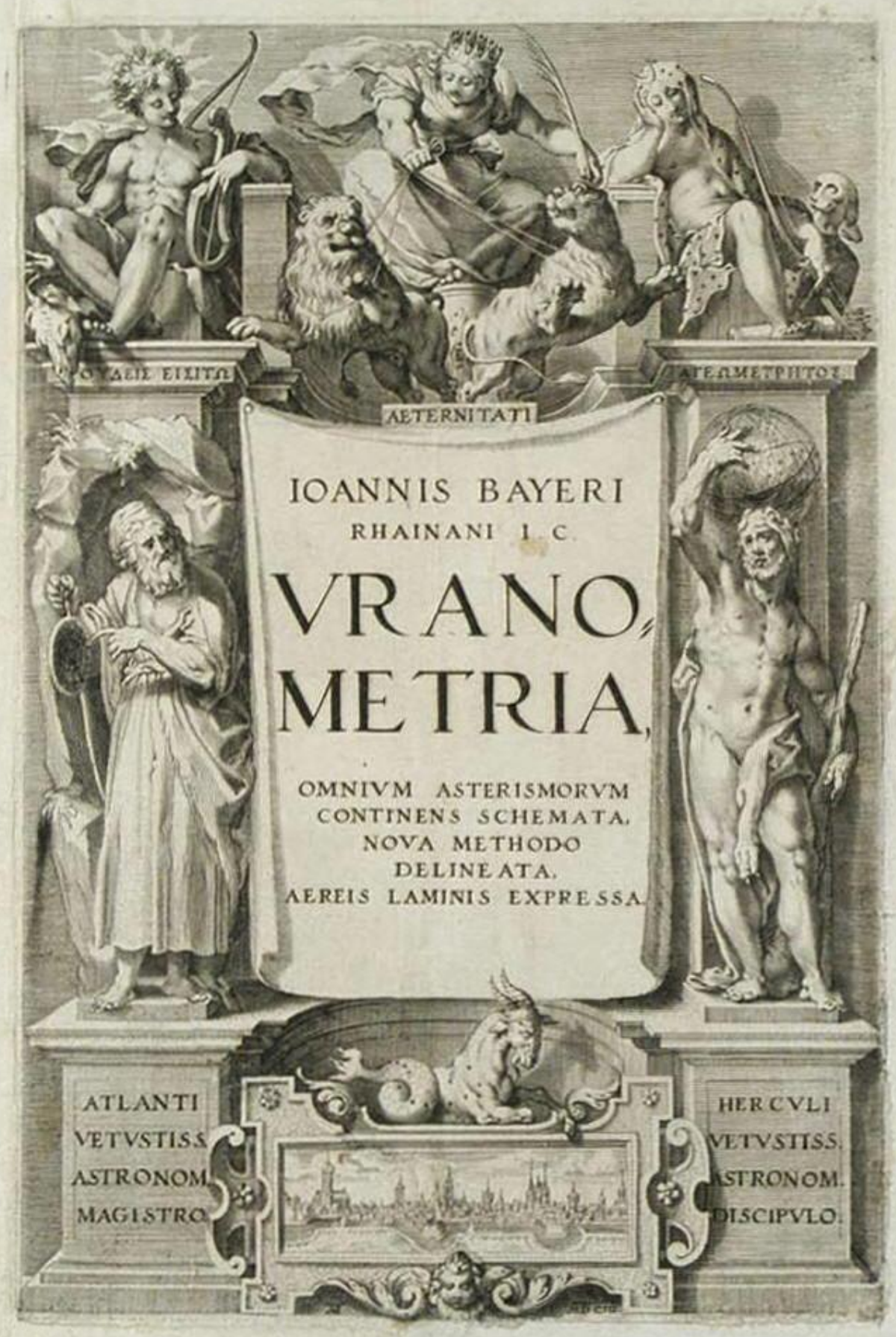
Johann Bayer,
Julius Schiller

and their

Star Atlases

These charts are provided through the courtesy of The Linda Hall Library of Science, Engineering and Technology.


ΟΥΔΕΙΣ ΕΙΣΙΤΩ
ΑΓΕΩΜΕΤΡΗΤΟΣ
AETERNITATI
IOANNIS BAYERI
RHAINANI I. C.
VRANO,
METRIA,
OMNIVM ASTERISMORVM
CONTINENS SCHEMATA,
NOVA METHODO
DELINEATA,
AEREIS LAMINIS EXPRESSA.
ATLANTI
VETVSTISS.
ASTRONOM.
MAGISTRO.
HERCVLI
VETVSTISS.
ASTRONOM.
DISCIPVLO.

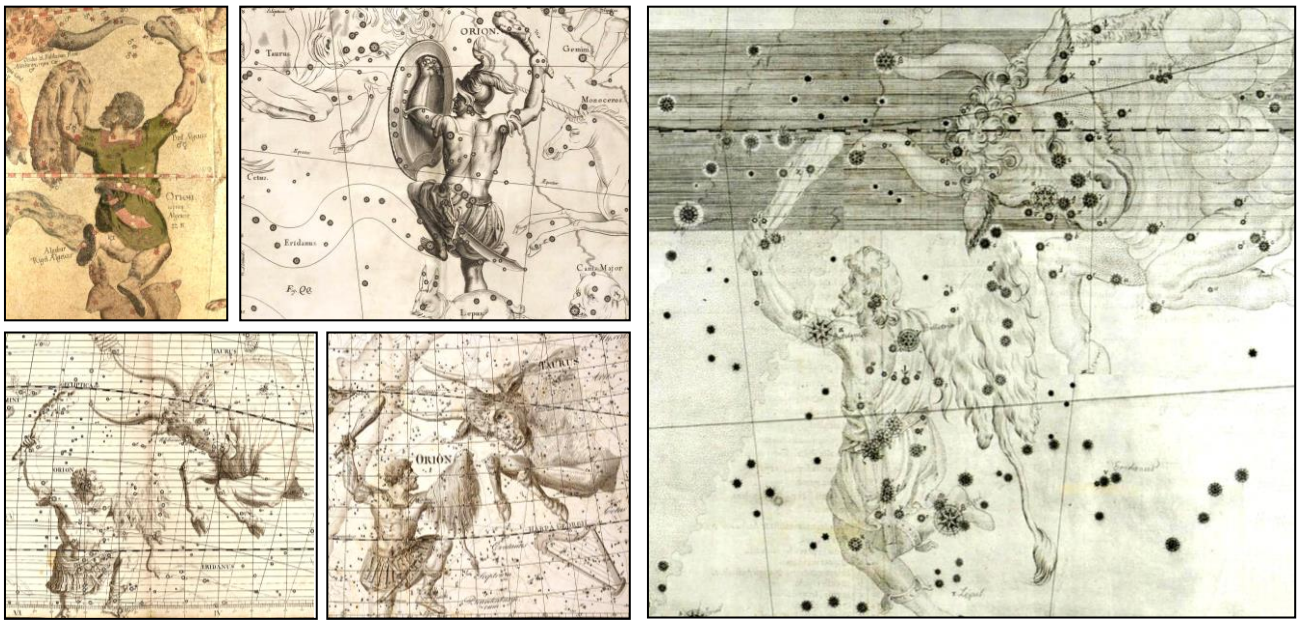
Johann Bayer (1572-1625) produced the first comprehensive and accurate star atlas, ***Uranometria***, in 1603 in Augsburg. He employed Alexander Mair (1562-1617) to produce the highly-detailed engravings on copper plates – most previous star charts had used woodcuts. The splendid title page is seen above. It was the first atlas to cover the whole celestial sphere, including the far southern skies which were unknown to the Greeks and Romans. Bayer was not an observer, and used 1004 star positions (in Ecliptical Co-ordinates) and magnitudes taken from the expanded catalogue of Tycho Brahe, which had been published the previous year. He also used about 200 more from other sources including 63 from the *Almagest*. He copied southern stars from globes by Mercator, Plancius, Hondius and Willem Blaeu. These gave him the rough positions of stars which had always been below Tycho's Uraniborg horizon, i.e. further south than Declination -30º (about the tip of Canis Major's tail, or the handle of Sagittarius' Teapot). (In practice, Tycho's southern limit was closer to Declination -20º.)

Each constellation picture was not named as such, for accompanying each was a table which gave its name and listed all the stars shown in it. For far southern stars, Bayer copied 137 star positions and twelve new southern constellations from one of Plancius' globes which he had acquired. He showed these, together with the constellation names, on his map of the South Polar Region, but did not include any tables pertaining to these constellations, as he feared that the star positions measured by the sailors Keyser and de Houtman might not be very accurate. In the event, this turned out to be the case, and their errors, particularly in the Crux area, were reproduced in Bayer's charts and later in Julius Schiller's atlas. He also copied from the globe the new star groups Coma Berenices and Antinous, including them in the charts for Boötes and Aquila respectively, and including information relating to them in the tables for those constellations. Columba Noachi (Noah's Dove) and Crux (Southern Cross) were drawn in but not named. Ophiuchus was shown as Serpentarius, Piscis Austrinus as Piscis Notius, and Equuleus appeared as Equus Minor. Many alternative names for other constellations, some quite obscure, were given in the tables. Bayer also made use of Piccolomini's maps of fifty years previously.

Bayer was aware of a long-held tradition that constellation charts should be drawn reversed, as if seen from a point in heaven outside the starry sphere, not as if seen from the Earth at the centre of the universe. Typical was Thomas Hood's 1590 star chart ***The Use of the Celestial Globe in Plano*** in which the humanoid figures are shown in reverse – they face away from the viewer down to the Earth except for Cassiopeia and Antinous. Bayer had possibly also seen one of Mercator's celestial globes of 1551, in which all of the humanoid figures turn their backs to the viewer excepting Cassiopeia and Antinous.

For ease of use, Bayer decided to show the star patterns correctly oriented (as they are seen from Earth), but then confused matters by deciding to combine these with the traditional 'back view' or reversed pictures of the constellations. This forced him to draw the pictures in mirror-image, in order to match the star patterns. This decision by Bayer played havoc with the humanoid pictures. Stars known to be on certain parts of a body and therefore named as such, now were found in the wrong places, which made their names ludicrous. For example, the star Rigel in Orion was described by Ptolemy as '*Lucida que est in pede sinistro'* meaning 'the bright star in the **left** foot' or *Rigel* in Arabic, but was placed by Bayer in Orion's **right** foot.

Rather than fixing the offending constellations, Bayer deliberately altered Ptolemy's Latin descriptions. In the page in *Uranometria* which gives the descriptions of star positions in Orion, Bayer has altered the description of Rigel to '*In extremo pede dextro*' ('at the end of the **right** foot'). Why did he not simply turn Orion around to face us, as he did Andromeda, Cassiopeia, Boötes, Gemini and Virgo? Oddly, the Hunter's head remained facing to his left as Mercator had shown. This means that, if we join Bayer's charts of Orion and Taurus as shown below, we find a bizarre situation in which Orion is facing away from the attacking Taurus as if running away, rather than facing the Bull with club raised as Mercator had depicted and Hevelius, Flamsteed, Bode and others did later.



Clockwise from top left: Mercator's globe, charts of Hevelius, Bayer (Orion+Taurus joined), Bode, Flamsteed.

A century later, the first English Astronomer Royal, John Flamsteed, criticised the fact that nine of Bayer's sixteen humanoid figures (Cepheus, Hercules, Auriga, Perseus, Ophiuchus, Sagittarius, Aquarius, Orion and Centaurus) were drawn facing away from us, making absurd a number of Ptolemy's star names and descriptions, and their Arabian equivalents. In the preface to his *Atlas Coelestis* of 1729, Flamsteed described what he called Bayer's 'innovation' or 'fault', and explained how he, Flamsteed, had chosen a much more sensible method of creating star charts with correctly oriented pictures, by simply turning all the humanoid figures around to face the viewer. He wrote:

"Wherever he [Bayer] met ..... any [humanoid] Constellation, except Virgo and Andromeda, he drew it with the Back towards us, whereby he makes all those Stars that Ptolemy (and the Ancients, and all since then to himself) placed in *Right* Shoulders, Arms, Sides, Legs and Feet, &c. of their Forms or Figures to stand on their *Left*, whereby he renders the oldest Observations *False* or *Nonsense*. To remedy this Fault [in the descriptions of the star positions that accompanied the charts], when he mentions any eminent Fixed Star to be *in dextro Humero* [in the right arm] or *dextra Tibia* [right shin], he adds *alias in sinistra* [or in the left] &c., which indeed seems to excuse the Fault, but will perplex those that make Use of his Maps, and render them useless."

