

## Images

**01. Villa Laurentina.** Scamozzi, Vincenzo *L' Idea Della Architettvra Vniversale: Diuisa in X. Libri (Band 1): Dell' Eccellenza Di Qvesta Facoltà, De gl' Architetti prestanti: e Precetti, Inuentioni, Disegni, Modelli, & Opere merauigliose*— Venetia, 1615, p. 269.

**02. Villa Laurentina.** Félibien des Avaux, J. F., *Les plans et les descriptions de deux des plus belles maisons de campagne de Pline le consul*, chez Florentin & Pierre Delaulne ruè S. Jacques, à l'empereur & au Lions d'or, Paris, 1699, pp. 57-78.

**03. Vitruvian atrio testudinato.** Fra Giocondo da Verona. Vitruvio Polión, M., *De Architectura Libri Decem, M. Vitruvius per Jocundum solito castigatior factus cum figuris et tabula...*, G. da Tridentino, Venezia, 1511, pp. 62-63.

**04. Atrio testudinato.** Cesare Cesariano. Vitruvio Polione, M., Di Lucio Vitruuio Pollione *De architectura libri dece: traducti de latino in vulgare, affigurati, cōmentati...* Impressa nel amœna & delecteuole Citate di Como: P. Magistro Gotardus da Pöte, 1524, p. 97.

**05. Envoi d'Eustache.** 1887. Restored elevation, current elevation, perspective views of the current state. Seure, G. *Monuments antiques relevés et restaurés par les architectes pensionnaires de l'Académie de France à Rome, notices archéologiques* par Georges Seure, agrégé de l'Université, ancien membre de l'Ecole française d'Athènes, Ch. Massin, Paris, 1911?, p. 25.

**06.** Desprez. *Temple of Isis at Pompeii as it might have been in 79 AD.* Saint-Non, J.-C. R., *Voyage pittoresque, ou, Description des royaumes de Naples et de Sicile*, Vol. 2., Imp. De Clousier, Paris, 1781, pp. 245, planche n.º75 bis.

**07. Temple of the Supreme Sun.** Colonna, F., *Hypnerotomachia Poliphilli*, Aldus Manutius, Venezia, 1499, p. b v.

**08. View of Pliny's country villa.** Haudebourt, L.P., *Le Laurentin. Maison de champagne de Pline le Jeune restituée d'après la description de Pline*, Chez Carillan-Goeury Éditeur-Libraire, Paris, 1838, pp. 240-24.

**09. Léon Krier, Imaginary reconstruction perspective of Pliny's Laurentine Villa,** 1982, reprographic copy with pencil on paper, 41.5 × 49 cm, DR1985:0296. Canadian Centre for Architecture © Léon Krier.

**10. Léon Krier, Imaginary reconstruction perspective of Pliny's Laurentine Villa,** 1982, reprographic copy with pencil on paper, 30 × 40 cm, DR1985:0298. Canadian Centre for Architecture © Léon Krier.

## 08

# Reconstructing the Processes of Reproducing Monuments: the Impact on the Large Formats of the Nineteenth Century

## Montserrat Lasunción Ascanio

The creation of replicas using moulds was not new in the nineteenth century. However, for various reasons, particularly the creation of public museums, the use of casts as museum objects took off around the world. This was due to the use of new materials and improved techniques. This article addresses some issues in the processes of creating moulds of monuments based on new information found in archival documents on these objects. In the mould-making process, the requestor, the owners of the originals and the management of the operation are directly related to the state of conservation of monuments and the role of replicas in the preservation of current monumental heritage.



### PETITIONS IN VENICE

A few years before the reappearance of *The Stones of Venice* in its travel edition (1879), John Ruskin requested, through petitions to the prefecture of Venice and the Italian Ministry of Public Instruction, the purchase of some replicas of fragments of the Doge's Palace and of Saint Mark's Basilica of this city<sup>1</sup>.

These two petitions were made in 1876 and 1877 (figs. 01, 02). In them, Angelo Giordani, the sculptor who the "*illustre signore John Ruskin professore di Londra*" (the illustrious Mr. John Ruskin teacher from London) had entrusted with the work, stated that he planned to carry out the task following the legislation of the time and with the system "*all'argilla*" (clay), as had been used on other occasions.

