INTERIM Treatment REPORT I

Jackson Stewart's *Apollo Mural*

Conservation of the Mosaic

September 14, 2022

Figure 1

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INTRODUCTION:

Jack Stewart's Apollo is a 92-foot-long mosaic mural originally installed on the historic Miami Beach Versailles Hotel. This artwork was removed upon the demolition of the hotel and has remained in storage since 2014. Both times that RLA assessed the mural, it was stored in an empty lot at 285 NW 71st Street, Miami, FL 33150.

This interim report outlines the work completed for the conservation of the Apollo Mosaic commencing in April 2022 through August 19th, 2022. This work has included an inventory, relocating the mosaic, testing methodologies for treatment, initial cleaning, and review of the artwork by a structural engineer.

Record photographs are included in this document. Additional digital photographs were taken during the assessment, inventory, relocation and testing. To access, please copy and paste the following link into your browser:

https://www.*dropbox.com/sh/f5dtp9jv9t3v2cl/AACO3rxgxqs6A2G_9VMWtrRWa?dl=0*

INVENTORY:

Prior to relocation, all of the elements were assessed and inventoried on site on May 27, 2022 by RLA conservators Caroline Dickensheets and Salome Garcia, as well as technicians Diana Fridelova and Anjelica Russell. A diagram of the installed artwork was created based on historical photographs from its original location at the Versailles Hotel on Collins Avenue and 32nd Street. Each item was assigned a number (Figure 2), except for the aluminum bars and smaller link elements, which are difficult to identify in their current state. Each element was photographed and carefully catalogued and labeled on site. No identifiable elements appeared to be missing.
Lose tesserae were collected for re-use before and during the relocation. They were catalogued and stored in separate bags labeled in correspondence to the numbered elements they belong to and brought to the RLA Miami Studio to perform cleaning and testing.

Overall of mural at its original location in the Versailles Hotel, Miami Beach, photographed by Steve Reed in 2005. Retrieved from Reed's blog Shadows & Lights.

Detail of mural at its original location in 2012. Loss of tesserae already visible. Retrieved from Flickr.

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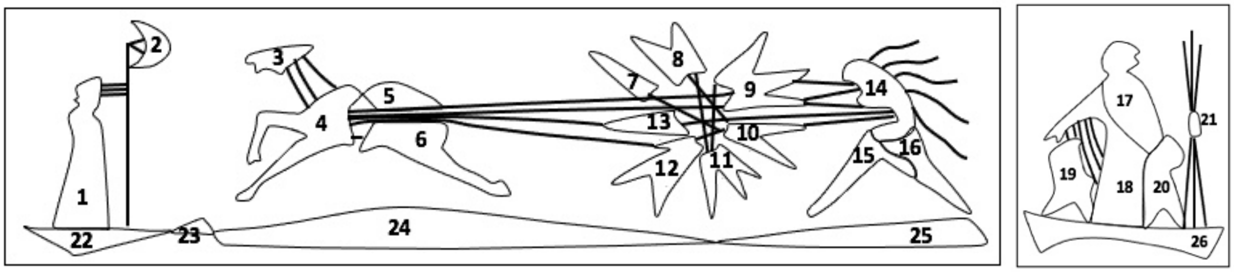

Figure 2. Diagram of the installed artwork. Panel 1 (left) and Panel 2 (right).

<u>*Legend and Tesserae Colors:*</u>

Panel 1: "Apollo Driving his Sun Chariot across the Sky (to meet his twin Artemis)"

1. Artemis – all colors
2. Artemis Moon/Arch – dark blue/green
3. Horse head – white and gold
4. Horse front legs – white and gold
5. Horse back – white and gold
6. Horse rear legs – white and gold
7. Sun ray 1 – orange/gold
8. Sun ray 2 – orange/gold
9. Sun ray 3 – orange/gold
10. Sun ray 4 – orange/gold
11. Sun ray 5 – orange/gold
12. Sun ray 6 – orange/gold
13. Sun ray 7 – orange/gold
14. Apollo's head – orange and lilac
15. Apollo's front leg – light blue/green
16. Apollo's back leg – white and gold

Panel 2: "Latona and Her Twins"

17. Latona's head – orange and lilac
18. Latona's dress – light and dark blue; orange and lilac
19. Twin 1 – orange, lilac, gold
20. Twin 2 – orange, lilac, gold
21. Spear – dark blue/green

22, 23, 24, 25, 26. Ground

RELOCATION:

As the mosaic was no longer able to be worked on at the site where it had been stored, a plan was devised together with the art handling firm Uovo, for safe transfer of the artwork to a new location in the Bakehouse at NW 32nd Street near 5th Avenue. The transfer took place on June 13 and 14, 2022, with the oversight of RLA conservators Christina Varvi and Salome Garcia.

