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Firmamentum Sobiescianum - the Magnificent Baroque Atlas of the Sky

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FIRMAMENTUM SOBIESCIANUM—THE MAGNIFICENT BAROQUE ATLAS OF THE SKY

The preparation and publication of the last works of Johannes Hevelius, the Gdańsk astronomer of European renown, met with particular adversities of fortune, and it was only after the author's death that the publication was accomplished.

When the printing of the second part of his great work, *Machina coelestis* (Gdańsk 1679) was drawing to an end, Hevelius wrote in the letters to his friends about his further works. He enumerated them in his letter of April 14, 1678 written to the Polish Jesuit and mathematician, Adam Adamandus Kochański, who at that time stayed in Wrocław.[1] These were : *Prodromus astronomiae, Catalogus stellarum fixarum*, the result of his observations performed for many years, *Uranographia* or the atlas of the particular constellations, and *Globi coelestes*—two large general maps of the sky. They were to form four positions linked up one with another ; the first one was of a descriptive-explanatory character, the second a catalogue, and the third and fourth were illustrative. *Machinae coelestis pars posterior* was dedicated by Hevelius to King John III Sobieski, who, from the year 1677 on, paid him a regular annual pension. The astronomer intended to dedicate the subsequent works to his former patron, King Louis XIV, hoping to regain the French pension paid to him in the years 1663—1671 but stopped because of financial difficulties.[2] In spring of the year 1679 Hevelius expected that he would be able to print his works already in the following year.[3]

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[1] J. Hevelius to A. A. Kochański, 14 April 1678, MS. 10349, Fonds Latins Bibliotheque Nationale in Paris (below abbreviated FL BNP), vol. XIII, p. 31.

[2] K. Targosz, "Jana Heweliusza zabiegi o pozyskanie królewskich mecenasów" ["Johannes Hevelius's Endeavours to Gain Royal Patronage"], *Studia i Materiały z Dziejów Nauki Polskiej*, Seria E, 1977, No. 6, pp. 121—164.

[3] J. Hevelius to P. Des Noyers, 28 April 1679, MS. 10349, FL BNP, vol. XIII p. 256.

His plans met with a failure. In autumn, an unexpected disaster fell upon the astronomer ; on September 26, 1679 fire destroyed his houses in Korzenna (Spices) Street : his belongings, the observatory, the polishing and engraving workshops, and the printing office—all he was able to found in the course of the years—was consumed by fire. A description of that event was published in print in Hamburg.[4] It informed that while Hevelius stayed in his suburban house, the fire started in the stable, where the coachman had left a burning candle, and spread to the neighbouring houses. People got running to that place, and while some of them plundered it carrying away precious things, others tried to save books and manuscripts throwing them outside through the windows. Unbound books underwent destruction and in that way the major part of *Machinae coelestis pars posterior*, which had just left the press, was lost. Fortunately, almost all manuscripts of the astronomer were saved. However, his scientific workshop ceased to exist. When the alarm was given to Hevelius and he returned at night, passing through the town's gate specially opened for him, all he found were smouldering ruins. This catastrophe might have proved disastrous for his further plans. All his "things and hopes"—*res et spes*—as he wrote a month later to King Sobieski—were turned into ashes within one hour.

Although in his letters to his friends Hevelius complained at that time that he was "the most miserable of all mortals,"[5] he thanked God that he preserved bodily and mental health, and did not stop working. In the autumn of the year 1681 he had his houses rebuilt, and the observatory equipped with several instruments lent to him by his friends from the royal court in Warsaw—Pierre Des Noyers and Tito Livio Burattini. But more than before he was under the necessity of appealing to mighty patrons for subsidies.

In July of the year 1683 memorable for King Sobieski's victory of Vienna, Hevelius informed Des Noyers that nearly sixty drawings of the figures representing the particular constellations were ready. They were to form his *Uranographia*, which he still intended to dedicate to Louis XIV.[6] Two months later, on September 30, before the news about the King's victory reached Gdańsk, Hevelius wrote a long letter to Francis Aston, secretary to the English Royal Society (of which he was a member since 1664) asking for help.[7] He suggested that the Society should provide for printing in England his recent works. Namely, it was on behalf of that Society and upon his initiative (*meo instinctu, mei gratia*—he wrote) that young Edmund Halley was sent in the years 1676—1678 with a special expedition to Saint Helena Island to perform the measurements of the stars round the south pole of the sky.[8] Halley's catalogue

[4] Capellus, *De incendio Heveliano*, Hamburgi 1679. That letter was reprinted by E. F. Mc Pike, *Hevelius*, London : Flamsteed and Halley, 1937, pp. 103—111.

[5] J. Hevelius to A. A. Kochański, 3 January 1680, MS. 10349, FL BNP, vol. XIV, pp. 99—100.

[6] *Idem* to P. Des Noyers, 22 July 1683, *ibid*, vol. XV, p. 259.

[7] *Idem* to F. Aston, 30 September 1683, *ibid.*, vol. XV, pp. 269—273.

[8] E. F. Mc Pike, *op. cit.*, pp. 38—43.

was to complete that compiled by Hevelius. Thus, it was justified to ask the Society for taking under its auspices the publication as a whole.

Many years back, John Blaeu of the famous Dutch family of publishers and cartographers obligated Hevelius to publish his maps of the sky in his firm ; but early in the 80s his son, also John, in spite of initial promises to respect his father's projects and agreements, did not meet these obligations, and Hevelius was informed that the firm of the Blaeus ceased to exist.[9] For these reasons, the astronomer explained to Aston how much he needed help in face of that failure. Besides his personal multiannual exertions and work performed daily and especially by night, financial expenditures grew, too. Just at that time, he had to pay an "excellent painter" (*optimum pictorem*) for drawing the constellations. He wished his maps to be not only more precise (*accuratiores*) but also elaborated "more clearly and in detail" (*nitidius et diligentius*) than those in the atlases hitherto published by Bayer and Schiller, as well as perfect from the artistic point of view (*splendidores quoad sculpturam*). However, as no adequately able engraver stayed at that time in Gdańsk, Hevelius asked the Royal Society to send "an excellent engraver" (*egregius sculptor*) who might engrave the plates under his supervision. He emphasized that the engraver must know the German or the Flemish language, and expected that the work would take about a year's time ; the engraver would be helped by a local man able to engrave straight lines and little stars. In spite of certain steps taken by Aston,[10] the English plans cherished by Hevelius were not fulfilled.

By that time the news about King Sobieski's military success at Vienna spread over Poland and Europe ; this inspired Hevelius to pay a special homage to John III and concentrate his future expectations on the Polish patron. In his letter of March 30, 1684 he wrote to the King that he also drops on his knees before him and commemorates his victorious name by an eternal monument. Of the seven bright stars observed by him for seven years between the Eagle, Antinous and Serpent-Carrier he formed a constellation and called it Sobieski Shield (*Scutum Sobiescianum*) to make the King's family coat of arms Janina shine since that time among other constellations in the sky. Enclosed with that letter Hevelius sent a separate one to the King's secretary, Adam Sarnowski, entreating him to strive for subsidies in order that he might propagate in print the new sign among other constellations in his *Uranographia* and publish his remaining works. He also mentioned the urgent need to fetch from abroad an engraver (*calcographus*). The picture of the new constellation and the letter were brought to the royal court and handed to King Sobieski at Jaworów by Michel Anthony Hacki, the newly designated Cistercian abbot at Oliwa. The picture and the poems written by friends and praising the King and the astronomer were also sent by Hevelius to Leipzig where they appeared in the same year 1684 in the scientific periodical *Acta Eruditorum*.

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[9] J. Hevelius to F. Aston, 17 November 1682, MS. 10349, FL BNP, vol. XV, pp. 195—205.

[10] F. Aston to J. Hevelius, 15 December 1682, *ibid.*, vol. XV, pp. 245—247.

In 1685 Hevelius succeeded to publish another of his works, *Annus climactericus*, devoted to the year 1679, which was so peculiar in his life. At that time, the astronomer's health—unusually good up till then—began to decline. In June of the following year he wrote to Des Noyers about his illness and simultaneously about the state of his works : *Prodromus astronomiae* and *Catalogus fixarum* were to go to the printing office, and the astronomer hoped that they would leave it in summer or not later than in winter.[11] He also informed that almost all maps of the atlas were most beautifully executed by "a prominent French engraver" and impressed (*fere omnes ab egregio sculptore Gallo iam sint exceptis duobus vel tribus elegantissime sculpti etiam impressi*). He still intended to dedicate *Prodromus* and *Catalogus fixarum* to King Louis XIV, and *Uranographia* and *Globi coelestes* to "our Polish King" (*Regi nostro Poloniarum*).[12] It must have been then that the idea occurred to him to call the atlas of constellations *Firmamentum Sobiescianum sive Uranographia*, and to dedicate the northern hemisphere to John III and the southern one to his son, Prince James, as these two large engravings show the date 1686 (il. 8—9). The ready atlas might have still rejoiced the eyes of the old astronomer. In October 1686 he wrote to Des Noyers that its printing proceeded well.[13] However, that was the last letter in their correspondence continued for forty years. In the middle of January of the following year Kochański, who at that time stayed in Gdańsk, sent message to the Warsaw friend of Hevelius that the state of the astronomer's health was hopeless.[14] The printing of the *Catalogue* was half-done, and Kochanski was afraid lest it should be stopped in case of its author's death.

Hevelius died on January 28, 1687 on his seventy-sixth birthday. John III presented his condolescences to the widow, Elisabetha Hevelia, and continued paying the annual pension to finish the publication of the works, which were printed in Gdańsk by Johannes Zacharias Stoll. The last works of our astronomer were type-set and appeared happily, though late, in the year 1690 in 400 copies[15] as we learn from the correspondence of Des Noyers, who diligently watched the fate of that publication.

Prodromus astronomiae opens with a two-page frontispiece engraving showing the interior of the palace of Urania, with whom six authors of the catalogues of stars, Hevelius included, sit at the table. Among others, Hevelius submitted in the *Prodromus* the explanations to *Catalogus fixarum*, in which he discussed the catalogues of his predecessors as well as his own work. He emphasized that the *Catalogue* reached the number of 1888 positions, the highest

[11] J. Hevelius to P. Des Noyers, 28 June 1686, MS. 1639, FL Nouvelles Acquisitions BNP, c. 100—101.