The process in question was that of copying with clay moulds that were applied against the original model to obtain an imprint of it, which was subsequently used to create the plaster cast. This new piece would constitute a portable replica of the architectural fragments that would return to England with the writer. All of the replicas were the result of the extensive bureaucratic and technical process that these petitions involved, as they were painstakingly regulated by the Italian authorities in the recently formed kingdom.

Specifically, in the document from 1876, Ruskin asked Giordani to make moulds of some fragments of the sculpture of Noah, situated in the corner of the Doge's Palace close to the *Ponte*

della paglia. The fragments included a grapevine with Noah's hand holding up the grape, a fragment with a bird and another of a leaf of the same vine.

From the same monument, Ruskin also requested a copy of the eighth part of a capital situated in the large ojival arcade – walled up at that time – close to the same bridge (figs. 03, 04).

Finally, from Saint Mark's Basilica, he requested a copy of some ornaments situated on the last archivolt of the main door of the church: a group of leaves and two birds.

In the 1867 petition, he again requested permission to "levare il calco" (take a cast) of eight symbolic figures situated in one of the archivolts of the same church entrance.

For several years, Ruskin had been purchasing casts and daguerreotypes<sup>2</sup> for the museum that he had created in Sheffield in 1875, which was open to everyone and particularly aimed at the working class.

These two petitions, and the related documents of the authorities that were appealed to, contain various points of interest in relation to the widespread creation of replicas of architectural fragments worldwide during the nineteenth century. Some aspects relating to the clients, the castmakers, the techniques used and the impact and function of these processes are addressed and compared with other data relating to the actions of protection, state of conservation of the original, and the role of replicas in heritage conservation.

#### SYSTEMATIZATION OF PROCESSES AND INTERNATIONAL TRANSACTIONS

First, it seems clear that this type of transaction was governed by legislation that was drawn up for a specific geographic area but had a common international nature. As is common in this type of transaction, participants were from different entities and

nationalities. At this point in the century, these transactions were allowed only when the monument in question was in a good state of conservation, and with the prior approval of the *Commissione Consultiva per la Conservazione dei Monumenti* (Consultative Commission for the Conservation of Monuments), which gave its opinion. If this was favourable, the contracting party, in this case John Ruskin, had to donate a plaster copy to the Italian authorities and so pay for a second cast, which theoretically went to swell the collections of the Museum of Reproductions in Rome. This museum was designed to house first replicas and imprints, so as to generate further copies without the need to create new moulds from the original monument<sup>3</sup>.

In addition, the castmaker, in this case Angelo Giordani, had to have proven experience and good work in these practices. This had to be confirmed in a document issued by a member of the same consultative commission. In this process, it was accredited that Giordani was a professional who was suitable for the execution of the copies requested by Ruskin. He had not caused any damage to the "preziosi originali" in previous commissions, specifically those of the German government, which was another of Giordani's clients and often requested these types of reproductions.

The systematisation of these processes is clear. In previous centuries, they had been less common and were of fewer items. Obtaining permission for the moulds had depended almost exclusively on the good relationships formed with the main owners of sculptures and reliefs from which people wanted to "make moulds" in plaster.

Before the eighteenth century, people who requested plaster casts formed part of an exclusive clientele: members of royal households<sup>4</sup>, aristocrats and intellectuals<sup>5</sup>. The growing popularity of the Grand Tour during the eighteenth century diversified and increased a clientele with a desire to collect that was interested in possessing antique objects and replicas, especially those that came from moulds *dagli originali*, sold by Italian castmakers and

more highly valued than the altered copies of some examples from the Greek-Roman catalogue that could be purchased in the fervent antique market<sup>6</sup>.

The blossoming of academies and university departments, which also used these objects, expanded the profile of applicants. The clients were institutions and a few students who could afford the luxury of returning from their travels with souvenirs and objects that would support their studies when they were back from the educational journey<sup>7</sup>.

Likewise, diplomats, intellectuals and heads of institutions played a notable role as for years they commissioned the casting of items for their personal collections and subsequently donated them to education institutions. In Spain, the cases of Anton Raphael Mengs and Nicolás de Azara are emblematic, as they donated their impressive collections to the Academy of Fine Arts of San Fernando<sup>8</sup>.