From 1729 on, all pictorial star charts followed John Flamsteed's system, rather than Bayer's.

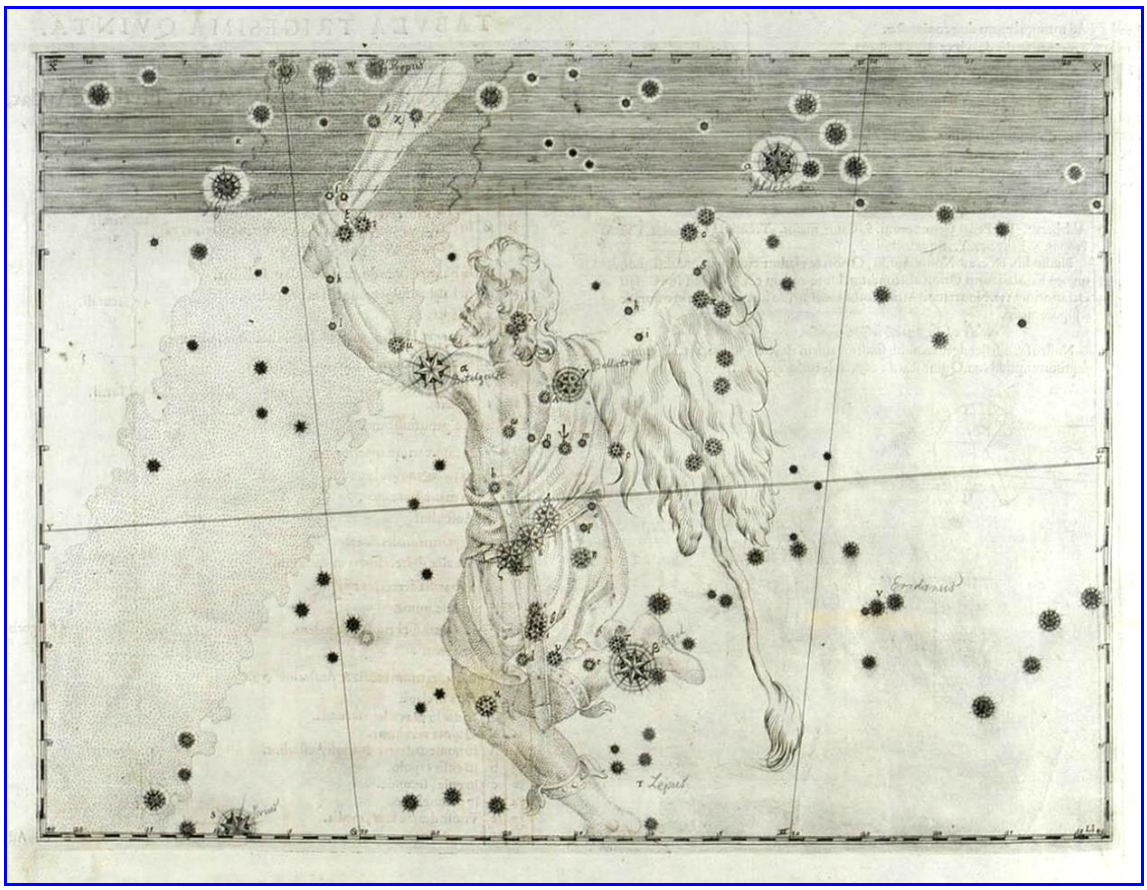
Julius Schiller (1580-1627) was a fellow citizen and colleague of Bayer in Augsburg. A religious man, he deplored the use of the old heathen constellations in the new star atlases then appearing. Hearing that Argo Navis was sometimes referred to as 'Noah's Ark', and Columba as 'Noah's Dove', he determined to re-organise the constellations, altering them to fit Biblical and early Judeo-Christian figures. Schiller persuaded Bayer to assist him in this project, by providing the star positions and existing constellation outlines. Like Bayer, he used the Ecliptic Co-ordinate System, as seen in the following charts, with the Ecliptic being the most dominant line, but like Mercator and Hood (and unlike Bayer), he showed the constellations in reverse, as on a celestial globe.

Firstly, he renamed the twelve signs of the Zodiac after the saints who were the twelve disciples of Christ (Saint Mattias replaced the traitorous Judas Iscariot). Then he replaced the constellations north of the Ecliptic by figures and items from the New Testament, and those to the south by figures and items from the Old Testament. Departing from Bayer's depictions, he showed all of his human figures facing the viewer. He left two star groups unchanged: Columba Noachi (Noah's Dove, next to his Ark), and the Southern Cross (not named, but shown as a cross worn by his new constellation of Abraham (Centaurus).

Schiller published his star atlas as the ***Coelum Stellatum Christianum*** in 1627. Its title page is below. Johann Mathias Kager drew the pictures and Lucas Kilian produced the excellent engravings. There were 49 plates each centred on one of his main constellations, with neighbouring constellations 'ghosted in'. The charts were originally not hand-coloured, but some later editions could be coloured if the buyer desired. The star positions were as accurate as in Bayer's ***Uranometria***, and each chart was accompanied by a page of Latin text explaining the original form of the constellation depicted, and the new form suggested by Schiller. The same year the atlas was published, Schiller died suddenly aged only 47. He never had the chance to promote his new Christian constellations, and Bayer had died two years before. Although his Atlas was in limited circulation, the renamed Christianised constellations never superseded the old pagan ones.

The story does not end there. Thirty-three years after Schiller's death, in 1660, the Dutch-German cartographer **Andreas Cellarius** (1596-1665) tried to popularise the Christian constellations and give them some authority by publishing them as two beautiful, hand-coloured hemispheres titled the ***Coelistellati Christiani Hæmisphaerium***, ***Prius*** and ***Posterius***. They appeared as Plates 22 and 23 in a sumptuous book called ***Harmonia Macrocosmica (Harmony of the Universe)***, The ***Harmonia Macrocosmica*** has been called history's most beautiful celestial atlas, and as it is still in print and widely available, Schiller's Christianised constellations have not been forgotten. They are reproduced in full hand-tinted colour at the end of this article.

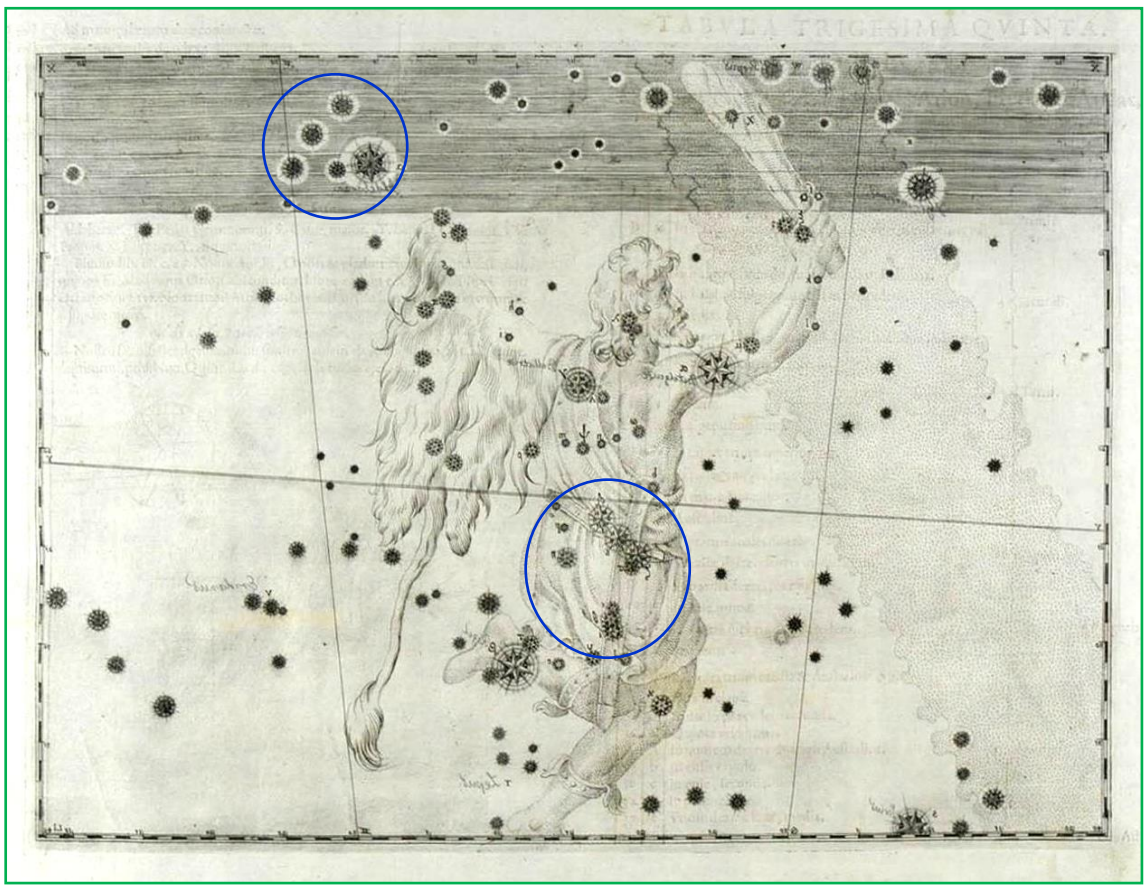
Bayer's and Schiller's versions of eight constellations follow. They are in sets of three charts. The first in each sets has a blue border and is Bayer's original as it appeared in ***Uranometria***. The second chart has a red border and is Schiller's Christianised version of the same constellation. The third chart with a green border is Bayer's original, but reversed left to right to assist comparison with Schiller's chart. Some groups of stars are circled in light blue, to assist in matching them up.



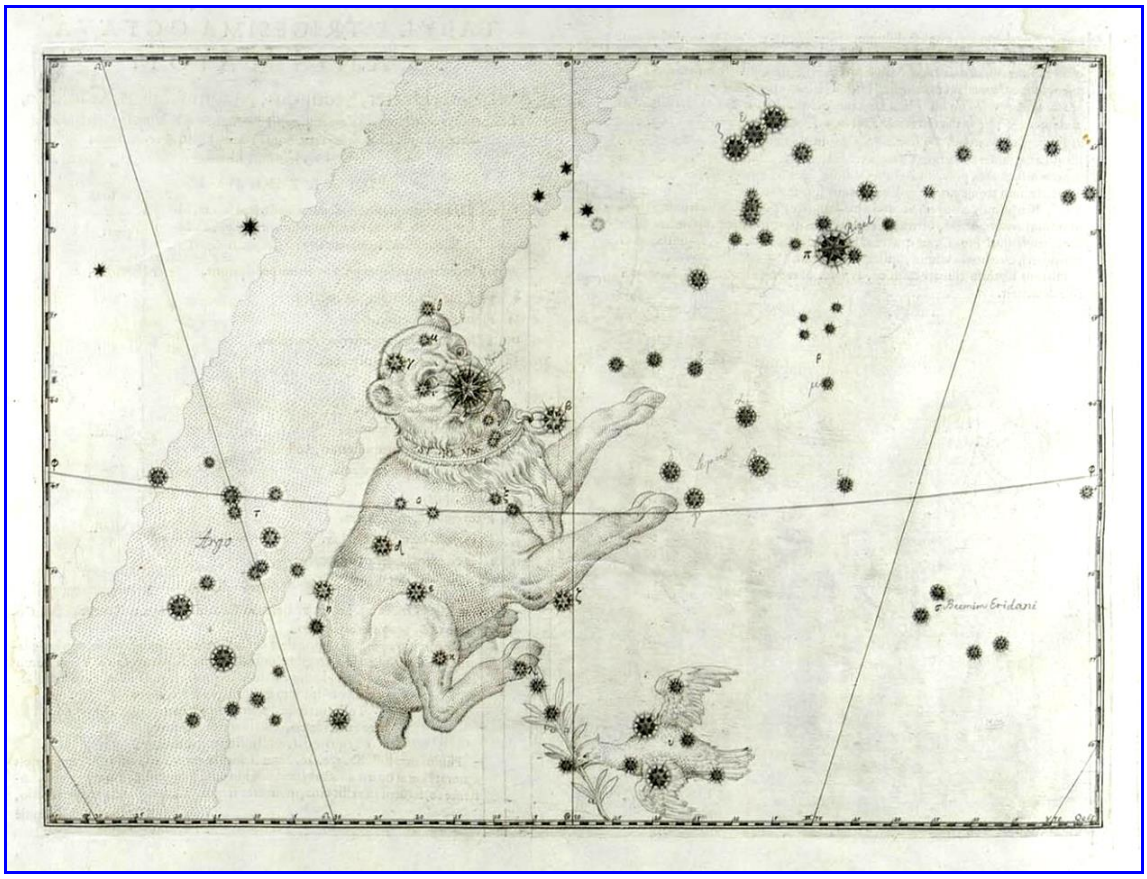
1a. Bayer's version of *Orion* as it appears in ***Uranometria***.

