Two Fragments of a Renaissance Bronze Zodiac Frieze

SZILVIA BODNÁR

Curator of Prints and Drawings, Museum of Fine Arts, Budapest

In 2004 The Metropolitan Museum of Art acquired two bronze reliefs that are clearly fragments of a larger work (Figure 1). One, symbolizing the zodiacal sign Sagittarius, shows a centaur with an arrow in his left hand; his right arm and right foreleg are missing. The other, representing Capricorn, bears a goat with a spiral fishtail as hindquarters. Since these two pieces are related and since they render adjacent signs of the zodiac—the usual sequence being Scorpio, Sagittarius, Capricorn, Aquarius—they must have been sawn apart at some time subsequent to their creation. In all probability they originally belonged to a larger work representing all twelve signs of the zodiac.

Without speculating as to their original function, James David Draper dates the reliefs to about 1530–40. On the basis of style, he further relates them to the work of prominent Venetian bronze sculptors of a slightly earlier generation: Alessandro Leopardi (1450–ca. 1523), Vittore Gambello (Camelio; ca. 1460–1537), and the Master of the Barbarigo Reliefs (active ca. 1486–ca. 1515), noting also that the punched background of the reliefs is a Venetian usage.[1] Draper's views accord with the results of technical examination of the objects, which revealed remnants of a characteristic Venetian black patina under the opaque reddish-brown paint. In addition, analysis of the metal showed components typical of Venetian bronzes. On the reverse, the profiles of the works are noticeably arched, both vertically and horizontally, which indicates that they must have belonged to a convex object. The complete circle that the reliefs of all twelve zodiacal signs would have made up can be calculated at about 80 centimeters in diameter, with a circumference of about 240 to 250 centimeters.[2] In the upper left corner of *Sagittarius*, Draper observed the letters "F.CIT A°" followed by a space, apparently for digits; the first of these have been scraped away, the last may be a 2. He rightly inferred that the inscription must have been effaced in order to present the objects for sale as ancient, pre-Christian works.[3]

The reliefs are worthy of study not only for their delicate composition and the question of their original function but also because, in the nineteenth century, they were recorded as antique objects in the Fejérváry-Pulszky collection, the most significant private collection in Hungary, which predominantly consisted of antique works. The reliefs were sold in Paris in 1868 and until their emergence in 2003, their location was unknown.[4] Accordingly, their emergence is of great interest to specialists in the history of Hungarian collecting.

In 2005, as part of a complex research project entitled "National or Universal Antiquities? The Nineteenth-Century Process of 'Musealisation' in Hungary and Europe,"[5] a group of scholars focused their attention on the collection amassed by Gábor Fejérváry (1780–1851) and his nephew Ferenc Pulszky (1814–1897). The aims of their research were to reconstruct the collection to the greatest extent possible and to investigate its place within the broader context of the history of European collecting. Their starting point—the visual reconstruction of the collection—focused on the most important source, a large album called the *Liber Antiquitatis*. Made in the 1840s and once comprising about 150 watercolors, this catalogue illustrated some of the highlights of the Fejérváry-Pulszky collection. The researchers studied the album in its present state and noted changes made to it during the twentieth century. They also examined the individual watercolors, comparing them with the actual objects, in cases where they are known to exist, and analyzing their descriptions in archival sources related to the collection. The results of their study were discussed at two workshops held at the Collegium Budapest and were published in the volume entitled *Antiquitas Hungarica*.[6] My comments on the Metropolitan Museum's zodiac reliefs were included in a paper tracing the fate of those Renaissance small bronzes in the collection that were previously regarded as antique.[7]

Fejérváry, a lawyer from Pest who moved to the northern Hungarian town of Eperjes (today Prešov,

The notes for this article begin on page 104.

Figure 1. *Sagittarius* and *Capricorn*, sections of a zodiac frieze. Venetian, ca. 1530–40. Bronze, 17.5 x 22.2 cm; 16.5 x 19.4 cm. The Metropolitan Museum of Art, European Sculpture and Decorative Arts Fund, 2004 (2004.440.1,2)

Slovakia), formed his collection in the second quarter of the nineteenth century with the assistance of his nephew. His primary holdings consisted of Egyptian, Greek, Etruscan, and Roman bronzes, gems, vases, marbles, and Late Antique ivory reliefs but also included Near and Far Eastern works, a thirteenth-century Mexican manuscript, and a small number of medieval, Renaissance, and modern pieces. After Fejérváry's death, the collection was inherited by Pulszky, who, because of his support for the Revolution of 1848, was forced into emigration after its suppression. In 1851 Pulszky left London with his fellow exile Lajos Kossuth for a seven-month tour of the United States and, after his return to England, published his overseas experiences in *White, Red, Black* (London, 1853), written in collaboration with his wife.[8] In 1853 he exhibited his collection in London.

Shortly afterward, financial difficulties and his decision to alter the focus of the collection led Pulszky to sell certain parts of it. Among these were the majolica pieces, acquired by a French art dealer; the ancient gold jewelry, purchased by the British Museum; and the Mexican manuscript, prehistoric items, and late antique ivories, bought by the Liverpool collector Joseph Meyer. At the same time, however, Pulszky persistently enriched his collection of gems and small bronzes with new acquisitions.[9] After his return to Hungary in 1866, he arranged to have the collection exhibited at the Hungarian Academy of Sciences in Pest, early in 1868. Despite the Hungarian National Museum's expressed intention to purchase the works, Pulszky first offered them for sale to the British Museum. He finally sold them to the auction house of Phillips in London, which in May 1868 offered the collection for sale in Paris.[10] Several pieces went to the British Museum, while certain others were bought by private collectors and later found their way to such institutions as the Musées Royaux, Brussels, the Louvre, the Victoria and Albert Museum, the Museum of Fine Arts, Boston, the Kunsthistoriches Museum, Vienna, and the Museum of Fine Arts, Budapest.[11]

