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The celestial Weigel Globe in the Stibbert Museum: restoration and valorisation

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Abstract: Erhard Weigel (1625-1699) was professor of mathematics at the University of Jena from 1653 until his death. As a convinced and passionate educator, he conceived several instruments for the popularization of astronomy including celestial globes, produced in several copies. These copper globes presented some innovative features such as a new series of figures, used to represent the constellations: instead of traditional ones, Weigel used heraldic figures, symbols of corporations, cities and European countries. Today of the eighteen globes still existing, one is preserved at the Stibbert Museum in Florence, purchased in the late nineteenth century by Frederick Stibbert (1838-1906) important collector of antiques, artworks and arms and armor from various eras and origins. Preserved probably without comprehend its meaning, the globe shows signs of many improper repairs and was mounted in a way that did not allow it to be properly understood. Thanks to a funding from association YOCOCU (Youth in Conservation of Cultural Heritage) a conservation treatment was undertaken. The presentation will outline crucial aspects of the restoration and strategies now possible for more effective enhancement.

Keywords: Celestial Globe, Erhard Weigel, Restoration Treatment

1. Introduction

When in 1888 Frederick Stibbert (1838-1906) (Fig. 1) made one of his many purchases in London to increase his collection of precious artefacts, it is possible that neither he nor the seller, was fully aware of the object that was changing hands. Today we can say that it was the Celestial Globe designed by Erhard Weigel (1625-1699), which has come down to us and is now preserved in the rooms of the Stibbert Museum[1] . The Globe, dated 1699, is composed by an embossed copper sphere with brass armillae and was nevertheless appreciated as a metal artefact and an example of applied arts, in line with Stibbert's interests.

The restoration project has been the occasion to increase the knowledge about the object, its materials, its history and the author. The various phases of the restoration treatment were very complex, due to the state of conservation of the constitutive materials and the need to understand the system of armillae around the sphere, which was seriously damaged and no more functioning.

The return of the globe to the Museum's rooms will be one more opportunity to appreciate the legacy of the cultured, eclectic and wealthy Anglo-Florentine Frederick Stibbert.

[1] The Stibbert Museum houses the collection of works collected and arranged by Stibbert in the rooms of his house-museum. Famous above all for its armoury, the museum also includes rich collections belonging to different fields with a large picture gallery and handicrafts (Museo Stibbert, 2011; Di Marco, 2008).

(a) (b)

Fig. 1: (a) Frederick Stibbert (the gentleman with the top hat on the steps on the right of the picture) at the Florence hippodrome. (Courtesy of Fondazione Alinari per la Fotografia) (b) Letterhead of one of Willson's bills to Stibbert (Stibbert Archive).

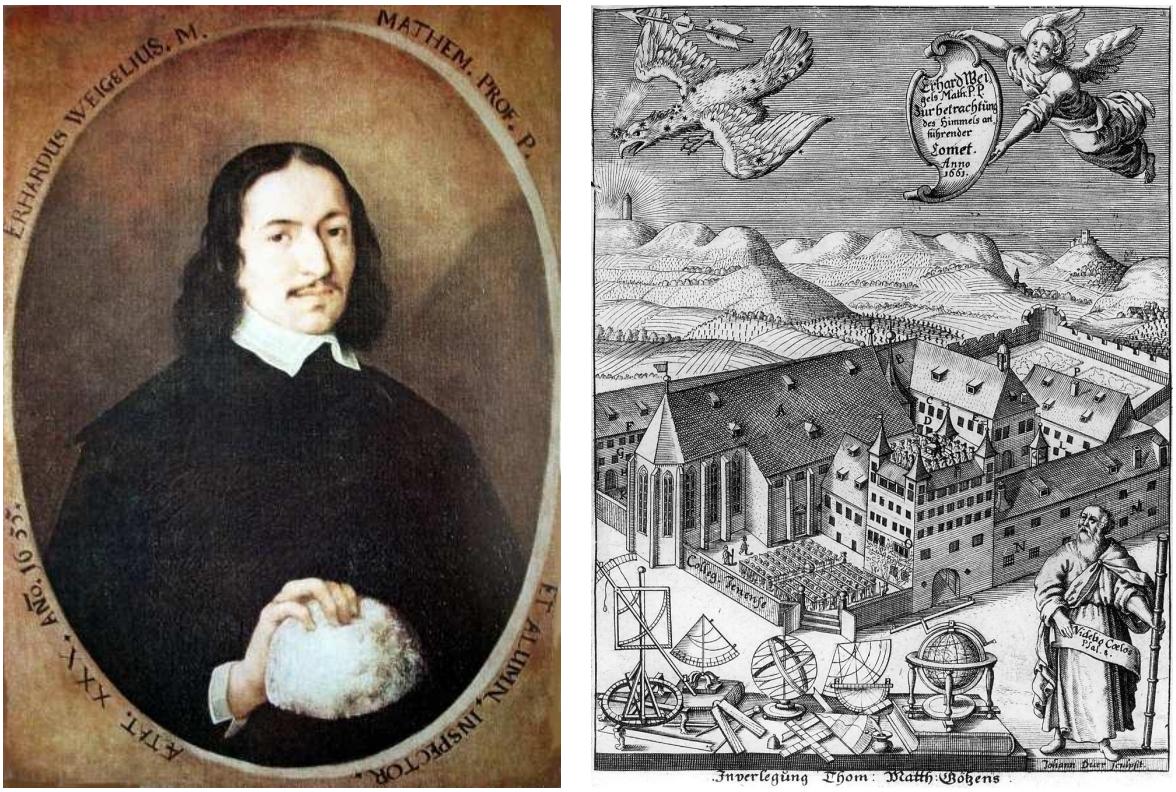
2. Erhard Weigel (1625 – 1699)

