

**Evolving Methodologies:**  
**The Conservation of Ancient Bronzes in China**  
**and Italy**

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### **Abstract**

The purpose of this project is to trace the changes in conservation of ancient bronze objects that have historically been rare in archaeological record because of the metal's inherent value. There is record of art conservation in Italy starting as early as the Italian Renaissance when aristocratic families like the Medici began collecting ancient Greek, Etruscan, and Roman art and artifacts. In China, the earliest discoveries and conservation of their ancient bronzes occur during antiquity. The treatment processes and practices of conservation have been influenced by social, political, and economic changes in the respective regions as well as scientific developments in the conservation field. The study of these evolutions by means of case studies will help define and illustrate the state of conservation in China and Italy. I will examine the similarities and differences of conservation techniques within these regions since antiquity.

### **Key Words**

Art History, Chemistry, Italian Studies, Ancient Italy, Ancient China, Bronze, Conservation, Greek, Etruscan, Roman, Imperial China, Italian Renaissance

Ancient Chinese and Italian bronzeworking differ in their manufacture, function, and style. These differences led to different approaches concerning their conservation, but they are not the only factors influencing conservators. Social, political, and economic changes over time have had a great impact on how an ancient bronze object is studied and treated. Today, bronze conservation focuses on becoming a more standardized practice, but the path leading the field to this point has been full of controversy, varying opinions, and mistakes. Tracing the evolution of these methodologies allows us to understand where the field of conservation is headed next and how to treat material culture that already has been subject to conservation work. China's history of bronze production predates its Italian counterpart, and as a consequence, Chinese conservation of bronzes occurs far earlier than in Italy.

### **Ancient Bronze Casting and Function**

Chinese bronze working can be traced from as early as the Xia dynasty (21<sup>st</sup>-16<sup>th</sup> century BCE), with the earliest known bronze mirror dating to 2000 BCE.<sup>1</sup> During what is known as the "Three Dynasties," encompassing the Xia, Shang, and Zhou dynasties, sophisticated bronze vessels were produced. Depending on the qualities of the mold or bronze worker, the final product sometimes exhibits mold marks or seams as from the junctions where the mold pieces joined. Some bronze elements like handles or legs had to be cast onto the vessel after the initial casting of the form and some vessels required patches or repairs due to faulty molds or other issues with the casting. Repairs related to the manufacturing process were common, such as recasting a specific part of the bronze with the same or repaired mold or soldering on patches where the metal did not flow. But it was not until the Han dynasty (206 BCE – 220 CE) that

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<sup>1</sup> La Susan Niece and Paul Craddock, *Metal Plating and Patination: Cultural, Technical and Historical Developments* (Butterworth-Heinemann, 1993), 50.

bronzes begin to be repaired with metal sheet and rivets.<sup>2</sup> The ancient repairs can be differentiated from more modern interventions, and they were integral to the finishing process of casting these ancient bronzes.

During the Shang dynasty (16<sup>th</sup>-11<sup>th</sup> century BCE), bronze production reached its zenith, stimulated by active ancestor worship activities that demanded ample bronze vessels.<sup>3</sup> Ancient bronze vessel piece-molds were usually used only once because the assembly was broken to remove the bronze.<sup>4</sup> Therefore, piece-molds created unique vessels, whereas molds for coins and sometime mirrors were used multiple times because they were made from more durable materials like bronze. Ancient bronze vessels are rarely seen out of the context of ritual or burial, which is reflected in texts describing their functions as well as their findspots. The bronze workers of the Shang and Zhou dynasties (11<sup>th</sup> century-221 BCE) created these bronze vessels for the storage or delivery of food and liquid, but their precious material, ornament, and unique character indicate they were primarily for ancestral worship.<sup>5</sup> These containers' connection to the past and their inherent value meant that their discovery – primarily in tombs and other caches known as early as the Han dynasty – were noted as very auspicious events in historical catalogs and annals that recorded objects within both private and imperial collections.<sup>6</sup> These catalogues later detailed thousands of objects that today are understood to include many fakes; nevertheless, they are representative of the developments in ancient studies and the abilities of Chinese

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<sup>2</sup> W. Thomas Chase, *Ancient Chinese Bronze Art: Casting the Precious Sacral Vessel* (New York: China Institute in America, 1991), 30.

<sup>3</sup> Christian Deydier, *Understanding Ancient Chinese Bronzes: Their Importance in Chinese Culture, Their Shapes, Functions and Motifs*, 2015, 12.

<sup>4</sup> Chase, *Ancient Chinese Bronze Art*, 77 and 79.

<sup>5</sup> Dawn Ho Delbanco, *Art from Ritual: Ancient Chinese Bronze Vessels from the Arthur M. Sackler Collections* (Washington, D.C.: Arthur M. Sackler Foundation, 1983), 13.

<sup>6</sup> Delbanco, *Art from Ritual*, 13.

craftsmen to replicate bronze production techniques.<sup>7</sup> It was not until the early 20<sup>th</sup> century that the introduction of modern archaeology to China persuaded the government to establish departments standardizing archaeological practices.<sup>8</sup> The excavation and subsequent treatment of ancient bronzes since the Han dynasty evolved and changed according to the ruling dynasty's priorities and state affairs, reflecting contemporary attitudes toward the ancient material.

Ancient Italian metalworkers preferred instead to use the lost wax method to cast their bronze. The peoples that occupied Italy in antiquity included the Greeks (ca. 800-30 BCE) in Sicily and the southern portion of the peninsula, the Etruscans (ca. 750-100 BCE) in north-central Italy, and the Romans (ca. 753 BCE-400 CE) in central Italy. All three groups were highly adept in bronze casting, demonstrated by the works that have survived the threat of being melted down and reused. There are three types of lost-wax casting methods: solid lost-wax casting, direct hollow lost-wax casting, and indirect hollow lost-wax casting.<sup>9</sup> All three techniques utilize a model of the finished project comprised either entirely of wax or wax and another more permanent material like clay. Solid lost-wax casting is usually used for smaller bronzes due to the large amount of metal necessary for production. Larger statues are usually cast from direct or indirect lost-wax methods due to the resulting statue being hollow, making the sculpture lighter and cheaper to cast. Larger Italian bronzes were cast in several pieces that were joined in the finishing processes.<sup>10</sup>

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<sup>7</sup> David A. Scott, *Art: Authenticity, Restoration, Forgery* (Los Angeles: Cotsen Institute of Archaeology Press at UCLA, 2016), 265.

<sup>8</sup> Vimalin Rujivacharakul and Paola Demattè, "Emperors and Scholars: Collecting Culture and Late Imperial Antiquarianism," in *Collecting China: The World, China, and a History of Collecting* (Newark: University of Delaware Press, 2011), 175.

<sup>9</sup> Colette Hemingway and Seán Hemingway, "The Technique of Bronze Statuary in Ancient Greece" In *Heilbrunn Timeline of Art History*, (New York: The Metropolitan Museum of Art, 2003).

<sup>10</sup> Hemingway and Hemingway, "The Technique of Bronze Statuary in Ancient Greece."

The Etruscans were fortunate to be situated in close proximity to metal ores, providing them with abundant material to make them proficient in metallurgical practices, such as refining and casting. Inhabitants of Vetulonia and Populonia were particularly proficient in metallurgy during the Orientalizing period (720-575 BCE) because of their rich copper mines<sup>11</sup>, but later other Etruscan cities like Vulci and Orvieto (ancient Volsinii) became important metalworking centers.<sup>12</sup> The resulting products were traded throughout Etruria and the Aegean region. The Greeks who settled in southern Italy also possessed knowledge of bronze casting and continued this practice utilizing the resources of Italy. The alloy composition of Italic bronzes was comparable to that of Classical Greece, so bronze production was more of a chronological development as opposed to regional in this part of the ancient Mediterranean.<sup>13</sup> The copper-tin alloys used to produce bronze gradually introduced a higher percentage of tin overtime as an additive for casting. This change in the alloy made bronze casting less expensive due to lead being easy to smelt and cheap in antiquity.<sup>14</sup> The higher lead concentration produces a dull grayish color as opposed to the golden and shiny surface of high-level tin alloys that are associated with earlier classical bronze statuary.<sup>15</sup>

### **Early Chinese Discovery of Bronzes**

The early discovery of ancient bronzes in the Han dynasty and those during subsequent dynasties were viewed as meaningful events directly connected with the emperor's political

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<sup>11</sup> Sybille Haynes, *Etruscan Civilization: A Cultural History* (Los Angeles: The J. Paul Getty Museum, 2000), 100 and 165.

<sup>12</sup> L. Chiarantini et al., "Copper Metallurgy in Ancient Etruria (Southern Tuscany, Italy) at the Bronze-Iron Age Transition: A Lead Isotope Provenance Study," *Journal of Archaeological Science: Reports* 19 (2018): pp. 11-23, 12.

<sup>13</sup> Jens M. Daehner and Kenneth Lapatin, *Power and Pathos: Bronze Sculpture of the Hellenistic World* (Los Angeles: J. Paul Getty Museum, 2015), 168-169.

<sup>14</sup> Daehner and Lapatin, *Power and Pathos: Bronze Sculpture of the Hellenistic World*, 168.

