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Flamsteed, John

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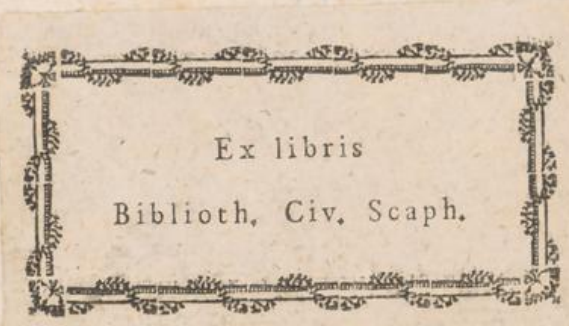
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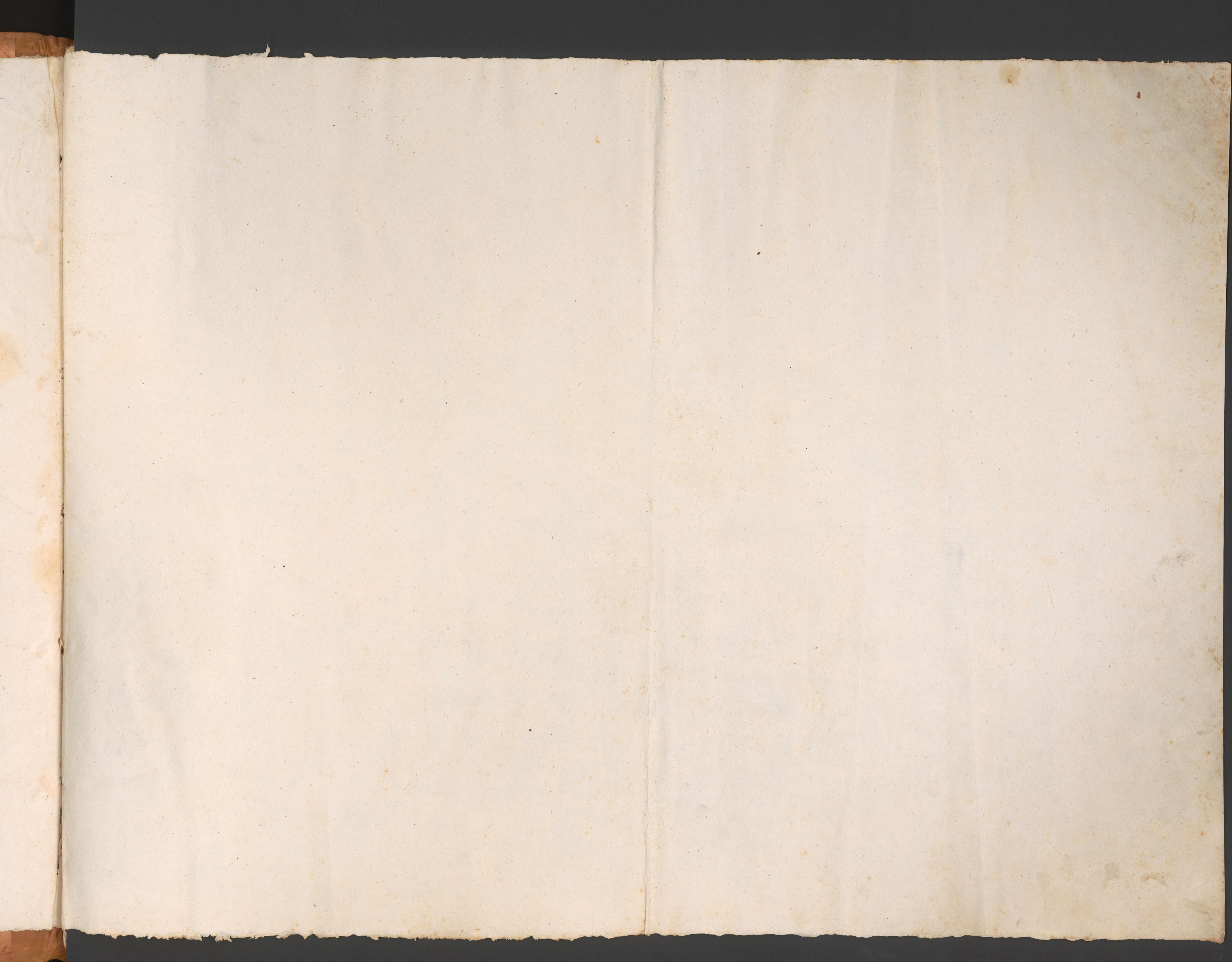
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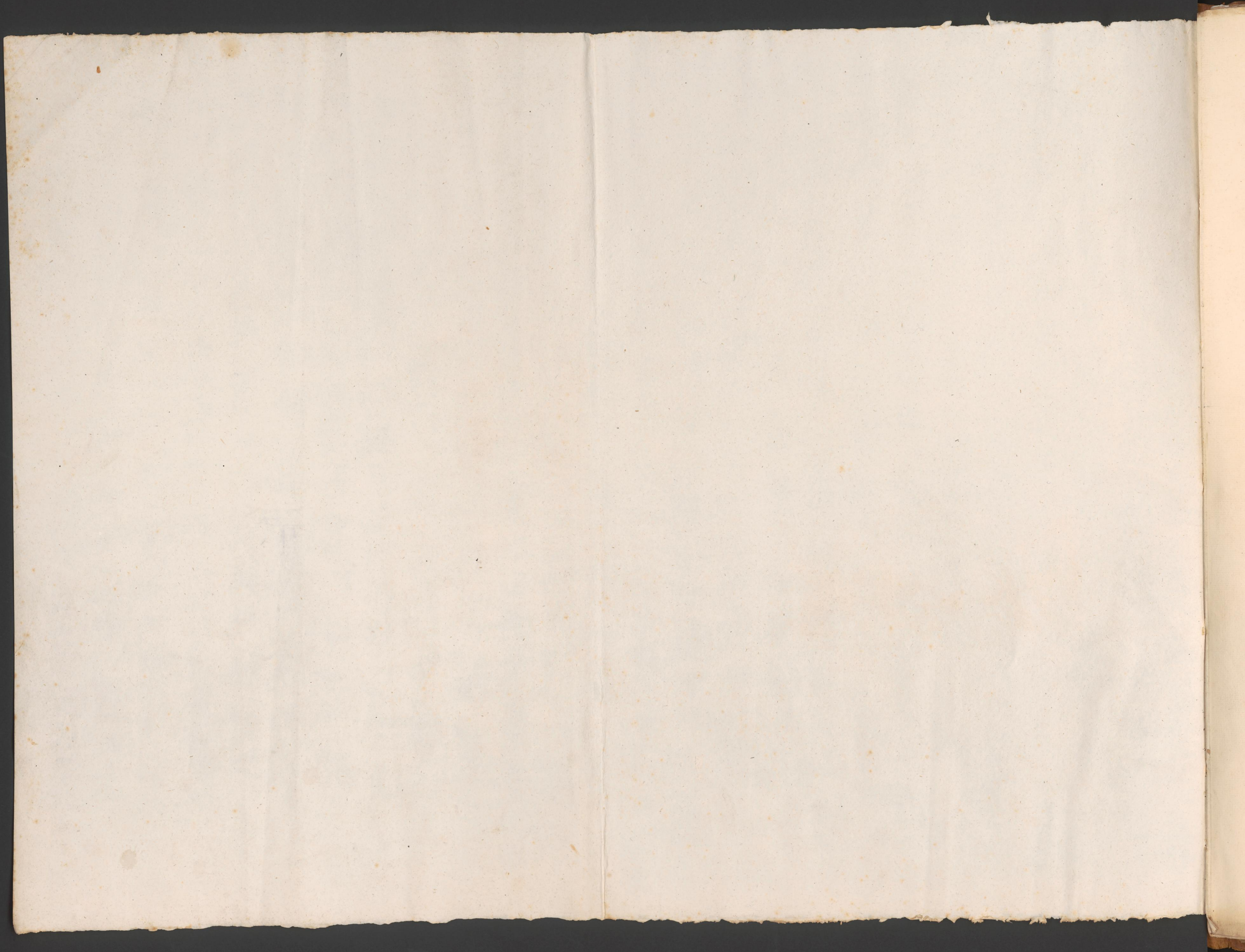
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ATLAS