1b. Schiller's *Saint Joseph* (the same area of sky but plotted in reverse).

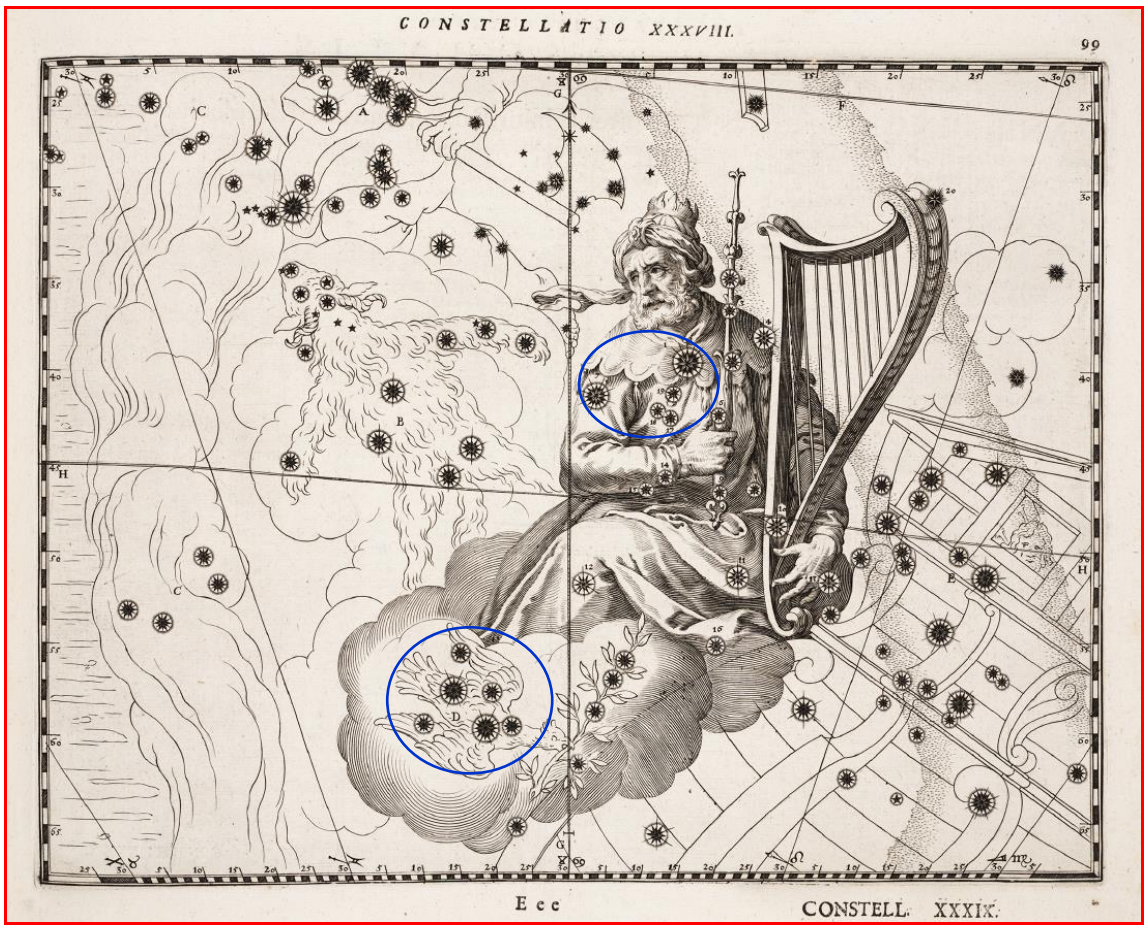
1c.



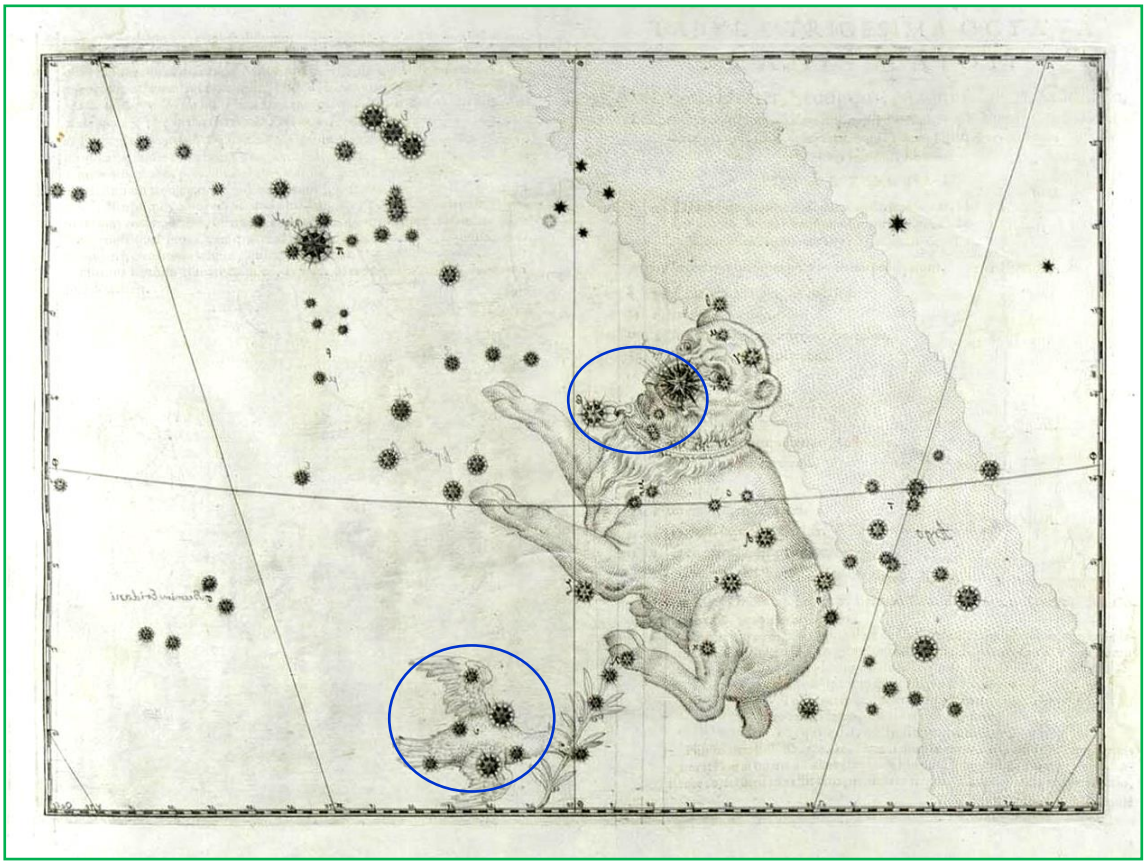
Bayer's version reversed to assist comparison with chart 1b.



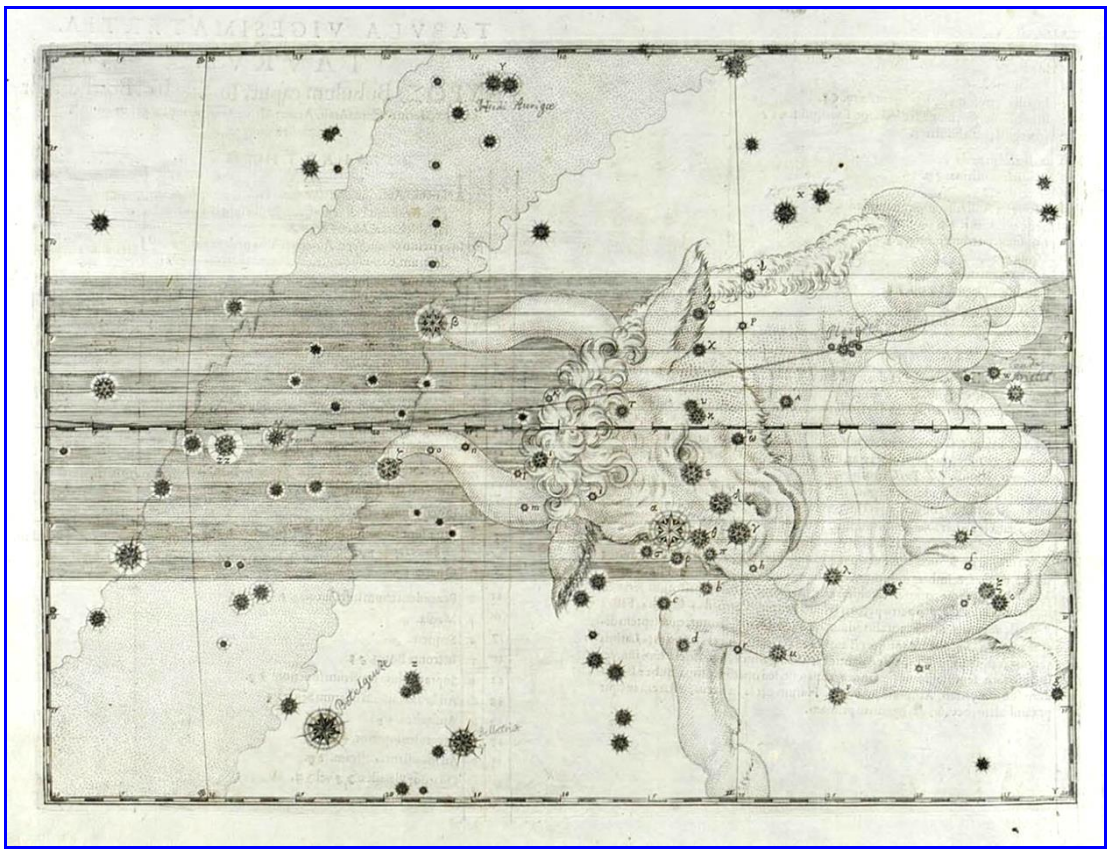
2a. Bayer's version of *Canis Major* as it appears in ***Uranometria***.



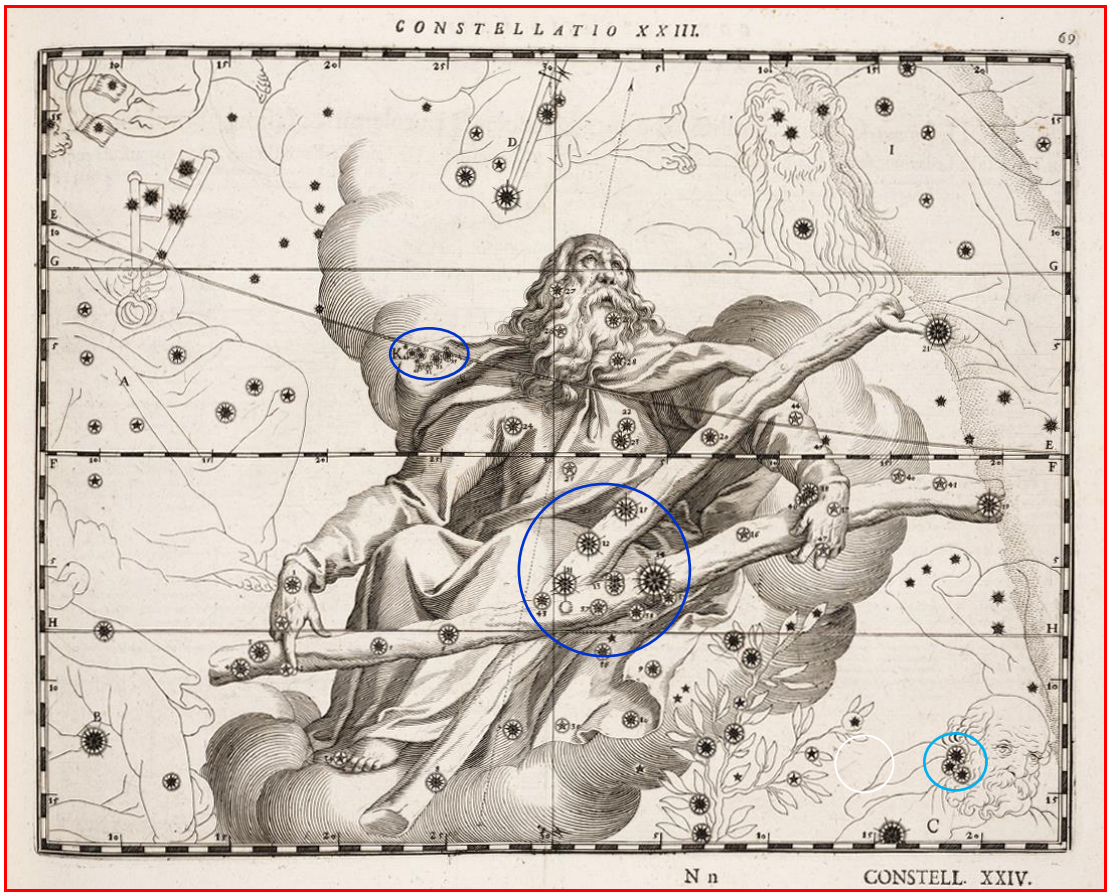
2b. Schiller's *Saint David* (the same area of sky but plotted in reverse).