<sup>15</sup> Daehner and Lapatin, 168.

righteousness. Since their conception, bronze vessels were imbued with political power in China, a belief solidified in Chinese legends. King Yu of the Xia dynasty (21<sup>st</sup>-17<sup>th</sup> centuries BCE), when he divided the kingdom into 9 provinces, had a large tripod, or *ding*, cast for each province, and these items became symbols of legitimacy bestowed by the royal power and heavens.<sup>16</sup> The *ding* became a very popular ancient bronze shape, probably due to this tale (Figure 1). The bronzes' ties to political authority continued with the serendipitous discoveries of ancient bronzes in subsequent dynasties.

The Shang dynasty brought a renewed importance to the function of bronzes, as they served a significant role in ancestor worship. Many bronze vessels cast were for ancestral, spirit, and nature worship ceremonies or were for elaborate ritual offerings or libations for the dead.<sup>17</sup> Various vessel forms were associated with different needs or occasions, and their shapes and functions were of interest to even the earliest antiquarians. The first descriptions of these vessels and their uses come from writings dating to the Zhou dynasty – found in the *Zhouli* (Rites of the Zhou), *Yili* (The Book of Rites and Ceremonies), and the *Liji* (Book of Rites) – marking the beginning of a long history of writing about ancient bronzes in China.<sup>18</sup>

Craftsmen during the Han dynasty adopted the lost wax process method of casting, which was the main means of bronze casting in the ancient Mediterranean.<sup>19</sup> This pivot in Chinese bronze production from the use of piece-mold casting coincided with a growing interest in the discovery of earlier bronzes recorded by Chinese scholars and intellectuals. As early as 116 BCE, the discovery of a large *ding* was noted in the *Hanshu*, or the Official Han dynasty Annals, and the emperor believed that the unearthing of this bronze vessel was a symbol of his right to

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<sup>16</sup> Deydier, *Understanding Ancient Chinese Bronzes*, 11.

<sup>17</sup> Deydier, 12.

<sup>18</sup> Deydier, 166.

<sup>19</sup> Deydier, 13.

rule.<sup>20</sup> Ancient bronzes retained their connection to the heavens, nature, and ancestral worship associated with their function and in later dynasties these sacred attributes and practices became associated with their discovery.

Bronzes were also discussed in encyclopedias and other catalogs including the *Erya* 爾雅 and the *Shuowen Jiezi* 說文解字. The *Erya*, compiled between the Qin dynasty (221-207 BCE) and the Western Han dynasty, contained nineteen sections, the sixth of which references ancient ritual bronzes numerous times in the context of discussing daily utensils, food, and clothing.<sup>21</sup> A more specialized study of ancient bronzes is the *Shuowen Jiezi*, which was written by Xu Shen and is considered to be the foundation of all following studies surrounding ancient Chinese bronze vessels.<sup>22</sup> Like the *Erya*, bronze vessel shapes and functions are mentioned, but they are also named as different types of vessels. This text includes comments on the qualities of the bronzes that were produced and describes their quality by the extent of their copper refining in the bronze-making process.<sup>23</sup> More refined copper means a higher quality of bronze. Due to their competence with producing bronzes, Qin and Han dynasty authors were familiar with different aspects of ancient bronzes including the refining process of metal ores which continued to be practiced after these dynasties.

### **The Result of Public Works and Economic Prosperity**

The end of the Tang dynasty (618-907 CE) and the onset of the Song dynasty (960-1279) brought with it renewed interest in the past, including ancient bronzes, due to the expansion of public works fueled by the economic prosperity and revived Confucian philosophies.<sup>24</sup> Public

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<sup>20</sup> Deydier, 165.

<sup>21</sup> Deydier, 166.

<sup>22</sup> Deydier, 166.

<sup>23</sup> Niece and Craddock, *Metal Plating and Patination*, 52.

<sup>24</sup> Rujivacharakul and Demattè, "Emperors and Scholars," 166; Deydier, *Understanding Ancient Chinese Bronzes*, 165.

works projects displaced a number of antiquities buried in caches or tombs and brought a new wave of writings and studies of these objects. Later Tang antiquarian studies were influenced by the rejection of Buddhism and Taoism present during the six dynasties preceding the Tang dynasty and the social and political return to Confucianism, known as Neo-Confucianism.<sup>25</sup> The concept of ancestor worship returned with a renewed spiritual importance as a part of Confucian philosophy, which in turn fueled interest in the discovery of ancient bronzes as a representation of cultural heritage. The philosophical nature of the later Tang dynasty antiquarianism heavily influenced the Song dynasty's study of the past that was mainly focused on recording and explaining the uncovered antiques, specifically the bronze vessels and their ritual functions. It was during the Song dynasty that Chinese interest in antiquity peaked, shown by the extensive and detailed number of ancient studies undertaken during this time, including the first scientific research of ancient Chinese bronzes by scholars and antiquarians, like Lü Dalin and Shen Kuo.<sup>26</sup>

Lü Dalin published the *Kaogutu* 考古圖 in 1092 CE, which was an illustrated catalog of antiquities including bronze and jade objects housed in private collections of the Song dynasty. The inclusion of a visual component was an advancement that allowed the bronzes to be organized by their vessel form types.<sup>27</sup> This structure for categorizing bronzes is still used today. Dalin's system of classifying vessels was unique in that it took vessels with similar physical characteristics and grouped them together under the typological name of an inscribed vessel within that group.<sup>28</sup> The *Kaogutu* features a short description of each bronze vessel along with information on its location of discovery, if known, and even refers to earlier writings such as the

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<sup>25</sup> Rujivacharakul and Demattè, 167; Kimpei Takeuchi, "Ancient Chinese Bronze Mirrors," *The Burlington Magazine for Connoisseurs* 19, no. 102 (1911), pp. 311-19, 312.

<sup>26</sup> Rujivacharakul and Demattè, 166 and Deydier, *Understanding Ancient Chinese Bronzes*, 167-169.

<sup>27</sup> Rujivacharakul and Demattè, "Emperors and Scholars," 166.

<sup>28</sup> Jeffrey Moser, "The Ethics of Immutable Things: Interpreting Lü Dalin's Illustrated Investigations of Antiquity," *Harvard Journal of Asiatic Studies* 72, no. 2 (December 2012), 265.

*Erya* of the Han dynasty and the *Zhouli* from the Zhou dynasty.<sup>29</sup> Other Song dynasty catalogues aimed to provide a record of these objects as well as focused on restoring the ancient rites and rituals, though not forms, through studying these ancient bronzes.<sup>30</sup> However, in the preface of the *Kaogutu*, Dalin shares that his motivation was not to reproduce the bronze vessels' forms, but rather to understand them as remnants of an ancient tradition that survived the Qin dynasty's rejection of traditional practices.<sup>31</sup> These Song dynasty ideas regarding the purpose of ancient bronzes aligned with the Neo-Confucian fascination with and emphasis on the past. In Dalin's innovative study of ancient material, there is little to no mention of intervention to alter the found bronzes. Rather the opposite is true; it seems that it was important to leave these antiques exactly as they were, as Dalin considered them to be evidence of ancient tradition that had to be investigated. This does not mean, however, that ancient bronzes did not undergo treatment after their discovery.

The archaeologist and collector, Shen Kuo (1031-1095 CE), wrote a series of essays compiled in *Brush Talks from a Dream Brook* 夢溪筆談 encompassing a wide range of topics from literature, science, music, and – especially pertinent to this study of bronze conservation – artifacts and implements. In Section Nineteen: Artifacts and Implements, Kuo reveals his own beliefs about the conservation of ancient bronzes, specifically regarding the study of ancient bronzes to conserve ancient skills.<sup>32</sup> In it, he describes and commends the techniques of ancient bronze mirror production, specifically the concave or convex reflective surface that determined its the size or function.<sup>33</sup> Most notably, Kuo writes, “some people even grind ancient mirrors flat

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<sup>29</sup> Moser, “The Ethics of Immutable Things,” 268-269.

<sup>30</sup> Moser, 263.

<sup>31</sup> Moser, 276.

<sup>32</sup> Chase, *Ancient Chinese Bronze Art*, 36.

<sup>33</sup> Shen Kuo, *Brush Talks from Dream Brook*, trans. Hong Wang and Zheng Zhao (Chengdu: Sichan People's Publishing, 2008), 581.

when they get one” and implies this erasure of the surface deters the appreciation for ancient metalworking.<sup>34</sup> Some Song dynasty scholars like Lü Dalin and Shen Kuo condemned the behavior of collectors who treated ancient bronzes as anything less than important remnants of cultural heritage.

### **Artificial Patination and Reduced Interest in Antiquity**

After the peak of antiquarianism in the Song dynasty, the outset of the Yuan (1271-1368 CE) and Ming dynasties (1368-1644 CE) are characterized by decreased interest and accuracy in the study of the past. Compared to the work of Song dynasty scholars, historical scholarship became less rigorous, which can be somewhat explained by the government-sponsored melting down of ancient bronze vessels to produce weapons and coins when the government was threatened by invasion from northern nomadic groups.<sup>35</sup> Despite the Ming dynasty’s reduced interest in ancient bronzes, there were many attempts to imitate the style and patination of ancient bronzes, including recording still-extant recipes for these patinas.<sup>36</sup> The surfaces of ancient bronzes can vary depending on the techniques used to finish them, the object’s environment since its construction, and the time elapsed from its creation.