COELESTIS.

By the late Reverend

Mr. *JOHN FLAMSTEED*,
REGIUS PROFESSOR of ASTRONOMY at *Greenwich*.



L O N D O N :
PRINTED in the YEAR M.DCC.LIII.

ATLAS

OF ECLIPSES

By the late Rev. Mr.

MR. JOHN FLAMSTEED,

REGIUS PROFESSOR OF ASTRONOMY at Greenwich.



LONDON:
Printed in the Year MDCCLXXII.

To His Most SACRED MAJESTY

GEORGE II.

King of Great Britain, France,
and Ireland, &c.

THIS

ATLAS COELESTIS,

OF

The late Rev. Mr. *FLAMSTEED*,

Regius Professor of ASTRONOMY,

AT

The Royal OBSERVATORY at *Greenwich*,

Is, with the greatest Submission, Dedicated,

By His Majesty's most Humble,

Most Dutiful, and most Obedient

Subjects and Servants,

MARGARET FLAMSTEED,

JAMES HODGSON.

To His Most Sacred Majesty

GEORGE II.

King of Great Britain, France,
and Ireland, &c.

THAT

ATLAS COELESSTIS

OF

The late Rev. Mr. WILKINSON,

Regius Professor of ASTRONOMY,

AT

The Royal OBSERVATORY at Greenwich,

is with the greatest Submission, DEDICATED,

By His Majesty's most Humble

Most Dutiful and most Obedient

Subject and Servant,

MARGARET WILKINSON,

James Hodgson.



O render the *indefatigable Labours* of Mr. FLAMSTEED as useful and beneficial to Mankind as may be, as well as to compleat the *Work* already publish'd, it has been judg'd very necessary by his EXECUTORS to carry on, and perfect the following Sheets, which contain all the *Constellations* visible in our *Hemisphere*, wherein the *ancient Figures* themselves are restor'd, and the STARS laid down in their

proper Places, with the greatest *Exactness* from his last *corrected Catalogue*.

The *Motives* that induc'd Mr. FLAMSTEED to set about this *Work*, the *Progress* that he made in it during his Life-time, and the *Methods* that he made Use of for *constructing* the *Charts*, which render them far more *useful* than any yet extant, will best appear by the *Account* that he himself has left behind him; wherein he tells us, That having about the Year 1700 compleated the *Calculation of the Places of the Fixed Stars*, he set himself to form *Maps of the Constellations*, in which he found it necessary wholly to depart from Bayer, of whom *Hevelius* himself complain'd, but without mentioning any Particulars; and this led him into a *strict Enquiry* to find out who those *Astronomers* were that first constructed *Maps of the Constellations*, and especially by whom the *Stars* were reduced into those *Forms* into which they are disposed in *Ptolomy's Catalogue*, (of which there is no *Account* given that can be relied on) for from what *Ptolomy* himself relates in the 4th Chapter of his 7th Book of his *Almagest*, it is evident, that those *Images* or *Figures* were older than HIPPARCHUS's Time, where he says, ' That we employ not the same ' Figures of the Constellations that those before us did, as neither ' did they of those before them, but frequently make Use of others ' that more truly represent the Forms for which they are drawn; ' for Instance, those Stars which *Hipparchus* places on the *Virgin's* ' Shoulder,

A

‘ Shoulder, we place on her Side, because their Distances from the
 ‘ Head appear too great for the Distance from the Head to the Shoulder,
 ‘ in his Sign of *Virgo*; and thereby making those Stars to be on the
 ‘ Sides, the *Figure* will be agreeable and proper, which it would not, if
 ‘ those Stars were placed upon the Shoulders.’

The *Chaldean Observations* were made in the 82d Year, *κατὰ χaldaίαν* corresponding with the 519th Year of *Nabonassar*, or 229 Years before *Christ*, wherein mention is made of the *Stars* in the *Southern Shoulder* of the *VIRGIN*, or the *Northermost* in the Front of the *SCORPION*, in an Appulse of *Mars* to that *Star*, which *Appulse* was observed in the 476th Year of *Nabonassar*, or 271 Years before *Christ*.