A partial reconstruction of the collection is greatly aided by contemporary illustrations as well as by handwritten and printed lists. The two Metropolitan Museum zodiac reliefs appear in several sources. The most important are the watercolors in the previously mentioned *Liber Antiquitatis*, which Fejérváry commissioned from two Viennese artists, Joseph Bucher (1821–1882) and Wolfgang Böhm (1824–1890).[12] A third, unidentified hand, discerned on some pages, is responsible for the watercolors after the zodiac reliefs. The album's frontispiece date of 1842 indicates only when the work was begun, for some of the watercolors inserted or attached to the pages were made on papers bearing watermarks of 1843, 1846, or 1847.[13] Furthermore, objects that entered the collection after 1842 are also found among the representations. The present state of the *Liber Antiquitatis* differs from the original: several pages have been lost and the order of

the watercolors was changed during the twentieth century.[14] Currently the album comprises 106 sheets illustrating 290 objects.[15]

The watercolors made after the Metropolitan's bronze reliefs appear today on pages 71 and 70 of the album (Figures 2 and 3, respectively). The area within the borders of each relief measures approximately 17 centimeters in height, while the width of *Sagittarius* is 21.5 centimeters and that of *Capricorn* 19 centimeters, close to the measurements of the reliefs themselves. The artist obviously intended to depict the objects actual size. That one of the two identical sheets bears a watermark with the date 1846 proves they belong to those pages of the *Liber* that were made at a later date.

Figure 2. *Sagittarius*, from *Liber Antiquitatis*, plate 71, ca. 1846. Watercolor, 49.4 x 37.8 cm. Museum of Fine Arts, Budapest

Figure 3. *Capricorn*, from *Liber Antiquitatis*, plate 70, ca. 1846. Watercolor, 46.8 x 34.3 cm. Museum of Fine Arts, Budapest

The watercolors show the reliefs covered with a greenish patination, and the incised letters at the upper left edge of *Sagittarius* do not appear, apparently because they were overpainted.

The earliest written reference to the objects is a note of November 1846 in Fejérváry's handwritten account book: "von Böhm, 2 Zodiacus Zeichen, 140 Ft."[16] It cites Joseph Daniel Böhm (1794–1865) as the owner from whom Fejérváry bought the reliefs. The year given for the acquisition explains why the watercolors were made on papers watermarked 1846. The next source is the manuscript catalogue of the Fejérváry collection, written in German in the 1840s and completed in 1847. Comprising a total of 2,003 items, it begins with a group of gems and ends with a list of rare books. Besides arranging the objects by category, the manuscript gives a description of each, including its technique, measurements, condition, provenance, and estimated value. The Metropolitan's two zodiac relief fragments are presented among the Greek and Roman bronzes as dating from the Imperial age. In addition to the usual information, the text notes that the fragments may have belonged to a larger, cylindrical work, possibly a sacrificial altar or basin.[17]

The author of the catalogue text enumerates several zodiac representations known to him, besides those on Roman coins, including among these two fragments in the Villa Albani. One is possibly a marble Atlas from the second century A.D., on which Atlas's body and the statue of Jupiter are modern additions.[18] The celestial globe supported by Atlas is symbolized by a marble hemisphere that measures one meter in diameter and is edged by reliefs with zodiacal representations. The other Villa Albani fragment is probably a marble frieze from the early Imperial age, measuring 79 centimeters in width and 17.5 centimeters in height and bearing reliefs of seven signs of the zodiac.[19] The author further cites the renowned marble sacrificial altar in the Louvre, dating from about A.D. 130 and measuring 80 centimeters in diameter, the edge of which is decorated with reliefs of the zodiacal signs separated by attributes of the deities (Figure 4).[20]

The manuscript catalogue then refers to a planisphere (a two-dimensional star chart) in Paris that depicts the signs of the zodiac along with the decans. This must be the so-called Tabula Bianchini in the Louvre, a fragmented marble plate from the second or third century A.D. that was found in 1705 on the Aventine Hill in Rome.[21] Finally, the text alludes to a Neapolitan work, presumably the Farnese Atlas, preserved in the Museo Archeologico Nazionale, Naples (Figure 5). Its celestial globe, the earliest extant representation of the type, measures 65 centimeters in

Figure 4. The Gabii Altar. Roman, ca. A.D. 130. Marble, Diam. 80 cm. Musée du Louvre, Paris, MA 666 (photo: the author)

Figure 5. The Farnese Atlas. Roman, 2nd century A.D. Marble, H. 204 cm. Museo Archeologico Nazionale, Naples, 6374

diameter and is covered with reliefs of the constellations, including the signs of the zodiac. It is a Hadrianic copy of a statue from the first century B.C., with the head and other details modern additions.[22]

After the enumeration of these zodiacs, the author of the catalogue takes note of the small holes in the two bronze reliefs, which served to affix them with pegs to a larger object.[23] He further observes that since the arrowhead on the *Sagittarius* continues onto the *Capricorn* fragment, the two pieces must originally have been continuous and later been sawn apart. (Although the arrowhead is not visible in the *Liber Antiquitatis*'s watercolor, it is apparent on the work itself.)

The next sources to mention the reliefs are the three printed lists of the collection. The first, a catalogue of the 1853 London exhibition written by Imre Henszlmann (1813–1888), includes the pieces among the Roman works as fragments of a large bronze vase and emphasizes their superior quality.[24] Next is an enumeration of the works in Pulszky's collection exhibited at the Hungarian Academy of Sciences in 1868, which describes the reliefs as fragments of a Roman ornamental basin.[25] The last, the catalogue written by Pulszky of the Paris sale of May 1868, again presents the two reliefs among the Greek and Roman bronzes, identifying them as fragments of a large vase. They brought 400 francs.[26]

After the sale in Paris, the reliefs disappeared. On the occasion of the 1997 Pulszky memorial exhibition, János György Szilágyi was the first to recognize that, judging from the watercolors of the two zodiac fragments in the *Liber Antiquitatis* the objects were most probably not antique but were made at a later date.[27] This statement was justified by the originals, which I initially saw in 2003 in a case at the gallery of Italian Renaissance Bronzes in the Metropolitan Museum.