[12] *Idem* to I. Boulliau, 29 June 1686 MS. 13044, Fonds Français (below abbreviated FF) BNP, c. 58—60.

[13] *Idem* to P. Des Noyers, 18 October 1686, MS. 1639, FL Nouvelles Acquisitions BNP c. 104 and MS. 13022, FF BNP, c. 209.

[14] A. A. Kochański to P. Des Noyers, 17 January 1687, *ibid.*, c. 242.

[15] P. Des Noyers to I. Boulliau, 13 October 1690, MS. 13023, FF BNP c. 103.

one hitherto recorded. To those previously known and personally verified he added 603 new ones established during his own observations, and 335 ones provided by Halley from the southern hemisphere. He mentioned that his collection might have been still greater if a part of his notes had not been destroyed by fire (in his letter written to Kochański in 1678 he spoke about 700 newly recorded positions).[16] A part of the stars which he observed for the first time he included in the constellations already known ; of the other stars he formed twelve new constellations and gave them the names as follows : Asterion and Chara or Hunting Dogs, the Lizard, the Lesser Lion, the Lynx, Urania's Sextant, Sobieski Shield, the Lesser Triangle, Fox and Goose, Cerberus and Mount Moenalis (of these, the Lesser Triangle and Mount Moenalis have not been preserved up to our times, while Asterion and Chara, as well as Fox and Goose, form single constellations). Hevelius described their situation and explained their names;[17] we shall return to them while discussing the figures of the atlas.

Prodromus astronomiae is adjoined by *Catalogus stellarum fixarum* (paged in continuum, although with an earlier date—1687—on the separate title page). The latter is composed of two catalogues compiled by Hevelius for the years 1660 and 1700, and of Halley's *Catalogue*, *Catalogus stellarum australium*, with the constellations in alphabetical order. They are the supreme achievement of the 17th century in that field.[18]

The illustrative part—*Firmamentum Sobiescianum sive Uranographia*—is composed of 54 square maps (30.5x37.5 cm) folded in the middle and showing a succession of 76 constellations. They are followed by two large circular maps—*Hemisphaerium boreale* and *Hemisphaerium australe* (51x51 cm). In the copy sent by Elisabetha Hevelia to Louis XIV the maps of the sky alternate with the pages of the *Catalogue*.[19] In various copies, still preserved, there are certain shifts. At the beginning or at the end of the atlas there is the frontispiece engraving and the *Introductio in Firmamentum Sobiescianum*, in which the author explains in detail certain problems concerning the atlas. The frontispiece engraving represents Urania, this time "throning" among clouds, surrounded by ten most famous astronomers, and Hevelius approaching her throne carrying Sobieski Shield and the Sextant ; he is followed by a row of animals, the names of which were given by him to his constellations. In different places of the volume—at the beginning or preceding the atlas—there is inserted the Dedication to John III signed by Elisabetha Hevelia, and the laudatory *Cenotaphium* in honour of the author written by his friend Johannes Ernestus Schmieden.

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[16] J. Hevelius to A. A. Kochański, 14 April 1678, MS. 10349, FL BNP, vol. XIII p. 32.

[17] J. Hevelius, *Prodromus astronomiae cum Catalogo fixarum et Firmamentum Sobiescianum*, Gedani, 1687—1690, pp. 114—117.

[18] P. Rybka, "Katalog gwiazdowy Heweliusza" ["Hevelius's Star Catalogue"], *Monografie z Dziejów Nauki i Techniki*, vol. CXXXII, Wrocław 1984 (together with the re-impression of the first, most important catalogue, pp. 47—156).

[19] At present under the sign. V. 1833 BNP.

The distribution of stars in the network of the ecliptic and equatorial co-ordinates, as well as their magnitude according to the variously marked six grades of luminosity were determined and drawn by Hevelius himself. That is why in the dedication of the northern hemisphere to John III, on the cartouche adjoining that map, he put his signature as the author, observer and designer (*auctor, observator ac delineator*). Moreover, two persons besides him, the artists, became the co-authors of the atlas : the *optimus pictor* mentioned in the astronomer's correspondence—Andreas Stech, and the *egregius sculptor Gallus*—Charles de La Haye.

The figures representing the constellations owed their artistic form to Andreas Stech (1635—1697), the well-known 17th century Gdańsk painter, the son of a painter from Słupsk. He spent his whole life in Gdańsk, active as the portrait-painter of the patriciate of that town, and as a religious painter. He was a dexterous Baroque eclectic utilizing the actual achievements in painting attained in the Netherlands. Already earlier he was engaged in scientific illustration. Thanks to his pictures of exotic plants the book *Exoticarum plantarum centuria prima* (Gdańsk 1678) by Jacobus Breyne, a Gdańsk physician, is recognized as one of the most beautiful publications in natural history in the 17th century. Stech co-operated with Hevelius earlier ; it was he who provided illustrations to *Machinae coelestis pars prior* of 1673 (their close friendship is proved by the fact that Hevelius stood godfather to one of Stech's sons). Stech's drawings of the maps of the atlas have not been preserved but the engravings executed on their basis demand their introduction in the *oeuvre* of that artist.[20] It is enriched by that important position, the rank of which will be elucidated in our further considerations.

Stech's drawings waited about three years ready to be engraved ; they were put down on copper plates by Charles de La Haye, a French religious emigrant, who came to Poland when Louis XIV revoked the edict of Nantes, i.e. after 1685. He probably is identical with the artist of the same name, born in Fontainebleau in 1641 and educated in Rome and Florence. In the following years he executed numerous engravings of the portraits painted by Stech. He also was active in Warsaw at the end of King Sobieski's reign, and next he moved to Vienna (died after 1712).[21]

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[20] They escaped, almost wholely, the notice of the monographers of that artist. B. Makowski, "Der Danziger Maler Andreas Stech," *Zeitschrift des Westpreussischen Geschichtsvereins*, 1910, Heft 52, p. 163—knew and took into account only the engraving representing Sobieski's Shield. Several but erroneous informations were reported by T. Grzybkowska, *Andrzej Stech, malarz gdański* [*Andreas Stech, the Gdańsk Painter*] Warsaw, 1979, pp. 106, 169—170, il. 102.

[21] U. Thieme, F. Becker, *Allgemeines Lexikon der bildenden Kunstler*, vol. 22, Leipzig, 1928 p. 224; A. Gosieniecka," Haye de la Karol," in : *Polski Slownik Biograficzny*, vol. IX, Wrocław, 1961, pp. 321—322 ; M. Karpowicz, *Sztuka Warszawy drugiej połowy XVII w.* [*Art in Warsaw in the Second Half of the 17th Century*] Warsaw, 1975 pp. 142—149. The year 1682 given as the date of his arrival to Gdańsk seems too early. Karpowicz quotes the new sources indicating that de La Haye was not a protestant (may be he was converted to the Roman Catholic Church when he stayed in Poland).

This threefold authorship of the atlas with Hevelius as astronomer, Stech as painter-designer, and de La Haye as sculptor-engraver is evidenced on the cartouches in the upper right corners of the two hemispheres. The artists' names appear also on the two large frontispiece engravings decorating *Prodromus* and *Firmamentum*, as well as in the atlas on the map with the Sobieski Shield constellation (fig. Q); their authorship concerns of course all other maps, although they have not been signed.

As we know, Hevelius desired the maps of his atlas to be distinguished not only by a greater accuracy but also by their clearness, if compared with the previously published ones. For that reason he did not introduce any denotations or captions besides the name of the constellation, since the atlas was published jointly with his *Catalogus stellarum*, in which the astronomer discarded the multitude of designations, and only quoted the best known Latin names of constellations. The particular stars were defined by him traditionally within the figure of the constellation (e.g. *ultima caudae*—"the last in the tail," *in collo*-"at the neck," etc.). He regarded as "burdensome" (*toediosissimum*, *molestum*) to designate the stars by means of letters or numbers, the manner introduced at the beginning of the 17th century by Bayer.[22] He explained that, following most of his predecessors, he decided to show the figures "from the back" (*a tergo*) that is in an inverse arrangement of stars than they are seen from the Earth.[23]

Throughout the ages, the pictures of constellations were characterized by an essential duality of representation. In general, the position of stars on maps was drawn in accordance with their outlook in the sky by transposing on a flat surface the seemingly concave "bowl" of the sky. Thus, it was an internal representation from the alleged centre of the universe. The impression of its sphericity and the impression that all stars are equidistant from the Earth gave rise to the construction of celestial globes, on the surface of which the signs of the constellations had to be shown inversely, in an "outer" representation. This was not essential as regards the objective signs, simmetric in their shape. In relation to animal constellations shown in profile this only caused the transposition of their figures in the inverse side. But as far as human figures were concerned there arose the necessity of showing them from the back. According to such a representation, Ptolemy determined the situation of stars in *Almagestum*. In the course of ages, that differentiation was not always obeyed. For instance, Hevelius pointed out the confusion, which reigned on Bayer's maps.[24] The stars were represented in an "internal" arrangement, but human figures were often shown from the back (due to which Perseus holds his sword, and Hercules and Orion their clubs in left hands). This was not essential for Bayer, since he had introduced the marking of stars by means of letters instead of expressions "on the right" or "on the left"

[22] J. Hevelius, *Prodromus...*, p. 110 ; *idem, Introductio in Firmamentum Sobiescianum*, Gedani, 1687 p. 6.

[23] *Ibid.*, p. 5.

[24] *Idem, Prodromus...*, p. 110.

hand or leg. Hevelius decided to give fully corresponding figures and determinations ; but as regards the maps he chose the "external," "globular" solution, and explained that he followed the tradition of ancient descriptions and the contemporary greater popularity of globes.[25] He was consequent in pursuing his choice—his atlas is thus a celestial globe transferred on fragmentary maps and two hemispheres. He emphasized that his maps would successfully replace the globes and be able to serve sailors and travellers.[26] At the beginning, when the astronomer joined his editorial hopes with the Blaeu office and next with the Royal Society, he expected that his designations on maps would be applied at once on the globes.[27] In the case of maps Hevelius gave a less easy solution by inverting the system perceived from the Earth ; in the following times that solution was finally rejected in flat cartography. Evidently, he did not take into account the difficulty in inverting the figures and mirror arrangements. May be, he himself had no such difficulty ; the ability of reflexive "mirror writting" is known to occur.