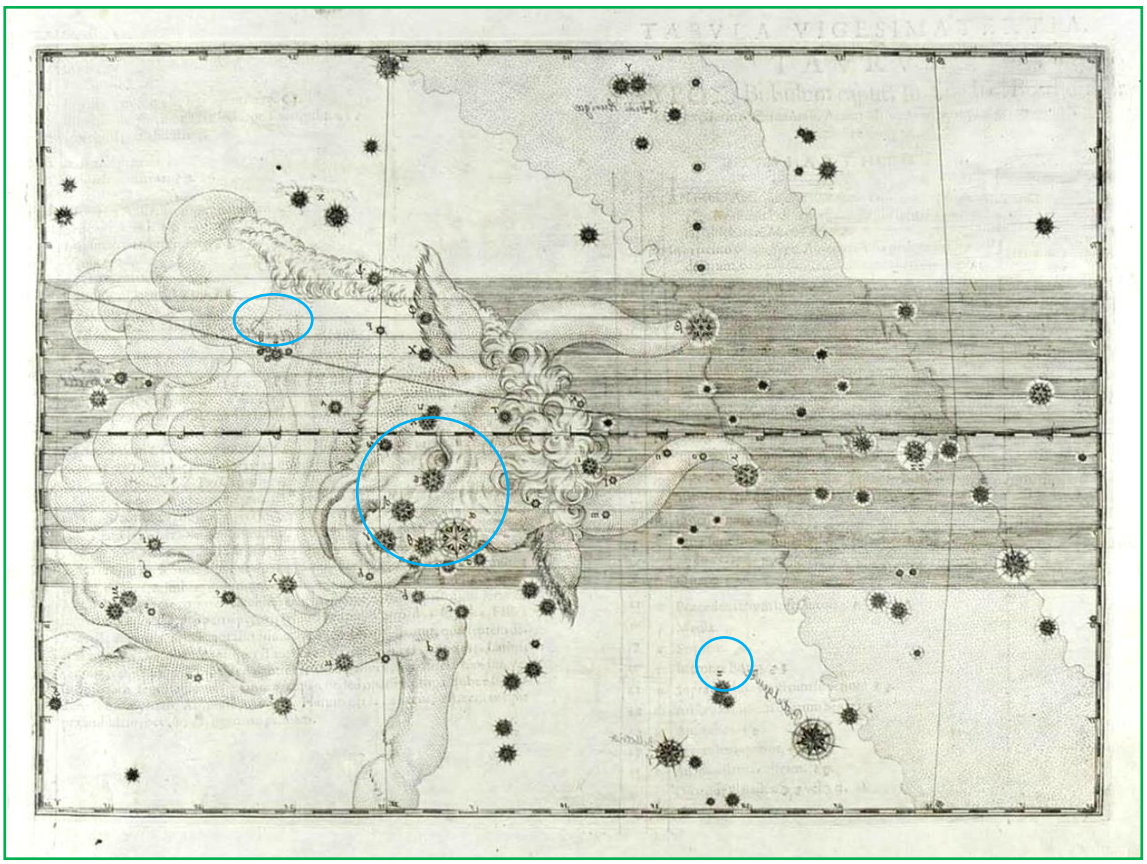
2c. Bayer's version reversed to assist comparison with chart 2b.



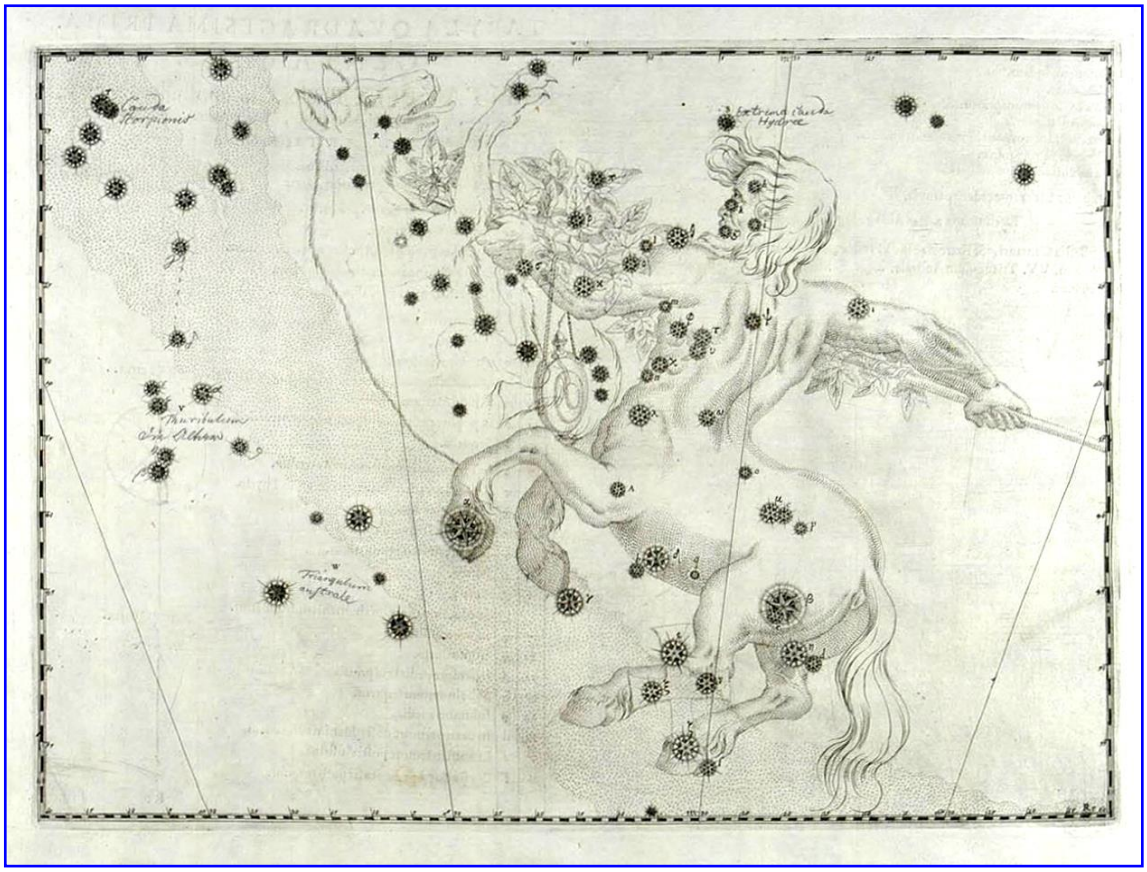
3a. Bayer's version of *Taurus* as it appears in ***Uranometria***.



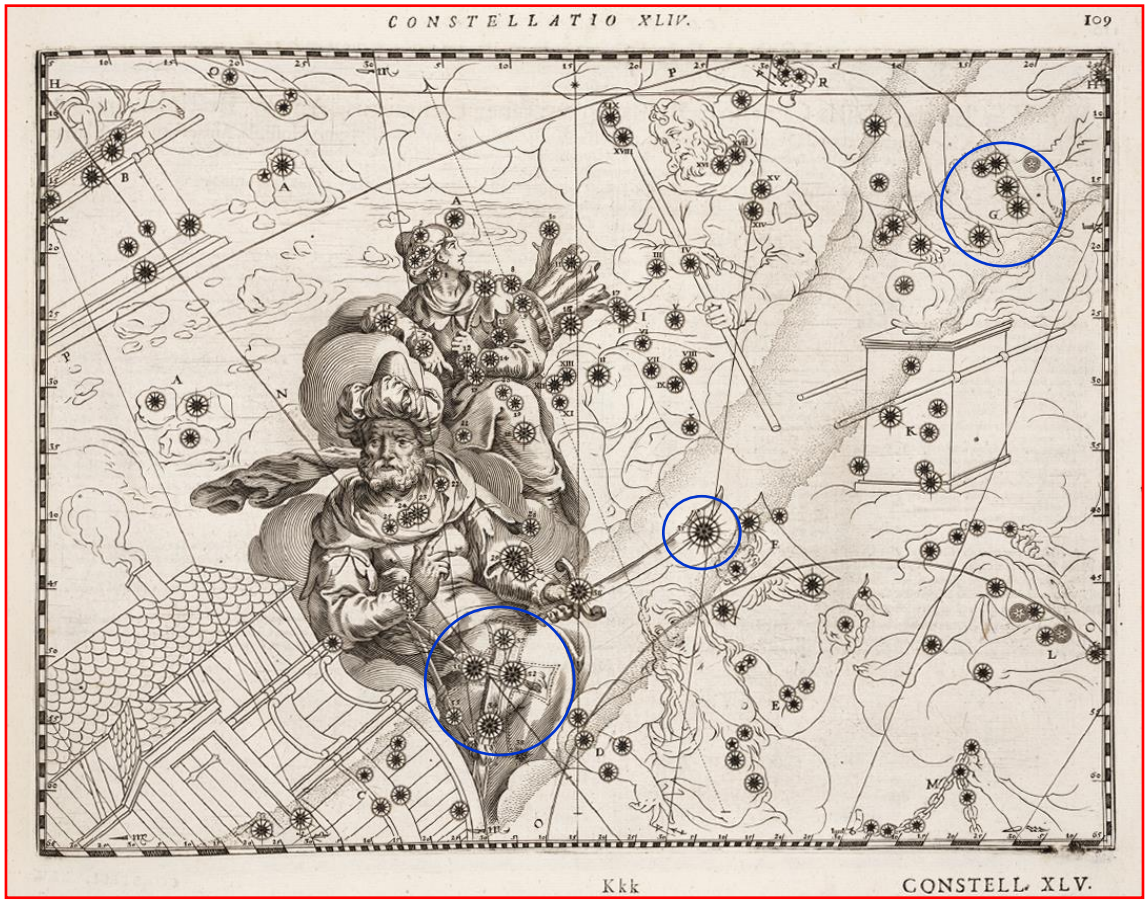
3b. Schiller's *Saint Andrew* (the same area of sky but plotted in reverse).



