

*Contextualising the Arabic Nomenclature  
of Coronelli's Celestial Globe  
at the Biblioteca Federiciana in Fano*

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At the end of the 17<sup>th</sup> century, different editions of the terrestrial and celestial globes by the geographer and cosmographer Vincenzo Coronelli (1650-1718) were circulating all around Europe. After the production of two large globes (384 cm in diameter) for Louis XIV (1681-1683), Coronelli's pair of terrestrial and celestial globes had acquired enough prestige to hit the market as geographical and astronomical instruments, but also as grand decorative and collectible objects. The construction of a globe was a complicated operation characterised by different phases of production: Coronelli was firstly producing the gores of the globes that had to be engraved and printed for "mass" distribution. However, the printed material was only the skeleton of each globe. Framed sections were left empty in order to add customised dedicatory inscriptions as well as further details on the donation or purchase of the object; also, geographical and astronomical notations were written by hand at a later stage, the colouring of the globes was optional and came at a higher price, and the globes were then installed in different types of pedestals. Coronelli's globes

Gianni, Celeste; Saliba, George; Tagliabracci, Michele (2018-2019). «Contextualising the Arabic Nomenclature of Coronelli's Celestial Globe at the Biblioteca Federiciana in Fano». *Suhayl* 16-17, pp. 323-343. ISSN: 1576-9372. DOI: 10.1344/SUHAYL2019.16-17.7.

were different in size and installation, but also in design and content. Consequently, each globe should be considered a unique object that deserves to be described on its own as well as understood in the context it was meant to be placed.

In particular, Coronelli's celestial globes have been the object of few studies and the retracing of their history of production has often been difficult to define with certainty. For example, the first major studies on Coronelli's 110 cm (3½ feet) celestial globes suggested that he produced 6 different engraved plates between 1688 and 1707,<sup>1</sup> but recently it has been confirmed that only 3 different engraved plates were used, and that the differences between the globes are due to the customised manuscript additions.<sup>2</sup>

One of the handwritten elements that characterises Coronelli's celestial globes and makes each of them unique is the Arabic nomenclature of stars and constellations. Names of stars and constellations were also given in Latin, Italian, French and Greek. Arabic nomenclature appears in several editions of Coronelli's celestial globe, including on the great globe produced for Louis XIV. It is not the first instance of Arabic nomenclature used in European globes, as already in 1630, the Dutch cartographer Willem Janszoon Blaeu (1571-1638) used Arabic script for names of the constellations, followed by Jacob Aertsz Colom (1600-1674) in 1635. For Louis XIV's globe, Coronelli probably relied on a collaborator that was an Arabic speaker (or at least mastered Arabic calligraphy) and that used as source for Arabic astronomical nomenclature the *Book on the Constellations* by Abū al-Ḥusayn al-Sūfī (903-986), already used by Colom as a source for the Arabic nomenclature of his globe.<sup>3</sup> However, for Coronelli's later globes the calligrapher and the sources vary in accordance to the model and time of production.

Keeping with the tradition that had already been established during the seventeenth century by Willem Janszoon Blaeu (1571-1638) and Jacob Aertsz Colom (1600-1674) of adding, in Arabic script, the names of the constellations, stars, and in some cases even lunar mansions (as in the case of Colom), Coronelli was very

1. M. L. BONELLI, "I globi di Vincenzo Coronelli", in *Istituto e Museo di Storia della Scienza. Biblioteca III. Catalogo dei globi antichi conservati in Italia*, Fasc. 2 (Firenze: Olschki, 1960).

2. M. MILANESI, "Coronelli's large celestial printed globes: a complicated history", *Der Globusfreund*, 47/48 (Wien: Coronelli-Weltbund der Globusfraunde, 1999/2000): 143-160.

3. P. KUNITZSCH, "The Arabic nomenclature of Coronelli's great celestial globe: its sources and a comparison to the Arabic inscriptions on other types of his globes", *Zeitschrift für Geschichte der Arabisch-Islamischen Wissenschaften*, 19 (Frankfurt am Main: Institut für Geschichte der Arabisch-Islamischen Wissenschaften an der Johann Wolfgang Goethe-Universität, 2010-2011): 235-242.

keen in maintaining the Arabic nomenclature of stars and constellations at least on some of his own globes. He even seems to have supplemented his knowledge of the previous globes by undertaking additional research of his own in other sources for such nomenclature. As Kunitzsch had already conjectured,<sup>4</sup> for Coronelli the use of Arabic, in original script, which had already been applied by Blaeu and Colom, was one aspect of keeping up with the high scientific standards of the time. For at the height of the Renaissance, the three languages, Latin and Greek together with Arabic, were then perceived as the “three historically important languages”.

Of all the globes produced by Coronelli, the awe-inspiring 384 cm (in diameter) pair of globes made for the great Sun King, Louis XIV, has received the lion's share of studies currently known to us.<sup>5</sup> In addition to that, the various articles of Paul Kunitzsch devoted to the nomenclatures on the smaller-size globes, as well as others with Arabic nomenclature, have gone a long way in explaining the circumstances of the Arabic constellation captions on such globes as well as the etymologies of the Arabic terms and their sources whenever possible. And yet there are still several inconsistencies and problems with these Arabic nomenclatures on the various globes produced by Coronelli, some of which will be detailed in the following.

To start with, and for some unexplainable reason, in Kunitzsch's early article on Coronelli's celestial globes he had characterized some of those globes that carried Arabic captions as “trilingual”,<sup>6</sup> when in fact the great majority of them were quadrilingual, as is the case with the great Louis XIV globe, and even quintilingual as in the case of the Biblioteca Federiciana in Fano celestial globe under study, or even the very same globes Kunitzsch and Embleton studied from the Austrian National Li-

4. P. KUNITZSCH and C. EMBLETON, “The Trilingual Inscriptions on some Celestial Globes of V. Coronelli”, *Der Globusfreund*, 40/41 (Wien: Coronelli-Weltbund der Globusfraunde, November 1992 for 1992/1993), 67-76.

