Abstracts without Papers

[title]*Apoxyomenos: Discovery, Underwater Excavation, and Survey*

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[main text]

The main goal of this paper is to present the discovery and underwater survey of the ancient Apoxyomenos and to explore the mystery of how the statue ended up at the bottom of the sea.

A Belgian diver, R. Wouters, discovered the bronze statue of the Apoxyomenos by chance while diving in the waters off the island of Mali Lošinj in the Republic of Croatia. The statue was found at a depth of 46 meters, on a curved seabed, stuck between two rocks. After very exacting preparations, which included the advice of many experts, the process of excavation began. The statue was brought to the surface with the cooperation of underwater archaeologists and members of the special police. Afterward, the Apoxyomenos was delivered to conservators. A month of research was then conducted at the underwater site where the statue was found.

The research was international in character, with English, Belgian, and Croatian divers. They were driven by the same goal: to find other discoveries and possibly the underwater shipwreck. Unfortunately, despite detailed investigation with underwater metal detectors and waterpipes, the shipwreck has never been found. Does this mean that we will never find out how the Apoxyomenos ended up on the seabed? To answer this question, we will have to look more deeply into historical, geographical, climatic, and nautical contexts.

[title]*The Bronze Statue of Germanicus from Ameria (Amelia)*

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[main text]

Although it was discovered many years ago near Amelia (Italy), a handsome, over-life-size bronze cuirassed statue with an inserted portrait head of Germanicus has garnered relatively little attention. In pose and typology, this work resembles the statue of Augustus from Prima Porta, but the imagery of the muscled cuirass—depicting the death of Trojan Troilos at the hands of Achilles—is quite different.

Because of its seemingly odd subject matter for a Roman sculpture, the principal interpretation of this statue, in a 2008 monograph by G. Rocco, is that it originally represented King Mithridates VI, who saw himself as a new Achilles in his war against Rome. The depiction of the defeat of Troilos would have served as a reference to Mithridates’ victory over Rome, which traced its origins back to Troy. In the end, Mithridates was himself defeated by Sulla, who, according to Rocco, then brought the statue back to Rome, where its head was first replaced with a portrait of Sulla and eventually with one of Germanicus.

I argue, however, that the portrait of Germanicus was either integral to the original composition or was substituted for the head of his son Caligula after Caligula’s assassination and damnation. My interpretation is based on the decorative motifs of the armor, which go back to Hellenistic models but are also found in Roman art, as well as technical considerations and a very different interpretation of the meaning of the defeat of Troilos.[[1]](#footnote-1)

[title]*The Material Interpretation of Ancient Large Bronzes: The Case of the Florentine Masterpieces*

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[main text]

The archaeometallurgical study of the metal artifacts is fundamental to their analysis and valorization. Material analyses and technological interpretations can contribute substantially to the revelation of cultural contents, which are complementary to historical and archaeological interpretations. Archaeometallurgy, in addition to reconstructing the history of objects’ technological development based on compositional and structural evidence, can allow discrimination between originals and replicas, recognizing possible integrations. It can also shed light on the creative process.

After about half a century of investigations into the manufacturing processes of ancient large bronzes, a great deal of material data has been collected on several masterpieces. However, the interpretation of the evidence and analytical measurements can sometime be very complex, and results are often equivocal. Naked-eye observations, radiography, and some chemical analyses rarely permit the prompt determination of raw materials, crafting procedures of the wax model, core structure, casting set-up, assembly, and finishing. On the contrary, thorough objective morphological and structural examinations, accurate compositional mapping, and very critical interpretation of the data are needed in order to reduce the range of the compatible technical interpretations. With the growing body of data comes an increasingly complex technological picture; some execution processes, which were once believed to be well-established practices in ancient times, today represent only a rather partial list of the methods used in Classical and Hellenistic art foundries.

Within this framework, the large bronzes of the Medici collections, exhibited at Florence’s National Museum of Archaeology, offer noteworthy examples of the methodological variability and of hitherto unknown peculiarities of ancient production, which significantly broaden the interpretational perspective. The Idolino from Pesaro (Iozzo 1998), the Minerva (Cygielman 2008) and the Chimaera of Arezzo (Siano et al. 2012; Siano 2013), the Arringatore (discovered in the environs of Lake Trasimeno), and Horse’s Head (see chapter 39 of this volume) have been thoroughly investigated during the last two decades. The present contribution discusses the main aspects of these studies along with their general implications in terms of methodological approach and knowledge of the ancient art foundry.