In Liu An’s *Huai Nan Zi* (an earlier Han dynasty document), he writes about an important compound in the ancient finishing process of a bronze mirror, but it is not until the Ming dynasty that the recipe was written down. As early as the late Shang dynasty, the compound, *Xuan Xi* 玄錫, was used to polish the surface of bronze mirrors.<sup>37</sup> When the grayish-white powder was rubbed onto the surface of the bronze, its color changed to black before the mercury was

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<sup>34</sup> Kuo, *Brush Talks from Dream Brook*, 581.

<sup>35</sup> Deydier, *Understanding Ancient Chinese Bronzes*, 170.

<sup>36</sup> Scott, *Art: Authenticity, Restoration, Forgery*, 265.

<sup>37</sup> Niece and Craddock, *Metal Plating and Patination*, 60.

eliminated through heat or evaporation, leaving behind a bright silver surface.<sup>38</sup> The Ming dynasty book *Duo Neng Bi Shi* by Liu Ji records the recipe of the abrasive compound made up of tin, mercury, alum, and deer horn ash.<sup>39</sup> This abrasive forms a thin surface layer that merges with the metal surface, resulting in a protective coating on the bronze. This abrasive technique is compared to the use of an ancient patina that results in a tin-enriched and corrosion resistant shiny jet-black surface known as *Hei-Qi-Gu* (or black lacquer antique) that was mentioned as early as the Song dynasty.<sup>40</sup> An example of an ancient bronze object with a black surface that was probably made using this false patina is a mirror now in the Royal Ontario Museum (Figure 2). The Ming dynasty's fascination with ancient patination and the appearance of bronzes may be linked to their determination to imitate ancient bronze forms and styles.

The Ming dynasty's interest in antiquity can be understood through its replication of the past. During the later Song dynasty and the Ming dynasty, attempts to imitate the ancient bronzes often included copying either the black patinas or smooth greenish-blue surfaces that mimicked the appearance of ancient bronzes after having been buried for significant lengths of time.<sup>41</sup> The burial of these ancient bronzes resulted in the change of their surfaces to different colors - such as black, green, red, blue, or grey - depending on the environment in which the bronze was buried (Figure 3). These colors are the formation of natural patinas and corrosion that were observed by later dynasties whose metalworkers attempted to reproduce these finishes through patination. Gao Lian, a collector during the Ming dynasty, records elaborate treatments to produce these artificial patinas, including the burial of the bronze in acidic soil for a specific

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<sup>38</sup> Niece and Craddock, 52 and 58.

<sup>39</sup> Niece and Craddock, 57-60.

<sup>40</sup> Niece and Craddock 53 and 56.

<sup>41</sup> Scott, *Art: Authenticity, Resoration, Forgery*, 265.

length of time.<sup>42</sup> It is also from Lian that we know soft solder was used during the Ming dynasty, although it is not clear when it came to China.<sup>43</sup> Solder can be used to join metal, but it is also necessary to use flux to prevent the formation of metal oxides that would impede the solder from flowing between the two metals. Despite the presence of solder in the Ming dynasty, the lack of knowledge surrounding fluxes could have prevented their use in repairs.<sup>44</sup> Many fakes produced during the Ming dynasty reveal their inauthenticity due to their decoration being complete fabrications featuring elements that are nothing like any motifs of the Shang or Zhou dynasties.<sup>45</sup> The Ming dynasty antiquarianism is characterized by its goal of being fully committed to imitating ancient skill through fabrication.

### **A Return to Antiquity and Questions of Authenticity**

Later in the Ming period came a renewed interest in the empirical study of ancient bronzes, which built the foundation for the Qing dynasty's (1644-1911 CE) archaeological practices and research.<sup>46</sup> The Qing dynasty marks the fall of China to the Manchu, and Chinese scholars at that time blamed China's fall on Neo-Confucian scholarship that had emphasized the spiritual matters and cultural heritage of China. Instead, the study of antiquity was promoted for the political message associated with ancient bronzes. Under the rule of Emperor Qianlong, interest in antiquity was rekindled as he sponsored the completion of the *Xiqing Sijian* 西清古鑑, the Four Books of Appreciation and Appraisal, which was seen as an extension of the *Kaogutu* or *Xuanhe Bogutu*.<sup>47</sup> These four books include sketches and descriptions of 4074 bronzes from

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<sup>42</sup> Scott, Art: Authenticity, Restoration, Forgery, 265-266.

<sup>43</sup> R. John Gettens, *The Freer Chinese Bronzes*, vol. 2 (Meriden Gravure Comp., 1969), 211-212.

<sup>44</sup> Gettens, *The Freer Chinese Bronzes*, vol. 2, 212.

<sup>45</sup> Deydier, *Understanding Ancient Chinese Bronzes*, 185-186.

<sup>46</sup> Rujivacharakul and Demattè, "Emperors and Scholars," 166-167.

<sup>47</sup> Rujivacharakul and Demattè, "Emperors and Scholars," 172; Deydier, *Understanding Ancient Chinese Bronzes*, 170.

the Qing imperial collection.<sup>48</sup> During this dynasty, other important bronze collections were formed and published in catalogs; however, it is believed that roughly half of these ancient bronzes recorded in Qing texts were later fakes, most of which are Yuan dynasty reproductions that are conserved today in Beijing.<sup>49</sup>

During the Qing dynasty, the emperors' concern with their public image and political power sparked their interest the past, and the discovery of ancient bronzes continued to be viewed as auspicious events that confirmed the ruling emperor's divine favor. Railway lines being constructed throughout the country unearthed a number of tombs along with caches of bronze and other materials, which in turn contributed to the Qing dynasty's study of antiquities and led to their mastery fabricating antiques.<sup>50</sup> The abundance of available early bronzes facilitated artisans' ability to closely copy techniques and styles of the past, creating forgeries that fueled contemporary studies of Chinese art history and the development of scientific testing to distinguish the fake bronzes from the authentic.

### **Modern Excavation and International Conservation**

The overthrow of the Qing dynasty and the establishment of the Republic of China gave excavating ancient sites a new societal importance. The Archaeological Department of the National Research Institute of History and the Philology of the Academia Sinica was established by the government, and it organized 15 scientific excavations between 1928 and 1937.<sup>51</sup> The techniques of scientific archaeological excavation were brought by Chinese students returning from their studies in the West. Since these early government-sponsored excavations, many archaeological sites have revealed a plethora of ancient with secure find spots and other

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<sup>48</sup> Deydier, *Understanding Ancient Chinese Bronzes*, 170.

<sup>49</sup> Deydier, 185; Rujivacharakul and Demattè, "Emperors and Scholars," 173.

<sup>50</sup> Deydier, 166 and 186.

<sup>51</sup> Deydier, 175.

environmental information that in supports the work of object conservators. Many bronzes found and written about before these excavations lack provenance, the key information that helps trace what treatments (if any) a bronze underwent over the course of time. In Princeton's University Art Museum, a bronze p'ou dated to the Shang dynasty (Figure 4) was heavily restored in the early 19<sup>th</sup> century. It appears in the University's acquisition records in 1968 as a gift of Mr. and Mrs. Earl Morse.<sup>52</sup> After its entrance into the collection, an American conservator, Stephen Guglielmi, discovered its extensive reconstruction. The object's pristine condition would have made it a very valuable ancient artifact in the 1960s, but after some investigation, it was deemed to include elements of reworked metal and a re-patinated surface.<sup>53</sup> Its first appears in its heavily restored state in Hong Kong in the 1920s, but there is no clear information on when it was restored to this condition.<sup>54</sup> The lack of information regarding its provenance and work done to it means that later conservation work included investigating and discerning the authentic from the imitation so as to better treat the ancient bronze.

In the 20<sup>th</sup> century, charters and other documents issued by cultural preservation authorities have attempted to document and define conservation practices such as the Nara Document on Authenticity. Articles 10 and place cultural value within the considerations of conservators. Written in 1994, the Nara Document addresses the fact that different cultures have different views on authenticity.<sup>55</sup> The Western approach to conservation and authenticity often takes a unified approach or one of universality in treating all objects, regardless of cultural

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<sup>52</sup> Alfreda J. Murck, "Acquisitions 1968," *Record of the Art Museum, Princeton University* 27, no. 2 (1968): pp. 94–105, 100.

<sup>53</sup> Stephen Guglielmi, "Report on the Spurious Nature of a Shang Dynasty Bronze P'ou," *Record of the Art Museum, Princeton University* 27, no. 1 (1968): pp. 3-10, <https://doi.org/10.2307/3774421>, 6.

<sup>54</sup> Guglielmi, "Report on the Spurious Nature of a Shang Dynasty Bronze P'ou," 4.