Of the original functions posited in the sources—sacrificial altar, ornamental basin, bronze vase—the altar can be ruled out as lacking a relevant context in the sixteenth century, but the other two are plausible. Supporting the second hypothesis are antique sandstone fragments with the signs of the zodiac that once decorated the outer edge of a basin measuring more than a meter in diameter (Saalburg-Museum, Bad Homburg, Germany).[28] The master of the ex-Fejérváry reliefs may have been inspired by such a prototype.

The reliefs might also have belonged to a celestial, or astral, globe. These representations of the constellations (groups of stars forming human, animal, or mythological figures with shapes and names borrowed mainly from classical mythology), with the signs of the zodiac among them, have been known since antiquity. It was probably Eudoxus of Cnidus, a Greek astronomer of the fourth century B.C., who first mentioned

them.[29] In the second century A.D., Ptolemy described the appearance and use of such objects and gave instructions for producing them in his astronomical treatise *Mathematike syntaxis*, also known as the *Almagest* from the title of its Arabic translation.[30] The globes were produced either for scientific purposes, to facilitate astronomical calculations and navigation, or as parts of larger works having a symbolic meaning, in which they were meant to represent the world.

The earliest celestial globe to survive from antiquity, showing most of the forty-eight constellations identified by Ptolemy, is that borne by the Farnese Atlas. After this marble statue was found in Rome in 1575, it entered the collection of Cardinal Alessandro Farnese (1520–1589). Its forty-three constellations, outlined in relief without indication of individual stars, include the twelve signs of the zodiac, which always appear on celestial globes based on the Ptolemaic tradition. Another globe from the same period as the Farnese Atlas, the so-called Mainz Globe, is made of brass and includes forty-eight constellations, the majority of which correspond to those described in the *Almagest*. It measures 11 centimeters in diameter.[31] In the early Middle Ages, Arabic scholars produced celestial globes following the Greek tradition, which was derived mainly from Ptolemy's writings. Their globes, approximately 130 of which survive, were used throughout the Middle Ages as models for the production of similar instruments.[32]

The first celestial globes were either painted or engraved on spheres and thus existed only as single examples, but the rapidly increasing demand for such objects led in the early sixteenth century to the invention of printed globes. The new technique, which continued to be employed through the mid-nineteenth century, made possible the serial production and wide distribution of identical globes, which were used for teaching and studying astronomy.[33] The celestial map with the constellations was printed on twelve or more paper segments (gores) that were pasted on a sphere. The globe was then placed on a stand within a frame, in which the globe could turn around its axis. One of the oldest surviving printed celestial globes was made by Johannes Schöner in Nuremberg about 1533–34

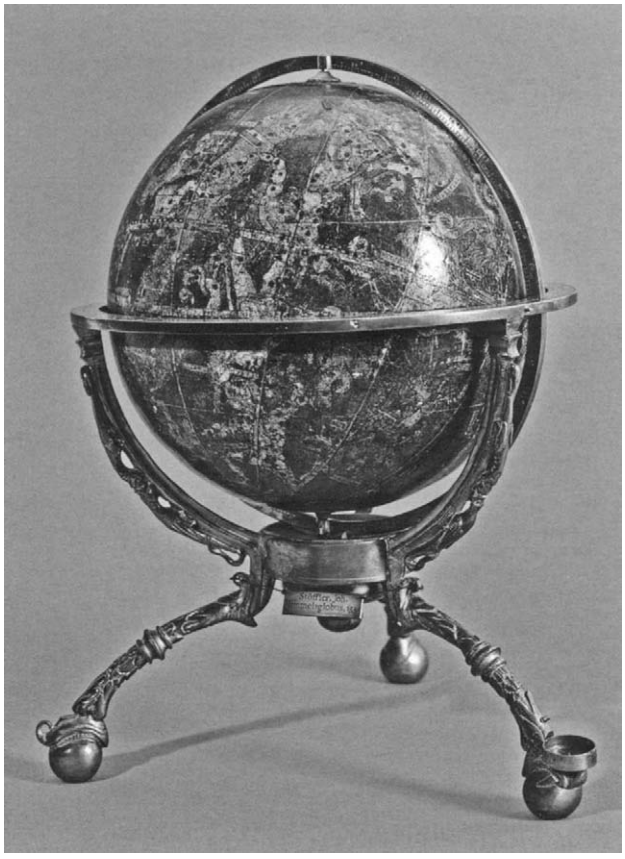

Figure 6. Johannes Schöner (German, 1477–1547). Celestial globe, 1533–34. Papier-mâché, woodcut, and brass, H. 44 cm, Diam. 27 cm. Klassik Stiftung Weimar, Herzogin Anna Amalia Bibliothek

Figure 7. Celestial globe with clockwork. Austrian or Bohemian, 1579. Silver, partly gilded, and brass, 27.3 x 20.3 x 19 cm. The Metropolitan Museum of Art, Gift of J. Pierpont Morgan, 1917 (17.190.636)