Andreas Stech, while shaping the groups of stars into conventional figures, had to take into account—like every artist facing such a task—the already existing rich traditions. Throughout the ages, certain representations were repeated, and their antiquity was not even realized by the following generations of artists. It is only in our times that laborious investigations reveal the roots of these traditions, which date back to the cultures of Mesopotamia and Egypt, Greece and Rome.[28] Ancient maps and instruments perished in the course of ages. One of the few fairly well preserved relics of the past is that of the Globe of Farnese, a Roman marble globe with carved figures without stars. It was excavated in the 16th century and aroused great interest in the 17th century.[29] Fragments of ancient astronomical instruments and illustrations appeared here and there in post-antique Europe, especially at the times of the consecutive "renaissances" of the mediaeval period ; their examples are for instance the planisphere of Geruvigus[30] and the globe of Nicolaus of Cusa.[31] The heritage of

[25] *Idem, Introductio...*, p. 6.

[26] *Ibid.*, pp. 18—19.

[27] This is evident from his correspondence with F. Aston, see above note 9.

[28] E. L. Stevenson, *Terrestrial and Celestial Globes*, vol. I, New Haven, 1921 pp. 14—25; O. Muris, G. Saarmann, *Der Globus im Wandel der Zeiten*, Berlin, 1961 pp. 15—26 ; E. Unger, "From the Cosmos Picture to the World Map," *Imago Mundi*, 1937, pp. 1—7 ; G. Strohmaier, *Die Sterne des Abd ar-Rahman as-Sufi*, Leipzig, 1984, pp. 7—11.

[29] G. Tabarroni, "Jean-Dominique Cassini et la datation de la sphère Farnèse," in : *Actes du XII^e Congrès International d'Histoire des Sciences*, Paris, 1968, vol. III B, Paris, 1971 pp. 149—153.

[30] B. Brown, *Astronomical Atlases, Maps and Charts*, London, 1922 (frontispiece illustration).

[31] Z. Ameisen, "Globus Marcina Bylicy z Olkusza i mapy nieba na Wschodzie i Zachodzie" ["The Globe of Marcin Bylica of Olkusz and Maps of the Sky in the East and the West"], *Monografie z Dziejów Nauki i Techniki*, vol. XI, Wrocław, 1959, p. 18, il. 11. A good review of the mediaeval representations of celestial signs is found in the successive volumes of the publication *Verzeichnis astrologischer und mythologischer illustrierter Handschriften des lateinischen Mittelalters*, vol. I—IV, Heidelberg, 1915—London, 1966 (from vol. III on under the title in the English language).

the astronomical knowledge together with maps and globes was most carefully preserved by the Arabs, who transformed the figures in the oriental style.[32] From them they were taken over and reworked in the classical style by modern Europe of the Renaissance proper. Let it be mentioned that in the collections of the Jagiellonian University there has been preserved the largest globe constructed before the year 1500 bequeathed by Martin Bylica of Olkusz ; it is a work executed in 1480 by Hans Dorn in his Vienna workshop ; it unites in its artistic shape the Arabian, late-Mediaeval, and early-Renaissance elements.[33] The maps of the sky dating back to the 16th century, most often in the form of one or two planispheres (some best known ones are connected with Albrecht Dürer's name) are distinguished by the figures represented partly in the antique style and partly dressed according to the contemporary fashion.[34] Among the celestial globes produced in pairs with terrestrial ones there are the Dutch globes constructed by Gerard Mercator, which are distinguished by a special deftness of figures and classical style. The largest globe, six feet in diametre, was constructed in the years 1570—1584 by Tycho Brahe.[35] At that time in Poland, the Cracow edition of the poems by Jan Kochanowski in 1585 including his translation of *Phaenomena*, the famous Greek astronomical poem by Aratos of Soloi (translated into Latin by Cicero) was provided by the printer, Jan Januszowski, with two maps of the northern and southern hemispheres, which originated most probably in Cracow in connection with the French maps of the year 1559 and the German ones of 1565.[36]

Stech's and de La Haye's atlas produced hundred years later than the Cracow maps belongs to the subsequent Baroque wave in the astronomical illustration ; its beginning is marked by the two already mentioned atlases by Bayer and Schiller. *Uranometria,* the atlas by Johann Bayer (1572—1625), lawyer and astronomer of Augsburg (published in that town in 1603, next editions in 1639, 1648, 1655 and 1661)[37] comprises 50 square maps of constellations (il. 10) and two planispheres with only the stars marked. The drawings and doubtlessly the engravings of figures were executed by Alexander Mair (Mayr), the engraver

[32] E. L. Stevenson, *op. cit.*, vol. I, pp. 26—32 ; O. Muris, G. Saarmann, *op. cit.*, pp. 33—38.

[33] Z. Ameisen,*op. cit.* and T. Przypkowski, "Globus Bylicy i pierwsze nowoczesne mapy nieba. Na marginesie rozprawy Zofii Ameisenowej o globusie Bylicy i mapach nieba" ["The Globe of Bylica and the First Modern Maps of the Sky. A Side-note on Zofia Ameisen's Dissertation on the Globe of Bylica and Maps of the Sky"], *Kwartalnik Historii Nauki i Techniki*, 1961, pp. 553—567.

[34] Z. Ameisen, *op. cit.*, il. 38—46; B. Brown, *op. cit.*, pp. 13—19.

[35] E. L. Stevenson, *op. cit.*, vol. I, pp. 185—186 ; O. Muris, G. Saarmann, *op. cit.*, pp. 97—146.

[36] T. Przypkowski, *op. cit.*, pp. 563—565, il. 3a—3b and *idem*, "Pierwowzór pierwszej drukowanej polskiej mapy nieba z 1585 r. ["The Prototype of the First Printed Polish Map of the Sky from 1585"], *Kwartalnik Historii Nauki i Techniki*, 1964, pp. 11—13. Author emphasized strongly that the Cracow maps showing the sky as it is seen by man from the Earth were up-to-date at the time of their publication.

[37] B. Brown, *op. cit.*, pp. 19—25; E. Rosen, "Bayer Johann," in : *Dictionary of Scientific Biography*, vol. I, New York, 1970 pp. 530—531.

active in the years 1600—1616.[38] Another lawyer and astronomer of Augsburg, Julius Schiller, published the atlas *Coelum stellatum christianum* (Augsburg 1627) changing the former figures of constellations into new, Christian ones.[39] Thus, for instance, he replaced Ursa Minor by St. Michael, Ursa Maior by St. Peter's Boat, the twelve Zodiac signs by the Twelve Apostles, etc. This entirely new vision of the sky (the atlas contained 54 square tables) was created by Johann Mathias Kager,[40] a productive Baroque painter, and according to his drawings the engravings were executed by Lucas Kilian of the well-known Augsburg family of publishers and engravers[41] (il. 11). While writing about that innovation Hevelius approved Schiller's intentions but was of the opinion that much like geographical names, those rooted in the astronomical nomenclature should not be changed. Seeing that Schiller's proposal did not spread wider in the course of sixty years, he himself remained faithful to the Greco-Roman tradition.[42]

Other works of the 17th century celestial cartography were limited to lesser sets of comprehensive maps showing several constellations. Andreas Cellarius, a native of Palatinate, rector of the school in Hoorn in the Netherlands, published *Harmonia macrocosmica* (Amsterdam 1660, subsequent editions up till 1708) including, among others, eight circular maps of the "antique" and "Christian" skies.[43] Jacobus Bartsch, Kepler's son-in-law, professor of mathematics in Strassbourgh (died in 1630) was the author of *Planisphaerium stellatum sive vice-globus coelestis* (Nürnberg 1661), for which he himself drew a map of the northern hemisphere and two tables with the developed Zodiac belt engraved probably by Paulus Fürsten.[44] Hevelius also mentioned these two works while writing about the preparation of his own *Catalogue* and atlas, and must have possessed them in his library, from which they were no doubt known to Stech. Moreover, two atlases appeared in France in the latter half of the 17th century, and might have reached Gdańsk. Ignace-Gaston Pardies, a young Jesuit, was the author of *Globi coelestis in tabulas planas redacti descriptio* (published soon after his death, Paris 1673—1674, subsequent editions 1693, 1742, 1789)[45] including six circular maps, the engravings of which were executed most probably by Guillaume Vallet, the royal engraver,[46] whose name as the

[38] U. Thieme, F. Becker, *op. cit.*, vol. 24, p. 461.

[39] B. Brown, *op. cit.*, pp. 31—33.

[40] U. Thieme, F. Becker, *op. cit.*, vol. 19, pp. 431—434.

[41] *Ibid.*, vol. 20, p. 295.

[42] J. Hevelius, *Introductio...*, p. 16 and following. Neither accepted another 17th century proposal to change the names of constellations into those of the coat-of-arms of the countries and their rulers according to the suggestion of Erhard Weigel, *Coelum heraldicum*, B. Brown, *op. cit.*, pp. 33—35.

[43] *Ibid.*, pp. 40—42.

[44] It is not known whether Fürsten was only the editor or also the engraver, U. Thieme, F. Becker, *op. cit.*, vol. 12, p. 563.

[45] B. Brown, *op. cit.*, pp. 36—37.