TYMOCHARIS and *ARISTILLUS* are still ancients than the *Chaldeans*, who lived about 300 Years before *Christ*, and observed the *Appulses* of the *Moon* to the Fixed Stars about 295 Years before *Christ*, or Year of the World 3709, and again in the 283d Year before *Christ*, or Year of the World 3721, at which Time it is plain from what *Ptolomy* says, that the *Ancients* had Figures or Maps of the *Constellations*, with the Stars Places designed on them.

ARATUS the Poet, (who wrote of the *Rising* and *Setting* of the Stars, flourish’d about the 125th *Olympiad*, or about 276 Years before *Christ*) was, if not Cotemporary, yet but little later than *Tymocharis* and *Aristillus*, and certainly older than the *Chaldean Observers* of the *Appulses*: From whose *Poem* ’tis confirm’d, that the *GREEKS* had Figures of the *Constellations*; but from whom they had derived them, or how they came by them, is no where to be learnt.

From the aforementioned Place in *Ptolomy* it is evident, that by those before him he meant *Hipparchus* and his Followers, and by those Elder than the *Chaldean* or *Greek Astronomers* who flourished before *Hipparchus*’s Time, he meant those *Astronomers* who first of all made Observations of the *Appulses* of the Planets to the Fixed Stars; from the *Translation* of which we have an Account of an Observation in the Northermost Star in the Front of *Scorpio*, made in the 476th Year of *Nabonassar*, or 276 Years before *Christ*; and likewise of another in the Southermost Shoulder of *Virgo*, made in the 519th Year of *Nabonassar*, or 229 Years before *Christ*: But *Tymocharis* and *Aristillus*, whose Observations are also transmitted to us by *Ptolomy*, mention Stars of many other *Constellations*; whereby it is evident, That they had formed Figures of them in their Time, about three hundred Years before our Saviour; which is all the Account we have from *Ptolomy*.

From *Ptolomy*’s Time to Ours the Names that he made Use of, have been continued by the ingenious and learned Men of all Nations; the *Arabians* always used his *Forms* and *Names* of the *Constellations*; the old *Latin Catalogues* of the Fixed Stars use the same;

COPER-

COPERNICUS's Catalogue (the first we have in good *Latin*) and TYCHO BRAHE's use the same; so do the Catalogues publish'd in the *German, Italian, Spanish, Portuguese, French* and *English* Languages: All the Observations of the Ancients and Moderns make Use of *Ptolemy's* Forms of the Constellations and Names of the Stars, so that there is a Necessity of adhering to them, that we may not render the *old* Observations unintelligible, by altering or departing from them.

Tycho Brahe died in the Year 1601, two Years after BAYER publish'd his *Uranometria*, wherein he gives us Maps of all the Constellations: His Figures are tolerable, and the Stars rightly laid down according to their Places in *Tycho's* Catalogue, and many other small Stars are added which it hath not: These, 'tis probable, he inserted upon his own *bare* View, by comparing them with the Fixed Stars inserted in his Maps from *Tycho's* Catalogue, whose *Nomenclatura* is the same; but having drawn all his *Human Figures*, except *Bootes, Andromeda*, and *Virgo*, with their Backs towards us, those Stars, which all before him place in the *Right* Shoulders, Sides, Hands, Legs or Feet, fall in the *Left*, and the contrary in his Figures; with which therefore whosoever goes about to examine the *antient* Observations, or the Catalogues of the Fixed Stars, printed or publish'd in any Language, will find himself much perplexed, if he be not before-hand apprized of this.

The Reason probably of *Bayer's* Fault was, that finding the Word $\epsilon\nu \nu\acute{o}\tau\omicron$ and $\epsilon\nu \mu\epsilon\tau\alpha\phi\acute{\epsilon}\nu\omega$ often in *Ptolemy's* Catalogue, and consulting the *Greek Lexicons* for the Sense of them, he found constantly $\nu\acute{o}\tau\omicron$ render'd by *Dorsum*, and $\mu\epsilon\tau\alpha\phi\acute{\epsilon}\nu\omega$ by *Interscapilium*, and therefore concluded, that *Interscapilium* was the Space betwixt the Shoulder-Blades on the Back; and wherever he met with either of these Words in the Description of any Constellation, except *Virgo* and *Andromeda*, he drew it with the Back towards us, whereby he makes all those Stars that *Ptolemy* (and the Antients, and all since them 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, when he mentions any eminent Fixed Star to be in *dextro Humero*, or *dextra Tibia*, he adds *alias in Sinistra*, &c. which indeed seems to excuse the Fault, but being done but seldom, will perplex those that make Use of his *Maps*, and render them useless.