<sup>55</sup> Scott, Art: Authenticity, Restoration, Forgery, 99-11; "The Nara Document on Authenticity (1994)," The NARA document on authenticity (1994) - International Council on Monuments and Sites, January 11, 2011.

values, with the same strategy.<sup>56</sup> This Western approach neglects what is addressed in the Nara Document in that the cultural value of an object can and should greatly influence its treatment. In the treatment of ancient bronzes, there is great debate on how they should be approached because of the overwhelming number of counterfeit and reconstructed bronzes in collections. Scholar and conservator, W.T. Chase argues for bronzes to be treated in regard to their degree of authenticity.<sup>57</sup> An excellent case study is a Late Shang dynasty *Ku* vessel from the Freer Gallery of Art (Figure 5). The vessel is composed of five authentic pieces with an original patina cast onto the foot of an entirely fabricated vessel.<sup>58</sup> The reconstructed elements of the vessel were covered in a false patina that was not integral to the metal and over time loosened so that it was easily torn off to expose the original metal surface.<sup>59</sup> By contrast, at the Palace Museum in Beijing, a similar *Ku* was restored in 1993 using soft solder and low zinc brass, exemplifying the invasive restoration practiced in China until rather recently.<sup>60</sup> Restoring ancient bronzes was by no means a new development, but this vessel is evidence of a traditional conservation practice within China.

The conservation facilities of Peking (Beijing), Lo-yang, and Shanghai were visited by W. T. Chase in 1974, and he commented on some of the techniques and practices he observed there in a report to the committee on Scholarly Communication, which he noted as being rather traditional. It is mentioned that at Peking “bronze repair [was] generally done by fabricating repair pieces” and then these pieces were attached using soft solder.<sup>61</sup> The vessels were then smoothed and a patina of pigment in shellac was added to the repair piece to match the entire

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<sup>56</sup> Scott, 138.

<sup>57</sup> Scott, 268.

<sup>58</sup> Chase, *Ancient Chinese Bronze Art*, 84.

<sup>59</sup> Chase, *Ancient Chinese Bronze Art*, 84.

<sup>60</sup> Chase, *Ancient Chinese Bronze Art*, 84.

<sup>61</sup> W. T. Chase, “Conservation in the People’s Republic of China,” *Bulletin of the American Institute for Conservation of Historic and Artistic Works* 14, no. 2 (1974): pp.131–41, <https://doi.org/10.2307/3179330>, 133.

vessel.<sup>62</sup> The goal of these techniques is to produce a vessel that appears to be continuous in style and production. These processes are noted as being the same method used on some bronzes in the Freer collection, which was probably done in the 1930s.<sup>63</sup> One such object may be the Late Shang dynasty *Ku*.

Meanwhile, at the Shanghai Museum in China, there is a long history of conservation and scientific study. Established in 1958, its restoration workshop, despite its name, aims to preserve the objects in its collection in their current state and record any work done on the objects.<sup>64</sup> Although their conservation practices were said to be similar to those at Peking, their scientific research makes them stand out from their counterparts elsewhere.<sup>65</sup> The scientific studies of bronzes in Shanghai focused mainly on bacteria and mold growth on bronzes, protecting objects from ultraviolet exposure, and the stabilization of bronzes with benzotriazole.<sup>66</sup> Benzotriazole is used in one of two heavily researched protection methods of ancient bronzes in China, specifically used to inhibit corrosion. The inhibitor is added after soil and other compacted materials are removed, and then a coating is applied to the surface to create a film.<sup>67</sup> The scientific conservation in Shanghai aims to preserve these objects as they are without invasive treatments.

Much of the conservation work in China today is geared toward studying and investigating the current available catalog of bronzes and developing a knowledge of conservation materials. Using the wide breadth of tools, conservators can understand a great deal about a bronze's manufacture, function, and history. For example, the use of x-radiography can

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<sup>62</sup> Chase, "Conservation in the People's Republic of China," 133.

<sup>63</sup> Chase, "Conservation in the People's Republic of China," 133.

<sup>64</sup> Chase, "Conservation in the People's Republic of China," 133.

<sup>65</sup> Chase, "Conservation in the People's Republic of China," 133.

<sup>66</sup> Chase, "Conservation in the People's Republic of China," 134.

<sup>67</sup> Julin Wang, YuQing Wu, and Sheng Zhang, "A New Coating System Modified with Nano-Sized Particles for Archaeological Bronze Protection," *Studies in Conservation* 59, no. 4 (September 2014): pp. 268-275, 268.

highlight cracks, repairs, or other aspects of bronzes that are invisible to the naked eye without more intrusive investigation that includes removing the surface or taking core samples from the metal. These more scientific approaches to conservation can help to fill in the history of an object including distinguishing ancient and modern repairs that are not recorded. Chinese cooperation at an international level has also increased since W. T. Chase's work in 1974. Major conservation organizations and research institutions have collaborated with China on different projects to expand cross-cultural dialogue on the topic of conservation.<sup>68</sup> These efforts include working with the Getty Conservation Institute and Nottingham Trent University on projects within China and extending their knowledge to Cambodia and Mongolia for the conservation of the Ta Keo Temple and the Borger Palace Museum respectively.<sup>69</sup> This exchange of ideas and conservation knowledge discourages redundancy in research and allows for practices and treatments to develop with new perspectives. However, due to conservation practices' political ties in China, decision-making usually falls into the hands of the government or experts less inclined to participate with foreign partners.

Material science has been one important aspect of evolving Chinese conservation methods, most notably in revisiting traditional craftsmanship. The committee that visited Chinese conservation facilities in 1974 commented on these traditional practices, and scientific conservation research has allowed Chinese preservation methods to evolve. For the repair of bronzes involving joining fragments, a zinc chloride is normally used as flux to solder bronze fragments together, but this zinc chloride poses a health risk due to its production of toxic

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<sup>68</sup>Zhanyun Zhu and Tonia Eckfeld, "The Development of Conservation Practices in China from the 1980s to the Present," *AICCM Bulletin* 37, no. 1 (February 2016): pp. 26-34, <https://doi.org/10.1080/10344233.2016.1206287>, 30.

<sup>69</sup> Zhu and Eckfeld, "The Development of Conservation Practices in China," 30.

fumes.<sup>70</sup> The chloride ion also encourages bronze corrosion after soldering and so chlorine-free fluxes and other adhesives have begun to replace these traditional practices.<sup>71</sup> In 2006, the State Administration of Cultural Heritage (SACH), which governs the cultural materials conservation in China at the highest level, established the Standardization Committee for Conservation which works to regulate and reshape the practices and materials used by conservators today to improve the field.<sup>72</sup> This committee and the work that they do is also supplemented by legislation crafted to protect Chinese cultural objects.

### **Repairs and Preservation in Ancient Italy**

Early conservation of ancient Italian bronzes began with the finishing processes associated with metallurgy. When casting large scale sculptures, the lost-wax method necessitated the bronze to be cast in sections. The inherent value of the bronze and other materials used during production meant that any resulting issues with casting had to either be repaired or the entire section be recast. For this reason, the sculptures that survive are usually in rather good condition or without any major repairs from antiquity. The finishing of the bronzes included repairing any defects from the casting process, including adding a metal plug to any incomplete surfaces and polishing the bronze.<sup>73</sup> It was also typical in the Greek and Roman world to leave surfaces of bronzes unpatinated, but polished, creating a bright, golden-colored surface.<sup>74</sup> However, due to corrosion or exposure to the elements, this original color of the bronze usually deteriorated over time.

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<sup>70</sup> Zhu and Eckfeld, 27.

<sup>71</sup> Zhu and Eckfeld, 27.

<sup>72</sup> Zhu and Eckfeld, 28.

<sup>73</sup> Joseph Veach Noble, "The Wax of the Lost Wax Process," *American Journal of Archeology* Vol.79, no.4 (1975), pp. 368-369, 369.

<sup>74</sup> La Niece and Craddock, *Metal Plating and Patination*, 6 and 36-38.

This change in the bronze surface was not entirely unknown to the Greeks and Romans, as there are ancient authors who describe the effects of corrosion and different ways to prevent it.<sup>75</sup> One such source is Pliny the Elder, who spent much of his life writing the encyclopedic *Naturalis Historia*, which discusses different natural ancient materials like bronze. Pliny identifies a copper alloy, *hepatizon*, that creates a dark purple color and writes about using oil and liquid tar to protect bronze surfaces.<sup>76</sup> In some cases, artists took advantage of the different alloy colors and used them to cast details of their statues in these alloys for contrast. On the other hand, bronze corrosion, an often-unintentional byproduct of casting bronze, was recognized and there were attempts to prevent it. Overall, ancient Italians understood a great deal about bronze and its properties, and in some cases used these characteristics on purpose like in the case of producing polychromatic metallic sculptures such as the Terme Boxer (Figure 9), to be discussed further below.

### **Early Discovery and the Medici Family Collections**

The earliest sources on discovering ancient bronzes in Italy come from the 12<sup>th</sup> century with the documentation of the Spinario (Figure 6), a Classical statue that seems to have never to have been buried.<sup>77</sup> It was not until 1471 that the statue was given from Pope Sixtus IV to the Roman people by placing it in the Capitoline Museum collections. Much of its provenance prior to this moment is unknown.<sup>78</sup> During the Renaissance, it was considered a Greek bronze original, although it is now understood as an Augustan era statue (1<sup>st</sup> century BCE – 1<sup>st</sup> century CE) that repurposed an Hellenistic statue type for a Roman audience.<sup>79</sup> The Spinario statue depicts a

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<sup>75</sup> Daehner and Lapatin, *Power and Pathos: Bronze Sculpture of the Hellenistic World*, 159.

<sup>76</sup> Daehner and Lapatin, 160.

<sup>77</sup> Daehner and Lapatin, 69.

<sup>78</sup> Daehner and Lapatin, 305.