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[title]*The Riace Bronze Statues: Chemical, Textural, and Isotopic Investigation of the Metals*

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[main text]

Two exceptional Greek original bronze statues were discovered underwater at Riace Marina (Calabria, Italy), in 1972. The statues represent a pair of warriors or athletes and are commonly labeled Statue A and Statue B. On the basis of stylistic studies, many authors date Statue A to 470–460 BC, and Statue B to 440–430 BC (Arias 1986).

During the restoration campaign carried out in Rome at the ICR, the inner cavities of the bronzes were explored and cleaned by remote-controlled mechanical arms. Here we report the archaeometric investigation of 12 metal samples taken from the inside of the statues: 3 bronze and 1 lead samples from Statue A; and 3 welding alloys, 3 bronze, and 2 lead samples from Statue B.

Chemical and textural investigation of the Cu-alloy samples was performed by SEM-EDS, EPMA, and metallographic analyses on polished cross sections. The data are discussed and compared with literature data available for coeval statues. Moreover, the lead isotopic compositions of selected samples were investigated by MC-ICP-MS. Comparison of the results with existing Pb-isotope databases (OXALID; BRETTSCAIFE.net; Alpine Archaeocopper Project) shows that the copper used for Statue A is compatible with western Mediterranean deposits, whereas the copper of Statue B fit with eastern Mediterranean ores. The isotopic signals of the welding samples from Statue B show a different provenance, possibly related to the age of the welding operations. The lead of the tenons of both statues has a very well defined isotopic signal compatible with a Greek source.

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[title]*Praxiteles’ Bronze Sculpture at Delphi*

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[main text]

A statue base (Delphi Museum inv. no. 3951) discovered in 1896, southeast of the Apollo Temple at Delphi, preserves cuttings for a now-lost bronze statue and evidence for the fourth-century Athenian sculptor Praxiteles’ commissions in the eastern Mediterranean. The inscription states that the *demos* Abydos, a Milesian colony in Mysia, dedicated a portrait of Chairidemos, son of Antiphanos of Pitania, to Apollo, and that Praxiteles Athenaios made it. Attributed to a shadowy third-century member of the Praxiteles family because of tripuncts (vertical rows of dots) separating some words in the inscription, the monument has been ignored. It does not even appear in Jacquemin’s recent publication of inscriptions at Delphi.

A reevaluation of the inscribed text, an examination of the old arguments for the attribution to Praxiteles’ hypothetical grandson, and a new look at the stone itself suggest that it should be assigned instead to the famous fourth-century sculptor himself. Furthermore, this base, with another now in the Thebes Museum, provides secure evidence for Praxiteles’ production of bronze statues. Overall, the five fourth-century bases from mainland Greece bearing his name all attest to Praxiteles’ work as a portrait artist. Delphi 3951, the only surviving Praxitelean votive commissioned by a city instead of a private individual, documents the sculptor’s work in bronze at the panhellenic site. Ancient literary sources emphasized Praxiteles’ mythological statues, especially his famous marble Aphrodite, but analysis of the archaeological record—fourth-century statue bases bearing his “signature”—reveals a different facet of his artistic profile. The inscribed base for a bronze statue at Delphi sheds new light on Praxiteles.

[title]*The Gréau Mirror and the Phenomenon of Fakes in Nineteenth-Century Paris*

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[main text]

A fine caryatid mirror formerly in the collection of Julien Greau was recently determined to be a pastiche of Greek and Etruscan, ancient and modern. It is well established that the corpus of bronze caryatid mirrors contains a large number of fakes. This paper analyzes the production of these objects within the social context of nineteenth-century Paris.

After decades of upheaval and transformation as a result of Hausmannization, cultural anxieties surrounding modernity resulted in an increased interest in collecting antiquities. While large numbers of Greek antiquities made their way into the European market as a result of expanded excavations as well as looting, many required heavy restoration in order to make them marketable to an increasingly bourgeois collecting public. The distinction between a restored object, a pastiche, and a total fabrication broke down over time, especially as the diminishing flow of Greek imports failed to keep up with demand.