5. See, inter alia, the works of M. BONELLI, M. MILANESE, and P. KUNITZSCH already cited above in addition to Kunitzsch, “The Arabic nomenclature on Coronelli's 110 cm celestial globes”, in *Zeitschrift für Geschichte der Arabisch-Islamischen Wissenschaften*, 9 (Frankfurt am Main: Institut für Geschichte der Arabisch-Islamischen Wissenschaften an der Johann Wolfgang Goethe-Universität, 1994) 91-98, and Kunitzsch's edition of Louis XIV globe in “Coronelli's Great Celestial Globe made for Louis XIV: Nomenclature”, originally published in *Zeitschrift für Geschichte der Arabisch-Islamischen Wissenschaften*, 14 (Frankfurt am Main: Institut für Geschichte der Arabisch-Islamischen Wissenschaften an der Johann Wolfgang Goethe-Universität, 2001), 39-55, reprinted in P. KUNITZSCH, *Stars and Numbers: Astronomy and Mathematics in the Medieval Arab and Western Worlds*, Burlington Vt, Ashgate/Variorum, 2004, study xxiv.

6. Kunitzsch and Embleton, *op. cit.*

brary.<sup>7</sup> In fact, the globes illustrated in the 1992 study, like the others we will refer to from the Federiciana library, all exhibit quintilingual nomenclatures. In the illustrations used by Kunitzsch and Embelton for their article, they both demonstrate quintilingual nomenclatures. For example, the illustration they used for the Monoceros constellation, the nomenclature clearly reads as follows: “Licorno”/“Alicorno” (two Italian variant forms), “La Licorne” (French), “Monoceros” (Latin), “MONOKEPOS” (Greek) and the Arabic “*wahīd al-qarn* وحيد القرن”.

The Federiciana globe is still distinguished further by the fact that it carries, in addition to the five languages in the nomenclature, elaborate citations from earlier Latin sources about the legends and myths surrounding those constellations. Take the constellation of Cygnus on the Federiciana globe, for example, (Fig. 1), where we find the following caption inserted by Coronelli: “CIGNO, LE CYGNE, CYGNUS, Alor, Avis, Milunius (sic), Gallina, Vultur cadens, Myrtilus, Leda<sup>e</sup> Adulter, Hierezim, Arided, Degage, Adegege, quasi Rosa redolens, KYKNOΣ, وَرْدَةٌ”.



FIGURE 1. Showing the nomenclature for the Cygnus and Scorpio constellations.<sup>8</sup>

7. See for example the two illustrations published in Kunitzsch and Embleton, *op. cit.*, Fig. 11, 12, for the constellation of Monoceros, and Fig. 13 and 14 for the constellation of Piscis notius, taken from globes of the Austrian National Library GL 30, and GL 22 and GL 31 from the same library, respectively.

8. In the legend to this constellation, the long citation of the Latin variants is taken, almost verbatim, from the 1679 comments of Michael FAYUS, on the *Astronomicon* of Manilius, *Astronomicon Interpretatione et Notis ac Figuris Illustravit*, Paris: Frédéric Léonard, 1679, 45, to which the additional references to the variants in the Arabic names are taken, again almost verbatim, from Coronelli’s own *Epitome Cosmographica*, Venice: Andrea Poletti, 1693, 62.

Or the caption for the constellation of Scorpio where he has: “SCORPIONE, LE SCORPION, SCORPIO, Scorpius, Nepa, Magna Fera, Hacrab, Altarab, vel Alacrab, ΣΚΟΡΠΙΟΣ (sic instead of ΣΚΟΡΠΙΙΟΣ), and finally العقرب”.<sup>9</sup>

In both instances, we find the heavy reliance on Manilius's *Astronomicon* for the Latin variants, and the *Epitome* for the other languages including the Arabic variants. And here again, we find further confirmation of the quintilingual production of the Federiciana globe in contrast to the quadrilingual captions on the grand globe of the Sun King Louis XIV.

Other constellation captions present particular difficulties that have not been adequately resolved so far. In his foundational article on the Arabic nomenclature on Coronelli's smaller globes, already noted above (n. 5), Paul Kunitzsch raised two very important philological issues related to the peculiar usage of Arabic terms on the globes he was studying. The first issue concerns the constellation of Corona Borealis, indicated in Arabic as Tāj al-Gharbī (تاج الغربي) on the small globes produced by Coronelli, including the Federiciana's globe, as can be seen in Figure 2 below:

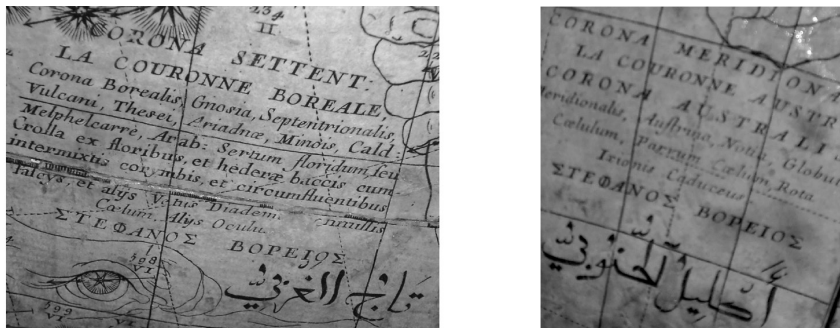


FIGURE 2. The Arabic designation of Corona Borealis on the Federiciana globe as *tāj* (instead of *al-tāj*) *al-gharbī* تاج الغربي in contradistinction to the southern corona here named *iklīl* (instead of *al-iklīl*) *al-janūbī*, (sic) أكليل الجنوبي the southern crown.