However, what really caused moulding processes to take off in the nineteenth century, with casts of monuments of all periods and styles, was the emergence of public museums. These were developed in the enlightened tradition of the preceding century and catalysed by trends of positivism, whose theories ordered, classified and compared the contents of all knowledge to bring them to the greatest number of citizens possible, by exhibiting examples of each discipline systematically.

Other structural changes due to the technological transformations of the industrial revolution and progress in the experimental sciences, which fed back into each other, influenced and defined the concept of education and some disciplines such as the plastic or decorative arts.

The creation of new nations, colonised territories and the redefinition of empires entailed complicated political and territorial reorganisation. Some countries took advantage of the fact that museums brought art and culture closer to the people to instil a collective national imaginary through new objects. These created a specific historical past that was valid for each country and ready to be "exported" to the rest of the world.

The Great Exhibition of 1851 was organised in this context and held in the Crystal Palace of London. It was conceived by Henry Cole, who directed the first School of Decorative Arts, in close contact with the emblematic Museum of South Kensington, which opened in 1850 and later became the Victoria & Albert Museum<sup>9</sup>.

The event converted the exhibition of plaster replicas into a spectacle for the general public, a kind of concentrated Great Tour (fig. 05), organised for those who could not travel for tourism<sup>10</sup>.

The museum and company of Crystal Palace, which was created after the event, promoted an ambitious policy of exchanging plaster casts with institutions around the world. This was made official at the Universal Exhibition of Paris of 1867, where the "Convention for promoting universally reproductions of works of art for the benefit of museums of all countries" was created. This convention was promoted by Henry Cole and signed by fifteen princes and representatives of various European countries, including those of Prussia, Belgium, Russian, Italy and France<sup>11</sup>.

This visionary agreement reveals the value of replicas for the knowledge and dissemination of art worldwide and for the enjoyment of everyone "at a moderate cost" and at monumental scale<sup>12</sup>. The convention made official the exchange of copies that some museum institutes had started in the preceding decades, by involving other countries.

This is shown in a petition made to the Archive of the State of Rome in 1852, in which the Museum of Berlin, through the diplomatic delegation of Prussia in Rome, addressed the Ministry of Trade and Fine Arts of the Papal State to request casts of a series of monuments and sculptures, including the entire obelisk of the Piazza di San Giovanni and fragments of the Arch of Titus. The aim was to enter this network of exchanges proposed by the Crystal Palace Company:

"offering the casts that these supply, casts of statues that they do not have yet, as it is hoped that this Company will obtain numerous beautiful and rare works of art"<sup>13</sup>.

The same spirit can be found in the 1865 petition to the incumbent of the Cathedral of Santiago de Compostela to obtain a cast of the Portico of Glory, which is currently exhibited in the rooms of the V&A Museum:

"The board of the Council of the Museum of South Kensington, in London, eager to enrich its Department of Arts with reproductions of the precious antique works of art that are found in many towns, agreed to send special commissions to various points of Europe, to carry out investigations conducive to their important thinking"<sup>14</sup>.

In this case, as in many copying processes carried out in Italy, there was a financial transaction rather than an exchange of replicas. Before the convention, Henry Cole, on behalf of South Kensington and other institutions such as the British Museum, gathered an international catalogue that was very attractive for the exchanges that emerged in subsequent decades.

During the first half of the nineteenth century, countries such as Prussia and France also had a good collection of the Greek<sup>15</sup>, Roman and Egyptian catalogue, ready to be exchanged. In fact, the French Academy in Rome, through castmakers Malpieri and Torrenti, was one of the entities that requested most casts during the entire nineteenth century.

#### THE PATH FROM STONE TO PLASTER. MEASURES TO PROTECT THE ORIGINALS

With the increase in casting processes, which were repeated with increasing frequency, concerns grew about the state of conservation of the originals. Obviously, they suffered the consequences of continuous assembly and disassembly of scaffolding

and particularly from the continuous taking of imprints with different materials.

There is a contradiction between the desire to create replicas for the benefit of all without the originals suffering damage. This was stated in the convention of 1867 and evident in the reality of the facts during the first half of the century.