[46] U. Thieme, F. Becker, *op. cit.*, vol. 34, p. 81.

editor's is found on the title page of the atlas. The set of four maps, *Cartes du ciel* were elaborated by Augustin Royer (Paris 1679) who published them together with Halley's *Catalogue*.[47] In England, Halley himself published in 1679 two planispheres,[48] which no doubt reached Hevelius and Stech. The 17th century brought also the production of further globes of the sky.[49] The Dutch ones by Willem Blaeu (1571—1638) belong to those known best. One of his globes was owned by Hevelius, on whose portrait painted probably by Stech[50] it became commemorated. As it was mentioned earlier, Hevelius was in contact with the Blaeu firm, which was to produce further editions of globes according to his maps. In the years 1681—1683 the cartographer Vincenzo Maria Coronelli (1650—1718) of the Franciscan order in Venice, produced for Louis XIV a pair of globes of large dimensions, 3.9 m in diametre (now kept in Versailles), which up to the year 1922 were to remain the largest globes in the world. Hevelius knew about them, as well as about the reward in the form of a golden chain handed to Coronelli by the king of France.[51]

In the atlas published in Gdańsk, all the more important constellations were shown on separate maps, while lesser ones were joined in common tables. The constellation to which the given table is dedicated is distinguished by light-and-shade, while the neighbouring constellations are only outlined (*nudis lineolis*—as Hevelius expressed it). It was Schiller's atlas which served as a model to our authors, because in Bayer's atlas only stars were taken into account, without the figures of the neighbouring constellations, which—according to Hevelius—did not visualize their mutual relation.[52] The size of the particular figures is not uniform on the consecutive maps, on which they are repeated. The designer and the engraver did not copy their outlines mechanically, but created them anew on each map ; that is why they sometimes differ in small details (hair-dressing, attire of figures). According to the order accepted by Ptolemy, the constellations of the northern hemisphere go first in the atlas, beginning with those nearest the pole, and consequently following more or less a spiral (with one jump on the diametre) in the same direction as the seeming movement of the celestial globe (reverse to that of the hands of the clock). They are followed by the constellations of the southern hemisphere moving on a spiral from the border towards the pole (in that case the movement is in accordance with that of the hands of the clock). Animal signs form almost a half of the figures (Hevelius also conformed to that tradition, and on his side added animals). The remaining signs

[47] B. Brown, *op. cit.*, pp. 38—39, tabl. V.

[48] *Ibid.*, pp. 37—38, tabl. IV.

[49] E. L. Stevenson, *op. cit.*, vol. II, pp. 1—136 ; O. Muris, G. Saarmann, *op. cit.*, pp. 157—184.

[50] T. Grzybkowska, "Andrzeja Stecha portrety Heweliusza" ["Portraits of Hevelius by Andreas Stech"], *Biuletyn Historii Sztuki*, 1974, p. 240, il. 1, 5—6.

[51] P. Des Noyers to I. Boulliau, 27 January 1681, MS. 13021, FF BNP, p. 97 and the reports from France dated 23 December 1683, MS. 10349, FL BNP, p. 44.

[52] J. Hevelius, *Introductio...*, p. 3.

fall into two almost equal parts : objective-material signs, and human figures. Let us see what they look like within these three main groups elaborated by Stech, on the background of the more important earlier ideas, and at the same time reminding of the mythological meaning of the particular signs, which were well known and vivid in the 16th and 17th centuries.

Let us begin with the most numerous animal signs. The Polar Star marking the northern pole of the sky and for ages guiding the wanderers and sailors, is found at the end of the unnaturally long tail of the Little Bear (Ursa Minor—fig. A in the atlas). Stech represented it as a rather small, stealthily advancing animal with the tail traditionally elongated (since for Tales of Miletus this was the figure of a dog, hence the Greek name—Kynosura—given to the whole constellation). Near the Little Bear and round the pole of the ecliptic there entwines the body of the Dragon (Draco—fig. B), which, according to accepted models, is shown by Stech as a serpent with a queer head. According to some mythographers that monster was to guard the garden of the Hesperides and was defeated by Hercules (whose foot often presses its head, and in our atlas is seen just above it). According to others this was Zeus who, afraid of his father Chronos, transformed himself into a serpent and changed his two foster-mothers into she-bears. According to a more widely spread mythological version it was Calisto, the companion of Artemis ; seduced by Zeus, she was changed into an animal, the Great Bear (Ursa Maior—fig. D, il. 1). In Stech's version, that animal's body is massive and ponderous, and its head too magnified.

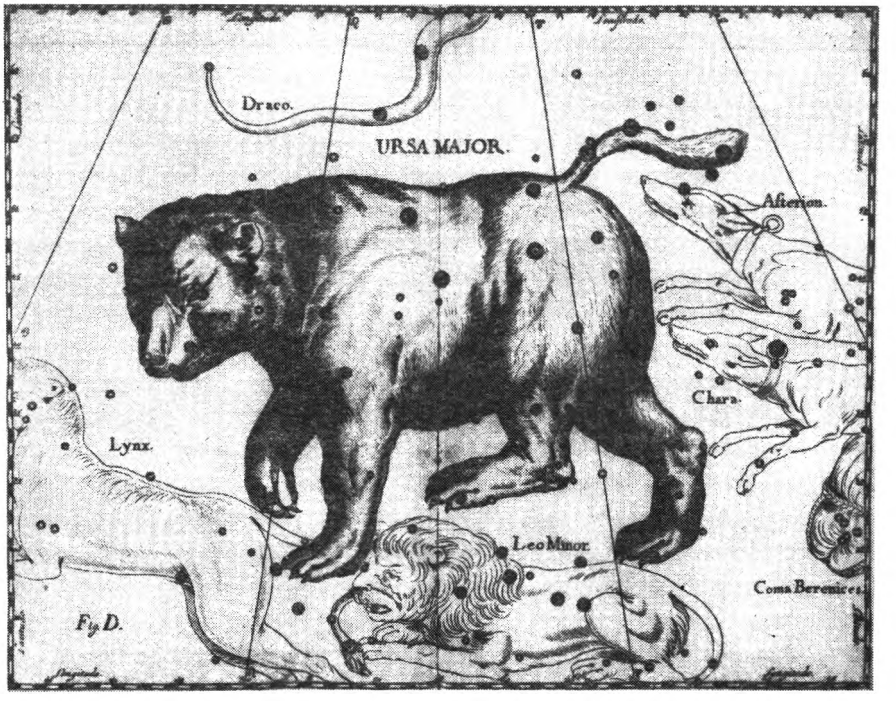
The Great Bear's hind quarters are reached at a run by the Hunting Dogs (Canes Venatici—figs. E and F—il. 2), Asterion and Chara, a constellation formed by Hevelius.[53] Three hounds held on leash and running after the Ox-Drover but in the opposite direction than the Bear, were represented already earlier, for instance on the planişphere by Petrus Apianus-Benewitz published in the year 1536.[54] Stech represented the Hunting Dogs as slim greyhounds shoving from behind the Ox-Drover. The figures of these three neighbouring constellations were joined by Hevelius thematically : we shall return to that topic when discussing the Ox-Drover. The following particular animal signs, formed also by Hevelius, are those of the Fox and Goose (Vulpecula cum Ansere—fig. L). The slim Fox carries in her paw an already known sign—the Arrow (Sagitta), and in her mouth the Goose hunted for Cerberus, who was weakened in his fight with Hercules—as our astronomer explained it. Hevelius gave the name of Cerberus to a group of stars on the left hand of Hercules, who strangles the three-headed monster.[55]

The Fox with the Goose was distinguished by Hevelius among three bird signs—two Eagles and a Swan. The Greek Lyre (Lyra—fig. I) was represented by

[53] *Idem*, *Prodromus...*, p. 114.

[54] B. Brown, *op. cit.*, il. on p. 14.

[55] J. Hevelius,*Prodromus...*, p. 117.

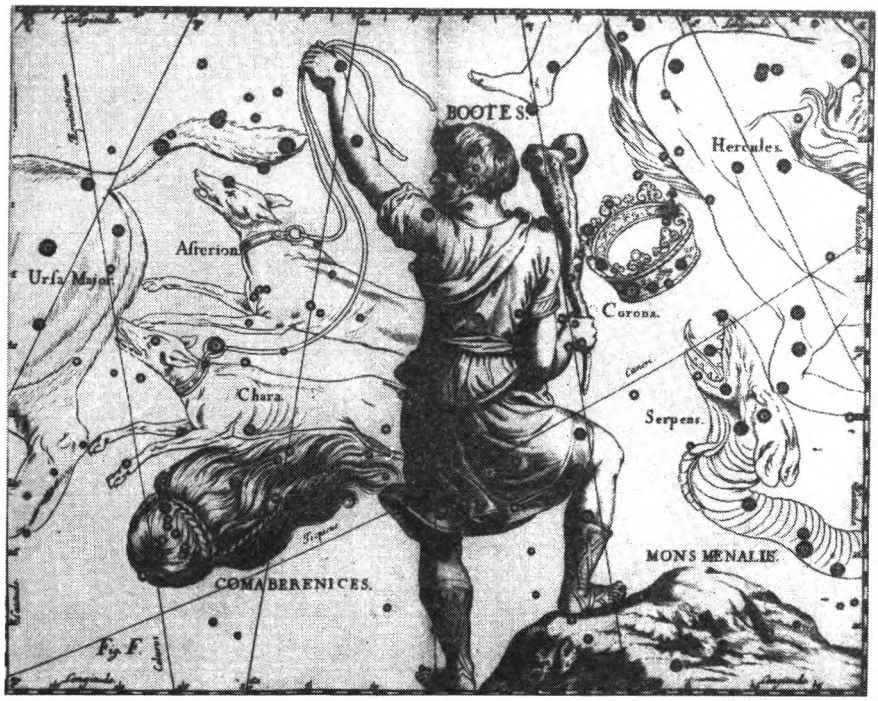


Il. 1. J. Hevelius, *Firmamentum Sobiescianum*, Gdańsk 1687—Great Bear (Phot. Jagiellonian Library)

Stech in accordance with the modern tradition as a stringed instrument carried by an eagle. On Arabic maps and globes this was the oriental sign of the Falling Vulture (Vultur Cadens) ; these two signs melted, and the Arabic name for the eagle—Wega—adhered to the first-magnitude star of that constellation. At the back of the near-by Eagle (Aquila—fig. R) there also is seen a first-magnitude star, Altair, which in Arabic means the Flying Vulture (Vultur Volans). This is a very old sign dating back to the Sumerian astronomy;[56] it also was represented as a sitting bird (for instance on the Globe of Farnese). On Stech's map the Vulture flies down, on a Baroque diagonal line from left to right. In the opposite direction there flies the Swan (Cygnus—fig. K) on one of the foregoing tables; it is shown from its ventral side, in accordance with the tradition (both these representations approach those in Bayer's atlas). On Stech's tables, the three birds have magnificent, spread wings and carefully differentiated plumage. Near the Swan's tail Hevelius placed his next small sign, the Lizard (Lacerta sive Stellio—fig. M), drawn by Stech as a little animal, as is suspended in the air. In accordance with the astronomer's intention its back is dotted with little stars[57] (which is peculiar to the rock lizard, as is indicated by its Latin name).