Had *Bayer* but drawn the Map of *Sagittary*, or any other of the *Human Forms*, so that the Stars placed in the *Right* Hands, Shoulders, Sides and Feet of *Ptolemy's* Catalogue might stand on the same in his Figures, he would have seen that they would all have their Faces towards us, and thereby would have learn'd, that in *Ptolemy's* *Greek*, the $\nu\acute{o}\tau\omicron$ signifies the *Crates Corporis*, or the *Ribs*, and that the

the μεταφρέων, the Space betwixt the Shoulders, not only on the *Back*, but also on the *Fore Part* of the Body, or *Upper Part* of the *Breast*, and there would then have been no Incongruity between His Figures, and the *Ancients* Descriptions; for not only *Ptolomy* but *Homer* himself uses those Words in a more comprehensive Sense than the *Lexicons* commonly allow.

Nevertheless, in most of the Maps of the Fixed Stars that have been Engraved since those of *Bayer*, the Forms are taken from him, and have the same Faults with his.

The Learned WILLIAM SKIKARD, Professor of the Oriental *Languages* and the *Mathematicks* at *Tubing* in *Germany*, Published his *ASTROSCOPIUM* at *Nordlingen* in the Year 1655, where, in *Page 44*, he takes Notice of this Fault of *Bayer's*, and of the Confusion it causes in the Denomination of the Stars, and tells us, That others before him have complained, that very often they made those Stars in the *Right Sides*, *Shoulders*, or *Hands* of his *Fingers*, which all *Ptolomy's* Descriptions placed on the contrary; so that we are not the first nor only Persons that have taken Notice of these Faults of *Bayer's* Maps, but others, and those Persons of great Reputation, have done it long before.

Mr. *Skikard* takes Notice in the Beginning of his little Treatise, that *Globes* are unfit for representing the Constellations of the Heavens by Figures pasted on them; and that whosoever would Learn the Stars by comparing the Figures on them with the Heavens, must find themselves very much perplexed, because those Representations are supposed to be made on the Outside of the *Globe*, or to the *Eye* placed beyond it, whereas we view the Stars disposed in the Constellations from our *Earth* as the *Center* of a *Concave Sphere* wherein they are fixed, and therefore their *Appearances* to us must be the Reverse of what appears on the *Convex* of the *Globe*, so that *Globes* are no Ways proper to represent the Heavens upon.

He farther takes Notice in *Page 43*, that *Planispheres* or *Stereographical* Projections are not convenient, because in them the Degrees near the Middle or *Center* are much less than the Degrees near the *Limb* or Outfides of the Projection, and thereby the Figures therein represented will be distorted.

To remedy which Inconveniency, Mr. FLAMSTEED thought nothing so necessary as a *new Method* of Projection, wherein all the *Parallels* of Declination might be equidistant *streight Lines*, and the Degrees of Longitude in every Parallel might be every where Proportional to the Sines of their Distances from the next Pole, and equal in the same to one another.

The *Maps* indeed thus described, will not answer to any of the usual *Orthographical*, or *Stereographical* Projections of the *Sphere*, in which is supposed a fixed Position of the *Eye*, whereas in these there is no such Supposition;

Supposition; but nevertheless they are derived from the Globe, as the *others* are, and that much more properly than the Projections generally made Use of in Maps of the Earth, or particular Countries, above *which*, and the forementioned Projections of the Sphere, This will have peculiar Advantages.

And for the better Understanding of which, conceive the Globe or Sphere to be compassed about with an infinite Number of equally fine *Thrids*, all exactly parallel to the Equator.

Let all the Circles usually drawn upon the Globe, as the *Equator*, the *Ecliptick*, the *Meridians*, &c. be supposed drawn and divided, and let the *Constellations* also be Formed upon them, and the Stars laid down in their proper Places.

Let also the Meridian passing through the *Middle* of any Constellation be conceived drawn on the Globe, and covered with a *fine Thrid*, with as many of the adjacent Circles as you think convenient.