In order to prevent flooding of the mural and to facilitate transportation, some elements were placed on plastic pallets, while other elements were moved with the wood pallets that they were laying on at the temporary storage location, as these were custom built and in good condition. Each element and its pallet was lifted from the ground using a forklift by Uovo art handlers, transported on a flatbed truck to the new location and moved to the fenced area at the Bakehouse using a forklift.

During relocation each element was photographed from the front and back sides. Cracks and distinguishing marks on the back were noted. Additional loose tesserae were collected and properly packed and labeled. These were also transported back to the RLA Miami Studio, along with panel #21 and other small unnumbered elements, to perform cleaning and testing.

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SELECT RELOCATION PHOTOGRAPHS:

*Overall of inventoried elements **before** relocation.*

*Overall of inventoried elements **after** relocation.*

*Overall of panel #17 **during** relocation.*

*Detail of water infiltration at crack on the back of panel #17 **during** relocation.*

*Overall of panel #18 **during** relocation.*

*Detail of cracks, distinguishing marks and exposed wire mesh on the back of panel #18 **during** relocation.*

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CONDITION:

Upon delivery to Bakehouse, conservator Christina Varvi partially excavated select areas of the large figurative panel labeled #1 in order to examine its structural support. Select areas of panels #4 and #18 were later partially excavated by conservator Salome Garcia and technician Diana Fridelova.

For most panels that make up the figures, sun, chariot, etc., the internal support system appears to be hollow aluminum tubes welded to the exterior aluminum edging at approximately halfway through the depth of each panel. There are smooth (i.e., not threaded) ferrous metal bars set within these tubes in all excavated panels. It's unclear if they were set with any adhesive or mortar within the aluminum, and if not, how they provide additional support/rigidity if they were not connected to anything. The composite tubes and bars appear to be generally set in a zig-zag pattern across each panel to help provide added rigidity. Additionally, there also appears to be ferrous metal mesh/lath in a diamond pattern set around the same depth within these panels. The weave/grid of this mesh is about 1″ L at the widest side. During the excavation it became apparent that the mesh is attached/connected to the internal support rods by thin ferrous metal wires.

For panels that make up the "ground" elements, the mesh appears to be closer to the surface within the concrete. In these panels, it is not evident what the mesh/lath is attached to within the assembly. The same aluminum tubes that are embedded in the panels that compose the figures, have been set at surface level, merely embedded in the concrete, and do not appear to have internal ferrous rods. It is not clear if there is another set of support rods embedded in these panels in addition to those set at the surface.

At both the figurative and ground panels, areas of exposed and excavated mesh/lath exhibit corrosion over all surfaces. The individual panels themselves are no more than about 4″ or less deep. The recommended depth of any embedded ferrous support is a minimum of 2″ from the surface to help mitigate corrosion as a result of concrete carbonation. One can assume that the concrete has carbonated to the depth of all the panel reinforcements and has facilitated corrosion of these elements.

In panel #1, an exposed aluminum tube with internal ferrous support was excavated. The iron was extensively corroded (almost all the way through the rod) and the force of expansion caused the aluminum tube to crack and also expand outwards. The expansion resulted in cracking of the concrete and dislodged embedded tiles. Though the embedded support structure is visible on this panel, it is assumed that this is happening elsewhere, likely due to trapped moisture and galvanic corrosion. As a result, there is extensive tesserae loss throughout most panels anywhere that there is an internal aluminum support bar. This was found to be the case at least in the other two excavated panels #4 and #18. Though the internal mesh is corroded, it does not appear to be causing similar cracking and tesserae loss. However, if it is meant to provide added rigidity to the panels within their backless aluminum frames, this may be compromised based on the extent of the corrosion.

Historical photographs recovered during an online search, show that at in least panels #17, #18, #19 and #20, originally located in the wall in 32nd Street, tile loss was visible since at least 2012.

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Conservator Christina Varvi sounded select panels and did not detect voids or delamination. However, since the panels are relatively thin, the same sound was detected across the surface, even though a large void/cavity was uncovered at panel #1 at the lower half of the panel. The cause of the void was not readily apparent, but it is possible that there may be additional voids at other panels. This cavity appears to have accelerated the corrosion of the cracked aluminum tube and the exposed internal ferrous bar. More high-pitched rattling usually associated with delamination between tiles bedding mortar and the slab substrate was not detected. Such rattling was detected at individual tiles where they have become delaminated from their bedding mortar, either due to cracking of the slab or biological growth taking hold behind the tile.

Multiple different types of mosaic tile have been used throughout the installation. These include stained glass, vitreous tile, and smalti tile. Some are translucent, others opaque, and many fabricated with true gold leaf. The condition of the various tiles differs depending on their location and composition. There seem to be two different types of gold leaf tiles. The smaller, thicker square ones seem to be an opaque brick red backing while the broader, thinner ones appear to be a translucent green glass backing. Both types are exhibiting surface spalls where the base glass is now exposed. They're also exhibiting surface spalls where the thin glass facing over the gold leaf has been compromised. Either the glass is missing, exposing the gold leaf, or it exhibits a pink discoloration/white hazing over the surface, which could either be alkali residue stains or Stage I glass corrosion.