Weigel (Fig. 2a) was a German astronomer, mathematician and philosopher who, after a brilliant career as a student in Halle and Leipzig, joined the University of Jena as a lecturer in mathematics, where he became also rector. Passionate educator, he shared his teachings on astronomy not only with his students but also with the general public. He was a religious man convinced that the glory of God is reflected in the heavens and is therefore also served through knowledge and appreciation of the cosmos.

In the 17th century, astronomy in Jena was built on an important tradition of studies and observations of the heavens, and in 1596 a small observatory had been established there by Georg Limnaeus (1554-1611). Although astronomy did not exist as a teaching subject, many of the University's mathematics lecturers included it among their subjects, in a well-developed scientific environment that welcomed Weigel in 1652 when he took up his residence there (Schielicke, 2008, pp. 13-27). The scholar had important teachers and opportunities during his education that allowed him to come into contact with astronomical instrumentation and to conduct measurements and observations.

Although no longer flourishing as in the past, Jena had a commercial vitality, with the presence of many workshops of craftsmen, engravers and printers. These opportunities must have played a certain role coupled with the ingenuity of Weigel, who was prodigal with inventions and capable of even daring ventures. His house, for example, had become an attraction because it housed a number of innovations that he had conceived and that were realised by artisans with whom he collaborated. The availability of skilled craftsmen must have even allowed him to set up a workshop dedicated to the construction of scientific instruments. The existence of this workshop is reported in some deeds and texts testifying the presence of premises dedicated to it within the Collegium Jenense, site of the city's University (Herbst, 2004). The activity of a collaborative enterprise linked to Weigel's reputation could also justify the recurrence of the year 1699, the year of Weigel's death, mentioned in the cartouches on all dated globes known today (Hamel, 2016). The manufacture of the celestial globe itself, to which we will return later, could testify a production that, if it is daring to call it "serial", was organised on common and repeated basic elements. Weigel also devoted his efforts to the construction of large globes, large enough to accommodate several people inside, forerunners of modern planetariums and equipped with devices to simulate movements and meteorological and seismic phenomena. Placed in the open air and in elevated positions, these devices reflected Weigel's desire to popularise astronomy, and his intentions to make the

stars and their positions known to a wide public, and let people admire the cosmos where the glory of God was reflected. The first built was on the roof of Jena Castle in 1661, but his Pancosmus, described in 1688, is certainly the most famous (Schielicke, 2008, pp. 29-52).



(a) **(b)**

Fig. 2: (a) Portrait of E. Weigel (public domain, source Wikimedia Commons) (b)The Collegium Jenense on a copperplate engraving by Johann Dürr in Weigel's publication (1661) (public domain, source Wikimedia Commons).

Erhard Weigel achieved fame and notoriety[2], a reputation that also allowed him to exert a certain influence in the process of accepting the calendar reform introduced by Pope Gregory XIII, a reform that in Protestant countries was still met with strong resistance for theological reasons.