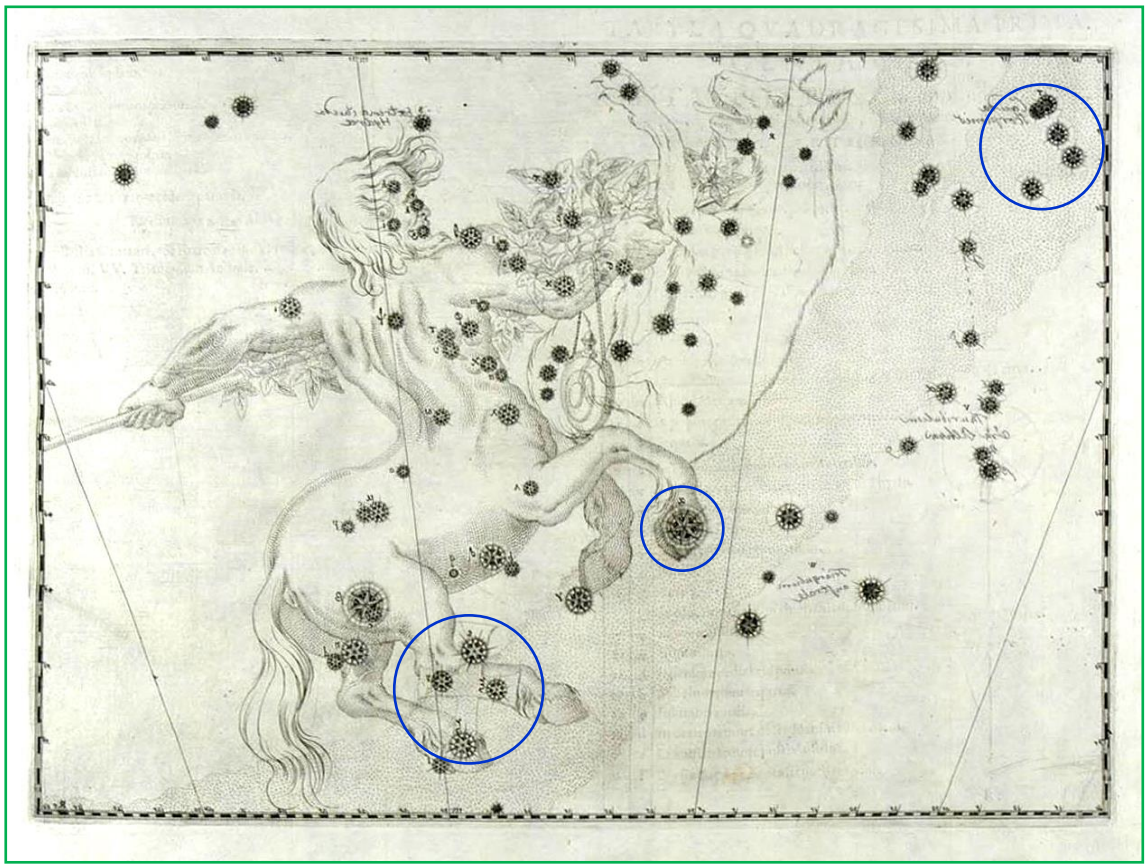
3c. Bayer's version reversed to assist comparison with chart 3b.



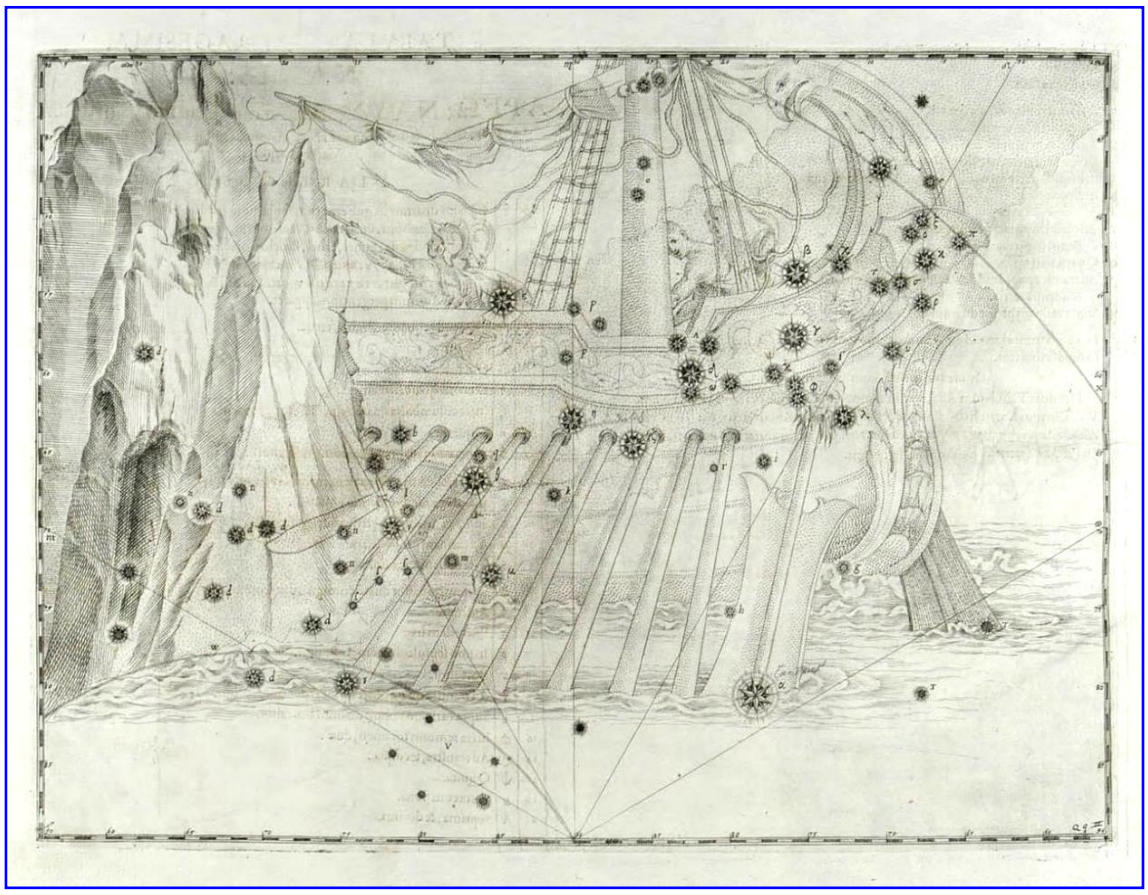
4a. Bayer's version of *Centaurus* as it appears in ***Uranometria***.



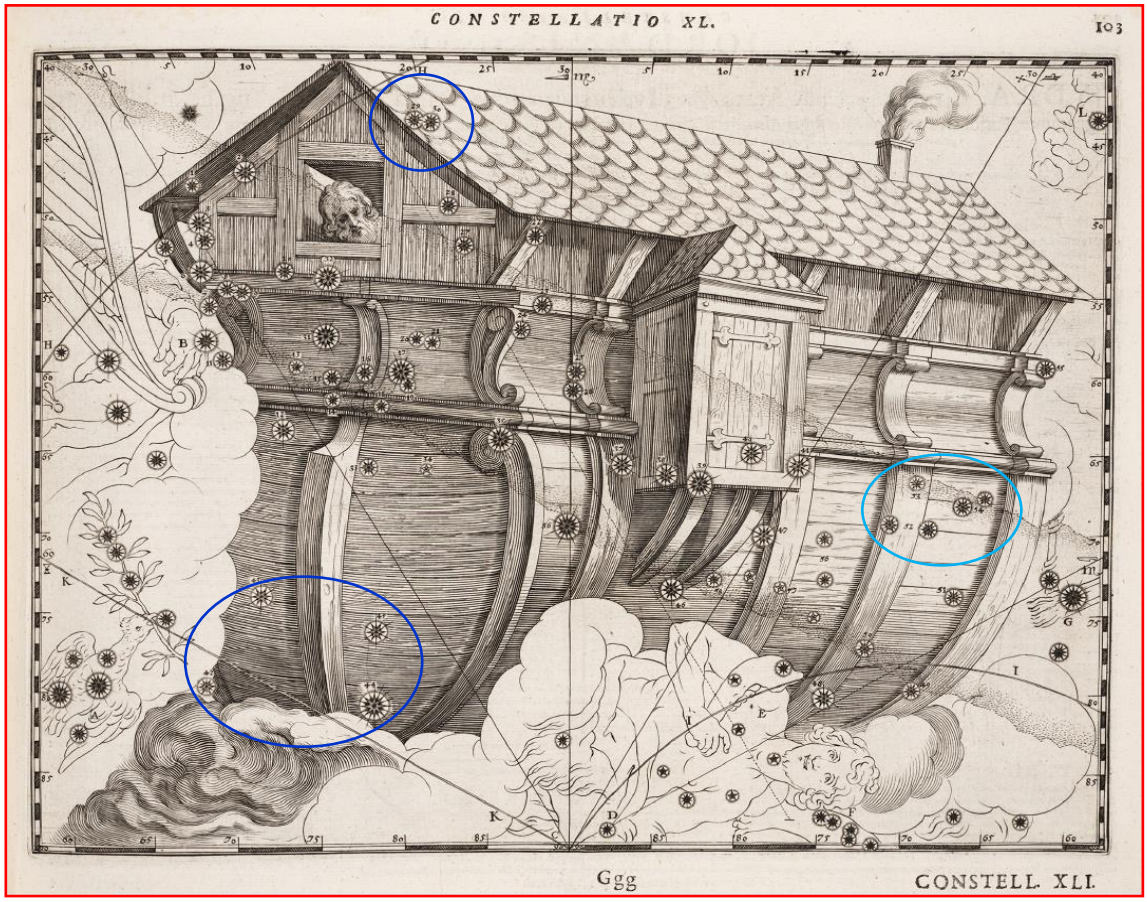
4b. Schiller's *Abraham and Isaac* (the same area of sky but plotted in reverse)..



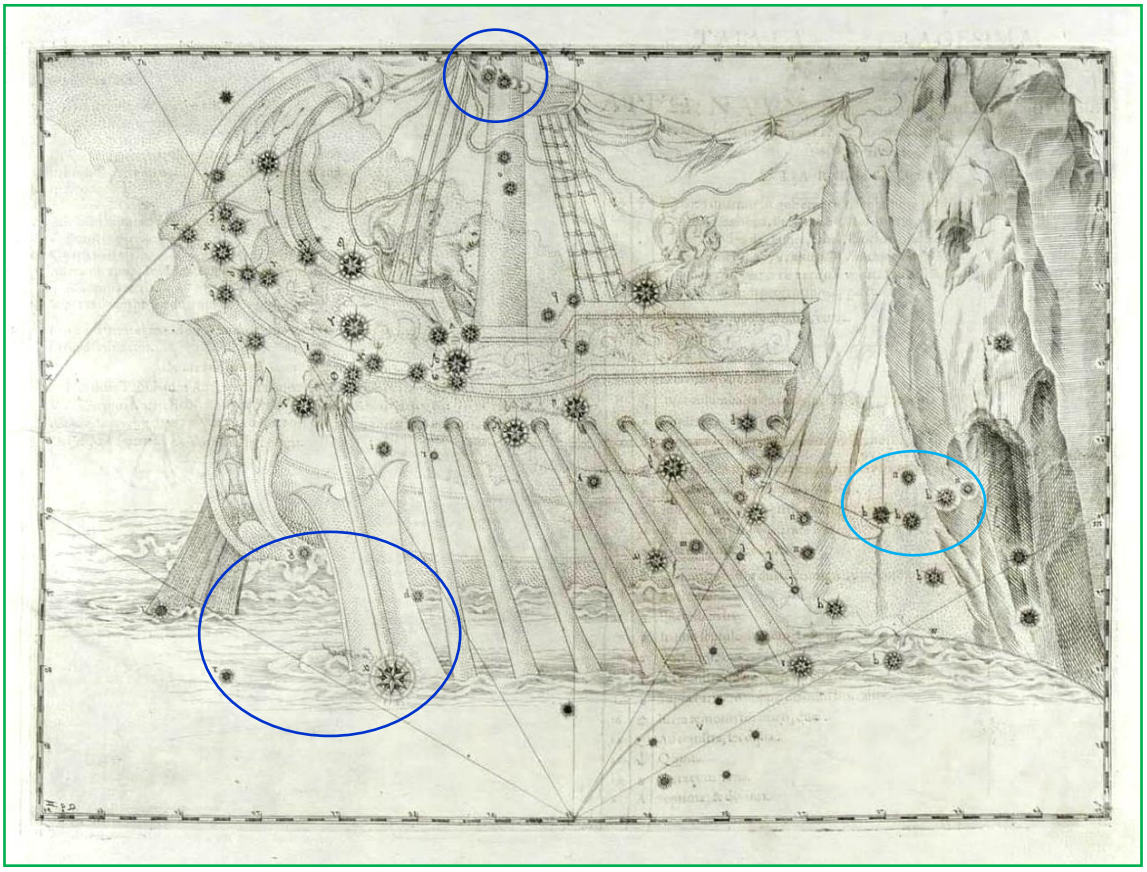
4c. Bayer's version reversed to assist comparison with chart 4b