[56] G. Strohmaier, *op. cit.*, p. 42.

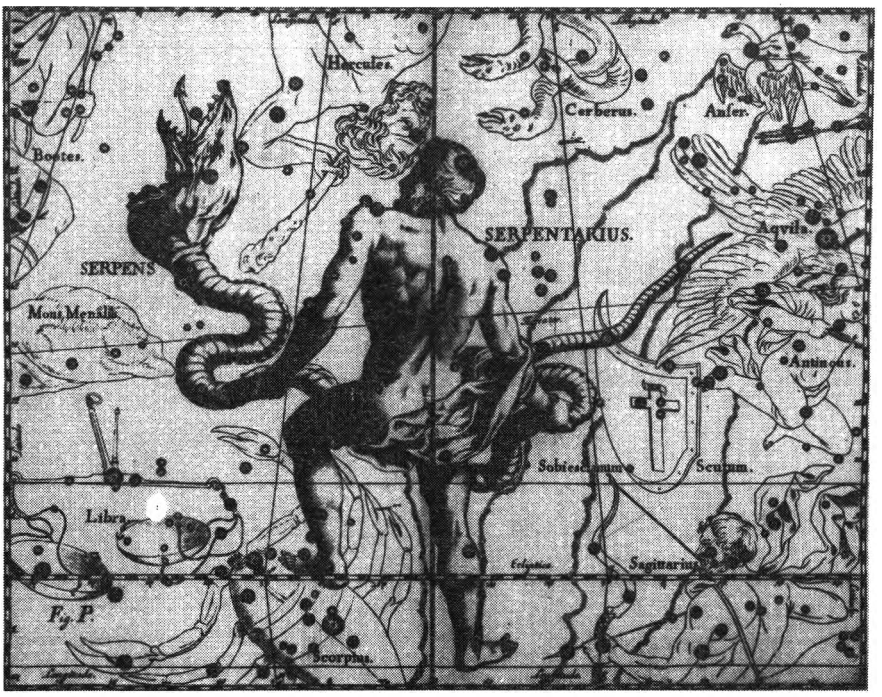
[57] J. Hevelius, *Prodromus...*, p. 114.



Il. 2. J. Hevelius, *Firmamentum Sobiescianum*, Gdańsk 1687—Bootes (Phot. Jagiellonian Library)

The consecutive animal sign in the atlas is that of the slim Giraffe (Camelopardalus—fig. O) represented by Stech as treading gracefully, with a little horned head, looking sharply with its one visible eye. But its tail resembling that of a horse, and the lack of pattern on its pelage do not agree with the looks of that exotic quadruped recently introduced in the sky.[58] The mighty Serpent (Serpens—fig. P, il. 3) in the Serpent-Bearer's hands who will be mentioned below, reminds of the Dragon, but Stech endowed it with a corrugated body. The already mentioned Eagle is followed in the atlas by the Dolphin and Little Horse (Delphinus, Equuleus—fig. S) joined in one table. In Greece there circulated numerous tales about dolphins, for instance that they saved Arion, the singer, from getting drowned in the sea. Stech's Dolphin has fancyful, indented fins inherited from some earlier representations. It is only the Little Horse's head, a sign added rather late by the Greeks (it was unknown to Aratos) and regarded sometimes to be the transformed Phaethon, which emerges from behind Pegasus (Pegasus—fig. T), a mythical winged horse. Traditionally, it is represented only as the fore-part of a horse, and shown in a reverse position,

[58] The constellation Giraffe occurs in J. Bartsch, *Planisphaerium stellatum*, Norimbergae (1661), p. 81 and in Royer's planisphere, B. Brown, *op. cit.*, p. 39 and tabl. V.



Il. 3. J. Hevelius, *Firmamentum Sobiescianum*, Gdańsk 1687—Serpent-Bearer (Phot. Jagiellonian Library)

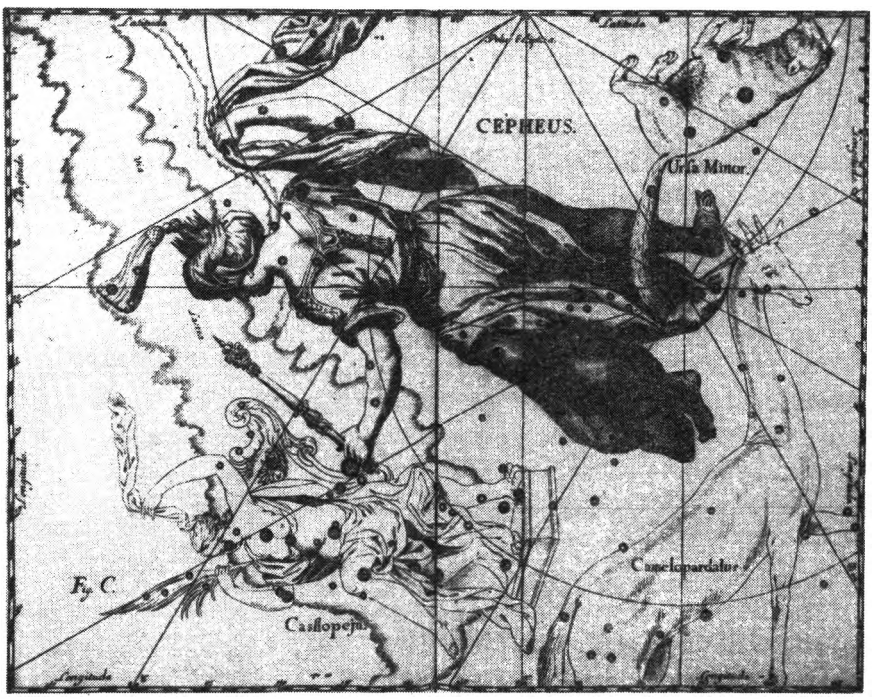
with the hoofs upwards. The constellation of the Goat with the goatlings, which for the Greeks commemorated Amaltea, the nurse of Zeus, became united with the constellation of the Charioteer (Auriga—figs. X and W—il. 6), and gave the name Capella to the first-magnitude star.

The two consecutive signs were added by Hevelius. One of them is the Lynx (Lynx—fig. Y) shown in a jump, with its legs and neck slightly elongated. It should be remembered that in the 17th century that animal was the emblem of the famous Italian academy (Accademia dei Lincei). Hevelius emphasized that every astronomer should have "the sight of a lynx" [59] and his friends often spoke highly about his sight, which really was marvelous.[60] The other sign is the Lesser Lion (Leo Minor—figs. Z and D—il. 1) added beside the Lion, and shown by Stech as a rather small, lurking animal.

Beginning with the Ram there follow the twelve Zodiac signs, among which animal figures prevail. They were represented very often because of their astrological meanings. Stech gave them faithfully their shapes already established and repeated throughout the ages almost unchanged. The lying Ram (Aries—fig. BB) was most probably of Egyptian origin ; it was linked up by the

[59] J. Hevelius, *Prodromus...*, pp. 114—115.

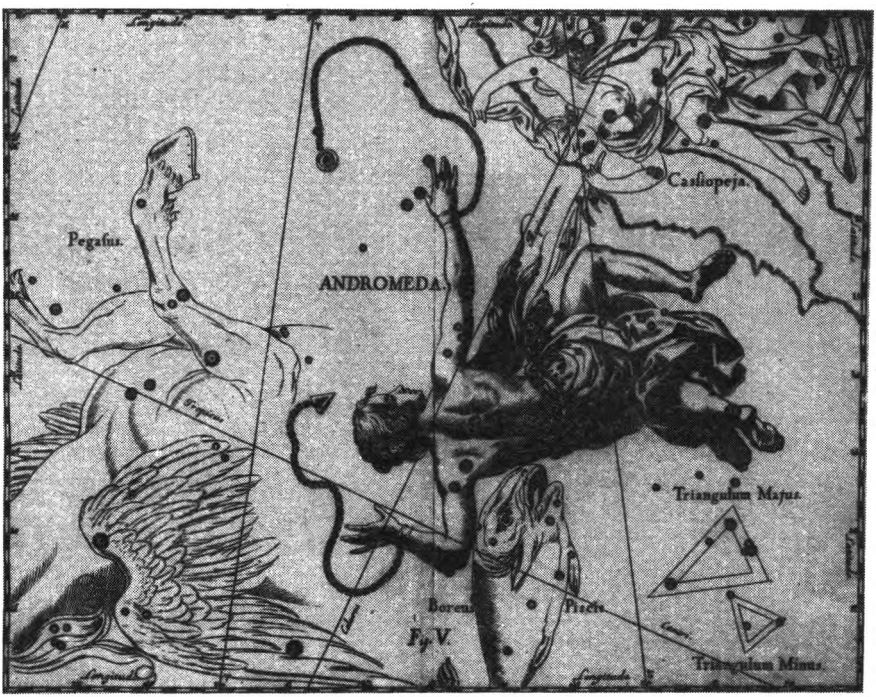
[60] K. Targosz, *Jan Heweliusz, uczony-artysta* [*Johannes Hevelius, Scientist-Artist*], Wrocław, 1979, p. 110.