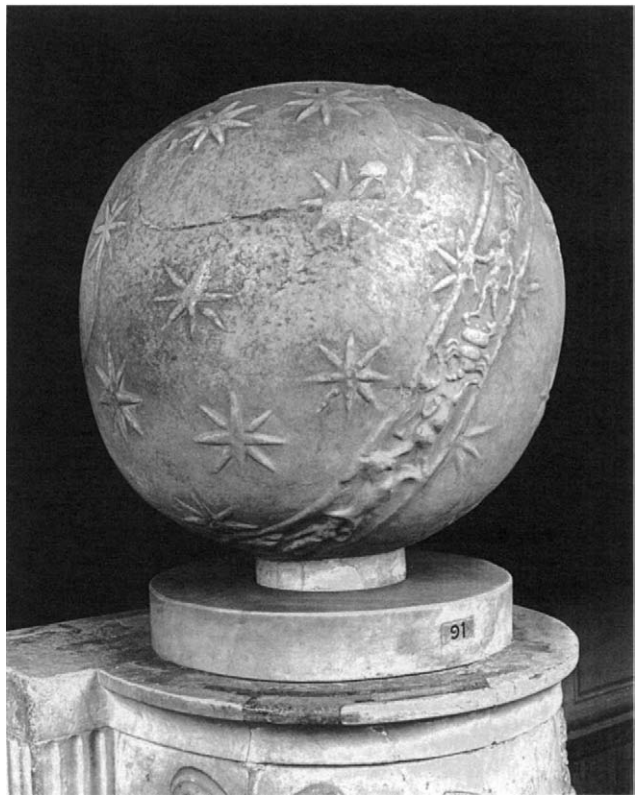

Figure 8. Zodiac globe. Roman, 2nd century A.D. Marble, Diam. 60 cm. Sala dei Busti, Vatican Museums, Rome, 784

Figure 9. Zodiac globe. Roman, 1st or 2nd century A.D. Marble, Diam. 16 cm. Landesmuseum Württemberg, Stuttgart, 1.83

Figure 10. Herman Posthumus (Netherlandish or German, active by 1536–died after 1542). *Fantastic Landscape with Roman Ruins* (detail), 1536. Oil on canvas, 96 x 141.5 cm. Sammlungen des Fürsten von und zu Liechtenstein, Vaduz–Vienna, 740

(Figure 6).[34] Despite the predominance of the printed versions, unique celestial globes were continuously produced and became celebrated art objects, often made by goldsmiths for collectors. The silver Pegasus celestial globe from 1579 in the Metropolitan Museum, with constellations engraved on the surface of the sphere, is attached to a clockwork and was created by an anonymous goldsmith who was probably employed at the imperial court in Vienna or Prague (Figure 7).[35]

If the *Sagittarius* and *Capricorn* reliefs belonged to a globe, it might have been of the special kind known as a zodiac globe. This type shows only a band with the zodiacal signs encircling the sphere and omits the other constellations. Usually constituting part of a larger work of art, it always symbolizes the heavens or the world. Of the extant antique works, the largest is a marble globe in the Sala dei Busti in the Vatican, dating from the second century A.D., on which the signs of the zodiac emerge from the surface as reliefs (Figure 8).[36] The signs are also represented as reliefs on another, much smaller marble zodiac globe from the Imperial age. This globe, which was in the Waldeck Collection, Arolsen, until 1928 and is today in the Landesmuseum Württemberg, Stuttgart, deserves attention because both its shape and its positioning of Sagittarius and Capricorn echo those of the Metropolitan Museum's reliefs (Figure 9).[37] These two globes elucidate why Böhm, Fejérváry, Henszlmann, and Pulszky regarded

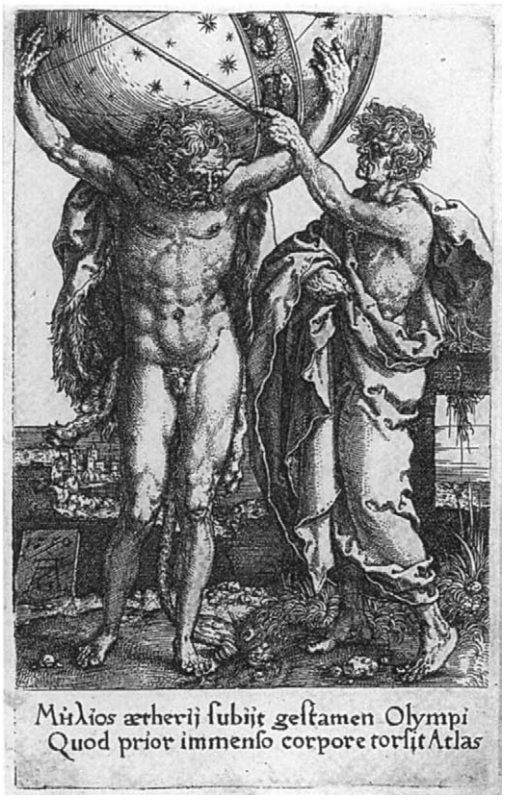

Figure 11. Heinrich Aldegrever (German, 1502–1555/61). *Hercules and Atlas with the Globe*, 1550. Engraving, 10.7 x 6.7 cm. Museum of Fine Arts, Budapest, 41948

Figure 12. Denys Fontenoy, after Giovanni Andrea Vavassore (Italian, active early 16th century). *Hercules and Atlas with the Globe*, ca. 1580. Woodcut. Bibliothèque Nationale de France, Paris, Ed 25a, réserve (photo: after Wolfger A. Bulst, "Der 'Italienische Saal' der Landshuter Stadtresidenz und sein Darstellungsprogramm," *Münchner Jahrbuch der Bildenden Kunst*, ser. 3, 26 [1975], p. 138, fig. 19)

the reliefs as Roman, for the antique iconographical types of the zodiacal signs appear on them all. Since antiquity, Sagittarius has been depicted as a centaur shooting his arrow, while Capricorn has generally been symbolized by a goat with a fishtail, both shapes having originated in Babylonian astrology.[38]

In his monograph on antique representations of the signs of the zodiac, Hans Georg Gundel also mentions sixteenth-century illustrations that demonstrate the survival of this type of celestial globe. Among them is a landscape of 1536 by Herman Posthumus (active by 1536–died after 1542) depicting Roman ruins that includes in the middle distance a marble statue of Atlas and Hercules bearing the celestial globe (Figure 10).[39] The statue refers to the Greek myth in which Hercules asks Atlas's help in obtaining the golden apples of the Hesperides, in the meantime taking over from him the task of supporting the heavens (actually a zodiac globe in the painting). Gundel regards the globe in Posthumus's painting as an ideal composition based on antique prototypes. It may have been modeled on an original, still extant in the sixteenth century but subsequently lost, or less probably, it may be a free interpretation of the above-mentioned Vatican, Stuttgart, or another globe. An engraving of 1550 by Heinrich Aldegrever (1502–1555/61) also depicts the scene of Atlas and Hercules, with the celestial globe again represented as a zodiac globe (Figure 11). A possible source for the artist is a Venetian woodcut of about 1506 attributed to Giovanni Andrea Vavassore (active early sixteenth century), of which a later copy is illustrated here (Figure 12).[40]