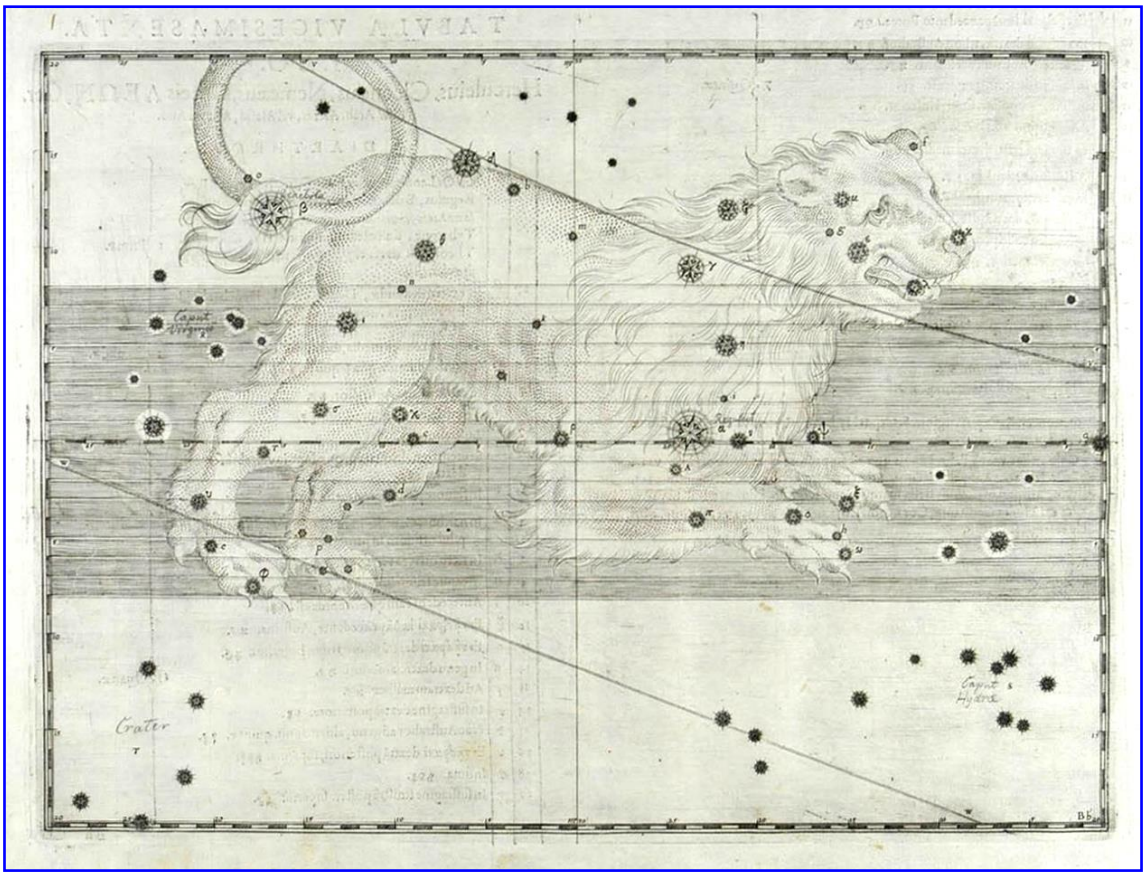
5a. Bayer's version of *Argo Navis* as it appears in ***Uranometria***.



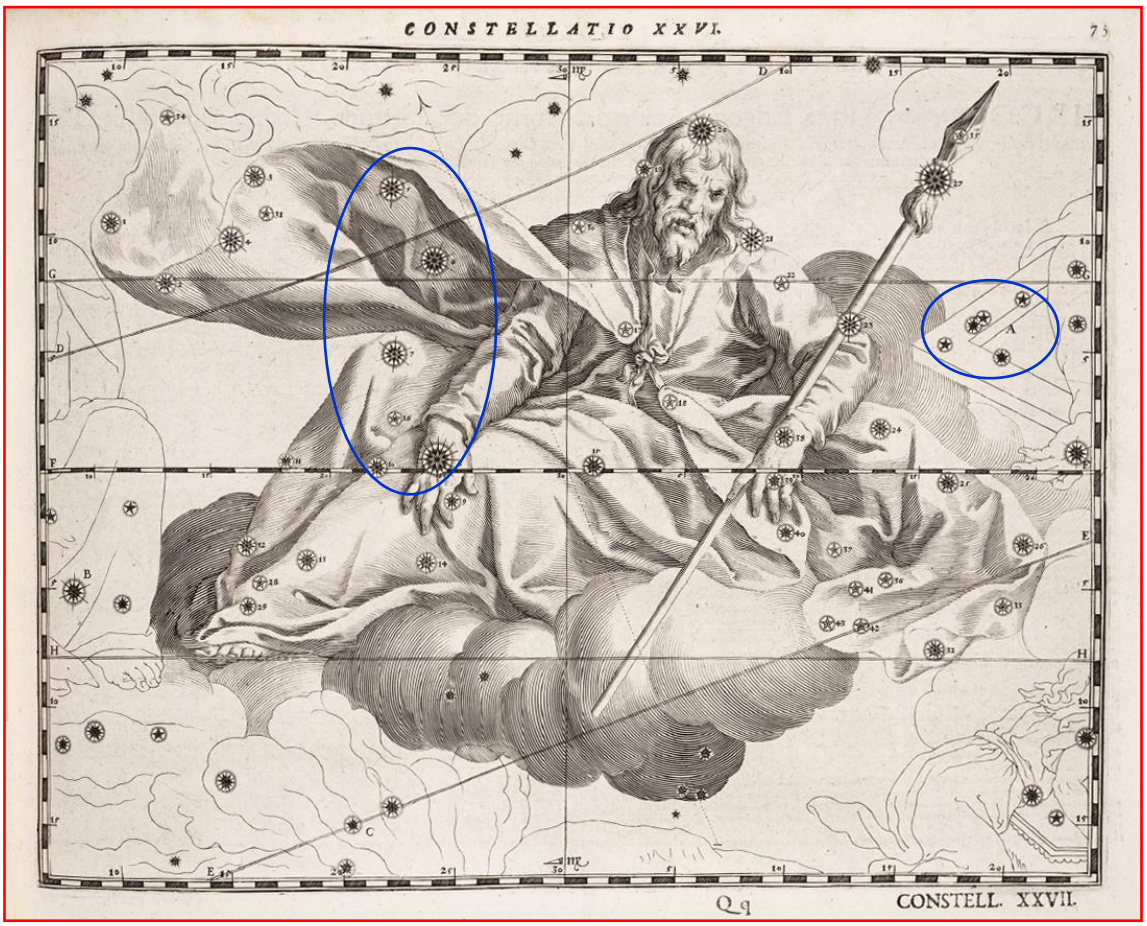
5b. Schiller's *Noah's Ark* (the same area of sky but plotted in reverse).



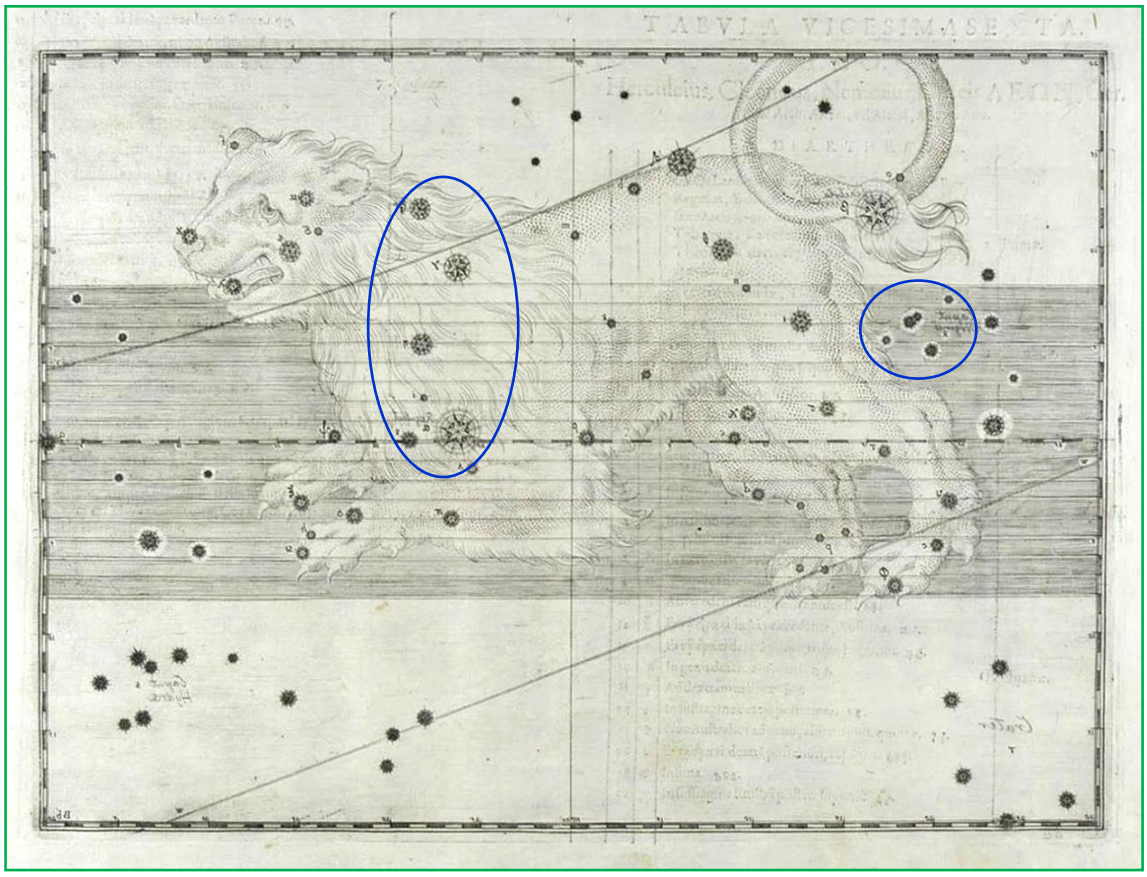
5c. Bayer's version reversed to assist comparison with chart 5b.



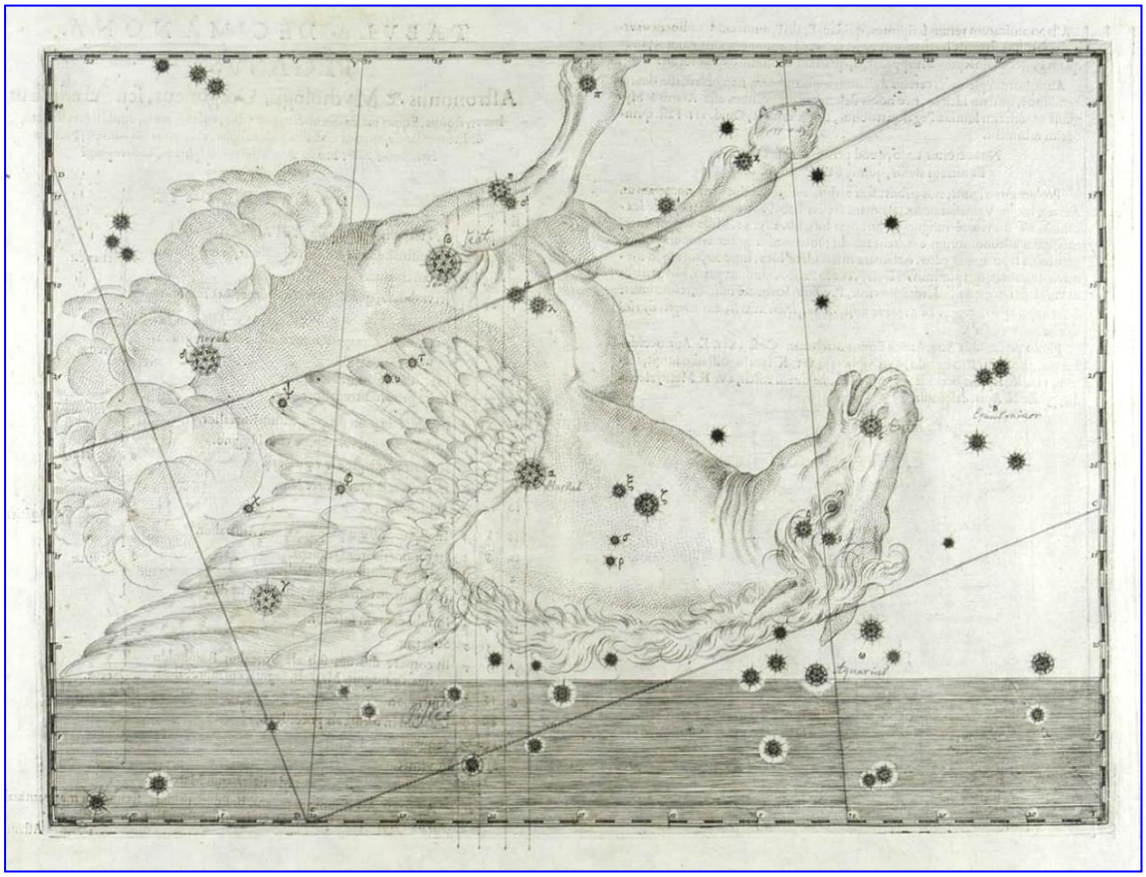
6a. Bayer's version of *Leo* as it appears in ***Uranometria***.