9. In the same manner as in the previous constellation, here too Coronelli drew on the commentary of Michael Fayus, on Manilius *Astronomicon*, *op. cit.*, 35, to list all the Latin variants for Scorpio. In his *Epitome* of 1693, he has for the Arabic names of Scorpio the following: “Nakrab (spelled Hacrab on the globe instead of just simply Acrab), Altarab, (as on the globe an obvious mistake resulting from a metathesis between the letters ‘t’ often confused with ‘c’ and the following letter ‘a’, which should have been read correctly as Alacrab as was rendered on the globe in the last variation), Alauab (an obvious misreading of the letter ‘c’ followed by ‘r’ here conjoined as one letter ‘u’ when the word is spelled correctly on the globe as Alacrab)”. The Greek name in the *Epitome* has the correct spelling for ΣΚΟΡΠΙΟΣ, unlike the confused Greco-Latin spelling on the globe.

For the unsuspecting reader or viewer of the globe the Arabic term *al-gharbī*, would normally mean “the western”. But since there is no such western crown, Kunitzsch correctly suggested in the same article, note 14, that this term should not be read as Arabic, rather it should be understood as taken over from Syriac,<sup>10</sup> where the term *garbyā*, or *garbyāyā*, could mean north, or northerly thus correctly identifying the constellation as northern, in contradistinction to the southern crown, known in Arabic as *al-Iklīl al-Janūbī*. In fact, the Syriac text of Bar Hebraeus’s *Ascension of the Spirit* (ܫܘܠܩܐ ܗܘܢܘܝܐ = *Sūloqā hawnonoyā*) clearly identifies this constellation as *klīlā garbyāyā* (ܟܠܝܠܐ ܓܪܒܝܝܐ) to mean the northern crown i.e. Corona Borealis.<sup>11</sup> The same expression is also used by the much earlier Syriac writer Severus Sebokht (d.c. 666) in a treatise on the constellations now preserved at BNF Syr. Ms 346, fol. 91r.

The obvious use of Syriac sources to identify this constellation must mean that once he was back in Venice, around 1684, or so, Coronelli sought the help of a native speaker from the East Mediterranean who was obviously familiar with both Syriac and spoken colloquial Arabic, and thus could have consulted such major astronomical Syriac works. This would explain why this assistant would almost transliterate Syriac *garbyāyā* into Arabic *al-gharbī*, and unwittingly retain the Syriac meaning of the term “northerly” rather than what the Arabic transliteration would indicate as westerly.

This becomes all the more puzzling since in the production of the grand celestial globe for Louis XIV Coronelli and/or his assistant had correctly identified this constellation with the traditional Arabic name *al-Iklīl al-Shamālī* (الاکلیل الشمالي) as he also did for the southern one as *al-Iklīl al-Janūbī* (الاکلیل الجنوبي).<sup>12</sup>

In the same vein, and to compound the linguistic problems Coronelli must have faced after returning to Venice, we also find on the Federiciana globe, as in Fig. 3 below, the name of the constellation Piscis Austrinus given as what looks like (حوت نصف النهایي), as read by Kunitzsch,<sup>13</sup> and interpreted by him as a mistake for *ḥūt nisf al-nahārī* (to mean “the Meridian Southern Fish”), which is neither a true constellation nor is it mentioned by anyone before or since in that form.<sup>14</sup>

10. Kunitzsch, “The Arabic nomenclature”, *op. cit.*, note 14, 94-95.

11. See, Bar HEBRAEUS, François NAU, *Livre de l’ascension de l’esprit*, Paris: E. Bouillon, 1899, 111.

12. See, Kunitzsch, “Great Celestial Globe”, *op. cit.*, 44, and 49 respectively.

13. *Ibid.*, 50

14. *Ibid.*



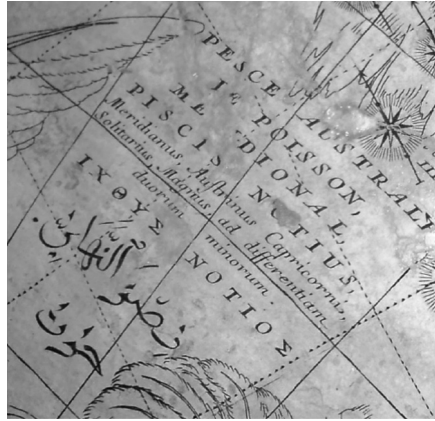






FIGURE 3. The nomenclature for constellation Piscis Notius, with the enigmatic reading signaled by Kunitzsch more than once.

When Kunitzsch first encountered this puzzle on the Austrian National Library<sup>15</sup> globe GL 31 he said at the time that “the characters used in the same word on Lib-GL22 and GL 30-31 are so distorted that no Arabic letter can be clearly identified”. This is in fact the same constellation that Coronelli had identified correctly on the grand globe of Louis XIV, years before he produced the Federiciana globe, as *al-ḥūt al-janūbī* (the Southern Fish). This must mean that the assistant who helped Coronelli identify this constellation correctly as *al-ḥūt al-janūbī* when he was in Paris working on the grand globe was no longer available to him when he returned to Venice and thus had to engage another assistant who was not familiar with the nomenclature that was used on the grand globe. The puzzle becomes slightly easier to solve if we attempt another reading of the Arabic nomenclature, which was apparently produced on most of the 110 cm globes, including the Federiciana globe. What seems to have engendered the puzzle was the misreading of the first Arabic word in the phrase of the nomenclature as “*nīs*”, with the first letter assumed to be a “*nūn*”. But taking into consideration the fact that the Arabic hand-written letter “*nūn*” can be easily confused with a careless rendering of the letter “*fā*”, both having to have a dot above, we can then realize that the assistant who penned the new name on these smaller globes was not translating the name of Piscis into Arabic, but rather was attempting to *transliterate* it starting with the name Piscis. Since Arabic

15. Kunitzsch, “Trilingual”, *op. cit.*, 76.

does not have the letter “p” this letter was usually rendered with the Arabic letter “f”. Thus, the word Piscis was rendered as *fiṣīṣ* (فصيص) with the missing dots under the *yā’*, which is not unusual, and carelessly rendering final letter “zayn” which could be confused with a final form of the letter “fā””. The same assistant who transliterated the letter “p” with a “fā” was in all likelihood the very same person who also transliterated —rather than translated— the name of the constellation Ophiocus  as is clearly seen on the gores for the *Libro dei Globi*.<sup>16</sup> Here we can easily see the similarity in the rendering of the same phoneme “fph” with the same Arabic letter “fā” , here used for Ophiocus, and the same letter  used in the transliteration of Piscis  on the Federiciana globe. This should confirm the reading of the first word as a transliteration rather than a translation.