The specific function of the Fejérváry-Pulszky reliefs may perhaps be clarified by a bronze sculpture in the Liechtenstein Museum, Vienna, representing Hercules carrying a zodiac globe (Figure 13). Another cast of the same work, with a modified placement of the separately cast globe and, surprisingly, with a different order of the zodiacal signs, is in the Robert H. Smith Collection (Figure 14).[41] The statue, made about the mid-seventeenth century by Ferdinando Tacca (1619–1686), was modeled on a work by his father, Pietro Tacca (1577–1640), which in turn is

Figure 13. Ferdinando Tacca (Italian, 1619–1686), after a model by Pietro Tacca (Italian, 1577–1640). *Hercules Supporting the Heavens*, ca. 1650. Bronze, H. 89 cm. Sammlungen des Fürsten von und zu Liechtenstein, Vaduz–Vienna, SK946

Figure 14. Ferdinando Tacca, after a model by Pietro Tacca. *Hercules Supporting the Heavens*, ca. 1650. Bronze, H. 89 cm. Robert H. Smith Collection

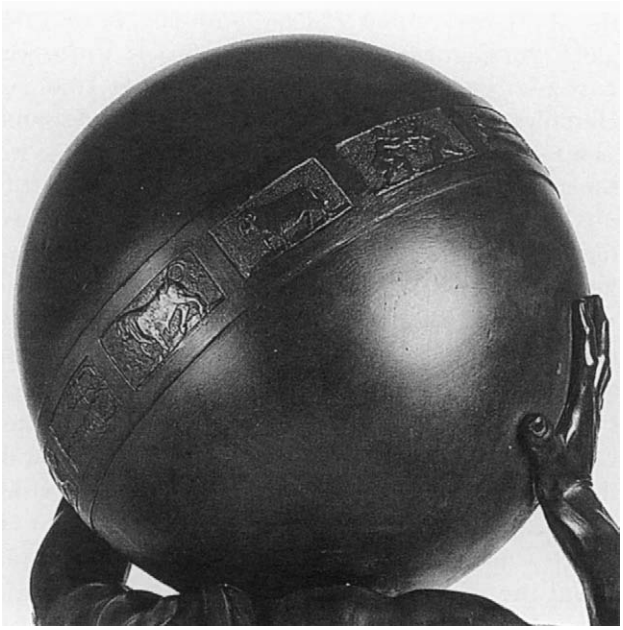

Figure 15. Detail of zodiac globe in Figure 14

Figure 16. Detail of zodiac globe in Figure 13

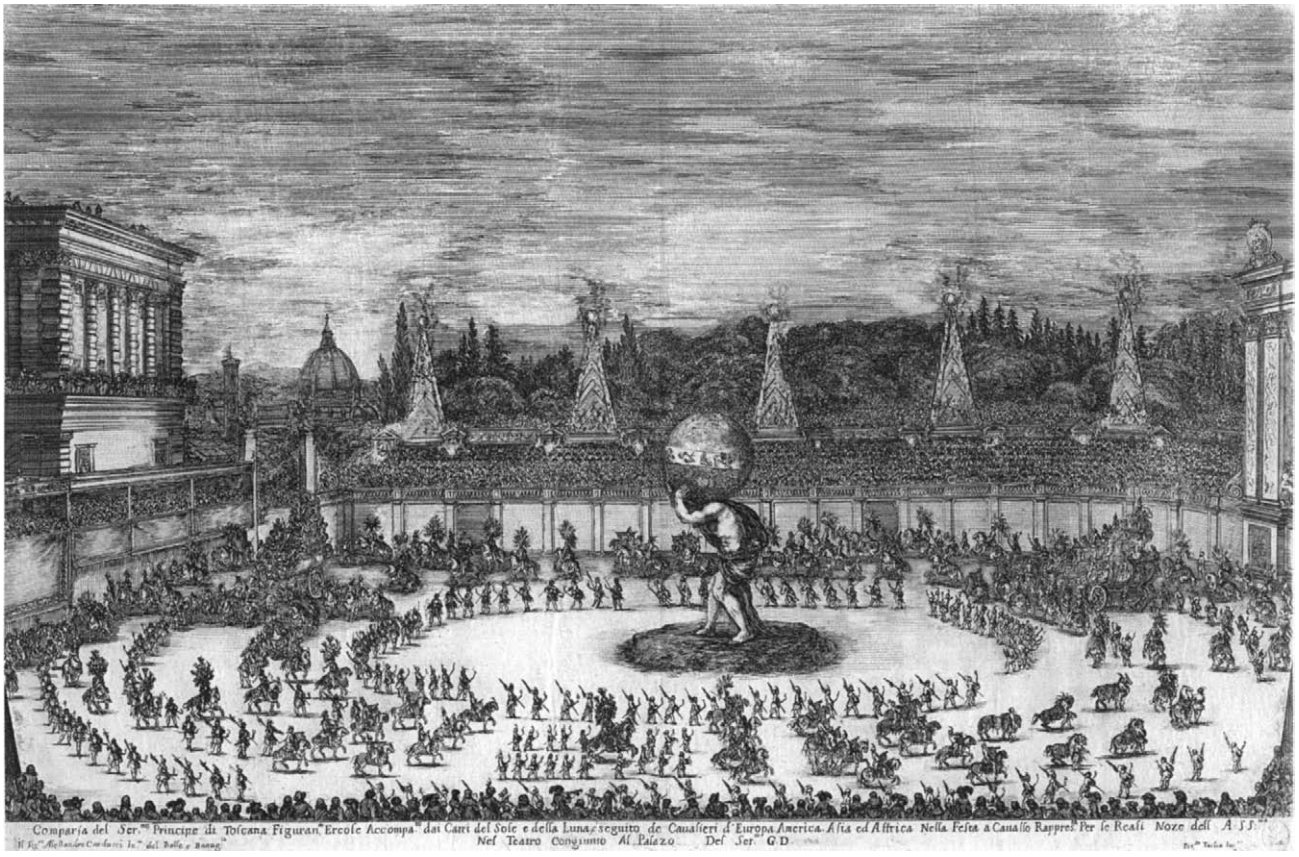

Figure 17. Stefano della Bella (Italian, 1610–1664). Illustration from *Il mondo festeggiante*, 1661. Etching, 28.9 x 44.1 cm. Museum of Fine Arts, Budapest, 19536