<sup>79</sup> Daehner and Lapatin, 69.

seated boy removing a thorn from the bottom of his foot, and it was cast with extreme detail in the boy's individual characteristics. A different copper alloy more reddish in hue from the one used to cast the entire statue was used to cast the lips to create a visual contrast with the boy's exposed flesh. The reintroduction of this statue to Rome in the 15<sup>th</sup> century influenced artists of the day in their work and their understanding of antiquity. It was one of many ancient bronzes that inspired a renewal of interest in the classical world that spread throughout Italy.

The Italian Renaissance coincided with this rediscovery of ancient material and inspired this fascination with the past. Florence, specifically, emerged as a cultural capital of the Renaissance with the powerful Medici family using its extensive wealth to grow its own collections of ancient art and become patrons of Renaissance art. The Medici were especially fascinated with the Etruscans as they saw them as the indigenous culture of Italy, and they became obsessed with connecting their own lineage with the Etruscans. One way in which they did this was through the exhibition of Etruscan art, and a famous example of this phenomenon is the Chimera of Arezzo that was uncovered with other ancient bronze sculptures in 1553 (Figure 7).<sup>80</sup> The Chimera is thought to be a part of a statue group featuring a myth of the hero Bellerophon who defeated the hybrid animal made up of lion, goat, and snake. The statue depicts the mythical beast in a seemingly defensive stance with injuries to the goat's head and lion's hind-leg. The Chimera is an example of Etruscan metallurgical skill, but during the Renaissance it also represented the political legitimacy of the Medici family.

As the self-proclaimed Duke of Etruria, Cosimo I de' Medici was especially interested in Etruscan culture, and upon the chimera's discovery, immediately brought it back to Florence

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<sup>80</sup> Haynes, *Etruscan Civilization: A Cultural History*, 304.

where it resides in the Museo Archeologico today.<sup>81</sup> Cosimo I made the Chimera a symbol of his expansionist politics in creating the Grand Duchy, and it served as a personification of the Medici's own enemies that had to be tamed in order for them to rule.<sup>82</sup> With the help of the artist Benvenuto Cellini, Cosimo cleaned and repaired its left legs that had been damaged before its discovery.<sup>83</sup> An Etruscan inscription on the front leg of the Chimera indicates its function as a votive offering to a primary Etruscan deity named Tin (Greek: Zeus) and further connects the statue – and by association the Medicis – to this ancient culture. It was not until 1785 that the entire form was completed with Francesco Carrodori's addition to the fragmentary tail, taking some artistic liberties to have the snake bite the goat's horn. Nevertheless, the goal of Renaissance conservation was restoration. The uniform hue of the metal is evidence of the addition of a patina, and further underscores the goal of these changes to create a complete and unified appearance. This restoration was necessitated because of the piece's connections to the Medici's power, and by extension Florence's political authority, so its condition had to be pristine.

The Chimera was not the only ancient sculpture in the Medici collection restored in part by Francesco Carrodori. A year before the Chimera of Arezzo was found, in 1542, another statue from Arezzo was purchased by Duke Cosimo I, known as the Minerva of Arezzo.<sup>84</sup> The statue has more recently been attributed as a work produced by the Greeks living in southern Italy as a reworking of an Athenian original, but it still held great importance in the Medici's collections during the Renaissance.<sup>85</sup> Upon its discovery, it was rather fragmentary. It was not until 1785

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<sup>81</sup> Beth Cohen, "New Light on a Master Bronze from Etruria," *American Journal of Archaeology*, April 7, 2016, <https://www.ajaonline.org/online-review-museum/365>, 1.

<sup>82</sup> Wall text (69750), Museo Archeologico Nazionale, XVI, Florence, Italy.

<sup>83</sup> Wall text (69750), Museo Archeologico Nazionale, XVI, Florence, Italy.

<sup>84</sup> Daehner and Lapatin, *Power and Pathos: Bronze Sculpture of the Hellenistic World*, 230.

<sup>85</sup> Wall text (69750), Museo Archeologico Nazionale, XVI, Florence, Italy.

that any conservation efforts were made to the statue.<sup>86</sup> Francesco Carradori restored the goddess's missing limb and the snake head that originally adorned her helmet, but did so without any concrete evidence as to their style or position.<sup>87</sup> The arm was situated on an internal wooden support using large iron brackets and rivets, but it was in a different position than it had been during statue's original manufacture.<sup>88</sup> The intent of Carradori's conservation was to complete the statue's form and restore it to its original composition by any means necessary. Carradori used metal, wood, and plaster to achieve this goal, which have been removed in modern interventions and placed on exhibition near the statue within Florence's Archaeological Museum. This tradition of restoration continued into 18<sup>th</sup> century Florence and it spread throughout Italy as an increased amount of archaeological material was found in different regions.

### **Herculaneum and Pompeii as Motivation for Southern Conservation**

The discovery of Herculaneum and Pompeii, in 1738 and 1748 respectively, forced Naples to become a restoration center.<sup>89</sup> Prior to 1739, it was customary to restore antiquities before placing them on exhibition, and so the Royal Foundry at Portici emerged as the headquarters for the treatment of the bronzes being unearthed at these ancient sites.<sup>90</sup> Specifically, it was Carlo Ceci and his family that became responsible for the restoration of bronzes in Naples, first at Portici before moving to the Royal Bourbon Museum at Naples, today known as the Museo Archaeologico Nazionale di Napoli (MANN).<sup>91</sup> The restorative work done

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<sup>86</sup> Daehner and Lapatin, *Power and Pathos: Bronze Sculpture of the Hellenistic World*, 230.

<sup>87</sup> Erik Risser and David Saunders, *Restoration of Ancient Bronzes: Naples and Beyond* (Los Angeles: The J. Paul Getty Museum, 2013), 65.

<sup>88</sup> Alessandra R. Giunlia-Mair et al., "The Restoration of the Minerva of Arezzo," in *Proceedings of the Xviiith International Congress on Ancient Bronzes, Izmir* (Autun, France: Editions Mergoïl, 2016), pp. 245-252, 247.

<sup>89</sup> Risser and Saunders, *Restoration of Ancient Bronzes: Naples and Beyond*, 15.

<sup>90</sup> Kenneth Lapatin, *Buried by Vesuvius: the Villa Dei Papiri at Herculaneum* (Los Angeles: The J. Paul Getty Museum, 2019), 21.

<sup>91</sup> Lapatin, *Buried by Vesuvius: the Villa Dei Papiri at Herculaneum*, 21.

in Naples included experimental work with cleaning techniques, the application of patinas, and production of new structural mounts. Many of the works restored in Naples at the foundry were painted with a foundry mark of three rosettes that now help catalog the work done during this time.<sup>92</sup> The purpose of these practices was to restore the artifact to its original appearance, or what they believed its original appearance to be, in preparation for exhibition.

The Royal Foundry's practices were not supported by everyone. During a visit to the foundry in 1762, the foundational art historian J.J. Winkelmann heavily opposed the restoration methods that he observed. Winkelmann describes seeing fragments of bronzes from Pompeii and Herculaneum being discarded as scraps that were then melted down and used to cast new bronzes or repair other bronzes in better condition.<sup>93</sup> These invasive and often damaging restoration practices in Naples became known as "Bourbon-era restorations." This era of restoration also included the removal of heavy layers of malachite corrosion products from the bronze surface.<sup>94</sup> Malachite is a copper carbonate mineral that has been well known since antiquity as a secondary corrosion product on buried bronzes and has also been used as a green decorative element.<sup>95</sup> As a secondary corrosion product, the malachite builds up on the surface of another corrosion product without directly damaging or changing the original surface of the metal. Therefore, removing the malachite reveals this lower corrosive layer and eliminates any protective patina offered by the malachite. This process necessitated the addition of some kind of layer to protect the metal surface, and adding a patina to the surface came with the benefit of unifying the ancient original and modern additions.

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<sup>92</sup> Lapatin, 24-26.

<sup>93</sup> Lapatin, 22.

<sup>94</sup> Lapatin, 24.

<sup>95</sup> David A. Scott, *Copper and Bronze in Art Corrosion, Colorants, Conservation* (Los Angeles, Calif: The Getty Conservation Institute, 2002), 100-106.

Two popular patinas developed at Naples by Carlo Ceci's son, Giacomo, continued the family's legacy in bronze conservation. Giacomo Ceci was known for teaching the application of ancient patinas including the popular "Herculaneum" and "Pompeii" patinas.<sup>96</sup> Winkelmann criticized the use of patinas in restoration practices at the Museo Ercolanese because the color added to the bronze differed from the ancient patina and looked disgusting to him.<sup>97</sup> However, one bronze sculpture that Winkelmann found to be a highlight of the king's museum at Portici was the Drunken Satyr (Figure 8), found in 1754 from the Villa dei Papiri in Herculaneum.<sup>98</sup> The Drunken Satyr appears to have fallen onto a wine skin and lion skin that are laid upon a rock, and the entire sculpture has undergone a great deal of conservation since its discovery. Missing parts of the skins were recast, the right arm of the satyr was repaired, and other limbs were reattached to the statue in 1759.<sup>99</sup> However, through patination, the conservators attempted to hide these changes and unite the ancient original parts and historical conservation efforts. The addition of a patina to create this complete work was an important step in 18<sup>th</sup> century restoration practices. At the turn of the century, more people spoke out against these invasive methods and worked to change the goal of conservation moving forward.