To create an imprint of a shape, the original had to be subjected to mechanical pressure induced by the materials that were applied. For example, pressure was applied during the swelling of plaster in its hardening process and particularly in the phase of removing the mould, a point at which the mould attached to the surfaces had to be separated from them, which put a strain on the object that caused breaks and losses.

For this reason, it is understandable that the Italian authorities asked applicants to specify which method would be used and which castmaker was going to make a mould before permission was granted or refused. In many cases, the process was prohibited automatically. This is the case of the Prussian delegation's petition mentioned above, in which the reproduction of the obelisk was authorised due to the "*solidità del granito*" (solidity of the granite) but not the fragments of the Arch of Titus, which had already been damaged due to the tools used to remove the remains of the clay "*cavare coi ferri la creta*" (to dig out the clay)—that had caused the incisions and wear on the original reliefs.

Some surfaces and structures withstood continuous stress during the first half of the century. This was illustrated in a document from 1833, in which the Commission of Antiquities and Fine Arts of the Papal State asked the Camarlengo, as the responsible authority, to forbid the making of drawings, moulds and the construction of scaffolding around the ruins of Temple of Castor and Pollux (fig. 06), a place that was a real obsession for students of architecture:

"due to the continuous additions of clay, from which to make the model (...) as there are already numerous copies made of plaster. To this is added the fact that the weight of the scaffolding could unbalance these three columns and this frieze; it seems a wonder that they remain standing firm as they are"<sup>16</sup>.

Repeating the processes on the same monuments was what, decades later, the Kingdom of Italy wanted to avoid, by issuing a decree in 1873. Therefore, when Ruskin applied to obtain plaster casts in Venice, he was asked to pay for and donate another copy to the Museum of Reproductions in Rome, whose items would eventually provide future replicas. This action safeguarded the original and also showed the use of replicas in the conservation of architectural heritage.

This decree was issued after a period of total prohibition of moulding processes on bronze and stone works, established in two notices of 1865<sup>17</sup> that were sent to the entire territory of the kingdom. However, institutions from other countries continued to request copies at any expense. At the same time, an effort was made to preserve the originals, which were subjected to continuous processes of taking imprints. A difficult balance was sought between profiting from the collections culturally and economically, through the sale and exchange of copies, and keeping the items in a good state of preservation.

In this respect, the British Museum decided to consult a team of chemists and other experts. Michael Faraday was one of the advisers. He advised against the execution of plaster moulds on some reliefs from Nimrud, due to their delicate state of conservation, and suggested the use of wax instead<sup>18</sup>. In these cases, the museum opted to make moulds of the pieces that were least damaged, to avoid losing the reproducibility of these collections.

Requests by the Louvre, the Museum of Berlin and the Crystal Palace Company to obtain copies of these reliefs were rejected. In 1853, the latter institution, surprised by the impossibility of using plaster and after the relevant scientific consultations, proposed using clay moulds: "merely squeezes of clay"<sup>19</sup>.

Like other emblematic monuments, such as the Parthenon or the Portico of Glory, the panels of Nimrud palace conserved polychromy. Logically, the museum, which had learnt its lesson from the loss of polychromy on some Greek reliefs, was reluctant to accept the numerous requests for moulds of the Assyrian originals. Finally, in 1853, some permits were given with certain conditions: "Should be moulded, being protected, wherever colour appeared, either by tin-foil, or by any other best means of protection"<sup>20</sup>.

In Spain, regarding the processes of making a cast of the Portico of Glory, which was carried out 1866 by Domenico Brucciani<sup>21</sup>, the known documentation<sup>22</sup> also shows evidence of the incumbent's concern to ensure that neither the sculptures, nor the polychromy that they conserved, suffered any damage. For this purpose, he appointed a commission and established a series of conditions, with previous knowledge of the working method and under the supervision of an expert during the execution of the moulds. These precautionary measures were very similar to those followed in the Italian territory, which were defined in the Royal Decree in 1873. This decree made official some of the demands required previously (checking the state of conservation, specifying the reproduction techniques and demonstrating the skill of the castmaker). They included the duty to donate a second copy to the Italian government, for any replicas made in the future, which would avoid having to make a new mould of the originals. In turn, this measure gave the Italian government the chance to generate new copies to sell or exchange. This broke the previous triangulation of transactions so that the government entered directly into the business.