based on one in the Twelve Labors of Hercules series by Giambologna (1529–1608).[42] In both versions of Ferdinando Tacca's sculpture the signs of the zodiac stand out in relief from the surface of the globe. As for the sequence of the signs, not only is it different in each version, but, even more interestingly, neither conforms to the usual order (Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricorn, Aquarius, Pisces). On the Smith Collection globe, only one sign, Gemini, is out of place, being positioned between Pisces and Aries (Figure 15). The globe held by the Liechtenstein Hercules presents a more confused order: it represents Aries, Taurus, Cancer, Scorpio, and Leo on one side, Virgo, Libra, Pisces, Sagittarius, Capricorn, and Aquarius on the other (Figure 16).[43] Even the orientation of the sequences is dissimilar on the two: on the Smith globe the signs proceed from right to left, on the one in Vienna, from left to right. The individual signs are sometimes identically shaped on the two; sometimes, as in the case of Scorpio, they differ. The reason for these alterations is not clear, but it can be inferred that the different compositions of the globes were intended to convey inflections of meaning.

Throughout the sixteenth and seventeenth centuries, then, different sculptural versions existed of the mythological theme of the Golden Apples of the Hesperides, with Hercules holding a zodiac globe. It is not beyond the realm of possibility that the *Sagittarius* and *Capricorn* reliefs belonged to such a bronze statue, which would perforce have been larger than any of the previously mentioned works. An even larger, colossal Atlas statue supporting a zodiac globe appears in the first of three etchings by Stefano della Bella (1610–1664) illustrating Giovanni Andrea Moniglia's text *Il mondo festeggiante* (Florence, 1661; Figure 17).[44] This series depicted the festive procession in the Boboli Gardens organized in July 1661 on the occasion of the wedding of Grand Duke Cosimo III de' Medici to Marguerite Louise d'Orléans. The statue of Atlas, which stood in the middle of the square, was constructed by none other than Ferdinando Tacca, who, according to Moniglia and the inscriptions on the etchings, was the engineer of the entire extravagant theatrical program.[45] With the help of machinery, the statue transformed before the spectators' very eyes into a mountain symbolizing Mount Atlas.

On the basis of the examples discussed here, one possible interpretation of the *Sagittarius* and *Capricorn* reliefs—and perhaps the most attractive—is that they decorated a zodiac globe supported by either Hercules or Atlas or by both mythological heroes.

ACKNOWLEDGMENTS

I am grateful to James David Draper for his encouragement, numerous suggestions, and critical reading of my text. I would also like to thank Joan R. Mertens, Margaret Donovan, and Margaret Rennolds Chace for their invaluable assistance, Zsuzsa Dobos for her translation of the text, and Nicholas Penny, Michael Schweller, Zsuzsanna Gila, and Zsuzsa Gonda for their help in acquiring photographs.