The tile and grout surfaces appeared to be relatively clean except for moderate accumulations of microbiological growths. The growths are tenacious in the grout and at exposed cement surfaces of the "ground" features. Throughout the relocation process and subsequent limited testing and cleaning, many tesserae continued to detach from the mortar bed. Detachment during relocation can be attributed to the flexing of the panels and vibration. While on the pallets, many tiles could be easily dislodged by hand. Those exhibited microbiological growths and/or a layer of what appears to be calcium carbonate efflorescence between the back of the tile and the mortar. The thinner/shallower tiles appear to be the most affected, presumably because it was easier for the growths to migrate from the surface behind these tiles. Thicker tiles were less affected, but some still became dislodged due to biological growths and calcium carbonate. There is concern that the amount of bio growth behind tiles is extensive and that most may have become destabilized as the bio growths and calcium carbonate layer break the bond between the tile and mortar.

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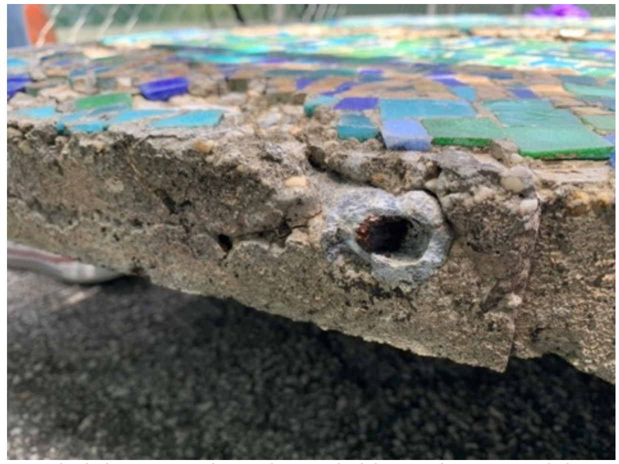
SELECT CONDITION PHOTOGRAPHS:

Overall of panel #1 ***during*** *excavation.*



Detail of aluminum tube and corroded ferrous bar exposed due to the detachment of the aluminum frame at panel #1.

Detail of exposed aluminum tube, corroded ferrous bar, corroded wire mesh, and large cavity at panel #1.

Detail of excavated aluminum tube showing internal corroded ferrous bar, and corroded wires (supposedly attached to mesh) at panel #4.

Detail of hollow, superficial aluminum decorative tube on 'ground' panel.

Detail of exposed aluminum tube, cracks, concrete loss and exposed corroded wire mesh on 'ground' panel ***during*** *excavation.*

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TESTING:

General Cleaning / Biological Growth Mitigation:

After relocation to the Bakehouse, all panels were initially sprayed with biocide D/2®, and another round of D/2® was spray-applied and allowed to dwell. All panels were later rinsed with filtered water and scrubbed with stiff nylon-bristle brushes to remove loose, dead bio growths. This cleaning method was tested at the studio on panel #21 prior to cleaning the rest of the panels at the Bakehouse, proving sufficient for cleaning the tile and grout surfaces.

Lose tiles stored at the studio were cleaned soaking them first in a solution of distilled water and conservation grade detergent Orvus®, and rinsing afterwards with distilled water. Nylon bristle brushes and microfiber cloths were used to mechanically remove remaining bio growth and/or mineral deposits from the surfaces.

The surface of the aluminum frames is covered in dust, paint splashes of different colors, and is corroded. Some appear to have been coated with silver paint. Cleaning tests were performed in the studio with solvents and aqueous solutions. Acetone was effective to remove the paint and a solution of distilled water with Orvus applied with Scotch Brite was effective in reducing the dirt and corrosion. A metal scraper was necessary in some areas to remove heavy paint deposits.

Gold Tiles:

Testing was conducted to attempt to mitigate the damage to the gold tiles and reduce the glass haze with Winsol® Crystal Clear 550 per manufacturer's specifications. The product was applied to the surface of 3 tiles in different concentrations (1:10, 1:2, undiluted) using microfiber cloth and pressure, with no more than two (2) passes to avoid causing secondary damage and new haziness. An acrylic resin (B72 2.5% in acetone) appropriate for glass conservation was applied in the microfractures in the glass surface, to test if this method would be effective in reducing the haziness. Unfortunately, there was no considerable improvement in the surface haziness after either of these two tests, indicating that the damage is irreversible. It is yet to be determined whether all the damaged tiles should be replaced.