### **Limiting of Intervention and Increased Discourse**

At the onset of the 19<sup>th</sup> century, people became more concerned with the intervention of conservation methods, which materialized in the forms of royal decrees and academic literature. In 1818, King Ferdinand IV of Naples prohibited any restoration of ancient material, but that

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<sup>96</sup> Lapatin, *Buried by Vesuvius: the Villa Dei Papiri at Herculaneum*, 21.

<sup>97</sup> Lapatin, 26.

<sup>98</sup> Carol C. Mattusch, *The Villa Dei Papiri at Herculaneum: Life and Afterlife of a Sculpture Collection* (Los Angeles: The J. Paul Getty Museum, 2005), 321-322.

<sup>99</sup> Mattusch, *The Villa Dei Papiri at Herculaneum: Life and Afterlife of a Sculpture Collection*, 321-322.

only lasted for three years.<sup>100</sup> After this brief hiatus of restoration work, the conservation of ancient patinas became the focus of new regulations, and bronzes found whole in excavations could only have the dirt cleaned off.<sup>101</sup> This was an early shift in limiting the intervention conducted on ancient Italian bronzes, but it did allow for restoration or repatination if supervised by a special commission made up of seven different people.<sup>102</sup> Controversies in conservation practices riddled Europe during the 19<sup>th</sup> century, and two influential philosophies that emerged came from John Ruskin in England and Eugène Viollet-le-Duc in France. Ruskin's *Seven Lamps of Architecture* (1849) and Viollet-le-Duc's extensive writings on conservation directly opposed each other, with Ruskin believing restoration to be destruction and Viollet-le-Duc favoring restoration to create a unity of style.<sup>103</sup> More people started to perceive and question the real effects of traditional conservation practices, and even within Italy there were similar disagreements in what conservation should accomplish.

At the end of the 19<sup>th</sup> century, two new conservation theories were developed by Luca Beltrami and Camillo Boito. Beltrami's *historical restoration* approach focused on historical research by the restorer of both the work of art and the events shaping its creation. These findings are what are then used to reconstruct or reintegrate stylistic aspects to the work.<sup>104</sup> This detailed study and commitment to restoring the art to its original style and appearance prevents any stylistic development of the object by the conservator. The second popular Italian conservation theory was expressed best in Boito's *Questioni pratiche di belle arte*. In it, Boito asserts that the monument is a document that should be read without additions and that the

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<sup>100</sup> Risser and Saunders, *Restoration of Ancient Bronzes: Naples and Beyond*, 25-26.

<sup>101</sup> Risser and Saunders, *Restoration of Ancient Bronzes: Naples and Beyond*, 26.

<sup>102</sup> Risser and Saunders, *Restoration of Ancient Bronzes: Naples and Beyond*, 26.

<sup>103</sup> David A. Scott, *Art: Authenticity, Restoration, Forgery* (Cotsen Institute of Archaeology Press at UCLA, 2016), 104-108.

<sup>104</sup> Scott, *Art: Authenticity, Restoration, Forgery*, 105.

monument's importance is eliminated when it is altered by any stylistic additions.<sup>105</sup> Instead of restoration, Boito was focused on conservation with a preference for scientific study and preserving the monument by any means necessary. Both Boito and Beltrami agreed that stylistic choices made by a conservator are harmful to the object's authenticity when they are not directly derived from the object, but Boito's approach to this issue is much more extreme or idealistic.

Europe at the end of the 19<sup>th</sup> century and beginning of the 20<sup>th</sup> century experienced a new concern for determining authenticity and promoting conservation. In 1883 – influenced by earlier writings of Ruskin and Viollet-le-Duc, Boito published his own restoration thesis in *Prima Carta del Restauro*, which establishes eight principles to approach authenticity that include differentiating the original from the new, documenting any restoration work, and recognizing any material removed or altered by exhibition or inscriptions.<sup>106</sup> Boito's ideas were extremely modern and mark the onset of a new wave of conservation that encouraged scientific and historical study remarkably ahead of its time.

The application of these philosophies is best exemplified by the treatment of the Statue of a Seated Boxer, also known as the Terme Boxer (Figure 9), found in 1885 on the Quirinal Hill in Rome.<sup>107</sup> The Terme Boxer is famous for its state of preservation and the skill of the original artist in producing this statue. It is thought that due to its incredible condition, the boxer may have been intentionally buried as a preservation method.<sup>108</sup> Present on the stomach of the boxer is an inventory number that places the statue within a catalog of artworks present in Rome during the late Republican period. The original artist's skill is clear in the use of different alloys to add

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<sup>105</sup> Scott, 105.

<sup>106</sup> Scott, 106.

<sup>107</sup> Daehner and Lapatin, *Power and Pathos: Bronze Sculpture of the Hellenistic World*, 223.

<sup>108</sup> Daehner and Lapatin, 223

naturalistic detail in the lips, nipples, blood droplets, and bruises. The bruises and blood complement the boxer's swollen post-fight state and clearly identify his sport. These different alloys are visible due to the lack of any modern patina added to the surface after its discovery to preserve the statue's intentional polychromatic nature. The goal of this work, or lack of invasive and irreversible treatments, was conservation with limited intervention. Today, the boxer resides in the National Museum of Rome collections at the Palazzo Massimo alle Terme where very minimal work has been done to change its features.

### **Standardization of Practices**

Inspired by the changing practices and more in-depth studies related to conservation, the European governments became more concerned with standardizing conservation practices. In Austria, Alois Riegl published an influential essay, "Der Moderne Denkmalkultus" ("The Modern Cult of Monuments: Its Character and Its Origin") that challenged current existing beliefs surrounding conservation. In the same year, 1903, Riegl was appointed as the Chief Conservator of Monuments in Austrian Crown Lands.<sup>109</sup> He defines six values that can be attributed to visual monuments and describes how they have evolved overtime to influence what should be conserved and how they should be conserved. The main takeaway from Riegl's essay is his push for conservation as opposed to restoration with respect to the material authenticity or historical value of the monument.<sup>110</sup> These ideas are like those of Ruskin in England and Boito in Italy, but Riegl's influence was much more widespread with his push for conservation legislation and the international charters that reflected his ideas.

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<sup>109</sup> Wolfgang Kemp, Introduction to Alois Riegl, *The Group Portraiture of Holland*, translated by Evelyn M. Kain and David Britt (Los Angeles: Getty Research Institute for the History of Art and the Humanities, 1999), 5.

<sup>110</sup> Alois Riegl, "The Modern Cult of Monuments: Its Character and Its Origin," translated by Kurt W. Forster and Diane Ghirardo, *Oppositions: A Journal for Ideas and Criticism in Architecture* 25 (1982), pp 21-51, 46.

Riegl's essay served as an introduction to an unsuccessful law draft aimed to standardize conservation and preservation at government level.<sup>111</sup> In Italy, a similar move toward providing legislation for conservation practices occurred in the early 20<sup>th</sup> century. In 1908, *Per le Antichità e le belle arte* was passed to co-ordinate all prior laws concerning the preservation of antiquity in Italy.<sup>112</sup> It required approval by the Minister of Public Institution for any restoration or modification to anything with historical, archaeological, and artistic interest.<sup>113</sup> This early trend of government involvement in conservation and the movement away from pure restoration inspired the removal of historical restorations in some cases.<sup>114</sup> An example is the 2002 removal of the arm added to the Minerva of Arezzo created by Francesco Carrodori in the 18<sup>th</sup> century. This new period of conservation was concerned with fixing perceived past mistakes and aimed to preserve the ancient state of the artifact.

These conservative views on preservation are mirrored in international charters such as the International Charter for the Conservation and Restoration of Monuments and Sites, also known as the Venice Charter. As a result of the 2<sup>nd</sup> International Congress of Architects and Technicians of Historic Monuments in 1964, the International Council on Monuments and Sites (ICOMOS) met and drafted this document, which deals with the concept of authenticity and promotes ideas from both Ruskin and Riegl, stating that “unity of style is not the aim of restoration.”<sup>115</sup> The charter reiterates the ideas of earlier thinkers like Ruskin and Riegl and attempts to provide universal conservation guidelines around the world. However, moving into

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<sup>111</sup> Michele Lamprakos, “Riegl’s ‘Modern Cult of Monuments’ and The Problem of Value,” *Change Over Time* 4, no. 2 (Fall 2014): pp. 418-435, 420.

<sup>112</sup> Lionel Cust, “The New Italian Law ‘Per Le Antichità e Le Belle Arti,’” *The Burlington Magazine for Connoisseurs* 13, no. 63 (1908), pp. 130-132, 130.

<sup>113</sup> Cust, “The New Italian Law ‘Per Le Antichità e Le Belle Arti,’” 130.

<sup>114</sup> Risser and Saunders, *Restoration of Ancient Bronzes: Naples and Beyond*, 6.

<sup>115</sup> ICOMOS, “International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter 1964),” *IInd International Congress of Architects and Technicians of Historic Monuments* (1964).

the 21<sup>st</sup> century, conservation continues to change with more respect to all the phases of an object's life that came before.

