benzyl ammonium chloride), Jahn M30 (cement based injection grout without acrylic additives), Jahn M70 (cement based repair mortar without acrylic additives):
Cathedral Stone Products, Hanover, Maryland, (800) 684-0901, (www.cathedralstone.com)

Dry Pigments:
Kremer Pigmente, 247 W. 29th Street, New York, NY 10001, (212) 219-2394, (800) 995-9501

Paraloid B-72 (copolymer of methacrylate and ethyl methacrylate):
Conservation Support Systems, PO Box 91746, Santa Barbara, CA 93190, (800) 482-6299

Sonotube:
local hardware store

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