#### SUITABILITY OF PROCEDURES, MOULDS AND MATERIALS

Some materials that were applied to the original surfaces have already been mentioned: the most commonly used moulds were made from clay and plaster. From the second half of the nineteenth century, the

use of gelatine on large formats became common. This is an elastic substance based on animal glue, whose preparation was perfected with the use of glycerine instead of oils. This was possible due to chemical advances in organic synthesis and constant experimentation in the search for new solutions that would facilitate moulding processes<sup>23</sup>.

The conditions on scaffolding were precarious and the time was tight. Therefore, the moulds had to be made fairly quickly and in the way that was least damaging to the models. Several Anglo-Saxon and French manuals from the period provide formulae and specifications. In these circumstances, the work was approached using moulds that were lost in the process or had limited capacity. They were often thrown away once the cast had been obtained in situ, unlike in the previous centuries<sup>24</sup>. Once in the workshop, the castmaker could make new imprints from the first copy obtained in situ, created from the mould that had been in contact with the original surfaces, which gave it a value similar to that of the original.

The second-generation imprints were made of many pieces in plaster and were known as "*a buona forma*" (in good shape). They had high capacity. Numerous copies could be obtained from them, which were ready for sale or exchange. These copies increased the work of casting workshops (figs. 07, 08).

The specialised literature of the nineteenth century indicated that clay was the most suitable material for original monuments that should not be damaged<sup>25</sup>. Unlike plaster, clay retracts as it dries, a quality that reduces the risk of mechanical damage to the originals and makes it easier to take the mould off. The suitability of clay is also noted in the archive documents that were consulted. In most cases, it was the material allowed by the commissions: "*trarre forma in Creta*" (take shape in clay) or "*formare in calco di Creta*" (formed in the mould of clay). However, the state of the originals did not always enable reproduction of the monuments in the least damaging way. In any case, the most suitable method was determined by the type of surface and the complexity of the volumes, hence the use of mixed moulds for large surfaces in which the use of plaster, clay, wax and even gelatine could be combined on flatter volumes.

Another key aspect to consider when deciding on the moulding technique was which separating material to apply to the original surfaces to prevent the mould from adhering to the original. For clay moulds, a dry material was sprinkled over the surface, such as talcum powder or ash, substances that were relatively easy to remove. In contrast, to make plaster or gelatine moulds, oily materials needed to be applied such as oils, tars and soaps that stained the stone and could damage the polychromy irreversibly. Organic synthesis provided other substances such as kerosine, mineral waxes or other hydrocarbons that were applied generously to monuments that were going to be moulded with gelatine<sup>26</sup>.

After the operations, the surfaces could be washed with water and soap, something that was even required by some permits. This process also caused chemical transformations and losses on the surfaces.

For all these reasons, it is easy to imagine that the actions and substances that were applied would cause at least surface alterations, particularly on works that had remains of polychromy and detachment of the stone.

#### **DESPITE EVERYTHING, REPLICAS WITH AND WITHOUT AURA**

Today, it seems strange that John Ruskin, for whom the patina was one of the central points of his theories, would commission the creation of copies using moulds. Even though the moulds were made from clay, they involved the voluntary transformation, at least aesthetically, of the original surfaces. Ruskin considered that the surfaces held the real nature of the monument and contained an intangible and aesthetic value that developed with the passage of time. The patina is clearly one of the most fragile signs of authenticity. It is difficult to preserve and is constantly discussed among the community of restorers.

It is also surprising that the aforementioned convention of 1867, which promoted spreading the practice of making replicas, stated that these could be made "easily" and "without the least damage to the originals". At that time, the main institutions involved had already noted the deterioration of their collections and were implementing measures to avoid this.

However, it cannot be said that replicas are entirely harmful to the conservation of monumental heritage. In fact, the opposite could be claimed. Copies had, and will have the function of rescuing many works that suffered from deterioration or disappeared. Like photography, the creation of moulds has been an invaluable method of reproduction for heritage preservation.

First generation moulds are almost originals, copies with aura, which on occasion have preserved their "authenticity" more than the originals when these have undergone profound transformations.

