

Conservation of an early glass cloche excavated in the Louvre's Cour Napoléon

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INTRODUCTION

Fragments from a rare, mid-17th century, bell-shaped glass cloche found in the Louvre Palace garden excavations were analyzed and treated at the C2RMF.

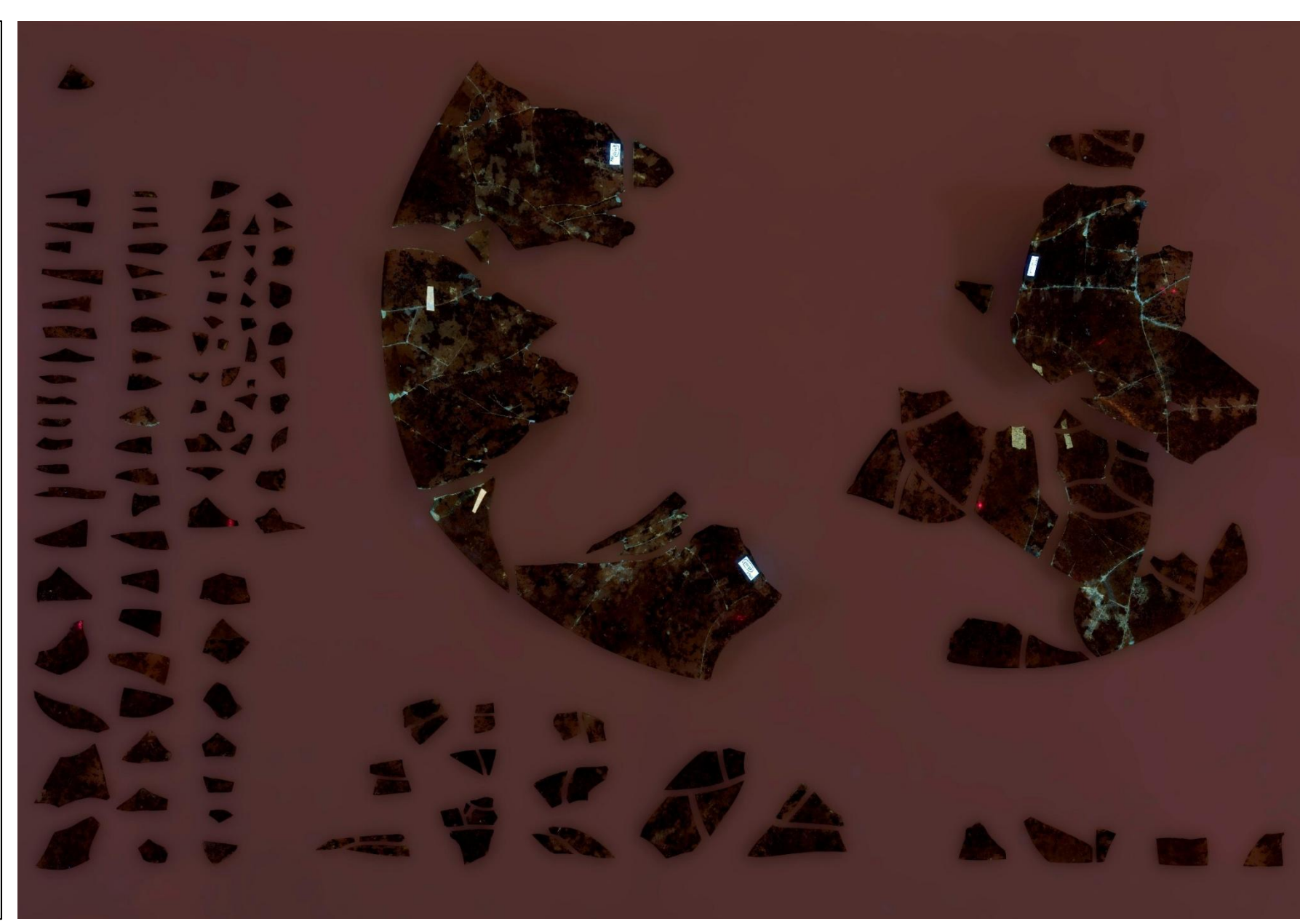
Conservation treatment consisted mainly of surface stabilization and re-treatment of previous 1980's restoration.

Condition assessment

- Broken into over 140 fragments.
- Heavy glass degradation: extremely weathered and lifting surface layers. Extensive surface losses.
- Previous treatment: surface consolidation and assembly, using at least 3 different adhesives, including epoxy resin and Rhodoviol® polyvinyl alcohol resin, (see UV fluorescence picture on the right). Resins have become brittle, yellowed intensely, crosslinked, and are failing, causing additional breakage. Consolidant and adhesives on the surface are now retracting and pulling off weathering layers.
- Some burial soil residues were consolidated onto the surface.
- Additional fragments from neighboring archaeological strata were not initially assembled but included in the present treatment.