Il. 4. J. Hevelius, *Firmamentum Sobiescianum*, Gdańsk 1687 Cepheus (Phot. Jagiellonian Library)

Greeks with the Golden Fleece Lamb. Represented by Stech, it is distinguished by very rich and curly wool. A cloud, against the background of which there is visible a small Fly (Musca—fig. AA) divides the Ram from the formidable proton of the Bull (Taurus—fig. CC) with the first-magnitude star Palilitium (Aldebaran) near its eye, a group of Pleiades at the back of its neck, and Hyades on its muzzle. The formidable elongated Crab (Cancer—fig. EE), which gives the name to one of the celestial tropics, reaches the mouth of the tremendous Lion (Leo—fig. FF) lying in wait ready to jump, with two first-magnitude stars, one on its breast, the other at the end of its drawn up tail. These two signs were bound by the Greeks with Hercules, who crushed the Crab under foot while fighting with Hydra of Lernae, and killed the Lion of Nemea. Farther on, in the Zodiac belt we find the Scorpion (Scorpio—fig. II) ; its abdomen is long and strewn with stars, and the deadly fang at the end. The Scorpion's "Heart," Antares, is a first-magnitude star. The Capricorn (Capricornus—fig. LL), after which the other tropic has been named, according to tradition had the forepart of a goat grown up with the back of a fish. The series of the animal signs in the Zodiac is closed by two Fishes (Pisces—fig. NN) represented by Stech with their mouth open, as if gasping, and their tails bound by means of a mysterious ribbon mentioned already on the Babylonian tablets.[61]

[61] G. Strohmaier, *op. cit.*, p. 78.



Il. 5. J. Hevelius, *Firmamentum Sobiescianum*, Gdańsk 1687—Andromeda (Phot. Jagiellonian Library)

The Whale (Cetus—fig. OO) opens a less numerous group of signs of the southern hemisphere. This is really neither a whale nor "a large fish" but "a marine wonder", and Stech followed the models (dating back to the globe of Farnese), which show a terrible monster with a horn on its head, legs with claws in the front part of the body, and only the back of a fish. On one of the consecutive maps we see the Unicorn (Monoceros—fig. RR), in the existence of which people believed still in the 17th century. Of the two dogs in the southern sky, the Lesser Dog (Canis Minor—fig. SS) is a traditional shaggy, little dog with its head raised, shining with the Procyon, a first-magnitude star. The Great Dog (Canis Maior—fig. DDd) sits as if "begging ;" it has a large head of a bulldog (as in Bayer's atlas) and in its jaws there is Syrius, the brightest star of all those seen from the Earth. Hydra (Hydra—fig. TT) was shown by Stech in accordance with the tradition as a long, corrugated serpent (its heart is a first-magnitude star). At the end of its body there sits the Raven (Corvus—fig. WW). The following Wolf (Lupus—fig. YY), originally every wild beast (Fera) was represented unchanged for centuries in an unreal pose, as if suspended in front of Centaurus, who spears its neck (sometimes he holds the Wolf by its legs as a trophy). The Southern Fish (Piscis Notius—fig. BBb) was represented with its spine downwards in the same table as the standing Crane (Grus—fig. BBb). On one map there also are shown

Il. 6. J. Hevelius, *Firmamentum Sobiescianum*, Gdańsk 1687—Perseus (Phot. Jagiellonian Library)

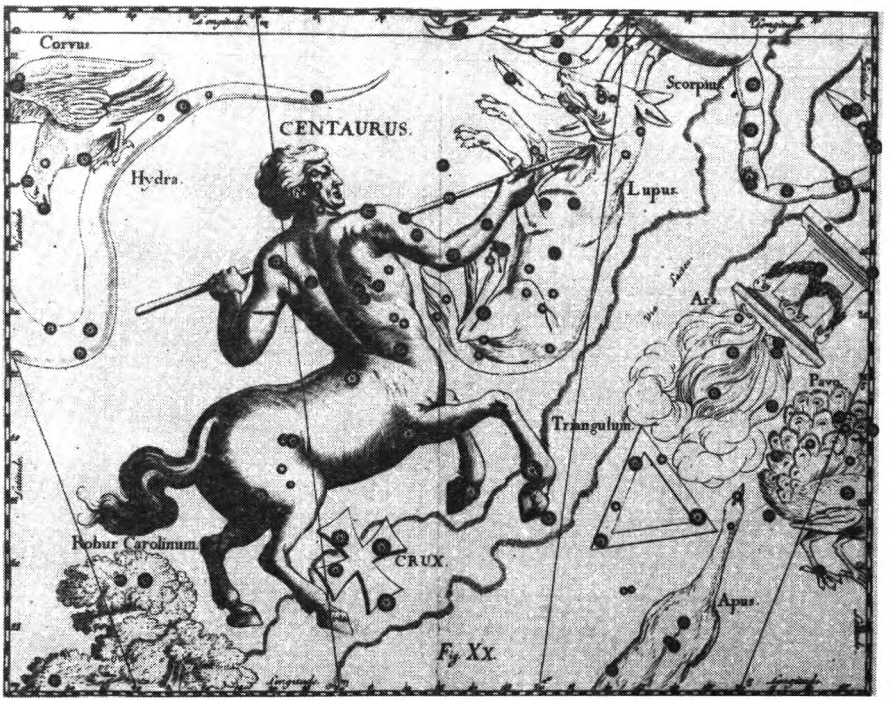
two rather small constellations—the Hare and Noah's Dove (Lepus, Columba—fig. CCc).[62]

On the last map of the atlas (fig. FFf) there are collected ten animal signs near the southern poles of the sky and of the eclyptic ; they became known and were given names at the time of the great geographical discoveries by the sailors of the southern seas. Basing upon the data reported by the Dutch sailor, Petrus Theodori, and the mathematician, Fridericus Houtman, they were introduced in the globes by Jodocus Hondius,[63] and in the flat cartography by Bayer.[64] These are figures of exotic animals. The Toucan and the Phoenix were already represented by light-and-shade on the map with the river Eridanus (Toucan, Phoenix—fig. PP), the Peacock together with the Altar (Pavo—fig. ZZ), and the Crane together with the Southern Fish (Grus—fig. BBb). In the last table (fig. FFf) there also are shown the Bird of Paradise (Apus), the Bee (Musca Apis), the Chameleon (Chamaeleon), the Lesser Water Serpent (Hydrus), the Flying Fish (Piscis Volans), and another one, the Sword Fish (Xiphias), the elongated trunk of which passes the southern pole of the eclyptic. No doubt, Hevelius initially

[62] J. Bartsch, *op. cit.*, p. 97; B. Brown, *op. cit.*, p. 39 (Royer's map).

[63] E. L. Stevenson, *op. cit.*, vol. II, p. 8.

[64] B. Brown, *op. cit.*, pp. 22, 29.



Il. 7. J. Hevelius, *Firmamentum Sobiescianum*, Gdańsk 1687—Centaurus (Phot. Jagiellonian Library)

intended to present in separate tables also these less known signs with the stars measured at that time by Halley upon his encouragement. In 1682 he wrote about 60—70 maps, which he planned.[65] Apparently, the hurry to finish his work inclined him to give up a detailed final series and, following Bayer, he collected the southern circumpolar signs on the last map.

Let us pass in turn to the signs linked up with objects. The Head plaited with a tress and a wave of hair is Stech's Tress of Berenice (Coma Berenices—fig. F—il. 2) named after Berenice II, sister and wife of Ptolemy Euergetes, whose happy return from the war she tried to induce by offering her hair to Artemis in her temple, and the royal astronomer commemorated it in the form of a constellation. This representation returned in the iconography of the latter half of the 16th century. The same table shows Mount Moenalis (Mons Moenalis—fig. F—il. 2) added by Hevelius at the foot of the Ox-Drover.[66] Beside his figure there is the Northern Crown (Corona—fig. G) represented in the frequent conception of an open crown with fleurons, and adorned by Stech additionally with magnificent jewels, although a part of the mythographers regarded it as Ariadne's wreath, as we see in Bayer's atlas. The Lyre (Lyra—fig. I) was

[65] J. Hevelius to F. Aston, 17 November 1682, MS. 10349, FL BNP, p. 203.

[66] J. Hevelius, *Prodromus...*, p. 117.

Il. 8. J. Hevelius, *Firmamentum Sobiescianum*, Gdańsk 1687—Northern Hemisphere of the Sky (Phot. Jagiellonian Library)

decorated by Stech with a Baroque flourished frame. Sobieski Shield (Scutum Sobiescianum—fig. Q), a sign so important for us Poles, is the Janina coat of arms of the King's family. Hevelius added a cross as the symbol of Christianity defended by that King. The four stars at the border of the shield were connected by Hevelius with the King's four sons, and the three ones on the cross with the King, the Queen, and their only daughter ; he thus honoured the whole family of John III.[67] The map with the Shield is distinguished by great elaboration. All the signs are represented with plasticity. There also is on it a special dedication surrounded with a wreath with the signatures of the astronomer and of the two artists because the reprints of that engraving were doubtlessly intended for

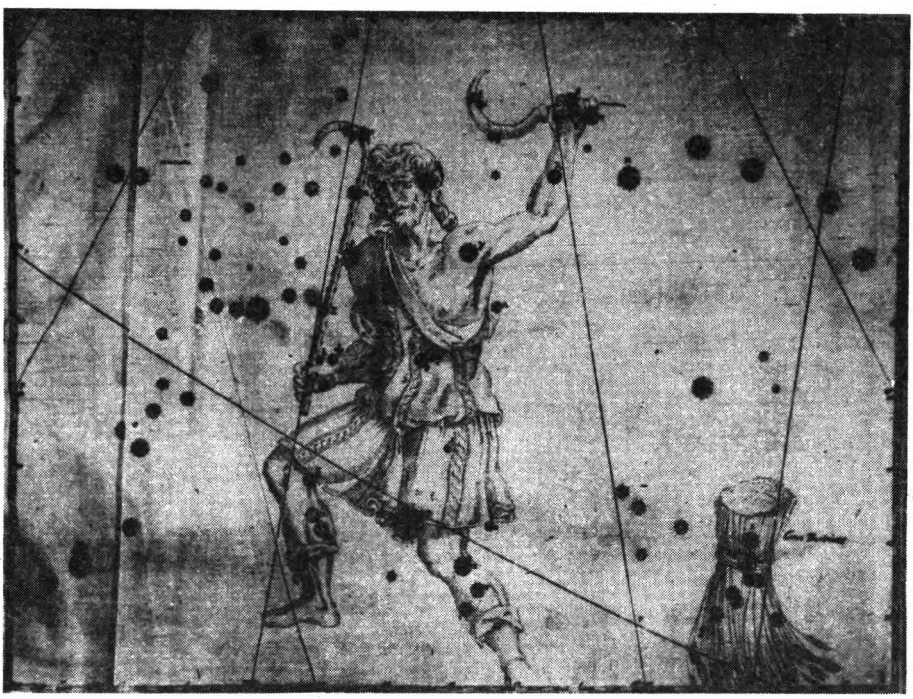
[67] *Ibid.*, pp. 115—116.