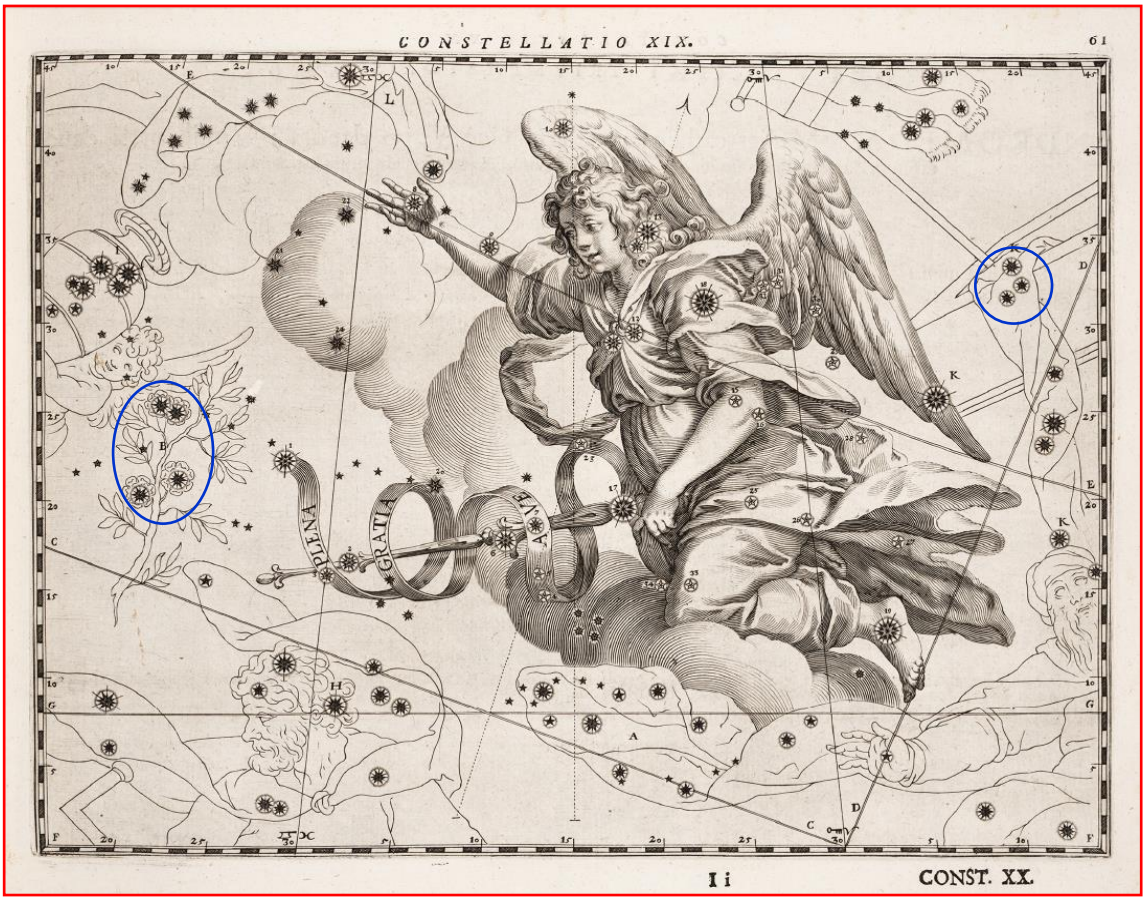
6b. Schiller's *Saint Thomas* (the same area of sky but plotted in reverse).



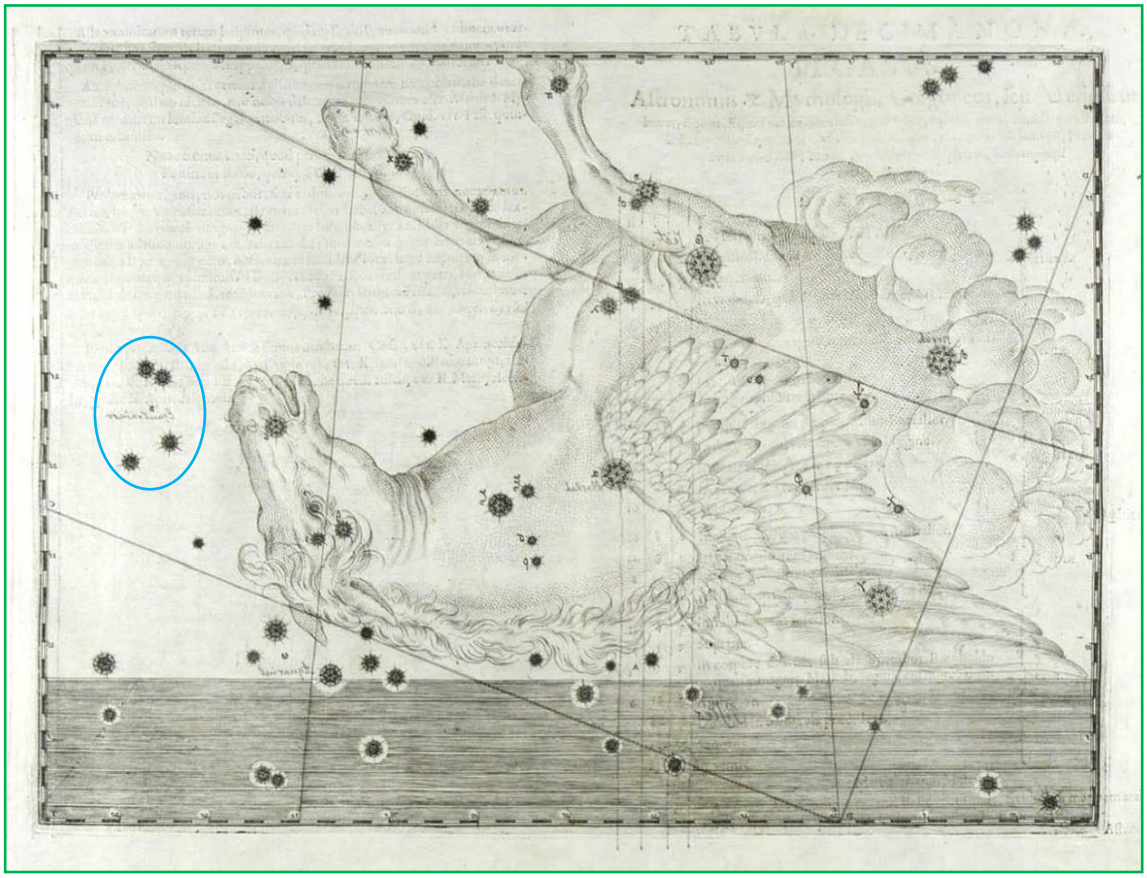
6c. Bayer's version reversed to assist comparison with chart 6b.



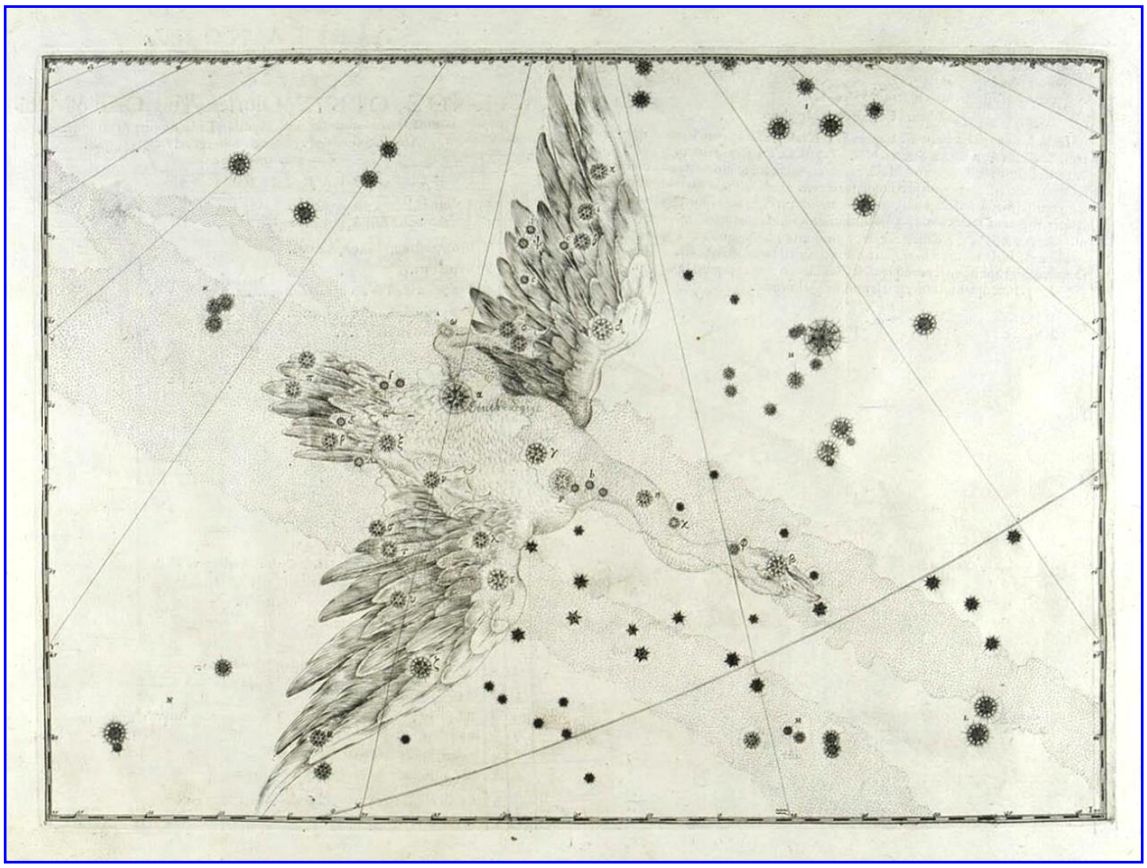
7a. Bayer's version of *Pegasus* as it appears in ***Uranometria***.



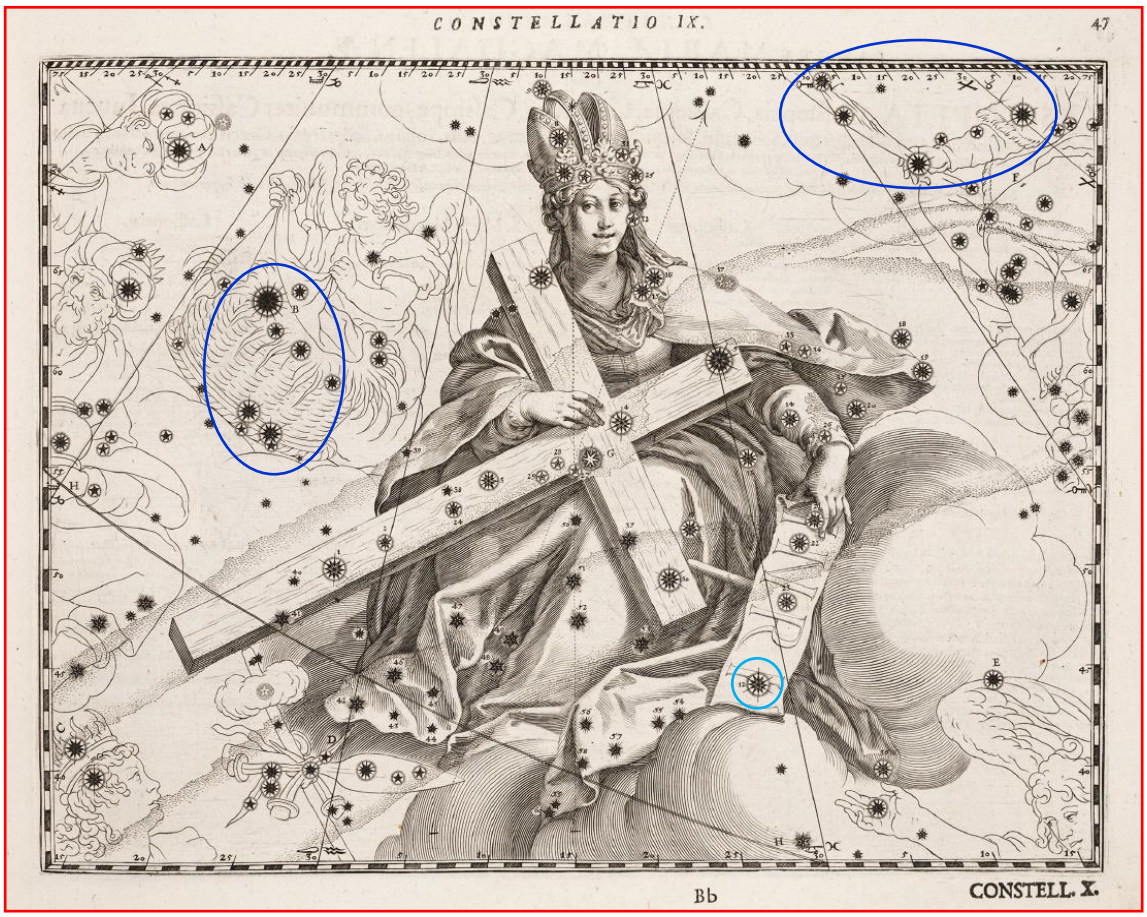
7b. Schiller's *Archangel Gabriel* (the same area of sky but plotted in reverse).