Before treatment, exterior side, under visible light ©C2RMF / A. Maigret



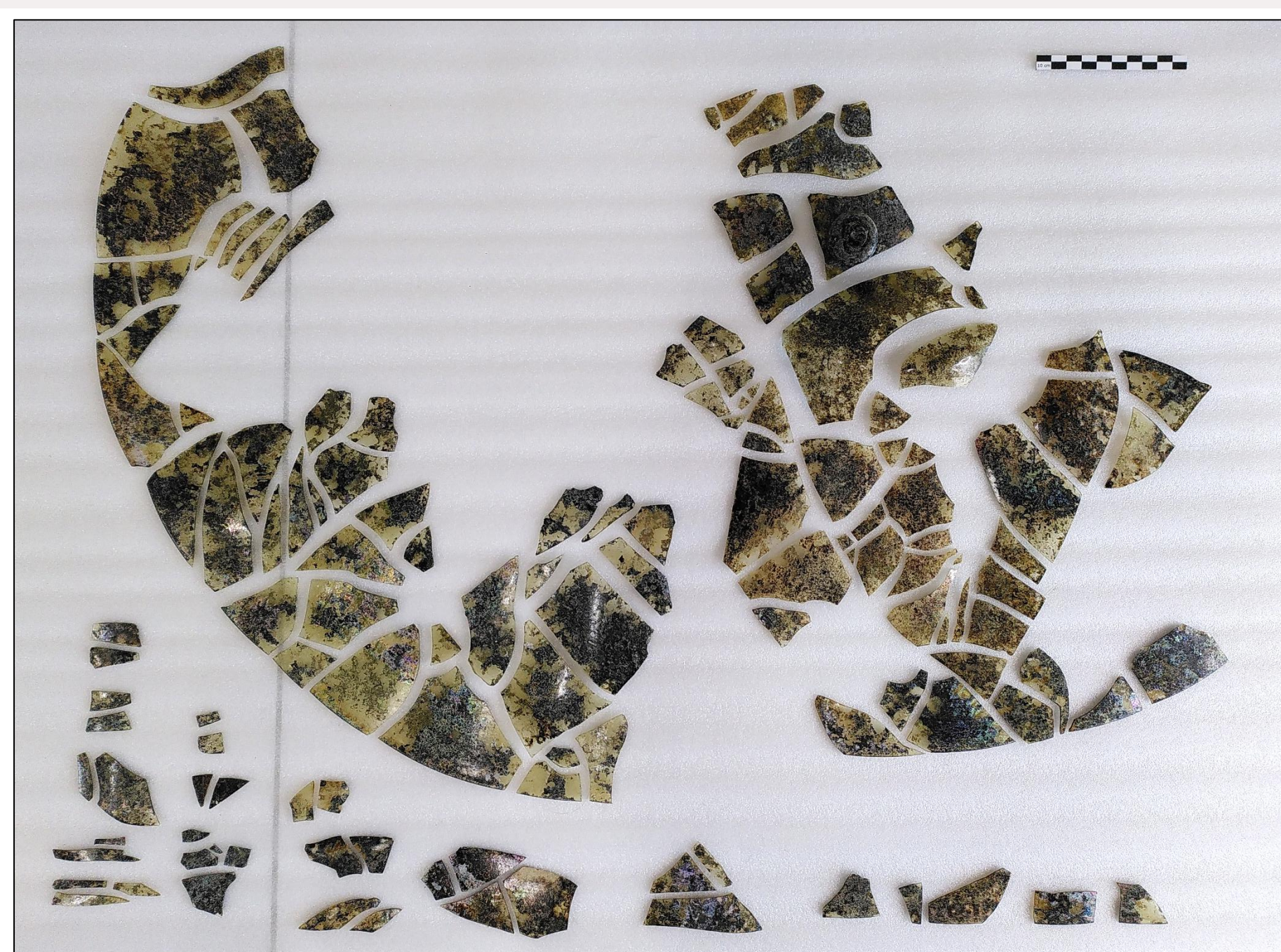
Before treatment, interior side, under UV fluorescence ©C2RMF / A. Maigret

Historical context

- Excavated between 1983-86 during the Grand Louvre project (prior to building I. M. Pei's pyramid) and treated on-site immediately after.
- Fragments were found in filled pit latrine strata among daily-life artifacts from houses, workshops, and fields.
- Bell-shaped glass cloche used for growing melons in colder climates, most likely for royal or aristocratic consumption.
- The use of glass cloches for agriculture can be traced to as early as 1600. The Louvre cloche appears to be one of, if not the, earliest and most complete known examples in European collections.