It is not surprising that one of the supervisors of mould making operations in the Papal State was Giuseppe Valadier, a key figure in the development of modern restoration theories. Neither is it surprising that Luca Beltrami, inspired by the Parisian museum of the Trocadero, would create a plaster cast collection in the Certosa de Pavia, with the aim of showing, through comparison, the degradation that the original stones of the magnificent façade inevitably suffered<sup>27</sup>.

In France, Lassus and Violet-le-Duc incorporated the making of casts into their restoration campaigns almost in a routine way<sup>28</sup>. Today, an exhibition can be visited in the *Cité de l'Architecture et du Patrimoine* in tribute to the Notre-Dame of Paris. The casts and models embody the history of the cathedral materially, in three dimensions. They are the closest reminder of what existed but is no longer there.

Luckily, technological advances provide the opportunity to reproduce in three dimensions, with no need for any contact, and global digitalisation projects are being undertaken that represent a paradigm shift and inestimable assistance in the assessment and safeguarding of heritage.

However, to return to the original monuments, it is now essential to find out more accurately the impact of mould-making processes on architecture and sculpture. As we have described, these were subjected to continuous applications of plaster, clays, animal glues and other oily substances used as separators. Some of these materials, such as waxes, drying oils, natural resins and tars, have been widely used for aesthetic and protective purposes since antiquity<sup>29</sup>. Therefore, during restoration processes, analyses to characterise materials are insufficient<sup>30</sup>. To distinguish the remains of a film of varnish from the traces of a possible separating agent, scientific analysis should be complemented by historical research that contextualises and documents a moulding process, information that restorers do not tend to have on most occasions, mainly because these processes were never documented.

Given the interdisciplinarity of the matter, it would also be necessary to recover and put into practice forgotten formulae and carry out laboratory tests to measure the impact of these operations, which caused mechanical damage and chemical and aesthetic transformations to the surface, caused by the use of separators and subsequent cleaning.

Due to the global nature of the phenomenon, the creation of a universal platform would be of great help, formed of a catalogue of the works that were the object of moulds. Characterisation studies, images and other information drawn from primary sources could be shared. In turn, this database could link the originals to their copies, which are scattered around the world.

To conclude, many first-generation copies and moulds that are stored in museums, universities and other institutions are still not known about. Studying these objects could provide a lot of data on the execution and pathologies detected in the originals.

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### Notes

**01.** Archivio Centrale dello Stato (ACS), Direzione Generale delle Antichità e Belle Arti (1860-1890). Monuments, Case 608, no. 3bis, Permission to make casts of the ornaments of St. Mark and the Doge's Palace for John Ruskin, 1876.

**02.** ARRHENIUS, T., "John Ruskin's Daguerreotypes of Venice", *Advanced Cultural Studies Institut of Sweden (ACS/S)*, Norrköping 13-15 June 2005. For further information on the relationship of the English critic with photography and its influence on his ideas on heritage and authenticity, see also: HARVEY, M., "Ruskin and photography", *Oxford Art Journal*, 1984, vol. 7, n. 2, pp. 25-33.

**03.** These and other points are included in the Royal Decree "col quale è approvato il Regolamento sui calchi delle opere d'arte" (with which the Regulations on casts of works of art are approved) from 7 December 1873 (ACS. Direzione Generale delle Antichità e Belle Arti (1860-1890). Monuments, Case 385, no. 23 "Calchi sulle opere in bronzo e in marmo": 15. Receipt of the regulations for casts, 1874). The Italian government had the right to choose the most perfect copy. If the work that was to be reproduced was of huge dimensions and extremely expensive, the company helped pay the costs.

**04.** In Spain, the campaign carried out by Velázquez for Felipe IV is notable, in his second trip to Italy. See LUZÓN, J.M., "Las estatuas más celebradas de Roma vaciadas por Velázquez", in *Velázquez: esculturas para el Alcázar*, Real Academia de Bellas Artes de San Fernando, Madrid, 2007, pp. 201-224. In France, the campaigns were started in the sixteenth century. See LE BRETON, E., "Pour une Antiquité moderne, entre esthétique et idéologie, du XVII<sup>e</sup> au XX<sup>e</sup> siècle", in *Une Antiquité moderne*, Villa Médicis Académie de France à Rome et Louvre, Milan, 2019, pp. 13-17; and CUPPERI, W. "Giving away the moulds will cause no damage to his Majesty's casts" – New Documents on the Vienna Jüngling and the Sixteenth-Century Dissemination of Casts after

the Antique in the Holy Roman Empire", in AA.VV., *Plaster casts: Making, Collecting, and Displaying from Classical Antiquity to the Present*, Frederiksen, R. y Marchand, E. (Ed.), De Gruyter, Berlin, 2010, pp. 81-98.