Within the larger context of the antiquities market in late nineteenth-century Paris, I argue that bronzes were of special interest to collectors. On the one hand, metals were an essential aspect of industrialization, as symbolized most dramatically by the construction of *la tour Eiffel* for the 1889 *Exposition universelle*. In many ways, metals represented both a link with the past and a path to the future. Small-scale bronze sculptures were, like the terracotta Tanagras, easily replicable, affordable for a mass market, and conveniently displayed on a mantel or shelf. Finally, the caryatid mirror held special appeal on account of its functional familiarity, but also because the female figure provided a model for women just as the French feminist movement was redefining modern femininity.

[title]*Modern and Ancient Metal Fakes: Composition, Patina, Production Technology, Technical Details*

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[main text]

Since ancient times, the discovery of fakes has been a hot topic: in the course of our scientific research we quite often discover interesting examples of ancient imitations of valuable items or coins. They give us a glimpse into what was considered precious at the time in which they were produced, and represent a welcome addition to our knowledge.

The discovery of modern fakes or forgeries (i.e., fraudulently altered ancient pieces) is a very different matter. Unrecognized fakes mar our perception of antiquity and must be identified and removed from the cases of our museums.

Identification studies of fakes are just as different and variable as the multitude of objects that come under our eyes while studying museum collections. In this paper, some of the most skillful ways of ageing freshly made objects, for example by applying some kind of a fake patina, are presented; “wrong” technical details are described; and several examples of ancient and modern fakes are discussed by highlighting their peculiarities.

[title]*The Doryphoros in Bronze: Venerated – Suppressed – Forgotten*

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[main text]

The two reconstructions of Polykleitos’s lost *Spear-Bearer* in bronze can tell us many stories. They were both made in Munich from three Roman copies between 1910 and 1921. This paper addresses the bronzes’ place in history: in ancient art, in Stettin and Munich, and in Germany after the First and Second World Wars.

[title]*The Transformation of Bronze Sculpture in the Hellenistic East and the Iranian World*

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[main text]

Bronze enjoyed a special status in Hellenistic Asia both because of its ability to take on a bright finish and for its associations with prestigious cultic and royal contexts. Although the medium was certainly not unknown in the lands of the former Achaemenid Empire and the earlier cultures of ancient Western Asia, the new Graeco-Macedonian modes of representation and royal cultures transformed the role of bronze sculpture in these regions.

This paper examines the dynamic intersection between medium, style, and political and religious power in the dissolution of the Seleucid Empire and rise of the new Iranian political and visual cultures of power under such dynasties as the Arsakids, Orontids, and Mithradatids.

[title]*The Hellenistic Heritage of Termez*

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[main text]

According to historical tradition, Bactria was called “the land of a thousand cities,” one of which was Termez, Uzbekistan, where a large-scale study of the archaeological monuments of the Hellenistic period is now underway. The materials from the excavations, which allow us to reconstruct the extent and boundaries of the Hellenistic transfers in the region, are stored in the Termez Archaeological Museum.

Analysis of materials from monuments in the region allows us to associate them directly with events that followed the campaign of Alexander the Great and colonization activities of the Greek settlers, who brought to the territory of Central Asia completely new elements of Greek culture. However, the Greeks borrowed a lot of local technologies and practices to adapt to the particularities of nature, climate, and population, which resulted in a transformation. For example in sculpture, technological development was associated with a limited number of materials using local stone types, although preference was given to clay.

The development of technology for clay sculptures on the basis of ancient, preexisting traditions received a powerful boost from the emergence of a new genre of art—painted clay sculptures—the style and iconography of which remained Greek. Thus, the composition of the products of Bactria in the third to first centuries BC in general corresponds to that in the Greek cities; the emergence of a variety of styles testifies to the intense processing of the imported traditions.

[title]*Figural Bronze Statuettes in the Ashmolean Collection and the Aesthetics of Replication*

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[main text]

This paper presents recent research on the Hellenistic and Roman bronze statuettes in the collection of the Ashmolean Museum. A number of individual statuettes are analyzed for the information they provide regarding the repetitive use of figural types developed during the Classical and early Hellenistic periods in later, primarily Roman, contexts.

Two categories of iconography are investigated: types that appear to be dependent on large-scale Classical visual forms, such as the very commonly found standing Mercury motif; and types that were conceived in small-scale format, such as dwarfs and genre figures. The paper provides a brief analysis of the visual relationships that these types have with their earlier models and with images in other media to offer some preliminary conclusions and ask further questions about visual replication in the realm of small-scale bronzes.