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Select Testing Photographs:

Detail of panel #1, showing dislodged tiles with bio growth visible on both the backs of the tiles as well as on the bedding mortar over which they sat.

Detail of panel #1, showing translucent square amber tiles with dark/black bio growth visible between the back of the tile and the mortar bed, and gold leaf tiles where thin glass surface has been compromised and spalled, turning light pink.

*Overall of panel #20 **before** relocation.*

*Overall of panel #20 **after** relocation, cleaning and removal of additional loose tiles.*

*Overall of panel #17 **during** cleaning with D/2®.*

*Overall of panel #17 **after** wet cleaning and removal of additional loose tiles.*

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Detail of aluminum edge **before** mechanical and wet cleaning test.


Detail of aluminum edge **after** mechanical and wet cleaning test.

ENGINEER REPORT:
Structural engineer Douglas Wood was consulted by RLA to determine what elements of original reinforcement can be salvaged and what has to be replaced, or at a minimum removed to mitigate future damage due to ongoing corrosion.

Findings:
Present Conditions:
- The concrete grout and mosaic tiles appear to be cracked and spalled (with missing mosaic tiles) at all (or most all) of the fully embedded aluminum tubes.
- The previously embedded aluminum tubes are now exposed are corroded. At one location, the severely corroded aluminum tube revealed a corroded steel bar inside the aluminum tube.
- In many locations, the perimeter aluminum frame has separated from the concrete grout.
- In numerous locations the concrete grout on the backside of the panels has gaps/honeycombing from the original grout placement.

Evaluations/Discussions:
- The corrosion of the aluminum tubes is probably mostly the result of galvanic current between the ferrous elements (wire mesh and reinforcing rods) and the aluminum elements, with the aluminum sacrificing to the steel. The steel bar corrosion is likely the result of exposure to the elements after failure of the aluminum tube.
- The tack welds of the aluminum tubes to the perimeter frames (particularly where potentially corroded) may not provide sufficient anchorage of the grout panels to the frames (see further discussion below).
- If it were decided to remove/replace the aluminum tubes, it would be necessary to remove a fair amount of the existing concrete grout and the existing associated mosaic tiles (although a fair amount of these tiles is already missing). If it were decided to replace the tubes, we would recommend replacing them with solid aluminum rods, welded to the perimeter frames. We would also likely recommend that the tubes be coated to isolate

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them from the surrounding concrete patching mortar. Since the concrete patches may not provide the same value of anchorage as the unpatched concrete, some additional anchorage would be appropriate.

- If it is decided that replacement of the aluminum tubes would be too damaging to the existing pieces, then all loose concrete grout should be removed, the exposed portions of the existing aluminum tubes should be cleaned of all corrosion products, coated with an isolating product, and the grout patched with an appropriate patching mortar. The one currently exposed and corroded ferrous rod (and what's left of the surrounding aluminum tube) should be removed and be replaced with a solid aluminum rod of the same diameter, welded to the perimeter frame.
- Any existing gaps/honeycombing at the back sides of the panels should be patched with an appropriate patching mortar.
- The concrete grout is mechanically anchored to the aluminum frames only by the tack welds of the aluminum tubes. In our opinion, it would be prudent to provide greater mechanical anchorage. This improvement may be better left until a permanent location for the art is determined. At that time, it may be appropriate to provide aluminum straps across the backs of the panels with positive anchorages to the backs of the panels. The straps could extend beyond the frames to allow anchorage to the new substrate (similar to the existing angle tabs).
- It should be recognized that the combination of aluminum and ferrous metals in concrete, along with exposure to water and chlorides is prone to the development of galvanic current and corrosion over a long period of time. Therefore, some level of continued corrosion should be anticipated. To prolong the life of the art, it may be prudent to apply sealers to both sides of the pieces. Sealers should be chosen that allow water vapor to escape but that inhibit absorption of liquid water (perhaps a high quality silane sealer).

FOUR MONTH LOOK AHEAD:

- RLA will begin inventorying and sourcing all different types, sizes and thickness of glass tiles required:
  a) Gold Tiles: source sample replacements for both red and translucent-backed tiles in similar thicknesses and color of gold. We have learned of recent supply chain issues with these elements and we will determine the best method of proceeding and make recommendations on whether to replace in kind or with similar elements.
- Continue to remove all loose concrete grout.
- Source solid aluminum rods to replace those that are found to be heavily corroded and begin testing:
  a) methods of mitigating corrosion in the exposed aluminum tubes avoiding undue damage to the existing pieces,
  b) isolating products to coat exposed aluminum tubes.
- Source and test adhesives:
  a) for stabilizing loose/delaminating tiles,
  b) for replacing tesserae,
  c) for resetting tiles in larger areas of loss where the original mortar had to be removed.
- Continue to clean all aluminum frames

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- Test patching mortars to patch existing gaps/honeycombing at the back and exposed sides of the panels.

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