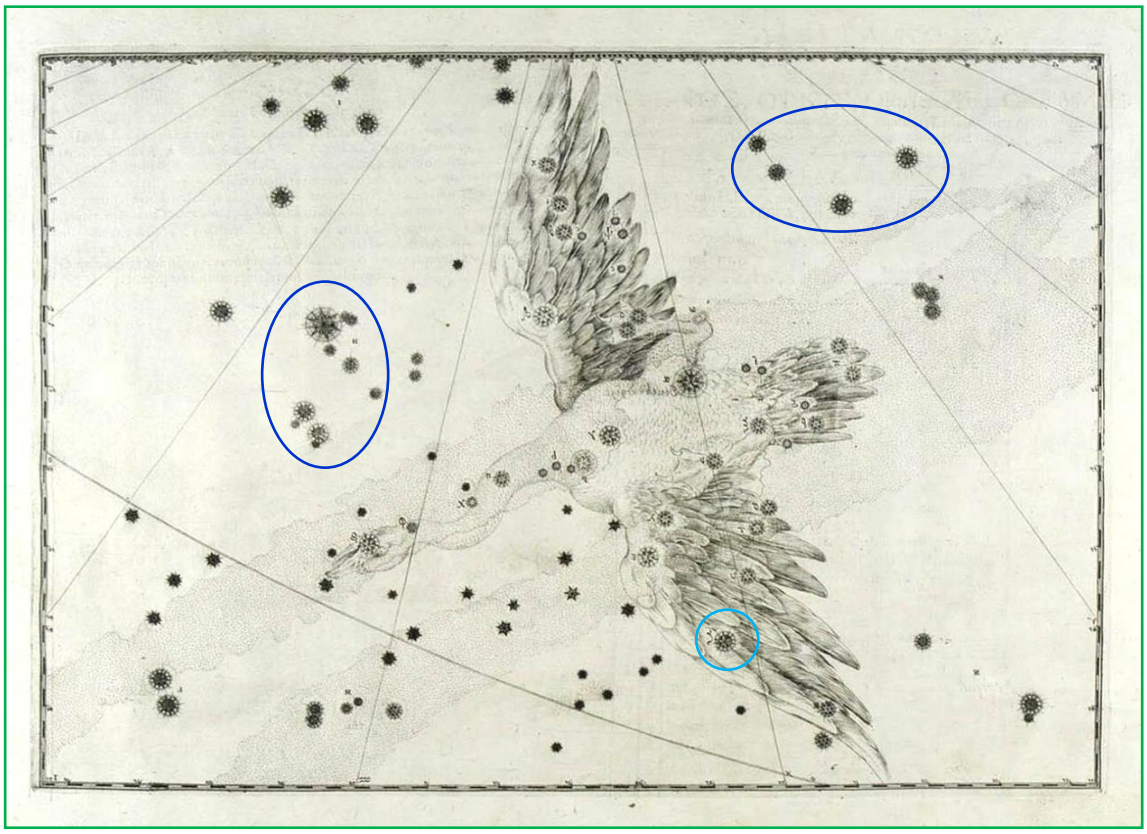
7c. Bayer's version reversed to assist comparison with chart 7b.



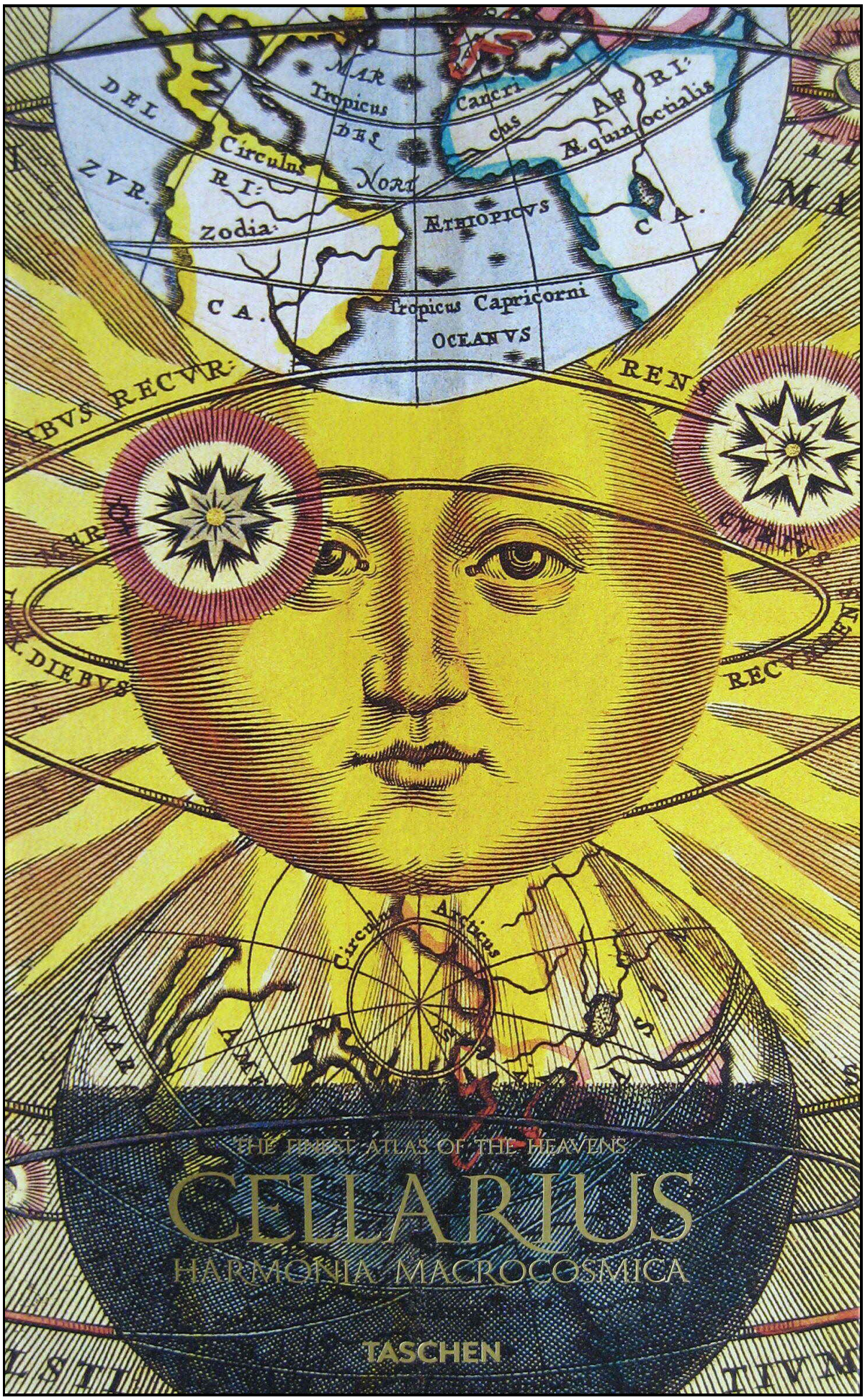
8a. Bayer's version of *Cygnus* as it appears in ***Uranometria***.



8b. Schiller's *Saint Helena with the Holy Cross* (the same area of sky but plotted in reverse). In the ellipse at left is the constellation Lyra, which Schiller has renamed 'the Baby Christ's Manger'.



8c. Bayer's version reversed to assist comparison with chart 8b.



THE FIRST ATLAS OF THE HEAVENS

CELLARIUS

HARMONIA MACROCOSMICA

TASCHEN

In 1660, the Dutch-German cartographer **Andreas Cellarius** (1596-1665) tried to popularise Schiller's Christian constellations and give them some authority by publishing them as two beautiful, hand-coloured hemispheres titled the ***Coelistellati Christiani Hæmisphaerium***, ***Prius*** and ***Posterius*** (both seen below).

They appeared as Plates 22 and 23 in a sumptuous book called ***Harmonia Macrocosmica (Harmony of the Universe)***, but despite the great popularity of Cellarius' book, the Judeo-Christian constellations never caught on. Columba and Crux remain the only quasi-religious star groups.

The ***Harmonia Macrocosmica*** has been called history's most beautiful celestial atlas, and it is still in print. Superbly produced, large-sized hardcover copies (57 cm × 48 cm when opened out flat) are available from Amazon for about $AU 400.00; 70 cm × 60 cm copies are dearer. Occasionally the price drops dramatically.

Beginning with an explanatory text, it has 29 large double-page plates including charts of the different world systems then in vogue, i.e. the Ptolemaic, Tychonic and Copernican. Only eight plates are of constellations, including the two charts of Christianised constellations referred to above.

Cellarius followed Bayer's example of showing the back views of the conventional figures, but closely copied Schiller's images of front-facing figures for the Christian versions.

These spectacular charts are still available today in large sizes for their beauty and elegance, and are often displayed in corporate boardrooms and offices, but they are very expensive. The detail in the engravings is exquisite, and the colours brilliant. The hard cover version's cover is shown above.

Complete sets of these and the other charts mentioned in this article may be downloaded on-line from the **Linda Hall Library** in Kansas City. From the homepage click on **Research** → **Collections** → **Digital Collections** and then search for the atlas you need.

Shortcut: To examine Bayer's ***Uranometria***, click on this link:

https://catalog.lindahall.org/discovery/delivery/01LINDAHALL_INST:LHL/1284377340005961?lang=en

To examine Schiller's ***Coelum Stellatum Christianum***, click on this link:

https://catalog.lindahall.org/discovery/delivery/01LINDAHALL_INST:LHL/1284387870005961?lang=en

(This atlas takes longer to load as it is a 1.2 GB PDF file due to its finely-detailed charts.)

To examine other old star atlases and books in the Linda Hall Library, click on this link:

https://catalog.lindahall.org/discovery/collectionDiscovery?vid=01LINDAHALL_INST:LHL&collectionId=8183287430005961

Enter the name of the atlas or book in the Search box, and click on the Search button.

The following two pages show Schiller's eastern and western hemispheres, with his Christianised constellations.


COELI
CHRISTI
MISPHÆ.
STELLATI
ANI HÆ
RIUM PRIUS.
Circulus Polaris Sept:
Circulus Polaris Mend.
Æquinoctialis.
Arca Noë.
Al. Argo Navis
S. Benedictus
cum Spina Fund.
Al. Sagittarius.
S. Thomas
Al. Leo.
S. Lacobus minor
Al. Virgo.
Arca Fœderis
Al. Crater et
Cornix.
XLI.
Iordanus.
Al. Hydra
S. Abrahamelisaac.
Al. Centaurus.
S. Israel
Sub Iacob.
Al. Lagus.
S. Bartholomæus
Al. Scorpio.
Philippus
Al. Libra.
Flagellum XPI.
Al. Coma
Berenices.
Corona XPI Spinea.
XXVI.
XXV.
XXVII.
XIII.
XXIX.
XLI et XLII.
VI.
VB.

COELI CHRISTI SPHÆRIUM

STELLATI ANI HÆMI POSTERIUS.

These are selected enlargements of some of Schiller's Christianised constellations, showing their aliases, e.g. Saint Matthew at lower left replaces Sagittarius. The quality of the engraving work is amazing.


S. Iacobus maior.
S. Ioannes.
S. Michael.
Navicula S. Petri.
Flagellum XPI.
S. Thomas.
Agnus Paschalis.
S. Iacobus minor.
S. Rex Dauid.
Arca Fœderis.
Iordanis.
Arca Noe.
S. Abraham et Isaac.
S. Israel.
S. Abel.
Polus Mundi et Axis Mundi et Colur. Æquinocc.