[title]*Figures on Fire: New Approaches to the Understanding of Roman Lighting Devices in Bronze*

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[main text]

A distinctive feature of Roman bronze devices is their figural idiosyncrasy: the sometimes charming, sometimes bizarre mixture of anthropomorphic, zoomorphic, and floral forms employed for stems, legs, handles, and bodies. Vitruvius famously criticized such fanciful visual language in the vegetabilized architectures of Roman wall-painting; what has been sidelined in the discussions on Vitruvius and the *monstra* is that the wall-paintings merely elaborated motifs long established in furniture. In scholarship on furnishings, their hybrid composition was first appreciated as delightful, and later, under the verdict of twentieth-century aesthetics, dismissed as superfluous ornamentation (“kitsch”). But it was never studied for what it can tell us about the notions associated with banquet accessories, corporeality, skillfulness, movement, and, not least, the physical energy—heat and light—produced by them.

This paper focuses on the figural and sculptural design of floor and table candelabra as well as select lamps from Pompeii and Herculaneum, which are part of a new research and database project on Roman lighting and heating devices in bronze led by the author in collaboration with Norbert Franken (Berlin). A large number of candelabra, largely unpublished, are held by the National Museum of Naples (270 specimens). Starting from this chronologically homogenous group of lighting devices, I explore avenues toward a new conceptual framework that enables us to integrate the objects’ intriguing “sculpturalism” with other, often sundered aspects: their energy and matter (fire and metal), their production technique and functionality, their effect on space and ambience, and ultimately their precarious status as objects managed by slaves.

[title]*Balancing Artifacts: Incense-Burners and Ponderation in Etruria*

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[main text]

Bronze *thymiateria* produced in Etruria from the Archaic to the Hellenistic age often include in their shapes components that make more or less explicit reference to specific properties of the artifacts themselves. These components can be abstract (e.g., series of superimposed discoid and lenticular elements) or figural (typically, human figures that support the stem of the *thymiaterion*; but also animals and isolated limbs such as legs). In both cases, they appear to underscore the aspects of gravity, lightness, and equilibrium.

This paper will argue that such aspects can be related to the actual functions of the incense-burners. They thereby serve as self-conscious visual commentaries on the perceived nature of these implements. At the same time, their analysis can also shed light on the multifaceted ways in which Greek ponderation was received and understood in Etruria.

[title]*A Sleeping Eros from Epiais-Rhus: Contribution of a Technological Study*

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[main text]

The fragmentary bronze statue (Louvre Museum inv. Br 4388; 63.5 cm x 29 cm) was discovered in ploughed land near a rich Roman villa in Epiais-Rhus, northwestern France, which preserves the remains of a Gallo-Roman city. After being used as a flowerpot for some years, the statue was acquired by the Louvre in 1959 (Piganiol 1961, 295). A wing was discovered around the same area in 1977, which has been attributed to this statue and reattached to its back. The bronze sculpture depicts Eros as a baby; its prototype derives from a Hellenistic model (Mattusch 1996, 160–68). The Sleeping Eros type is rare among extant large bronzes: only few other examples are known, such as the remarkable Sleeping Eros in the Metropolitan Museum of Art in New York (Hemingway 2015) and a head from Volubilis (Boube-Piccot 1969, no. 174, 160–61, plates 90–92).

In order to investigate the manufacture and the dating of the Louvre’s statue, a technological study was carried out at the C2RMF. Study of the inner wall was eased by the open access at the back of the statue, and completed by X-radiography. Elemental composition was determined on micro-samples analyzed by PIXE. The statue appears to have been cast in nine separate hollow parts mainly by the indirect lost-wax process. A tin bronze with a high lead content (Sn: 7 wt%; Pb: 25 wt%) was used. The separately cast parts were then assembled using flow fusion welding or brazing, depending on the shape of the join (in basins or using a platform). Some other clues (such as fingerprints in the wax) helped to reconstruct each step of the manufacture with more detail and to qualify the Sleeping Eros from Epiais-Rhus as a large bronze statue elaborated during the second century AD.

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[title]*Copper, War, and Art in Ancient Greece*

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[main text]

This study compares analytical and methodological variations present in the copper alloys (bronze and brass) used to craft weapon (i.e., helmets, swords, spearheads) and ornaments (i.e., Classical Greek sculptures). IPCE’s Scientific Department made numerous analytic studies to evaluate the chemical stability and physical integrity of the artifacts. X-ray, XFR, and MEB-SEM were performed to determine composition and the presence of active corrosion.