Glass composition analyses

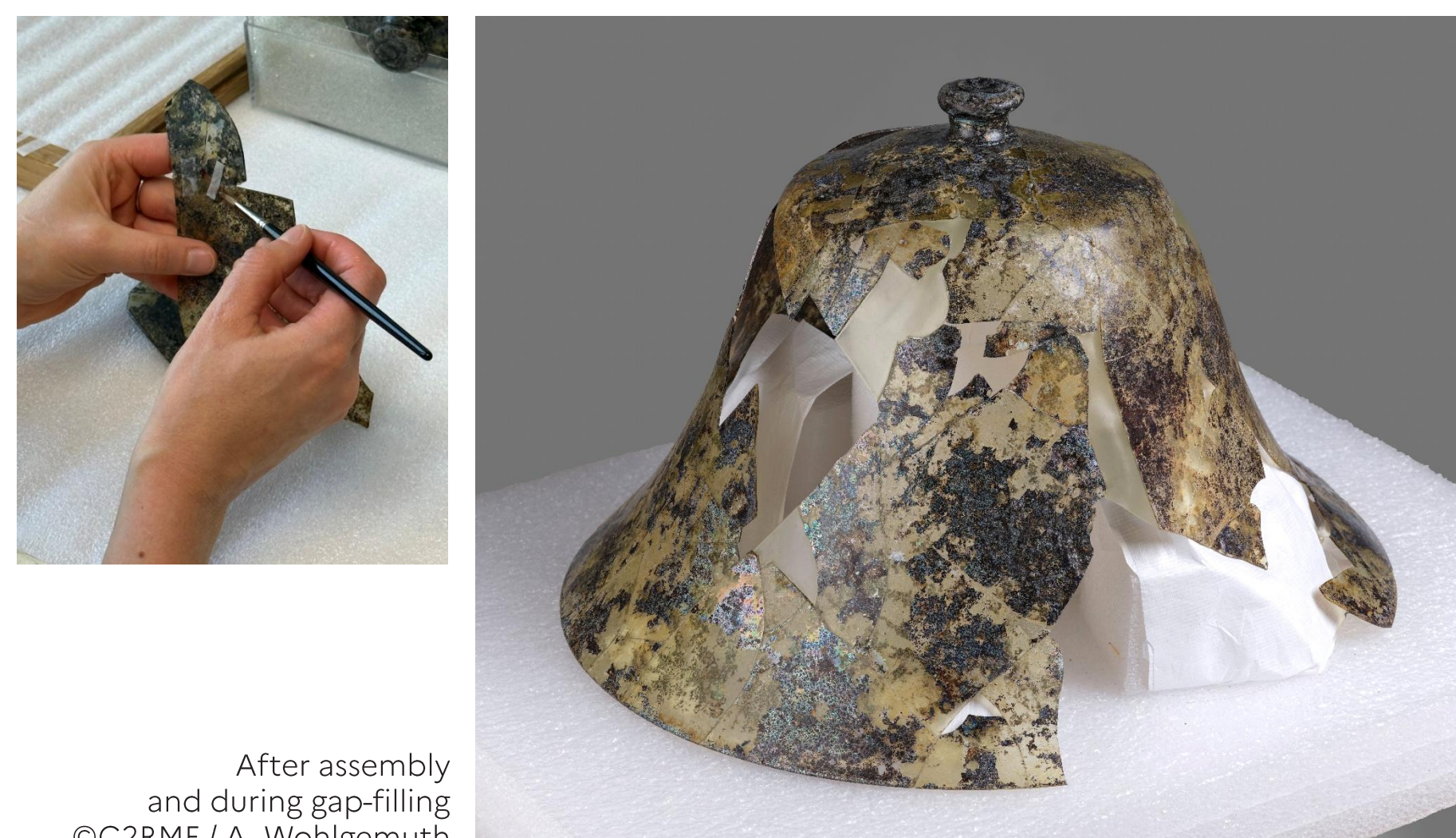
- Ion beam analyses (PIXE / particle-induced X-ray emission and PIGE / particle-induced gamma emission) were carried out using the new-AGLAE particle accelerator at C2RMF.
- Fine quantitative elemental composition of the glass was compared with that of eight other cloche fragments excavated in a neighboring area of Paris, and with the elemental composition of glass artifacts produced in Eastern and Northern France.
- The fragment compositions of all nine cloches were consistent with potash-lime glass production in the Argonne region (Eastern France) between the 14th and late 16th centuries, and with more widespread glass composition in the 17th and 18th centuries.