NOTES

1. James David Draper, "*Capricorn* and *Sagittarius*," *Metropolitan Museum of Art Bulletin* 63, no. 2 (fall 2005), p. 17.
2. I would like to express my thanks to Richard E. Stone, senior Museum conservator, The Sherman Fairchild Center for Objects Conservation, The Metropolitan Museum of Art, for valuable information concerning his examination of the objects.
3. Draper, "*Capricorn* and *Sagittarius*," p. 17.
4. At the time of their reappearance, it was not known that the reliefs had belonged to the Fejérváry-Pulszky collection. They were purchased by the Metropolitan Museum from the New York art dealer Michael Hall.
5. The overall project, supported by the Getty Grant Program, was organized and led by Ernő Marosi and Gábor Klaniczay at the Collegium Budapest research institute. See *The Nineteenth-Century Process of "Musealisation" in Hungary and Europe*, ed. Ernő Marosi and Gábor Klaniczay (Budapest, 2006). Research on the Fejérváry-Pulszky collection was conducted under the direction of János György Szilágyi, former head of the Department of Classical Antiquities, Museum of Fine Arts, Budapest.
6. *Antiquitas Hungarica: Tanulmányok a Fejérváry-Pulszky-gyűjtemény és a Liber Antiquitatis történetéről* [Studies in the History of the Fejérváry-Pulszky Collection and the *Liber Antiquitatis*], ed. Edit Szentesi and János György Szilágyi (Budapest, 2005). Although its title is the same as that of a periodical published in Hungary from 1947 to 1949, the volume is not a continuation of that series.
7. Szilvia Bodnár, "Antikizáló reneszánsz kisbronzok" [Renaissance small bronzes that appear antique], in *Antiquitas Hungarica*, pp. 223–40.
8. Francis and Theresa Pulszky, *White, Red, Black: Sketches of Society in the United States during the Visit of Their Guest [Lajos Kossuth]* (London, 1853).
9. For more information on changes to the collection, see János György Szilágyi in *Pulszky Ferenc (1814–1897) emlékére* [Ferenc Pulszky (1814–1897) memorial exhibition], ed. Ernő Marosi et al., exh. cat., with English trans., Hungarian Academy of Sciences, Budapest (Budapest, 1997), p. 138.
10. See note 26 below.
11. For another study of the history of the Fejérváry-Pulszky collection, see János György Szilágyi, "Materiale etrusco e magnogreco in una collezione ungherese dell'Ottocento: La collezione Fejérváry–Pulszky," *Scienze dell'antichità, storia archeologia antropologia* 5 (1991), pp. 483–572.
12. The looseleaf album is today at the Museum of Fine Arts, Budapest. See Edit Szentesi and János György Szilágyi, "A Fejérváry-Pulszky-gyűjtemény vizuális forrásai" [The Visual Sources of the Fejérváry-Pulszky Collection], in *Antiquitas Hungarica*, pp. 11–46.
13. István Pankaszi, "A Liber Antiquitatis papíranyagának vizsgálata" [The examination of the paper material of the *Liber Antiquitatis*] in *Antiquitas Hungarica*, pp. 67–74.
14. In the 1930s István Genthon (1903–1969), later director of the Museum of Fine Arts, studied the album and ordered photographs of several pages. A comparison of the ninety-two surviving photographs with the extant watercolors reveals that at least forty sheets, with images of nearly ninety objects, have been lost because of careless handling while the album was kept at the Hungarian National Museum. The surviving photographs are in the Department of Greek and Roman Antiquities at the Museum of Fine Arts, Budapest, and will be available on the museum's website in the near future. Certain changes in the sequence of the watercolors can be determined from traces of glue on the album pages indicating that larger or smaller sheets of paper were originally glued to those pages. In addition, Genthon notated some pages in pencil, stating the whereabouts of the objects represented by the inserted watercolors, and these notes no longer correspond to the objects depicted therein today. For further details on the fate of the *Liber Antiquitatis*, see János György Szilágyi, "Art Objects on Drawings," in *Pulszky Ferenc*, pp. 181–82, and note 11 above.
15. All the surviving watercolors of the *Liber Antiquitatis* can be studied at *http://www2.szepmuveszeti.hu/AH/LibAnt.pdf*.
16. Fejérváry's handwritten account book is in the Manuscript Archives of the National Széchényi Library, Fol. Germ. 1272, fol. 26. I thank Edit Szentesi for this reference. On Böhm (1794–1865), see Edit Szentesi, "Joseph Daniel Böhm Parthenón-fríze," in *Pulszky Ferenc*, pp. 56–64, with a summary in English: "Joseph Daniel Böhm's Parthenon Frieze," pp. 163–64.
17. The handwritten list of Fejérváry's collection (Manuscript Archives of the National Széchényi Library, Fol. Germ. 1273, nos. 542 and 543, Griechische und Römische Bronzen, Thiere [Greek and Roman Bronzes, Animals], 33) states: "Sagittarius aus dem Zodiacus als Centaur die rechte Hand am obern Arm abgebrochen en haut relief." Thiere, 34: "Capricornus ebenfalls aus dem Zodiacus in einen fischschwanz endigend en haut relief. Beide zeichen des Thierkreises gehörten zu einem größere Monumente cylindrischer gestalt, vielleicht einem Opferaltar oder Beken ähnlich dem borgesischen im Louvre die Arbeit ist kräftig, aus der kaiser epoche. Merkwürdig und einzig in seiner Art, daß der schütz nur mit dem Pfeile bewafnet erscheint, ohne Bogen – , die Thierkreise sind bekantlich selten, mit ausnahme der Münzen kenne ich bloß zwei fragmente in der Villa Albani, den berühmten Altar in Paris, des Planispher mit den Decanen eben daselbst, und eine in Neapel. Einige runde Löcher waren bestim(m)t für Zapfen, mit denen diese bronce bekleidung an den Monument, zu dem sie gehörten festgemacht waren, zwei dieses zapfen sind noch erhalten, samt der Bekleidung – die zwei stüke gehörten zusam(m)en, wie die

spizze des Pfeiles des Schüzen beweißt, die neben dem Steinbok wieder sichtbar ist; – diese vorstellungen sind auseinander gesägt, und passen jetzt nicht mehr zusammen." The estimated value of the two pieces together was 200 Viennese florins. According to Edit Szentesi, who transcribed the manuscript, the text is a copy by an unidentified hand drawn apparently from several sources: some statements seem to reflect the words of Fejérváry, others are taken from Pulszky's earlier descriptions of the collection's objects. The complete manuscript is available at: *http://www2.szepmuveszeti.hu/antiquitas/index.php.*