The study is made by comparing pieces from various Spanish state museums, which have been analyzed and undergone restoration and conservation during recent years by the Subdirectory of the Spanish Historical Heritage Institute.

[title]Standspiegel*, Figured Appliqués, and Other Bronze Items at Locri Epizefiri (Magna Graecia): Morphology, Style, and Chronology between Local Production and External Influences (Sixth to Fourth Century BC): A Reappraisal*

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[main text]

A considerable number of outstanding bronze artifacts were retrieved from the sanctuaries and the necropolis of Locri Epizefiri, including mirrors with figured handles, rare instruments related to the symposium, and refined appliqués, among others (Cameron 1979; Meirano 2002). Notwithstanding the attention these objects have received in the bibliography—especially regarding their function and symbolic values according to find contexts—several aspects still require investigation.

Most of these items are attributed to local workshops due to technical, iconographic, and stylistic considerations and, like other local products, are considered to be almost exclusively intended for the internal market.

The analysis of the features of Locrian bronze objects allows for a reassessment of the local productive milieu between the sixth and the fourth centuries BC, a period that is characterized by traditionalism, external influences, and hybridism, as well as originality in the choice of iconographies and in the creation of specific items. The Locrian case-study provided a unique opportunity to understand the eclectic re-elaboration of patterns and morphology, and the adoption of novelty elements coming from different traditions, aimed at satisfying the tastes of the local elite. Besides, the recent reexamination of find contexts—namely the funerary assemblages (Elia 2010)—offers the opportunity to define an autonomous chronological system to be integrated with considerations deriving from stylistic analysis.

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[title]*Roman-Age Casting Techniques of Small Bronzes from Marche*

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[main text]

This contribution examines the Roman-era bronze artisans’ techniques and their methods for overcoming difficulties in casting small objects. In observing a group of small bronzes from Marche, an Italian region, realized with the lost-wax technique, we noticed some interesting features about the methods of production. The techniques for improving the casting involve, primarily, the positioning of the casting and vent channels. They can be seen in proximity to those parts of the casting that were more difficult for the molten metal to reach. During the realization of the wax model, the metal workers concealed the channels so as to become a part of the final sculpture itself, hidden in columns, trunks, or drapery.

[title]*A Multidisciplinary Study of Hellenistic and Roman Bronze Mirrors from the Archaeological Collection of Ancient Messene, Greece*

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[main text]

Ancient Messene in the southern Peloponnese is one of the most impressive and well-preserved cities of the Hellenistic/Roman era in Greece. Archaeological excavations from the early twentieth century to the present have revealed a site spanning around 13 square kilometers with fortifications, public buildings, and impressive burial monuments *intra muros*. Its museum houses a rich collection of metal artifacts dating from the fourth century BC to the fifth century AD, which includes everyday objects related to the activities and the customs of the Messenian society. This poster presents the author’s Ph.D. research, a systematic multidisciplinary study of 380 representative copper-alloy objects, including toiletry and decorative objects, tools, instruments, vessels, weapons, figurines, and door and furniture accessories.

The study combines an archaeological (classification/typology), archaeometric (noninvasive scientific analyses), and conservation (condition survey using statistics) approach in order to better understand the technological characteristics of the collection. For the first time, the context of this important copper-alloy collection was related to the technological profile of both local and imported metal production, the function of the objects, and their significance to the local society. Specifically, the poster focuses on 10 bronze mirrors from dated burial contexts (from the third century BC to the first century AD) representing 3 distinct archaeological types. They are luxury items that are associated with the high society of ancient Messene. The technological characteristics, such as manufacturing, decorative, and surface techniques were investigated using X-radiography, XRF and μ-XRF, LIBS, and XRD. The chemical and/or mineralogical compositions of the copper alloy and corrosion layers were determined in order to identify techniques used to produce these bronze mirrors. The results indicate that a variety of manufacturing techniques were used to produce the mirrors, with three different methods employed to produce a reflective surface, using three different types of alloys for the metal substrate.