The second term on most of the 110 cm globes —including the Federiciana nomenclature for this constellation— was read correctly by Kunitzsch as (النّهائيّ = the last).<sup>17</sup> But then he thought that it was a mistake for *al-nahārī*, meridional, which is difficult to defend. Our suggestion is that it should indeed be read as *al-nihā’ī* = meaning the final or the last, in agreement with the reference to the same constellation by Apianus,<sup>18</sup> where he characterizes it as the last: “*Piscis notius postremus est*”, and is in fact the very last constellation Apianus mentions in his list. It is also the last in Šūfī’s *Šuwar al-kawākib al-thābita* (Book of the Fixed Stars). So Coronelli’s assistant probably meant to say “Piscis the last Fish”, or something to that effect trying to reflect Apianus’s characterization of it.

As was stated above, since this constellation was correctly identified, using the well documented traditional Arabic name of *al-ḥūt al-janūbī*, when Coronelli was producing the grand globe for Louis XIV, around the years 1682-1683, then why was this information discarded and replaced around the year 1693 with an awkward transliteration of the name Piscis, and a borrowed description from Apianus that was translated into Arabic as *al-nihā’ī*?

This and other such questions seem to be encountered when considering some of the features of Coronelli’s smaller globes. Such questions seem to imply that there was a real loss of information during the decade or so that separated the making of the grand globe and the smaller globes such as the one at the Federiciana.

16. Vincenzo CORONELLI, *Libro dei Globi*, Venezia 1693 (1700), *Theatrum Orbis Terrarum*, with an introduction by Helen Wallis, Amsterdam, 1969, gore for the constellation here marked in Latin as “Serpentarius”, and ΟΦΙΟΥΧΟΣ in Greek.

17. Kunitzsch, “Great Celestial Globe”, *op. cit.*, 50.

18. APIANUS, *Astronomicum Caesarum*, Ingolstadt: Peter Apianus, 1540, s.v. “Piscis Notius”.



Other features also include the kind of Arabic that Coronelli's assistants were using during these later years. We have already mentioned the use of the term *garbyāyā* derived from Syriac rather than Arabic to refer to the northern direction. Add to it the use of the term *qiblī* (instead of *janūbī*) to identify the southern direction, or the term '*adhrā* (with *alif maqṣūra*) for Virgo instead of the more classical *al-'adhrā*', or the term *al-jawzah* instead of the more classical *al-jawzā*' for Gemini, and using such terms as *al-jidi*, for Capricorn instead of the more classical *al-jady*, or *wazza*, for the constellation of Cygnus (here misplaced instead of Lyra which was called *awazza*, in BNF Arabic ms 5036 copy fol. 52v or the printed text of Sūfī's work p. 67). All these features and many others clearly indicate that Coronelli's informant(s) who advised him in Venice was/were less educated and were apparently more familiar with colloquial Arabic terms of the Eastern Mediterranean in contrast to the assistant who advised him on the grand globe while in Paris and who was apparently much better educated in such matters.

Finally, there is the peculiarity of the name of the constellation Phoenix, which was called *nādira* on the Louis XIV's globe, and *al-'uqāb* on the Federiciana and most other 110cm globes, a name that was applied to the constellation *Aquila* on the Louis XIV globe. *Aquila* on some of the gores of the *Libro dei globi* (as in the Federiciana) is identified as *al-nasr*, while it is called *al-nasr al-wāqī*' on other gores and presumably globes derivative from them.

Some answers to these questions can be found by studying and understanding the context in which these globes were meant to be used and placed. If major attention has been given, for instance, to the great globe of Louis XIV and to the most renowned globes housed at the Museo Galileo in Florence, less attention has been granted to minor institutions and personalities that purchased the globes at the time. Yet, the documentation available for such realities could provide relevant proof of the constant interaction between different cultures towards the development of the sciences — astronomy in this case and the use of native informants by Coronelli from the Eastern Mediterranean that we just mentioned when he was back in Venice — as well as enlightening less known aspects and dynamics of this interaction.

One of these less known instances is the history of the 110 cm (3½ feet) celestial globe purchased by Domenico Federici (1633-1720)<sup>19</sup> for his personal library that he established in the oratory of the Congregation of Oratory of Saint Philip

19. M. TAGLIABRACCI, "L'avventurosa vita di Domenico Federici," *Nuovi Studi Fanesi*, 24/25 (Fano: Biblioteca Comunale Federiciana, 2010/2011): 27-104.

Neri housed in *San Pietro in Valle* in Fano (Marche, Italy).<sup>20</sup> Together with 12,000 volumes, the library housed scientific and astronomical instruments as well. The library was opened to the public in 1720, at the death of Federici, who endowed it for the benefit of the town.