3. Celestial globe description

The first important characteristic of the globe is the use of metal: the sphere is made of copper, while the armillae surrounding it, bearing the reproduction of the astronomical reference system, are made of brass. Weigel deliberately chose materials that he considered to be particularly durable, more than the paper widely used to produce globes at the time. He considered these to be particularly perishable and, due to the organic glues used to adhere the gores to the structure, too prone to attack by pests such as rodents (Hamel, 2010, pp. 49-50). Close examination has allowed us to hypothesise that the copper leaf was worked to form the two hemispheres on which the figures representing the constellations were embossed. Constellation designs recur in the various globes known today with similar appearance, and this could signify also a use of matrices or hallmarks. It has been observed that the position of certain figures varies for some globes. The figures chosen for the representation of the constellations were not the traditional or mythological ones but a completely new system was imagined by Weigel, based mainly

[2] In Jena there is also a society dedicated to Weigel www.erhard-weigel-gesellschaft.de (accessed November 2024).

on the heraldry of the ruling houses, with also symbols referring to cities, states and guilds. This new symbolism, which corresponds on the globe to striking polychrome figures, is the most famous feature among the innovations introduced by Weigel, and is common to all globes known today. It was in 1686 that Weigel first published this reinterpretation of the heavens, so it is believed that all globes are dated after this date. The figures that characterise the traditional constellations, sometimes present, are not in relief and are practically monochrome.

The junction point of the two hemispheres is along the ecliptic and in the Florentine globe the union is made by simple screws with which the juxtaposed flaps are fixed. The features observed suggest a later reinforcement intervention, but one that does not seem to have altered the original structure. The disassembly of the component during the conservation treatment, allowed the observation of the interior of the globe where large blackened areas and a series of small fractures in the copper were noted in correspondence with the embossing of the figures (Fig. 4a). These two features must be related to another peculiarity of Weigel's globes: the Florentine globe, like almost all known globes in general, has four holes in the southern hemisphere about two centimeters in diameter. These holes were used to look inside the globe, which appeared as a starry sky thanks to other holes: those of a much smaller diameter drilled at the brightest stars and through which external light filtered. This contrivance allowed an observation of the sky from the same point of view as on Earth, in opposition to the usual representation of the starry vault as if the observer was located outside the heavens. This use, devised by Weigel in line with his educational aims and his work as a populariser, explains the internal blackening, which could otherwise have depended on the known use of pitch during the beating and chiseling processes. Undesirable, on the other hand, must have been the fractures in the most fragile points of the embossed design, because they allowed unwanted light to filter through. If for the system of holes this use seems to us the most convincing, it cannot be ruled out that in time the opposite use was also made: by bringing a candle closer to the larger holes, the light penetrating through the smaller holes (this time from the inside outwards) brings out the stars in the eyes of the observer (Dekker, 1999).

While on globes made of glued paper gores, the design of the ecliptic, celestial equator and coluri is shown directly on the surface, in this case the references for celestial coordinates are plotted on some brass circles surrounding the sphere and connected to each other. Not all known Weigel's globes are still equipped with this system of armillae, which the Florentine globe has retained even though it is partly damaged and heavily reworked, as we shall see later when discussing the restoration work. The armillae system also has a device that takes into account the phenomenon of the precession of the equinoxes (Fig. 4b) and allows for the correct positioning of the instrument over time. A precaution that may have been excessive given the time scale of the phenomenon, but which was considered particularly important by Weigel because it made the instrument "perpetuus", as the cartouche on the globe states[3] The Stibbert Museum globe, however, does not include another feature introduced by Weigel: the "Astrodictum". This element was intended to facilitate the location of the stars. It can be seen mounted on the globe depicted on the frontispiece of one of his publications (Fig. 2b) and is present, though in a different form, on only one globe, the one preserved in Kassel at the Cabinet of Astronomy and Physics. Other instruments besides the celestial globe are also depicted on the same frontispiece. We do not know, however, whether Weigel actually made them and in any case none seem to have been preserved today.

Many of the eighteen Weigel globes have holdings that are most likely not original, and this is also the case for the Florentine globe. On a twisted column resting on the ground, probably dating from a period between the late 19th and early 20th century, a fork, presumably contemporary to the column, is fixed to support the globe with the armillae. Prior to the restoration, the globe was leaning on this fork with

[3] The whole text of the cartouche is: "Erhard Weigelii Cons. Caes. Et Pal. Honorar. Globus Coelestis corr. Et perpetuus. Jenae – 1699".

Fig. 3: The globe before the restoration treatment.

its north-south axis placed in horizontal, with the fork supporting it positioned internally with respect to the major armillae, in an evidently incorrect arrangement. The provenance from the antiquarian market and the lack of documentation after entering the collection make it impossible to date these changes, which made it impossible to use and fully appreciate the object. The documentation is also deficient in linking with certainty this globe with the one purchased by Frederick Stibbert in 1888 in London from the "curiosity dealer" Samuel Willson[4] and named in the receipt as "Curious metal globe" (*Invoice*, 1888), but knowledge of the Stibbert collection and the globe's unusual appearance with its polychrome heraldic figures justify this identification.