### **Modern Conservation and Scientific Studies**

An important aspect of conservation today is to retain the historical restoration work and additions made by conservators. These additions are seen as an essential aspect to the history of the statue and its biography, so it is crucial to use reversible techniques that do not risk further damage to the object.<sup>116</sup> An example is the modern treatment of the Drunken Satyr from 2018-2019 done in partnership between the J. Paul Getty Museum and the MANN, one of many recent collaboration projects between these two institutions. The goal of the project was to understand the sculpture's construction and its conservation history as well as plan for its long-term preservation.<sup>117</sup> Using radiography, X-ray fluorescence (XRF), magnification, and other analytical instruments, the conservators determined the ancient from the more modern interventions so that the entire sculpture could be disassembled and further studied. The reason for the disassembly was assess and stabilize the internal supports, and the chosen materials used in the work prioritized their reversibility and long-term stability.<sup>118</sup> This methodology shows a clear deviation to earlier conservation techniques that aimed to add to or alter the physical appearance of the sculpture. Instead, current conservation focuses on studying the bronze in the context of its production, historical conservation efforts, and any aspects of physical deterioration.

### **Conclusion**

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<sup>116</sup> Risser and Saunders, *Restoration of Ancient Bronzes: Naples and Beyond*, 6.

<sup>117</sup> "Drunken Satyr Conservation Methodology," Drunken Satyr Conservation Methodology, May 26, 2022, <https://www.getty.edu/projects/drunken-satyr-conservation/methodology/>.

<sup>118</sup> "Drunken Satyr Conservation Methodology."

Chinese antiquarian interest oscillates between fascination and disinterest, which has influenced their conservation practices, whereas in Italy trends in conservation have been more linear with a gradual move away from restoration. From the earliest investigation into ancient Chinese bronzes, their value and cultural heritage were recognized through documenting the auspicious events of their discovery. The ruling powers in China exerted great influence on the study of ancient material as their political power could be connected to specifically the bronze vessels being unearthed. With the later revival of Confucianism and connected importance of ancestor worship, Chinese collectors venerated these objects as evidence of their cultural heritage. In the Ming dynasty, replicating these bronzes took precedent and there was an increase in replicating ancient material and patination. Since their first discovery, Chinese bronzes have served an important role in the evolving concepts of Chinese heritage, demonstrated by the enormous number of bronze reproductions found in collections. When the imperial system in China ended with the establishment of the Republic of China, conservation continued to develop while being shaped by the past. Modern conservation in China includes the promotion of international cooperation and creating safer ways to study and investigate ancient bronzes.

On the other hand, conservation in Italy initially aimed to restore to the bronze to its original state, starting in the Renaissance and reaching a zenith of invasive treatments during the 18<sup>th</sup> century. Then, an increased concern and discourse surrounding conservation practices in the 19<sup>th</sup> century led to the limiting of interventions by the 20<sup>th</sup> century. Current conservation in Italy focuses on the studying, cleaning, and stabilizing of bronzes. The development of bronze conservation in Italy is much more recent compared to China's lengthy history, where they were already discovering ancient objects in antiquity, but both regions' conservation practices reflect their popular contemporary social and political ideologies.

In China and Italy, there were international attempts to standardize conservation that in the end failed to consider cultural practices and values associated with these bronzes. The aforementioned Venice Charter of 1964 provides a definition of authenticity that directly relates to the material as opposed to the form, function, or cultural value. Whereas, the Nara Document, written thirty years later, attempts to address, without standardizing, the conservation issues regarding authenticity. Today, international cooperative efforts including the sharing of research or collaboration on projects like that of the Drunken Satyr are becoming more common. The aim of conservation should continue to strive for further global collaboration. Both Italy and China are examples of evolving conservation practices that are useful case studies that foster reflection on for future developments.



*Figure 1: Ritual tripod cauldron (Ding), Shang dynasty, 12<sup>th</sup>-11<sup>th</sup> century B.C.E., Bronze, Metropolitan Museum of Art, (49.135.10).*



Figure 2: Mirror, Eastern Zhou dynasty Warring States period, Bronze, Royal Ontario Museum, (934.17.273).



*Figure 3: Food serving vessel (dui), Eastern Zhou dynasty, 6<sup>th</sup> century B.C.E., Bronze, Metropolitan Museum of Art, (1992.165.24a,b).*



Figure 4: Ritual vessel (p'ou), Shang dynasty, 13th - 11th century B.C., Bronze, Princeton University Art Museum, (y1968-110).



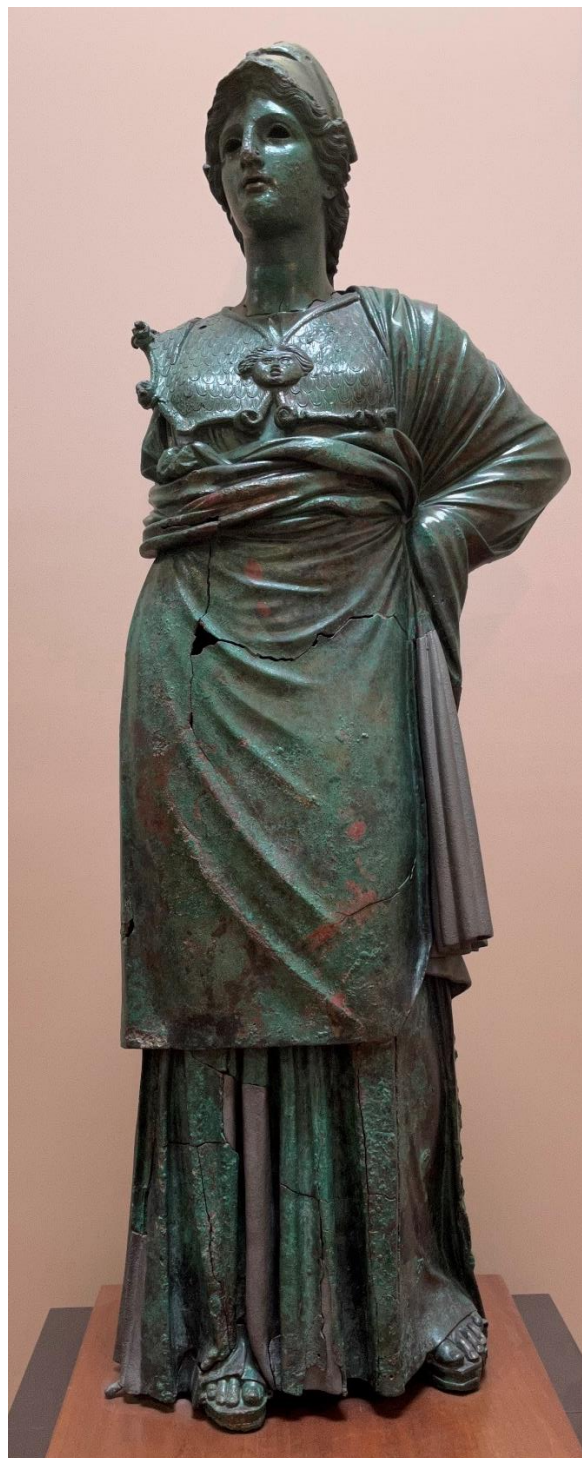
*Figure 5: Ceremonial vessel of the type ku, Late Shang Dynasty, Bronze, Freer Gallery of Art, (FSC-B-14).*



*Figure 6: Boy Removing a Thorn from his Foot (Spinario), 50 BCE, Bronze and copper, Rome, Musei Capitolini, (1186).*