Il. 9. J. Hevelius, *Firmamentum Sobiescianum*, Gdańsk 1687—Southern Hemisphere of the Sky (Phot. Jagiellonian Library)

separate distribution.[68] Beside the Triangle (originally the Greek letter *delta*) Hevelius also added the Lesser Triangle (Triangulum Maius, Triangulum Minus—fig. AA). In the Zodiac belt there is only one objective sign—the Scale (Libra—fig. HH), the meaning of which has never been explained.

The series of objective signs in the southern hemisphere is opened by the river Eridanus (Eridanus—fig. PP), into which Phaethon was said to have fallen. It is shown as a winding stream of water (without waterside thickets—unlike in Bayer's atlas) flowing out from under Orion's foot and shining with a first-magnitude star. In the southern hemisphere there also is the Sextant of Urania (Sextans Uraniae—fig. VV) decorated with Baroque flowery ornaments.

[68] B. Makowski, *op. cit.*, p. 163.



Il. 10. J. Bayer, *Uranometria*, Augsburg 1603—Bootes (Phot. Jagiellonian Library)

This was Hevelius's own favourite instrument burned during the fire in the year 1679 and represented by Stech many years earlier in *Machinae coelestis pars prior*. In the atlas, it is seen just above Hydra, against the background of which there hovers the tilted Vase (Crater—fig. WW). Here it has the shape of a wide, open, elaborately modelled Antique-Baroque vessel (in the Mediaeval-Renaissance iconography it also used to have the shape of a jug and even of a wooden bucket). The Greeks, when wishing to explain the neighbouring signs concocted the story of Zeus, who sent the raven to bring water.[69] Between Centaur's hoofs there is seen the Southern Cross (Crux—fig. XX) separated as late as in the latter half of the 17th century (for the first time on Royer's maps[70]). Nearby there is the Altar (Ara—fig. ZZ) represented by Stech in accordance with the prevailing tradition as an architectonic fumy altar (here in the antique style, decorated with festoons), although in ancient times that sign was a vessel-censer, as it is on the globe of Farnese, and the tripod in Bayer's atlas approaches that idea more closely. On the two sides of the Altar there are two other objective signs—the Southern Triangle (Triangulum Australe—fig. ZZ) and the Southern Crown (Corona Australis—fig. AAa) represented by Stech as an open and this

[69] G. Strohmaier, *op. cit.*, p. 98.

[70] B. Brown, *op. cit.*, p. 39.

time an indented crown. Almost a half of the southern polar circle is occupied by an enormous sign, now divided into four constellations, the Ship Argo (Argo Navis—fig. EEe). In Stech's version it acquired an unusually adorned shape: a large mask on the stern, with Canobus, a first-magnitude star shining there, and decorated shields on the ship's sides. Close to it Halley located Charles's Oak (Robur Caroli–fig. EEe) in honour of Charles II Stuart, King of England.[71]

Lastly, let us review the constellations connected with human figures. In the northern hemisphere their line begins with Cepheus ; however, he will be discussed below, together with the rest of his family. Here let us start with the Ox-Drover (Bootes—fig. F—il. 2). His figure has not changed since the representation on the globe of Farnese : he walks with his right leg bent (in our atlas he has Mount Moenalis under his feet) ; he holds a club in one hand, and into the other, raised high, Hevelius put the leashes of the Hunting Dogs. It was doubtlessly the astronomer who instructed Stech to turn the Ox-Drover's head backwards, to the Great Bear, since he regarded the Ox-Drover as a hunter[72] (some mythographers saw in him Arkas, the son of Callisto, who—while hunting—met his mother, a she-bear, and unintentionally raised his arms against her). However, the Greek name Bootes—Ox-Drover was attached to him for another reason: he reminded of a herdsman driving the seven oxen (at the back of the Great Bear) moving round the Polar Star as if bound to the pole of a treadmill and going round it. On the Ox-Drover's gown, just below its belt there shines Arcturus, the brightest star of the northern sky (Hevelius called himself "sub Arcto natus" and on his Oxford portrait he points to that part of the sky on the globe).[73] It is surely for these reasons that in the modern iconography the Ox-Drover used to be represented as wearing a fur cap, doublet, and high boots (for instance on the Blaeu globe of the year 1603, and on Cellarius's maps). Stech, however, dressed him in a short and light gown (in fig. E his back is even half-naked, much like on the globe of Farnese), following Bayer's and Royer's example (where he holds a stick and a sicle in his hands).

The next figure—Hercules (Hercules—fig. H) was represented in Hevelius's atlas similarly as on the globe, that is with his head downwards (much like by Bayer). The old Greek name Engonasin meaning a kneeling person, preserved in the Arabic language (in which personal names of the Greek heroes were rejected), was respected in iconography throughout the ages. Stech also represented the hero with his legs bent, not propped on the right knee but rather suspended in the air. The magic skin of the Lion of Nemea, thrown over his left arm, falls on his thighs with tufts of fur, and hangs between his legs (Hercules was often shown with a lion's head on his head and lion's skin covering his back—a solution adopted in Bayer's atlas). The athletic body of the hero is naked. In one hand he

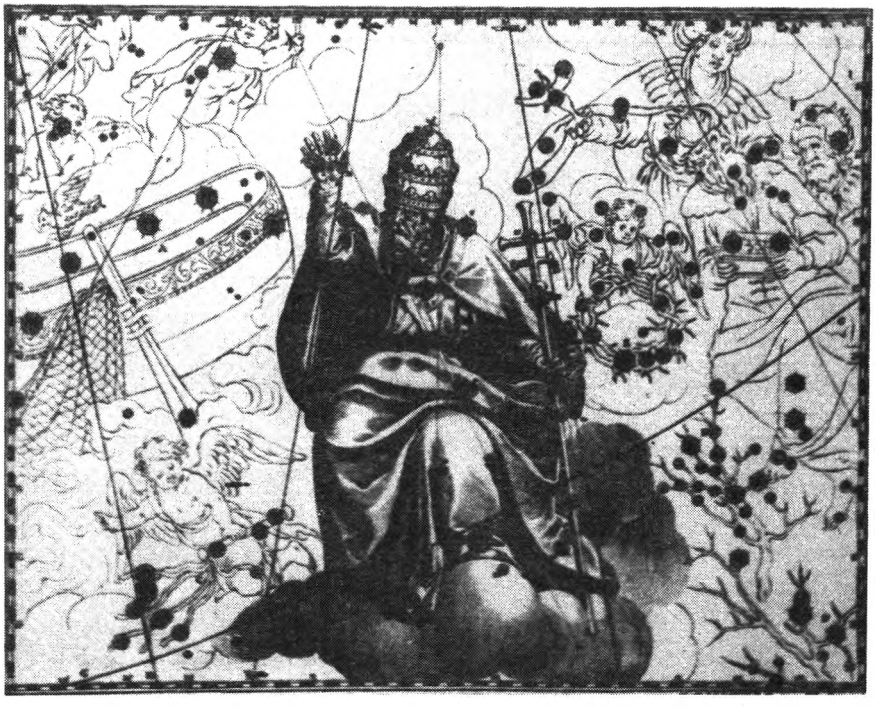
[71] *Ibid.*, p. 37.

[72] J. Hevelius, *Prodromus...*, p. 114.

[73] T. Grzybkowska, *Andrzeja Stecha portrety Heweliusza...*, p. 240 ; K. Targosz, *Jan Heweliusz...*, p. 118.

holds a mighty club, and with the other he strangles the Cerberus of Hevelius (in Bayer's and Royer's atlases he holds a branch with apples from the garden of the Hesperids). A still more imposing male nude screened only by a piece of light drapery was presented by Stech in the figure of the mysterious Serpent-Bearer (Serpentarius—fig. P—il. 3) who puts in trouble the mythographers joining him by force with Asklepios. Sometimes, the Serpent's body is girded round the waist of the Serpent-Bearer ; in Stech's design, and much like on the globe of Farnese, it is held in front. In later times, the quiet antique figure acquired more movement and dynamics, and such is Stech's Serpent-Bearer with strained muscles under the skin on his back. It is evident that man's strength is greater, and that he dominates over the mighty reptile, which coils as in a fit of convulsions. Let us mention here the third male nude in the atlas, that of the young Water-Carrier (Aquarius—fig. MM) of the Zodiac belt. Shown in most cases as kneeling (on the globe of Farnese in a standing posture), he pours water from a large, richly decorated jug slung over his right arm. The mysterious scroll, which he usually held in his left hand, was changed by Stech, who followed Bayer's atlas, into the end of a drapery winding round his thighs.