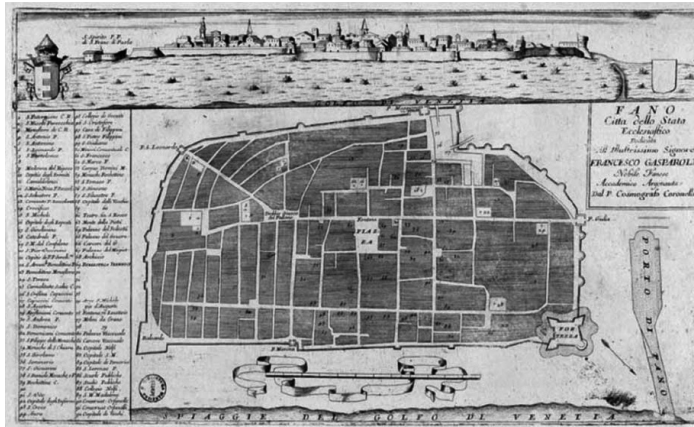


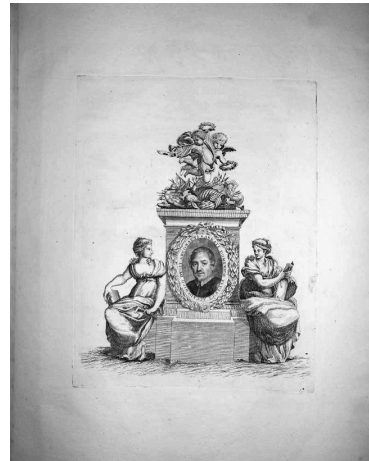
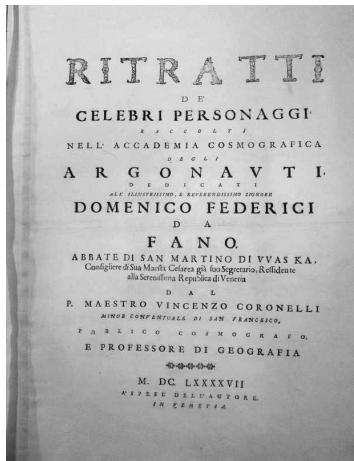
FIGURE 4. In addition to a pair of globes, Coronelli dedicated to Francesco Gasparoli, a noble from Fano, a map of the city of *Fano in Stato Ecclesiastico* (1696) also published in *Teatro delle Città* (1697).

Since 1667, Federici was *Residente cesareo* - diplomat for Leopold I of Habsburg - in the Republic of Venice, and collected art works, books and antiquities on behalf of the Court of Vienna as well as for his private collection. He was in contact with Coronelli and purchased several of his books<sup>21</sup> as well as the globes.

20. There are other two globes (490 mm) by Coronelli in the town of Fano in the Count Castracane degli Antelminelli's collection released either in 1696 or in 1699. They do not have Arabic nomenclature. See: F. BONASERA, "Terrestrial and Celestial Globes by Vincenzo Coronelli, 1688," *Imago Mundi. A Review of Early Cartography*, 10 (Stockholm,- Leiden: E. J. Brill, 1953): 79-80. Moreover, Coronelli dedicated two globes (6 cm) to the noble Francesco Gasparoli from Fano in 1693 (the gores of these globes are included in Book x of the *Atlante Veneto*, table 153). See: F. Bonasera, *Vincenzo Coronelli cosmografo della Serenissima* (1650-1718). *Vita ed opera* (Ancona: Comitato per le onoranze nelle Marche al padre Vincenzo Coronelli nel tricentenario dalla nascita, 1950): 25; C. PONGETTI, "Nella sfera del Coronelli. Il contributo cartografico alla congiuntura tra Venezia e le Marche," in R.M. Borraccini, G. Borri (ed.), *Virtute et labore: Studi offerti a Giuseppe Avarucci per i suoi settant'anni*, (Spoleto: Fondazione centro italiano di studi sull'alto Medioevo, 2008), v. 1: 429-464.

21. In the manuscript catalogue (1720 ca.) of the Biblioteca Federiciana, Coronelli's works are listed under "Vin" (i.e. Vincenzo Coronelli) the following titles: *Cronologia Universale*,

He must have been an esteemed patron, because Coronelli dedicated to Federici a map made in 1688 and included in the *Corso geografico* (published in 1692), titled “*Stato di Ragusi, Bocca del F. Narenta, Isole di Lesina e Curzola nella Dlamatia possedute dalla Serenissima Repubblica di Venetia dedic: all’Ill.mo Sig. Doemnico Federici, Abbate di Vaska, Consigliere di S. Maestá Cesarea*”,<sup>22</sup> and a book titled “*Ritratti de’ celebri personaggi*” (Portraits of famous personalities) published in 1697. The map and the volume *Ritratti* have two different portraits of Federici (one portraying the profile, one from the front). They were inserted in the volumes at a second stage, both to complete the map and to decorate the *antiporta* of the *Corso geografico* (part of the 13 volume *Atlante Veneto*).



FIGURES 5-6. Title page of *Ritratti de’ celebri personaggi* (1697), dedicated to Domenico Federici. On the opposite page (the *antiporta*), the portrait of Domenico Federici.

*Tavola Sinodica de Cardinali, Ritratti de Personaggi, Epitome Cosmografica, Corso Geografico Universale, Atlante Veneto, Isolario dell’Atlante Veneto*. In the card catalogue of the pre-modern collection, under “Cor” (i.e. Coronelli), the following titles are listed: *Cronologia Universale, Tavola Sinodica de Cardinali, Ritratti de Personaggi, Epitome Cosmografica, Corso Geografico Universale, Atlante Veneto, Isolario dell’Atlante Veneto* and *I viaggi del P. Coronelli*.

22. The map appears in Coronelli’s *Corso geografico universale, o sia la terra divisa nelle sue parti, e subdistinta nè suoi gran regni. Esposta in tavole geografiche, ricorrette, et accresciute di tutte le nuove scoperte, ad uso dell’Accademia cosmografica degli Argonauti dal padre maestro Vincenzo Coronelli M. C. Cosmografo della serenissima Repubblica di Venetia* (Venice: Vincenzo Maria Coronelli, 1692). A copy of the publication is in the Biblioteca Federiciana (Shelf mark: 2 M VIII 0021).



FIGURES. 7-8. Another portrait of Domenico Federici appears in the antiporta of the *Corso geografico universale* (1692) as well as in the map *Stato di Ragusi* included in this volume.