18. *Forschungen zur Villa Albani: Katalog der antiken Bildwerke*, ed. Peter C. Bol, vol. 4 (Berlin, 1994), pp. 372–84, no. 510, pls. 212–14.
19. Ibid., vol. 5 (Berlin, 1998), p. 255, no. 738, pl. 100.
20. H. G. Gundel, *Zodiakos: Tierkreisbilder im Altertum: Kosmische Bezüge und Jenseitsvorstellungen im antiken Alltagsleben* (Mainz, 1992), p. 213, no. 27.
21. The Tabula Bianchini shows five concentric circles, in two of which the zodiac sequence is represented. In ancient Egypt each zodiacal section was subdivided into periods of approximately ten days. These divisions are known as the decans, and there were three decans allotted to each sign of the zodiac. Of the thirty-six decans, only the figures of eight have survived on the fragments of the Tabula Bianchini. See ibid. pp. 110–11, fig. 51, p. 226, no. 63.
22. Ibid., p. 204, no. 8.
23. In the course of technical examination, Richard Stone observed that the holes are not original—they were drilled into the metal after the surface had been punched—and they do not have the original black patina. He stated that there is no sign of the reliefs ever having been mounted and that misdirection may have been responsible for the drilling of the holes. See note 2 above.
24. Imre Henszlmann, *Catalogue of the Collection of the Monuments of Art Formed by the Late Gabriel Fejérváry of Hungary*, exh. cat., Archaeological Institute, London (London, 1853), p. 36, no. 580, unillustrated.
25. *Pulszky Ferenc műgyűjteményeinek jegyzéke* [Pulszky's description of the collection, unillustrated], exh. cat., Hungarian Academy of Sciences, Pest (Pest, 1868), p. 18.
26. *Catalogue des antiquités grecques, romaines, du Moyen Age et de la Renaissance composant la collection de MM. de Fegervary–de Pulsky, dont la vente aura lieu Hôtel Drouot, Salle No 1.* May 18–23, 1868 (Paris, 1868), p. 12, nos. 181 and 182, unillustrated.
27. Personal communication.
28. Elmar Schwertheim, *Die Denkmäler orientalischer Gottheiten im römischen Deutschland.* Études préliminaires aux religions orientales dans l'Empire romain, 40 (Leiden, 1974), p. 143, no. 116 ag.
29. Ernst Künzl, *Himmelsgloben und Sternkarten: Astronomie und Astrologie in Vorzeit und Altertum* (Stuttgart, 2005), p. 57. Joan Mertens kindly brought this book to my attention.
30. *Ptolemy's Almagest*, trans. G. J. Toomer (London, 1984).
31. Künzl, *Himmelsgloben*, pp. 57–61, figs. 5.10, 6.1, and 6.2.
32. For the oldest known Islamic celestial globe, made in Valencia in the eleventh century (Istituto e museo di storia della scienza, Florence), see Elly Dekker and Peter van der Krogt, *Globes from the Western World* (London, 1993), p. 25, pl. 1. This book presents a good summary of the history of celestial globes, for which see also Edward Luther Stevenson, *Terrestrial and Celestial Globes: Their History and Construction Including a Consideration of Their Value as Aids in the Study of Geography and Astronomy* (New Haven, 1921); Oswald Muris and Gert Saarmann, *Der Globus im Wandel der Zeiten: Eine geschichte der Globen* (Berlin 1961); Jacob Hess, "On Some Celestial Maps and Globes of the 16th Century," *Journal of the Warburg and Courtauld Institutes* 30 (1967), pp. 406–9; Elly Dekker, "Der Himmelsglobus: Eine Welt für sich," in *Focus Behaim Globus*, exh. cat., Germanisches Nationalmuseum, Nuremberg (Nuremberg, 1992) vol. 1, pp. 89–100; Edward H. Dahl and Jean-Francois Gauvin, *Sphaere Mundi: Early Globes at the Stewart Museum* (Quebec, 2000); Elly Dekker, *Catalogue of Orbs, Spheres and Globes, Istituto e Museo di Storia della Scienza, Florence* (Florence, 2002).
33. Dahl and Gauvin, *Sphaere Mundi*, pp. 18–23.
34. See *Quasi centrum Europae: Europa kauft in Nürnberg, 1400–1800*, ed. Herman Maué et al., exh. cat., Germanisches Nationalmuseum, Nuremberg (Nuremberg, 2002), p. 478, no. 135, fig. p. 369. Schöner's globe is similar to that shown in Hans Holbein's painting *The Ambassadors* (1533; National Gallery, London). See Elly Dekker and Kristen Lippincott, "Scientific Instruments in Holbein's Ambassadors: A Re-examination," *Journal of the Warburg and Courtauld Institutes* 62 (1999), pp. 93–125.
35. See entry by Clare Vincent in *The Metropolitan Museum of Art: Renaissance in the North* (New York, 1987), p. 130, no. 95.
36. Walther Amelung, *Die Skulpturen des Vatikanischen Museums* (Berlin, 1908). vol. 2, pp. 529–31, no. 341, pl. 66; Künzl, *Himmelsgloben*, pp. 83–84, fig. 7.8 (image reversed).
37. See Künzl, *Himmelsgloben*, pp. 83–84, fig. 7.7.
38. Ibid., pp. 75–76, fig. 6.15.
39. See entry by Guy C. Bauman in *Liechtenstein, the Princely Collections*, exh. cat., MMA, (New York, 1985), no. 158; see also Gundel, *Zodiakos*, p. 330, no. 470,1.
40. See Otmar Plassmann, *Die Zeichnungen Heinrich Aldegrevers* (Marburg, 1994), pp. 91–92, figs. 74, 75; Wolfger A. Bulst, "Der 'Italienische Saal' der Landshuter Stadtresidenz und sein Darstellungsprogramm," *Münchner Jahrbuch der Bildenden Kunst*, ser. 3, 26 (1975), p. 138, fig. 19. Plassmann and Bulst attribute the woodcut *Hercules and Atlas with the Globe* to an anonymus Venetian artist of about 1500, but it is correctly identified as Fontenoy's copy of a work by Vavassore, published about 1580, in Mark P. McDonald, *The Print Collection of Ferdinand Columbus* (1488–1539) (London, 2004), vol. 1, p. 476, fig. 404, vol. 2, p. 503.
41. For Ferdinando Tacca's bronze sculpture *Hercules Supporting the Heavens* in the Smith Collection, see Anthony Radcliffe and Nicholas Penny, *Art of the Renaissance Bronze, 1500–1650: The Robert H. Smith Collection* (London, 2004), pp. 254–59, no. 45. The version of the sculpture in the Liechtenstein Museum (Figure 13) was kindly brought to my attention by Miriam Szőcs after it appeared on the museum's website as a new acquisition in 2005.
42. For Giambologna's statue of Hercules, see Wilhelm von Bode, *Die italienischen Bronzestatuetten der Renaissance*, vol. 3 (Berlin, 1912), pl. 197; Anthony Radcliffe, "Giambologna's Twelve Labours of Hercules," *Connoisseur* 199 (1978), pp. 12–19.
43. The missing Gemini may be on the top between Leo and Virgo, but it cannot be seen either in the museum, where the sculpture is placed too high to tell, or in the available photographs.
44. See Dorit Schäfer et al., *Stefano della Bella: Ein Meister der Barockradierung*, exh. cat., Staatliche Kunsthalle Karlsruhe (Karlsruhe, 2005), pp. 231–34, fig. 65a.
45. Luigi Zangheri, "Il maxiautoma dell'atlante e Ferdinando Tacca," *Psicon: Rivista internazionale di architettura* 3 (1976), pp. 116–23.