After disassembly, surface cleaning and consolidation attenuation ©C2RMF / C. Cuyaubère



During treatment; assembly (left) and join reinforcement (bottom left) ©C2RMF / V. Fournier



After assembly and during gap-filling ©C2RMF / A. Wohlgemuth

Conservation treatment

- Extensive puzzle work to identify previous, detached joins; new ones with additional fragments; and new break edges.
- Dismantling previous joins in acetone vapor chamber. Adhesive residues cleaned off using acetone swabs and scalpel.
- Reducing the aged, crosslinked consolidant using Evolon® unwoven fabric as benzyl alcohol poultices, in enclosed chamber for several hours, alternating with repeated, gentle benzyl alcohol swabbing. Final swabbing was done with ethanol.
- Localized surface consolidation as necessary, using 5% Paraloid® B72 in acetone.
- Reconstruction: fragments assembled using 1:1 Paraloid® B72:B44, prepared according to Stephen Koob's recipe for glass (48% w/v in acetone with fumed silica, in aluminum tubes). No tape nor clamp could be used for alignment.
- Join reinforcements (PB72-impregnated 18g/m² Tenjugo Japanese tissue) on the interior side.
- Structural loss compensation only: cast PB72 sheets lightly tinted with dry pigments, shaped and cut while still flexible, and adhered to the break edges with acetone. Minor in-painting using Golden® Heavy Body acrylic paints.
- Temporary support made of Plastazote® polyethylene foam during treatment. A long-term housing and display support will be necessary.

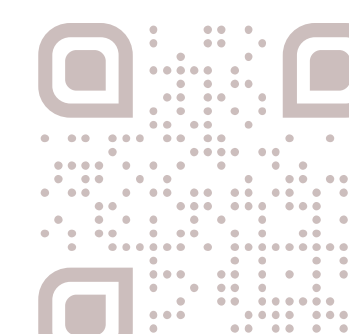
CONCLUSION

- Attribution: elemental composition analyses' results attribute the Louvre's cloche to Argonne glass production, although its provenance could have been a wider area of Northern and Eastern France. Archaeological stratigraphy indicates that this cloche would have been in use during the second quarter of the 17th century.
- About 40 additional fragments were identified and assembled.
- Conservation treatment was limited to essential procedures for the object's preservation. Complete removal of the old Rhodoviol® consolidant was neither possible nor wanted, due to partial cross-linking and the fragility of the weathered glass surface, which constrained every step of the treatment. Total treatment time amounted to over 30 days.

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REFERENCES

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Conservation of an early glass cloche excavated in the Louvre's Cour Napoléon

Excavations around the Musée du Louvre conducted between 1983 and 1986 as part of the Grand Louvre project revealed many daily-life artifacts from houses, workshops, and fields. Amongst the fragments were those of a rare, mid-17th century, bell-shaped glass cloche used for growing melons. The fragments were found in filled pit latrine strata, near the Louvre Palace. Descriptions of the use of glass cloches for agriculture can be traced to as early as 1600; they were used to grow melons in the colder climate of northern France, most likely for royal or aristocratic consumption. However, the cloche from Cour Napoléon appears to be one of the earliest, if not the earliest, and most complete known examples in European collections. Ion beam analyses (particle-induced X-ray emission and particle-induced gamma emission) were carried out using the AGLAE particle accelerator at the Centre de Recherche et de Restauration des Musées de France. They revealed the fine quantitative elemental composition of the glass, which was compared with that of eight other cloche fragments excavated in a neighboring area of Paris and dated to between the second half of the 17th and the second half of the 18th centuries. The data were also compared with the elemental composition of glass artifacts produced in eastern and northern France. The fragment compositions of all nine cloches were found to be consistent with glass production in the Argonne region (eastern France) between the 14th and late 16th centuries, but also with more widespread glass composition in the 17th and 18th centuries. These results make an attribution of the Louvre's cloche to Argonne glass production possible, although uncertain. The cloche's fragments were treated on-site immediately after their excavation in the 1980s, but no treatment report could be identified in the Musée du Louvre's archives. The treatment at that time consisted of consolidating the lifting, delaminating iridescent surface and joining several dozens of fragments together, with unknown adhesives. Forty years later, both the consolidant and the adhesive exhibited intense yellowing and partial cross-linking. The joins have also become brittle, and some of them have come undone, causing additional breakage. The present treatment protocol consisted of extensive puzzle work, including additional fragments from neighboring stratigraphic areas in Cour Napoléon, trials for attenuating the aging consolidant, surface consolidation, disassembly and removal of the failing adhesive, re-assembly,

and gap-fills as structurally necessary. A housing and display support will be essential for future storage and potential exhibition of the cloche. Publication in a monograph on the emergence of glass garden cloches is also planned.