The celestial globe was ordered by Federici in pair with the terrestrial globe around 1688, since his name appears in the list of the members of the *Accademia Cosmografica degli Argonauti* founded by Coronelli himself who granted every patron of the globes the membership to the *Accademia*. The terrestrial globe was produced in Venice and ready in January 1689. The celestial globe was also produced in 1692 in Venice and arrived in Fano on a boat from Venice together with the terrestrial globe, after 1693.<sup>23</sup>

Originally, Coronelli intended to have both globes ready by 1689. However, he could not finalise the agreement with the engraver Jean-Baptiste Nolin who was supposed to produce the celestial globe in Paris, and he obtained only some drafts of the plates from Nolin's engravings. Coronelli used these drafts to produce the convex celestial globe of the Marciana Library in Venice in 1689. The same drafts were also used by the *Societas Gallica* in France to produce a convex celestial globe in 1693. The Federiciana's celestial globe, however, is a concave model produced on new engravings made in Venice in 1692 and released in the market in 1693. Several members of the *Accademia* who had waited for the celestial globe were not satisfied with the Venetian concave model of 1692, and Coronelli had to produce another convex celestial globe in 1699 (known as Ottoboni globe). One element that was disapproved of in the concave globe realised in 1693 was that it was based on the same drawings used for the plates of the convex globe of 1688 but reversed, with the result that all the figures in the globe that are holding some object are left-handed. Moreover, a comparison between the celestial globe of 1692 and the *Epitome cosmographica* by Coronelli, reveals several discrepancies and mistakes in the naming and numbering of the stars and constellations, although the *Epitome* was supposed to work as a guide to consult in the production of the globe.

Despite having been considered a partial failure, the concave celestial globe produced in Venice in 1692 is the most widely-spread 110 cm celestial globe by Coronelli. For example, it can be found also in the libraries of Munich, Florence, Ravenna, Jesi among others. However, there are significant differences amongst those samples as several components of these globes are in fact manuscript additions, including the colouring of the globes, the nomenclature of constellations

23. Marica MILANESI, "Il globo celeste di Vincenzo Coronelli nella Biblioteca Federiciana di Fano", *Nuovi Studi Fanesi*, 12 (Fano: Biblioteca Comunale Federiciana, 1998): 65-83.



(in Italian, Latin, French, Greek and Arabic) – thus quintilingual in nature as well, and the dedicatory inscriptions.<sup>24</sup>

Domenico Federici accepted the concave model (Venice, 1692), and his globe is distinguished by some specific details. There are three framed inscriptions in the Federiciana’s globe. The first, in the northern hemisphere, is the dedicatory inscription from Coronelli to the Republic of Venice. The second, on the southern hemisphere, explains that the celestial globe was meant to represent the sky as it would appear in year 1700. The third, by the side of the second framed inscription, explains the perspective of the observer of the globe: the observer looks at the globe as if he was watching the sky from the earth (and not from the Empyrean as it was usually the case for the so called convex globes). The inscription also publicises Coronelli’s upcoming publication, “*Epitome cosmografica*”.

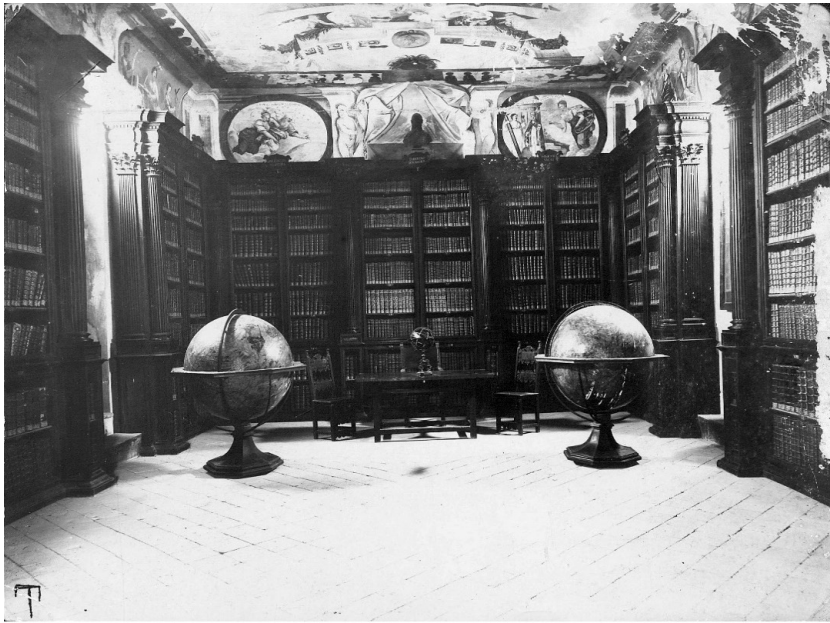


FIGURE 9. Hall of Globes at the Biblioteca Federiciana (picture taken around 1920s, before the earthquakes).

24. There is no comprehensive volume that gathers all the celestial globes still existing by Coronelli so far, but each should be studied as a unique object.





FIGURE 10. Hall of Globes today.