The three figures linked by family bonds—Andromeda, Cassiopeia and Cepheus—are placed across the tables. Stech's Andromeda (Andromeda—fig. V—il. 5) has a naked back, streaming hair and a skirt. Much like Hercules, she half kneels and half hovers in the air (on the globe of Farnese she stood in a long tunic, in the modern iconography she often was naked with her legs drawn up). The chains on her hands form decorative windings (in Bayer's atlas even the rocky shores are visible). Destined for a prey of the marine monster (the Whale from the southern hemisphere) sent by the angry Neptune, she was a victim of her mother, Cassiopeia, who boasted that she was more beautiful than the Nereids. Cassiopeia (Cassiopeia—fig. N) is an exceptional figure shown always in front because of the throne with a high back (that is why the Arabs called her "The Throning"). Of course in Stech's version that throne has acquired a richly decorated Baroque shape. The sitting Cassiopeia is almost naked and only slightly shrouded in ample, wind-blown drapery. In her left hand she holds the end of the turban flying off her head ; in her right hand she sways a palm (much like on Blaeu's globe of the year 1603 and in Bayer's atlas)—the unfortunate sign of priority. That woman, rather unattractive in earlier representations, was endowed by Stech with the features of a real beauty, typical of his epoch, in the style of Rubens. Near his wife and daughter there is Cepheus (Cepheus—fig. C—il. 4) the king of Ethiopia (in Bayer's atlas he had Negroidal features). Both in Bayer's atlas and in that by Hevelius that figure acquired an imposing size (much like formerly on the globe of Farnese)—because his legs, wide apart, reach beyond the Polar Star, which is found between them. In the Mediaeval-Renaissance iconography his figure was small, often as if "dancing" on his drawn-in legs. Stech's Cepheus has a turban on his head, with a crown and magnificent tuft; he wears a robe cut low at the back and open on the sides ; in his hands he holds a sceptre and the end of a wind-blown drapery. To help his



Il. 11. J. Schiller, *Coelum stellatum christianum*, Augsburg 1627—St. Silvester (Phot. Jagiellonian Library)

unhappy daughter, Andromeda, there runs Perseus (Perseus—fig. W—il. 6) shown according to tradition in a jump, or rather flying (he has little wings at his sandals)—in a pose again dating back as far as the globe of Farnese. Stech did not show him naked but in an antiquated helmet with feathers, and in a short robe (much like in Bayer's atlas), with Medusa's head and a broad sword above his head. His face seen in the left profile expresses great tension and effort.

Close to Perseus there is the Charioteer (Auriga—fig. X), variously identified in the Antiquity. Most often, he was shown in a kneeling position ; in his right hand he holds his symbols : the Whip and the bit. On Stech's map he wears a short gown, his back is half-naked, and on his head he exceptionally has a Baroque fantastic beret with two long feathers. He turns his head backwards looking at the Goat and goatlings, supported by him with his left hand. Just below the Eagle there is Antinous (Antinous—fig. R), a sign introduced by Tycho Brahe, and shown by Stech as a lad, according to the recent tradition. Considering the close vicinity of the Sobieski Shield, Hevelius gave him additionally the "Polish arms"—a bow and an arrow.[74] The Twins (Gemini—fig. DD) were represented by Stech as two plump children flying with their legs directed forwards, by which

[74] J. Hevelius, *Prodromus...*, p. 116.

he followed most of the modern models (on the globe of Farnese these were slim lads). The artist adorned their heads with bands with feathers, and put in their hands a whip and a club. Besides the Twins, there also is in the Zodiac the Virgin (Virgo—fig. GG), one of the three women figures in the sky. Represented invariably as a winged figure in a long robe with a bunch of spikes in her hand (with a first-magnitude star—Spica) she was the personification of the "holy justice" and was said to have lived on the Earth in the Golden Age. Farther on, in the Zodiac belt, we meet the Archer (Sagittarius—fig. KK), half-man and half-horse at whose arms there are two wind-blown draperies, represented in some cases as the ends of a turban, and in others as wings. The last figure in the Zodiac belt, the Water-Carrier, was discussed previously.

In the southern hemisphere there are only three human figures. One of them is Orion (Orion—fig. QQ) represented by Stech much like Perseus, in which the artist followed some earlier models ; he wears the antiquated garment of a warrior, although he was believed to have been a wild giant hunter, who molested the Pleiads (he attacks the Bull), and later on died bitten by the Scorpion. This constellation is particularly luminous, having two first-magnitude stars on Orion's arm and foot, and three second-magnitude stars marking his Belt. The second figure is the Centaur (Centaurus—fig. XX—il. 7) who, much like the Archer, is a half-breed ; with a savage expression on his face he spears the neck of the Wolf. In the last comprehensive table—the Southern Pole (Polus Antarcticus—fig. FFf) we find the third human figure—the Indian (Indus) ; in Stech's version he became—for no known reason—an Indian woman with a naked breast, wearing a skirt made of feathers and holding a bunch of arrows.

When representing animal figures Stech showed them in their outlines previously accepted by his nearest predecessors, whom he followed fairly faithfully. Apart from the slight shortcomings mentioned above, his animals are distinguished by the neatness of their shape, not encountered before, their differentiation, and the truth of expression. They are rendered in their natural movement, or at rest. Moreover, their character is shown in a suggestive manner, whether they are kind or distrustful, shrewd, or rapacious. It is true that the small-scale representations on general maps and globes gave little chance, but even the large-scale ones, for instance the engravings in Bayer's atlas, which preceded that by Hevelius, did not attain the degree of suggestiveness. Stech learned a good lesson from the animal representations in the Dutch painting of his time, although in his own pictures, animals are encountered only sporadically.

The objective signs were decorated by Stech with antiquated and Baroque ornaments, which were not only richer but also in a better taste than former representations. The same refers to the garments and armour of the figures. Stech gave up the Renaissance convention of showing naked figures side by side with those dressed in the clothes of his time : doublets, armour, hats and high boots. Some figures were shown by him almost naked, though always in light draperies, others in antiquated costumes. Following some representations dating back to

Il. 12. G. B. Passeri, *Atlas Farnesinus*, in : A. F. Gori, *Thesaurus gemmarum antiquarum astriferarum*, Firenze 1750—Globe of Farnese (Phot. Jagiellonian Library)

the latter half of the 16th century (for instance those on Mercator's globes) and of the 17th century in Bayer's, Pardies's and Royer's atlases he dressed his figures in light and short robes, or in long ones but cut on the sides. These robes are rich in folds and always wind-blown. Stech's figures are bare-foot or wear open-work, decorated sandals. On their heads there appear antique helmets, eastern turbans and, sporadically, the contemporary beret ; magnificent and volatile feathers served as frequent decorations. Instead, there disappeared the pointed caps, which persisted for ages and were characteristic of the Arabic iconography but

had doubtlessly originated in the Ancient East and occurred still in the 17th century iconography.

Most of Stech's figures are bare-headed or have antiquated, short, wavy coiffures, sometimes a short, unshaved beard (much like in Pardies's atlas). They are all young or in their prime, and handsome ; their silhouettes are beautiful. In the overcoming of Mediaeval and Renaissance patterns mostly showing clumsy, neck-less and dumpy figures Stech surpassed his contemporaries ; his figures are of a proportional build, if only more thickset and muscular than the slenderized figures on the globe of Farnese. He also succeeded in showing maximum expression of energy or charm even when he represented the figures from the back—with the trunk turned, the movement of legs, their heads turned forwards or backwards in profile (which often looked unnaturally elsewhere). To some of his figures he did not give any prop, they hover in the air, weightless as we may say today. Beautiful figures, but of a different kind, showing the saints wrapped in ample garments and resting on billowed clouds seen in the Baroque paintings on plafonds and domes were created by Kager in Schiller's atlas (il. 11). Stech gave an equally beautiful elaboration of the ancient heaven, as regards the form, in the most antiquated version.

Stech's drawings have not been preserved and we cannot judge Charles de La Haye's eventual personal additions when he transferred the drawings on the engraving plates. De La Haye did not follow the example set by Mair, the engraver of Bayer's atlas, who mainly used the point method, but much like Kilian in Schiller's atlas, he applied the precise, light and flexible line. Similarly, upon the latter's example, he modelled the side constellations very slightly, while the central constellation was rendered by him in strong light-and-shade, by means of parallel lines drawn in different directions. We know from the opinion of his contemporaries that this grading was judged even to be too strong.[75] But due to it, the artist achieved pictorial effects, and was able to render perfectly the plumage of the wings of birds, the softness and sleekness of the animal fur, the folds of draperies, and the roundness and musculature of the nude body.

As we know, Hevelius cherished the hope that his maps would be utilized at the production of globes, which really happened, although with some delay. The former firm of the Blaeus was taken over in the year 1683 by Gerard Valck, later on supported by his son, Leonhard. Their celestial globes, which appeared in the 18th century made use of the fruits of work of the *astronomi plane singularis, Joannis Hevelii* as we read on the cartouche of the globe from the year 1715,[76] to which Stech's figures were faithfully transferred. Similarly, Johann Gabriel

[75] P. Des Noyers to I. Boulliau, 13 October 1690, MS. 13023, FF BNP, c. 103. In his letter of 14 September 1691 he added that engraver, a Frenchman, lives in Warsaw near him in the Garden Palace (now Kazimierzowski Palace), *ibid.*, c. 114.

[76] E. L. Stevenson, *op. cit.*, vol. II, pp. 159—163 ; O. Muris, G. Saarmann, *op. cit.*, pp. 200—201; M. N. Zakrzewska, *Catalogue of Globes in the Jagellonian University Museum*, Cracow, 1965, pp. 16—17.

Doppelmayr,[77] a German publisher of globes and maps, based his publications on Hevelius's atlas but he twisted the artistic level of its representation.

It is known that King John III Sobieski patronized the classicizing current in the Polish Baroque art.[78] Thus, with King Sobieski's name in the title of the whole atlas, his name given to one of the new constellations, and appearing in the dedications of two general maps there was published the magnificent[79] antiquating celestial atlas of the Baroque age presented to the world of learning by Hevelius, Stech and de La Haye—*Firmamentum Sobiescianum*.

Translated by Jadwiga Targosz.

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[77] E. L. Stevenson, *op. cit.*, vol. II pp., 159—163 ; O. Muris, G. Saarmann, *op. cit.*, p. 194 ; M. N. Zakrzewska, *op. cit.*, pp. 17—19.

[78] M. Karpowicz, *Sztuka oświeconego sarmatyzmu. Antykizacja i klasycyzacja w środowisku warszawskim czasów Jana III* [*Antiquitization and Classicization in the Warsaw Milieu during the Reign of John III*], Warsaw, 1970.

[79] The highest artistic rank of the atlas on the background of that epoch was emphasized in a brief formulation by E. L. Stevenson (*op. cit.*, vol. II, p. 145), who intended to perform the re-edition of the atlas. Such a re-edition appeared in the Uzbek SSR to celebrate the 2500th anniversary of the foundation of Samarkand and of the activity of that town's ruler and astronomer, Ulug-Beg, in the 15th century (J. Gievelij, *Atlas zwiezdnovo nieba*, editor V. L. Shtsheglov, Tashkent, 1968). The Polish facsimile edition appeared in 1987 upon the initiative of Kazimierz Orzechowski of the Gdańsk Department of Ossolineum.