**05.** MARCHAND, E., "600 anos de coleções de gessos: alguns aspetos da sua receção", in *Esculturas Infinitas*, Fundação Calouste Gulbenkian, Beaux-Arts de Paris, Paris, 2020, pp. 32-45.

**06.** SEDLARZ, C., "Incorporating Antiquity –The Berlin Academy of Arts. Plaster Cast Collection from 1786 until 1815: acquisition, use and interpretation", in AA.VV., *Plaster casts: Making, Collecting, and Displaying from Classical Antiquity to the Present*, Frederiksen, R. y Marchand, E. (Ed.), De Gruyter, Berlin, 2010, pp. 197-228.

**07.** DESCAT, S., "Nouveaux programmes d'architecture. Le rôle du Grand Tour dans l'élaboration des premiers musées européens", en AA.VV., *El Arte español entre Roma y París (siglos XVIII y XIX). Intercambios artísticos y circulación de modelos*, Casa de Velázquez, Madrid, 2014, pp. 68-88.

**08.** NEGRETE, A., "La recepción de la Antigüedad en la Academia a través de los modelos en yeso", in AA.VV., *Anton Raphael Mengs y la antigüedad*, Real Academia de Bellas Artes de San Fernando, Madrid, 2014, pp. 80-93.

**09.** CONFORTI, M., "The Idealist Enterprise and the Applied Arts", in AA.VV., *A Grand Design: The Art of the Victoria and Albert Museum*, Harry N. Abrams, New York, 1997, pp. 23-47.

**10.** LENDING, M., *Plaster Monuments. Architecture and the Power of Reproduction*, Princeton University Press, New Jersey, 2017, pp. 17-18.

**11.** Document reproduced in CORMIER, B. (Ed.), *Copy Culture: Sharing in the Age of Digital Reproduction*, V&A Publishing, London, 2018, pp. 12-17.

**12.** LENDING, M., op. cit., p. 21.

**13.** Archivio di Stato di Roma (AS) Camerlengato (1816-1854). Part II 1824-1854. Title IV - Antiquities and Fine Arts. Case 295, no. 3378-9.

14. Missive by Charles Mould of 22 November 1865: Archive-Library of the Cathedral of Santiago (ABCS), *Solicitud de Permiso para vaciar el Pórtico de la Gloria*, Varia, First series, Volume IX, item 20. Also transcribed in the documentary appendix of MATEO, M., *El Pórtico de la Gloria en la Inglaterra Victoriana. La invención de una obra maestra*, Museo Nacional de las Peregrinaciones, Santiago de Compostela, 1991, p. 93.
15. See ZAMBÓN, A., "Fauvel et le monument de Lycistrate", en AA.VV., *Architectures urbaines, formes et temps. Mélanges en l'honneur de Pierre Pinon*, Picard, Paris, 2014, pp. 242-250; and PAYNE, E., "3D Imaging of the Parthenon Sculptures: Assessing the Archaeological Value of 19th Century Plaster Casts", *Antiquity*, 2019, Vol. 93, n. 372, pp. 1625-1642.
16. AS. Camerlengato (1816-1854). Part II 1824-1854. Title IV - Antiquities and Fine Arts. Case 222, no. 1862.
17. Circular no. 177 for works in bronze and no. 179 for those in stone (ACS. Direzione Generale delle Antichità e Belle Arti, 1860-1890). Monuments, Case 385, no. 23. "Reproduction of works in bronze and marble": 1. "Circular on casts of bronze works": sending of the circular to prefects, 1865; 2. "Circular on the casts of marble works": sending of the circular to prefects, 1865.
18. READE, J., "Nineteenth-Century Nimrud: Motivation, Orientation, Conservation", en AA.VV., *New Light of Nimrud. Proceedings of the Nimrud Conference (11th-13th March 2002)*, British Institute for the Study of Iraq, 2008, pp. 1-21.
19. Ibid.
20. Ibid.
21. WADE, R., *Domenico Brucciani and the Formatori of Nineteenth-Century Britain*, Bloomsbury Visual Arts, New York, 2019, pp. 21-35.
22. MATEO, M., op. cit., pp. 87-98.
23. LEBRUN, M. y MAGNIER, M.-D., *Nouveau manuel du mouleur en plâtre, au ciment, à l'argile, à la cire, à la gélatine*, Encyclopédie-Roret, Paris, 1887, pp. 185-194.