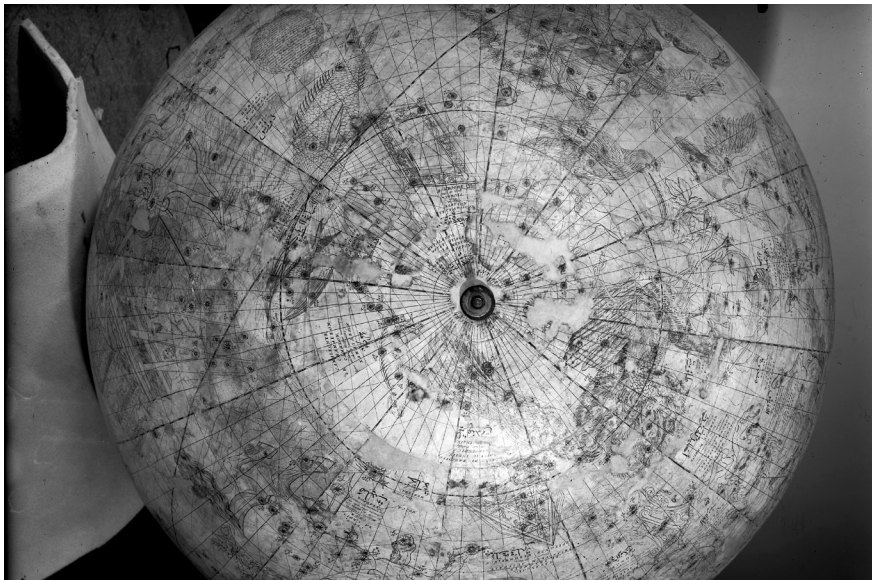


FIGURE 11. Details of the South Pole in the Federiciana's Celestial Globe

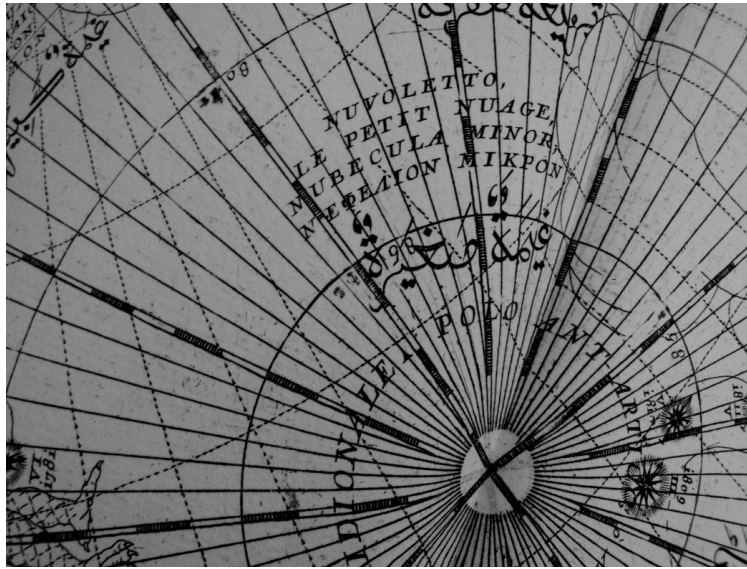


FIGURE 12. Chart of the South Pole in the Corso geografico universale (1692)  
(Biblioteca Federiciana, Shelf mark: 2 M VIII 0021)

Why did Domenico Federici purchase such an object? What is the context of a celestial globe with Arabic nomenclature in a 17<sup>th</sup> century library at the periphery of the Papal States?

The town of Fano is less than 50 km away from Urbino, renowned for the contribution to the Scientific Renaissance in the 16<sup>th</sup> century through the activities of scientists at the Court of the Duke of Urbino, such as Paul of Middelburg (1446-1534), astronomer and pen pal of Nicolaus Copernicus (1473-1543); Federico Commandino (1509-1575), mathematician and translator of Latin scientific works; Guidobaldo Del Monte (1545-1607), astronomer and physician, guarantor of Galileo Galilei;<sup>25</sup> Bernardino Baldi (1553-1617), mathematician and biographer; Muzio Oddi (1569-1639), engineer specialised in the construction of solar clocks; and many others. Urbino was also famous for its workshops specialised in the construction of scientific instruments, such as the Campi workshop for compass, set squares and astrolabes, and the Barocci workshop for scales and

25. Galileo studied Del Monte's *Mechanicorum liber* (1577), and his translation of Archimedes' commentary, *In duos Archimedis aequponderantium libros paraphrasis scholijs illustrata* (1588). Del Monte also helped Galileo to become professor of mathematics in Pisa (1589) and in Padua (1592).

solar and mechanical clocks. Moreover, the library of the Duke of Urbino held more than 500 titles of scientific works in the fields of mathematics, physics and astronomy, including translations of the works by Muḥammad al-Baghdādī (d. 1037), Ibn al-Haytham (d. 1040), Al-Balkhī (d. 934), Al-Farghānī (d. 870), Al-Kindī (d. 866 or 873), and Al-Qabīṣī (d. 967)<sup>26</sup>.

Not far from Urbino, the Biblioteca Federiciana, established in 1680 in Fano, holds numerous documents that attest to the conceptual evolution of the sciences, including astronomy, in 17<sup>th</sup> century Europe. Already in 1641, Fano saw the institution of the *Accademia degli Scomposti* (The Academy of the Discomposed) by the Amiani family, whose emblem is a disassembled Keplerian telescope.<sup>27</sup> The motto of the Academy was “*Compositi ad seposita*” (United to reach elevated things), meaning that each member of the Academy, specialised in a specific subject, could contribute to the work of each other in order to reach further scientific knowledge. The Biblioteca Federiciana holds the drafts of the project of a telescope dated end 17<sup>th</sup> beginning 18<sup>th</sup> century made by a member of the *Accademia*.<sup>28</sup>



FIGURE 13. Emblem of the Accademia degli Scomposti in Fano: a disassembled Keplerian telescope

26. M. TAGLIABRACCI (ed.), *Scienze* (Urbino: Quattroventi, 2015).

27. The telescope has been identified as a Keplerian telescope by specialists of the Museo Galileo in Florence.

28. Biblioteca Federiciana, Shelf mark: Ms. Amiani, n. 126/1.

Domenico Federici was also a member of the *Accademia degli Scomposti* and was very interested in astronomy and telescopes. In one of the library catalogues he redacted (Ms. Federici, 114) there is a section dedicated to books on telescopes. Federici believed that the telescope was the ultimate instrument capable of confirming what is true through the sense of sight over the rational thinking. In a poetic dialogue on an astronomic subject, Federici writes “[*I cristalli*] sì *perfetti che il saggio // toscò fabbricò con l’arte, [...] che tace ogni ragion il senso*” (The so perfect crystals [lenses of the telescope] that the wise Tosco [Galileo] skilfully created, [...] so that the sense [of sight through the telescope] defeats reason).<sup>29</sup> Federici called upon the excellence of the telescope also during an official speech at the Senate of the Republic of Venice, saying: “*Si danno, Eccellentissimi Padri, alcune immagini colorite che paiono informi e scontorte, eppure chi le mira nel seno di quel vetro che si chiama cilindro, le conosce diritte e di perfettissima forma [...]*” (There are given, my Excellences, my Lords, some distorted and colourful images, but who look at them through the telescope will know that they are straight and of perfect shape).<sup>30</sup>