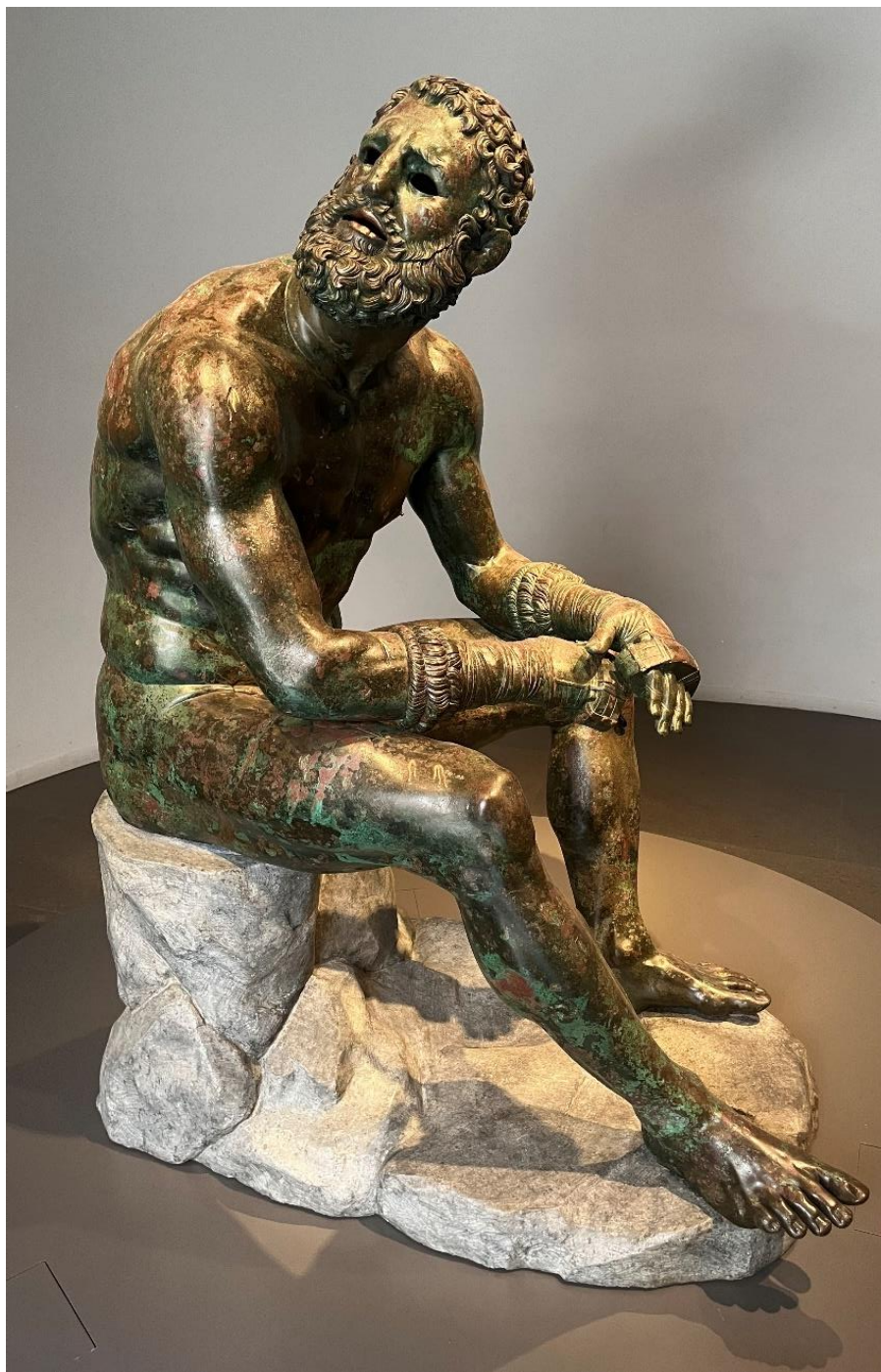
*Figure 7: Chimera of Arezzo, Late 5<sup>th</sup> – early 4<sup>th</sup> century BCE, Bronze, Florence, Museo Archeologico Nazionale, (69750).*



*Figure 8: Minerva of Arezzo, 300-270 BCE, Bronze and copper, Firenze, Museo Archeologico Nazionale, (248).*



*Figure 9: Drunken Satyr, 1<sup>st</sup> century BCE/CE, Bronze, copper, tin, and bone, Museo Archeologico Nazionale di Napoli, (5628).*



*Figure 10: Statue of a Seated Boxer (Terme Boxer), Early Hellenistic (3<sup>rd</sup> century BCE), Bronze with copper inlays, Rome, Museo Nazionale Romano di Palazzo Massimo, (1055).*

## Works Cited

- Chase, W. Thomas. *Ancient Chinese Bronze Art: Casting the Precious Sacral Vessel*. New York: China Institute in America, 1991.
- Chase, W. T. "Conservation in the People's Republic of China." *Bulletin of the American Institute for Conservation of Historic and Artistic Works* 14, no. 2 (1974): 131–41.
- Chiarantini, L., M. Benvenuti, P. Costagliola, A. Dini, M. Firmati, S. Guideri, I.M. Villa, and A. Corretti. "Copper Metallurgy in Ancient Etruria (Southern Tuscany, Italy) at the Bronze-Iron Age Transition: A Lead Isotope Provenance Study." *Journal of Archaeological Science: Reports* 19 (2018): 11–23.
- Cohen, Beth. "New Light on a Master Bronze from Etruria." *American Journal of Archaeology*, April 7, 2016. <https://www.ajaonline.org/online-review-museum/365>.
- Cust, Lionel. "The New Italian Law 'Per Le Antichità e Le Belle Arti.'" *The Burlington Magazine for Connoisseurs* 13, no. 63 (1908): 130–32.  
<http://www.jstor.org/stable/857491>.
- Daehner, Jens M., and Kenneth Lapatin. *Power and Pathos: Bronze Sculpture of the Hellenistic World*. Los Angeles: J. Paul Getty Museum, 2015.
- Delbanco, Dawn Ho, and Arthur M. Sackler. *Art from Ritual: Ancient Chinese Bronze Vessels from the Arthur M. Sackler Collections*. Washington, D.C.: Arthur M. Sackler Foundation, 1983.
- Deydier, Christian. *Understanding Ancient Chinese Bronzes: Their Importance in Chinese Culture, Their Shapes, Functions and Motifs*, 2015.
- "Drunken Satyr Conservation Methodology." *Drunken Satyr Conservation Methodology*, May 26, 2022. <https://www.getty.edu/projects/drunken-satyr-conservation/methodology/>.
- Gettens, R. John. *The Freer Chinese Bronzes*. 2. Vol. 2. Meriden Gravure Comp., 1969.

- Giumlia-Mair, Alessandra R., Carol C. Mattusch, Fulvia Lo Schiavo, Mario Cygielman, Marcello Miccio, and Alessandra Giumlia-Mair. "The Restoration of the Minerva of Arezzo." Essay. In *Proceedings of the Xviiith International Congress on Ancient Bronzes, Izmir*, 245–52. Autun, France: Editions Mergoil, 2016.
- Guglielmi, Stephen. "Report on the Spurious Nature of a Shang Dynasty Bronze P'ou." *Record of the Art Museum, Princeton University* 27, no. 1 (1968): 3–10.
- Haynes, Sybille. *Etruscan Civilization: A Cultural History*. Los Angeles: The J. Paul Getty Museum, 2000.
- Hemingway, Colette, and Seán Hemingway. "The Technique of Bronze Statuary in Ancient Greece." In *Heilbrunn Timeline of Art History*. New York: The Metropolitan Museum of Art, 2000–. (October 2003).
- ICOMOS. "International Charter for the Conservation and Restoration of Monuments and Sites (The Venice Charter 1964)." *IInd International Congress of Architects and Technicians of Historic Monuments* (1964).
- Kemp, Wolfgang. Introduction to Aloïs Riegl, *The Group Portraiture of Holland*, translated by Evelyn M. Kain and David Britt, 1-57. Los Angeles: Getty Research Institute for the History of Art and the Humanities, 1999.
- Lapatin, Kenneth. *Buried by Vesuvius : the Villa Dei Papiri at Herculaneum*. Los Angeles : The J. Paul Getty Museum, 2019.
- Lamprakos, Michele. "Riegl's 'Modern Cult of Monuments' and The Problem of Value." *Change Over Time* 4, no. 2 (Fall 2014): 418–435.
- Mattusch, Carol C. *The Villa Dei Papiri at Herculaneum: Life and Afterlife of a Sculpture Collection*. Los Angeles: The J. Paul Getty Museum, 2005.

- Moser, Jeffrey. "The Ethics of Immutable Things: Interpreting LÜ Dalin's Illustrated Investigations of Antiquity." *Harvard Journal of Asiatic Studies* 72, no. 2 (December 2012): 259–93.
- Murck, Alfreda J. "Acquisitions 1968." *Record of the Art Museum, Princeton University* 27, no. 2 (1968): 94–105.
- "The Nara Document on Authenticity (1994)." The NARA document on authenticity (1994) - International Council on Monuments and Sites, January 11, 2011.  
<https://www.icomos.org/en/charters-and-texts/179-articles-en-francais/ressources/charters-and-standards/386-the-nara-document-on-authenticity-1994>.
- Niece, La Susan, and Paul Craddock. *Metal Plating and Patination: Cultural, Technical and Historical Developments*. Butterworth-Heinemann, 1993.
- Noble, Joseph Veach. "The Wax of the Lost Wax Process." *American Journal of Archaeology* Vol. 79, no. 4 (1975): 368-369.
- Riegl, Alois. "The Modern Cult of Monuments: Its Character and Its Origin," translated by Kurt W. Forster and Diane Ghirardo. *Oppositions: A Journal for Ideas and Criticism in Architecture* 25 (1982): 21-51.
- Risser, Erik, and David Saunders. *Restoration of Ancient Bronzes: Naples and Beyond*. Los Angeles: The J. Paul Getty Museum, 2013.
- Rujivacharakul, Vimalin, and Paola Demattè. "Emperors and Scholars: Collecting Culture and Late Imperial Antiquarianism." Essay. In *Collecting China: The World, China, and a History of Collecting*, 165–75. Newark: University of Delaware Press, 2011.
- Scott, David A. *Art: Authenticity, Restoration, Forgery*. Los Angeles: Cotsen Institute of Archaeology Press at UCLA, 2016.

Scott, David A. *Copper and Bronze in Art Corrosion, Colorants, Conservation*. Los Angeles, Calif: The Getty Conservation Institute, 2002.

Shen, Kuo. *Brush Talks from Dream Brook*. Translated by Hong Wang and Zheng Zhao. Chengdu: Sichan People's Publishing, 2008.

Wall text (69750), Museo Archeologico Nazionale, XVI, Florence, Italy.

Wang, Julin, YuQing Wu, and Sheng Zhang. "A New Coating System Modified with Nano-Sized Particles for Archaeological Bronze Protection." *Studies in Conservation* 59, no. 4 (2014): 268–75.

Zhu, Zhanyun, and Tonia Eckfeld. "The Development of Conservation Practices in China from the 1980s to the Present." *AICCM Bulletin* 37, no. 1 (2016): 26–34.