24. When the moulds made long journeys and were more valued than the replicas, this was due to a large extent to the fact that the technical knowledge on reproduction was more limited. Maintaining the source or original was a guarantee of obtaining new replicas and meant that the exorbitant costs of these companies were recovered as much as possible. See HERAS, C., "Juan Pascual y Colomer, memoria y catálogo de las formas del taller de vaciados, 1815", *Boletín de la Real Academia de Bellas Artes de San Fernando*, 2000, n. 90, pp. 83-118.
25. LEBRUN, M. and MAGNIER, M.-D., op. cit., pp. 25-26.
26. Some formulae are gathered in MILLAR, W., *Plastering, plain and decorative. A practical treatise on the Art & Craft of plastering and modelling*, B.T. Batsford, London, 1897, pp. 317-342.
27. LODI, L., "Il Museo e il ruolo di Luca Beltrami: L'allestimento del 1911-1912", en AA.VV., *La Certosa di Pavia e il suo Museo. Ultimi restauri e nuovi studi*, Ministero per i Beni e le Attività Culturali, Milano, 2008, pp. 391-417.
28. FINANCE DE, L. y LENFANT, C., "Geoffroy-Dechaume restaurateur: de l'objet au monumental", en AA.VV., *Dans l'Intimité de l'Atelier. Geoffroy-Dechaume (1816-1892). Sculpteur romantique*, Honoré Clair, Cité de l'Architecture & du Patrimoine, Verona, 2013, pp. 175-205.
29. MIRAMBELL, M., "El concepto de 'pátina' a lo largo de los siglos. Entre la estética y la conservación preventiva", *Unicum*, 2003, n. 2, pp. 36-40.
30. Some of the most common techniques are scanning electron microscope (SEM); X-ray diffraction (XRD); infrared spectroscopy (FT-IR); Raman spectroscopy, and liquid chromatography and gas techniques (LC-MS and GC-MS).

## Images

01. Petition of 1876, signed by John Ruskin, in which a request is made to obtain replicas using clay moulds of some fragments from the Doge's Palace and Saint Mark's Basilica (ACS).
02. Petition of 1877, by Angelo Giordani, in which the obtention of other replicas from Saint Mark's Basilica (ACS) are requested.
03. Allegory of Liberality, plaster replica of an eighth part of one of the capitals of the ojal arcade of the Doge's Palace of Venice. Plaster cast carried out by Angelo Giordani between 1876-1877 (Collection of the Guild of St George, Museums Sheffield).
04. *The Second Capital and Arch, Sea Facade, Doge's Palace*. Watercolour by Thomas Matthews Rooke, 1884, where the balustrade of the *Ponte della Paglia* and the walled-in arcades of the palace, with one of the capitals, can be seen (Collection of the Guild of St George, Museums Sheffield).
05. Lithograph of one of the halls of Crystal Place in the Great Exhibition of 1851, dedicated to Nubia, with monumental casts of this area, 1854 (© V&A Museum).
06. Monumental cast of half a capital from the temple of Castor and Pollux (209x95 cm), carried out by castmaker Leopoldo Malpieri for the French Academy in Rome between 1829 and 1830, a few years before moulding processes on the remains of the temple were prohibited. Property of the Louvre Museum, from the exhibition *Une Antiquité Moderne* held in Villa Medici in 2019-2020.
07. Store of plaster casts and moulds of the Faculty of Fine Arts of the University of Lisbon, with a magnificent collection of architectural elements, whose collections were inherited from the Academy of Fine Arts of the same city.
08. Detail of two moulds for parts corresponding to an arm and a foot of the sculptural group of Laocoön. Their casings house numerous pieces like a puzzle, forming an imprint. Faculty of Fine Arts of the University of Lisbon.