Federici became a member of the *Accademia degli Argonauti*, founded by Coronelli in 1684, after he purchased the celestial and terrestrial globes. He also acquired several books written by Coronelli and, in general, other volumes on astronomy and other astronomic instruments. Together with Coronelli’s globes, the Biblioteca Federiciana holds a 16<sup>th</sup> century armillary sphere and an astrolabe produced by Bernardino Campi in Urbino in 1556. Moreover, archive pictures of the library prior to the earthquake of 1920s attest to the existence in the library of two globes by Willem Blaeu (1571-1638), identified by Edward Luther Stevenson as the terrestrial globe dated 1599 and the celestial globe dated 1603.<sup>31</sup> The archive pictures taken around 1920 also show the original frescoed ceiling of one of the rooms in the Federiciana before its collapse after the earthquake. The ceiling was adorned with a 16<sup>th</sup> century fresco: the allegoric representation of *Veritas* holds in her hand a celestial sphere. At the bottom corner on the right, it is possible to identify a man wearing a turban and holding in his hand the miniature of a city.

29. Biblioteca Federiciana di Fano, Shelf mark: Ms. Federici, n. 18.

30. Archivio di Stato di Venezia, Collegio, Esposizione de’ Principi, registro 75, cc. 58-60.

31. 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: Hispanic Society of America by the Yale university press; London: Humphrey Milford Oxford university press, 1921): 252.



Indeed, Federici's library is a manifestation of Federici's interpretation of astronomy as science of the truth (*Veritas*). The Arabic tradition had a significant role in supporting this representation in terms of both visual and iconic aids, such as the Arabic nomenclature in the globes and the figure in the fresco; and in terms of contents of the library, such as the Arab authors in Latin translation held in the collection and some works in Arabic.<sup>32</sup> The study of this apparently minor context at the peripheries of more renowned centres of scientific movements not only helps to understand what were the ideas, objects and scientific discoveries that circulated in Europe and beyond in the 17<sup>th</sup> century, but also highlights the manner in which these ideas, objects and discoveries were perceived, interpreted and represented by the intellectuals of the time.

32. The Biblioteca Federiciana holds also oriental manuscripts, documents and printed books, including: an Ottoman firman from the Court of Mehmed IV dated 1091 Hijrī (1680), Shelf mark: Ms. Federici, 75/IV; a 17<sup>th</sup> century prayer book in Ethiopian, Bevilacqua Collection, Shelf mark: Armadio C; an 18<sup>th</sup> century Arabic manuscript with the description of the al-Aqṣā Mosque in Jerusalem, Shelf mark: Ms. Fondo Antico, n. 101; a printed Arabic grammar, Filippo GUADAGNOLI, *Breues Arabicae linguae institutiones* (Rome: Tipografia della Congregazione di Propaganda Fide, 1642), Shelf mark: 2 M V 0015; a printed volume on the history of the Arabs, Gregorius Abū AL-FARAJ, *Tārīkh mukhtaṣar al-duwal Historia compendiosa dynastiarum* (Oxford: Henry Hall, 1663), Shelf mark: 1 B II 0015; a printed volume with the description of the Persian pavilion of Chehel Sotun, Petrus Bedik, *Cehil Sutun, seu Explicatio utriusque celeberrimi, ac pretiosissimi theatri quadraginta columnarum in Perside orientis, cum adjecta fusiori narratione de religione, moribusq. Persarum, & eorundem vivendi modo, populis vicinis, alijsq. de hac orientali natione famosissima scitu dignis* (Vienna: Leopold Voigt, 1678), Shelf mark: 1 C II 0045; a treatise on the optics by Ibn al-Haytham in Latin, *Opticae thesaurus. Alhazeni Arabis libri septem, nunc primū editi. Eiusdem liber De crepusculis & nubium ascensionibus. Item Vitellonis Thuringolopoli libri 10. Omnes instaurati, figuris illustrati & aucti, adiecti etiam in Alhazenum commentarijs, a Federico Risnero* (Basel: Episcopus Eusebius & Episcopus Nikolaus 2. Erben, 1572), Shelf mark: 2 O IX 0020; the treatise on medicine by Ibn Sīnā in Latin, *Auicennae Arabum medicorum principis Ex Gerardi Cremonensis uersione, et Andreae Alpagi Bellunensis castigatione. A Ioanne Costæo, & Ioanne Paulo Mongio annotationibus iampridem illustratus.* (Venice: Lucantonio Giunta 2., 1595), Shelf mark: 2 P x 5-6. The manuscript catalogue (1720 ca.) of Federici's collection mentions other titles that could not be located in the library so far, such as the treatise *De Morbis* by Costantinus Africanus and a translation of the work by Yuḥannā bin Māsawaih. The separate catalogue of the *Index Librorum Prohibitorum* (List of the prohibited books) that were held at the Federiciana also includes the translation of the *Qur'ān* in French by André du Ryer (d. 1660 or 1672) in 1647. The copy has not been located in the library yet.



FIGURE 14. The frescoed ceiling of one of the rooms in the Biblioteca Federiciana prior to the earthquake in the 1920s.



FIGURE 15. The celestial two globes were partially damaged during one of the earthquakes that hit Fano in the 1920s. The historical archives MIBAC (Istituto centrale per il restauro e la conservazione del patrimonio archivistico e librario, Rome) recently retrieved the pictures of the globe before and after its restoration in 1964.





FIGURE 16. The celestial globe, partially damaged during one of the earthquakes that hit Fano in the 1920s, before its restoration in 1964.



FIGURE 17. The celestial globe, partially damaged during one of the earthquakes that hit Fano in the 1920s, after its restoration in 1964.