(a) **(b)**

Fig. 4: (a) The inside of the sphere. (b) The device to take into account the phenomenon of the precession of the equinoxes.

[4] At the time the trade was passed on to the sons www.britishmuseum.org (accessed: November 2024)

4. The restoration treatment

The precariousness of inadequate fastenings made this rare globe not only illegible, but also dangerously precarious and, overwhelmed by the museum's many valuable works, it was certainly not appreciated. The project for its restoration won the "Minor Goods" tender of Yococu APS (Youth in Conservation of Cultural Heritage), a social promotion association in the field of cultural heritage conservation. With Yococu's scientific laboratory, it was also possible to carry out various diagnostic investigations that helped identify the constituent materials and those used in maintenance, as well as the degradation products detected on the artefact. Thanks to multispectral imaging, performed before and afterwards the treatments, it was also possible to assess the effectiveness of the methods chosen for cleaning the sphere.

The most challenging part of the restoration work[5] concerned the set-up of the instrument with the reinterpretation of the armillae system and what had to be done to restore it to its correct conformation and function. As mentioned above, in fact, the fork that supported it, prevented any movement. The rotation of the sphere was also prevented by the position of the armillae, which caused unwanted contact (Fig. 3). The correct repositioning of two armillae was also prevented by past interventions that altered them with additions, reinforcements and repairs that were not always carried out properly (Fig. 5a). These interventions on the circle of the celestial equator and the ecliptic even closed the notches that allowed them to fit together at the correct angle, a sign that the interventions were made without understanding the original structure and functioning of the object. Another strong testimony in this regard comes from observing how the scales of the two armillae mentioned above have been recomposed. The succession of the numbers and the constellation sings is odd. In the Ecliptic, one of the sectors is even without a scale and another reverses the progression of the constellations of the zodiac. Thanks to the comparison with the globe preserved in Weimar, it was possible to establish that the incorrect repair was made on armillae that were originally divided in an unusual way, i.e. half on one side and half on the other side[6].

The cause of these interventions must have been the damage suffered by the globe perhaps after a disastrous fall, as is also suggested by a dent on the surface of the copper sphere, fortunately not too disfiguring nor dangerous for conservation. The desire to make the instrument comprehensible and functional again[7] and thus allow it to be enhanced, was shared by all those who formed the working group or who were consulted for their strong expertise. This made it necessary to reopen the armillae notches that had been wrongly closed and to manage the significantly changed dimensions of all the armillae, so that they could be connected and reassembled. While it was judged essential to restore the overall reading of the object and its general functioning, it was deemed appropriate, as will be easily understood, not to intervene on the unusual arrangement of the scales, both because it was the result of interventions that were not fully understood and because of the excessive invasiveness of any actions that might be necessary.

As for the sphere, the polychromy was consolidated, cleaned and protected. The colours of the background and those of the figures were well preserved, and it was very satisfying to see them re-emerge (Fig. 5b). The retouching was minimal and aimed at reducing the disturbance produced by the colour gaps, especially in certain areas.

Regarding the support of the globe, it was decided to maintain the present structure by enlarging the brass fork so that the outer meridian circle could be placed on it, statically stabilised thanks to reversible supports moulded in stereolithographic resin (Fig. 6).

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5 For a more in-depth description of the restoration treatment see Collina *et al.*, 2024.

6 To the prof. Schielicke all our gratitude for allowing this comparison.

7 This however does not mean that it will be put into operation.

(a) **(b)**

Fig. 5: (a) The sphere during the cleaning. (b) The celestial equator as reassembled in the past.

Fig. 6: The globe after the restoration treatment.

5. Conclusions

This extremely complex intervention was only possible thanks to an enthusiastic team of work and a wide group of experts who have provided their expertise with generosity: each one of them was fundamental in their own competence on materials, interpretation, functioning of the object and methodological choices.

As always happens during a conservation treatment it is absolutely necessary to build the restoration project on a strong knowledge of the artifact and its conservation history, but also a lot of information are understood during the study and the restoration itself. We do hope more understanding and study of these objects are to come in the future years, moreover on the aspects less studied during our work.

One aspects worthy of study that could be addressed is the iconography changes proposed by Weigel and its confrontation with the traditional one. A study of this kind could be done in the future thanks to the realisation of a 3D model both of the inside and outside of the globe that will be freely accessible.

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