[title]*Second-Century Large Bronze Workshop at Gerasa (Jerash, Jordan): Jordanian-European Cultural Heritage Conservation Program at Jerash 2012*

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[main text]

In 1993, 2012, and 2014, well-preserved partial remains of a large bronze workshop were uncovered at the Sanctuary of Zeus in Jerash. Thanks to the close cooperation among Jordanian, German, and French specialists, more than 3,000 mold fragments have been restored and the other relevant installations of the workshop, dated of the second half of the second century AD, preserved. All the pieces will be accessible, as a world unique cultural heritage monument of Jordan, through an exhibit in the Jordan National Museum.

The bronze workshop was located on the lower terrace of the Zeus sanctuary. At the moment, its remains include four large molds pits, with traces of large-sized copper-alloy cast objects at the bottom of them (two circular, two rectangular in plan). Some 3,000 pieces of the smashed mold mantle (consisting of baked earth), along with numerous fragments of the furnaces and other installations, had been dumped into these pits when the casting process was finished. The negative impression on the interiors of the mold fragments led to the conclusion that large-sized draped statuary, as well as other objects (cultic instruments?), were fabricated in this workshop by the lost-wax procedure.

[A-head]Acknowledgments

The project under the Cultural Heritage Preservation Program of the Foreign Ministry of the Federal Republic of Germany was a joint venture of DAAD, the Department of Antiquities of Jordan, the Institut Français du Proche-Orient, the University of Jordan, Yarmouk University, Johannes Gutenberg University Mainz, Römisch-Germanisches Zentralmuseum Mainz, and the Rathgen Forschungslabor at the Staatliche Museen Berlin.

[title]*Examination, Conservation, and Analysis of a Composed Egyptian Ibis Statue*

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[main text]

This poster discusses the major issues related to modern studies on objects and materials of historical or cultural heritage. These usually involve the use of nondestructive and micro-analytical techniques, which are employed for various purposes and particularly for cultural heritage. The conservation and restoration of materials and artifacts requires analytical methods that can yield information on the chemical nature and composition of selected parts of artifacts to elucidate their provenance; on the state of alteration of the object as a result of short-, medium-, and long-term exposure to environmental conditions; and on the effectiveness of conservation strategies during and after application. This poster describes the application of nondestructive and micro-analytical techniques to an ibis statue of the Late Period in Egyptian civilization, which was excavated from Tuna el-Gabal in Al-Minya Governate by Cairo University in 1946; the object is currently in the inorganic storeroom at Grand Egyptian Museum Conservation Center. It is obvious from visual examination and analytical techniques that the object was made from a variety of materials. Previous interventions showed contemporary support by the wooden base with iron pins and wire, and determined the nature of the corrosion product on the statue’s metal surface (identified by XRD analysis and SEM-EDS). The statue is missing part of a leg, and this poster will discuss possible and suitable ways to extend statue’s life with safe and stable material (Plexiglas), which does not react with any material used in the artifacts of the ancient Egyptian civilization.

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[title]*The Ancient Chariot from Serbia*

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[main text]

The remains of a two-wheeled chariot was found accidentally in 2013 during work on the highway running between Niš and Dimitrovgrad in southeastern Serbia, at the Mađilka site near the village of Staničenje. More than forty iron objects, richly decorated, were discovered at a depth of about 6.5 meters during the mechanical removal of the southern half of a hillock on the right bank of the Nišava River. Right next to these items, partial skeletal remains of two horses were found. Archaeological investigation of the site revealed an elevated mound, 5 meters high and approximately circular, with a diameter of around 40 meters.

The chariot has the Roman suspension system. It is lavishly engraved with floral decoration made of inlaid brass and presents a work of art with high artistic value. The finds are dated to the first century AD (by radiocarbon method) and may be associated with the burial of a person of high social status.

The remains of the chariot were restored in the Conservation Department of the National Museum in Belgrade, and a reconstruction model of this unique ancient chariot was simultaneously built.

[title]*Technical Examinations on the Parthian Bronze Coffin from Chubtarash Archaeological Site, Khorramabad, Western Iran*

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[main text]

In the winter of 2005, an emergency archaeological excavation was carried out at the village of Chubtarash, in the Kargah Valley near the city of Khorramabad, Western Iran. Some artifacts from the middle of Parthian period (about first century AD) were found. The most important find of the excavation was a large metallic bathtub-like coffin in which a skeleton was found with two gold strips covering its eyes and mouth. The coffin has four handles that are joined to the tub-like body with pins. The coffin now is preserved in Falak-ol-Aflak Museum of Khorramabad.

To identify the manufacturing process of the coffin, a technical examination was performed by visual examination, SEM-EDS analysis, and optical microscopy (metallography).

The results showed that the coffin’s body is made of binary copper-tin (bronze) alloy. Other elements such as arsenic, lead, zinc, and nickel are detected as minor/trace elements. The handles also are made of tin bronze alloy, but with a different amount of tin. The observations and microstructural examination of samples revealed that the tub-like body of the coffin was manufactured in one piece, and a cycle of mechanical working and heat treatment was applied in order to shape the coffin. The bronze handles were made by casting, and some work was done on them to finish the final shape. The technical examinations on this individual bronze coffin from Iran illuminated some aspects of archaeometallurgical activities in the Parthian period of Iran.

[title]*Bronze Warfare from the Hellenistic Period: A Study of the Acqualadroni Naval Ram*

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[main text]

A rostrum (*embolos* in ancient Greek, “naval ram” in English) was an offensive naval weapon mounted on the prow of a ship at the waterline and was used to damage enemy warships. The rostrum was probably a Greek invention dating back to the sixth century BC and was considered a formidable offensive weapon for centuries. Its use required an experienced captain and a disciplined crew. Other rostra have been found in the Mediterranean and are not to be confused with cutwaters, also used to damage enemy warships. The Hellenistic Athlit rostrum was found south of Haifa (Israel) in 1980 and was dated to 220 BC. Its archaeological and metallurgical analysis data, based on physico-chemical and metallographic analyses, provided unique information about bronze-casting and the construction of warships during the Hellenistic period.

The present study is a scientific investigation of a rostrum found at a depth of 6 meters at Acqualadroni, 200 meters off the coast of Messina (Italy) in September 2008. Following its recovery, the rostrum was placed in a glass container full of demineralized water in constant flow to preserve the wooden parts.

The Acqualadroni rostrum is a metallic artifact with a fragile wooden part from the original warship still inside it. A blackish substance is present on some areas of the wood surface. The rostrum is 162 centimeters long and weighs about 250 kilograms. The thickness of the metal is approximately 2 centimeters. The rostrum is finely decorated on both sides with very faithful drawings of two *kopis* (single-edged curved swords) and a sword similar to a Hellenistic or Greek *xiphos* (a double-edged, single-handed sword) measuring 86 and 88 centimeters, respectively. The deformation of the blade on the right-hand side is attributable to collisions with other ships. It is possible to date the rostrum on the basis of such stylistic elements. Thus, its production date may range from the fourth to the second century BC. If the rostrum dates to the third century BC, it may have been mounted on a warship used in a naval battle during the Punic Wars (e.g., the Battles of the Lipari Islands and Mylae). The metallic part was investigated by the University of Palermo (CGA) using inductively coupled plasma optical emission spectroscopy (ICP–OES) and inductively coupled plasma mass spectrometry (ICP–MS) for lead isotope analysis. The two wooden samples were investigated by Fourier transform infrared (FTIR) spectroscopy, 13C{1H} cross-polarization magic angle spinning (CP MAS), NMR spectroscopy, energy-dispersive X-ray spectroscopy (EDX), ICP–OES, gas chromatography–mass spectrometry (GC–MS), and X-ray diffraction (XRD).The present investigation aims to provide information about the state of preservation of the wooden and metallic parts and to give some hints that could prove useful in conservation of the rostrum.

https://www.academia.edu/3782220/Il\_Rostro\_di\_Acqualadroni\_un\_relitto\_del\_III\_sec.a.C.\_in\_Un\_Mare\_d\_aMare\_Palermo\_2013

[title]*The Influence of Ancient Bronzes in Cuban Large-Scale Sculptures*

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[main text]

This project studies the influence of ancient bronzes on Cuban large-scale sculptures that are still on display in Havana today. It focuses on the process of creation and construction of three specific works, located in the capitol of the Republic of Cuba in the twentieth century.

These pieces are *The Republic*, *The Progress of Human Activity*, and *The Virtue of the People*. They were commissioned from the Italian sculptor Angelo Zanelli (1879–1942), who created them and was in charge of placing them in the capitol. This poster explains the impact they had on the Cuban architectural style of the period.

1. The full article based on this abstract will appear in *AJA* 121.3 (2017). [↑](#footnote-ref-1)