Conceive the *Thrids* on which the Constellation is painted to be cut off from the Surface of the Globe, and that which passes thro' the *Middle*, being extended streight on the Middle of some Paper, or perfectly plain Superficies, let the *Rest* be placed on it at Right Angles to the Middle Meridian, but reverted, or so as those Parts of them which stood to the *Right* Hand of it on the Globe may stand to the *Left* on the said Plane, and the Contrary.

So will you have the *Picture* of the Constellation Projected upon it, in which the *Parallels* of *Declination* will be *streight* Lines, and their Distances exactly equal, the same as they are on the *Globe*, as will also the Distances and Differences of the *Right Ascensions* of any two Stars that are equally distant from the Pole, or have the same Declination from the Equator.

But the *Meridians* will become *Compound Curves* of the same Nature, and having the same Properties with that which Dr. *Wallis* in his Treatise *de Cycloide* calls *Curva Sinuum*.

The *Circles* of Longitude, and *Parallels* of Latitude may be inscribed on the same Chart, by the Help of such Tables as shew the Declination and Right Ascension corresponding to every Degree of Longitude with every Degree of Latitude; for thereby *Points* may be found on the Paper or Chart, through which every Circle of Longitude or Parallel of Latitude will pass, thro' which *Points*, if *Lines* be Traced with an even Hand, they will represent the Circles or Parallels required.

Having therefore resolved upon this as a proper Method of Projection, and being no Ways liable to the Inconveniences that attended the aforementioned ones, He began to form his Maps of the Constellations, in which, as his Catalogue contained twice as many Stars as *Bayer's* or *Hevelius's*, he thought it requisite to allow *four Tenths* of an Inch for each Degree, and determined to make the Figures of the Stars less than *Bayer's*, in Order to gain more

Room, and then caused the *Charts* to be prepared, and the *Stars* laid down in their proper Places; after which the Images were drawn on them according to the Descriptions given in *Ptolomy's* Catalogue, (which have been used by all after him without Variation, 'till *Bayer* formed them anew, and spoiled them) that thereby the *ancient* Figures of the Constellations, that were made Use of by *Ptolomy* and his *Predecessors*, might be restored, and no longer spoiled by Innovators.

The *Maps* therefore being thus prepared, and all drawn upon large Imperial Paper, admit of many more Stars than belong to that particular Constellation for which the particular Map is drawn. In those of the *Zodiack*, besides the Stars of that Sign for which the Map was design'd, not only the principal Stars of the two *contiguous* Signs are laid down, but all the Stars in the *Northern* and *Southern* Constellations that come within the Compass of the Map are inserted.

But in the Maps of those Constellations that are without the Limits of the *Zodiack*, not any one Star is omitted that can be comprehended within it.

As there was no Necessity for drawing distinct Maps for every particular Constellation as well as for the Signs of the *Zodiack*, as *Bayer* and *Hevelius* have done; and since the Size of the Paper would allow of it, he judged it more convenient so to contrive them, that two or more of the Constellations might be compriz'd in one Map, which would considerably diminish their Number, without any Disadvantage to the Constellations themselves, and by this Means some of the smaller Ones, as *LYRA*, *SAGITTA*, *LACERTA*, are found entire in two or three several Maps. But *HYDRA*, which extends to above 80 Degrees of Right Ascension, and being likewise very near the *Equator* where the Degrees are widest, could not be comprehended within one single Sheet, and as it would have been very inconvenient to have alter'd the Scale for this single Constellation, it was much better to enlarge it to another Half Sheet, so that besides the Constellations of *CRATER*, and *CORVUS*, it contains that of *SEXTANS* entire, and most of the Stars in *VIRGO*: But tho' *URSA MAJOR* contains more than 80 Degrees of Right Ascension, yet by being near the North Pole, the Degrees are so much contracted that the whole Constellation is compriz'd within one single Map.

The same Projection and Scale is used in all except the *Polar* Maps, where it would not be so very convenient, and therefore the common Stereographick Projection on the Plane of the Equator was thought most proper and commodious, and liable to the least Distortion, by chusing such a Scale of Semi-Tangents that the Degrees of Polar Distance would be very near equal with those in the other Maps, decreasing a little near the Pole, and encreasing towards

towards the Limb; the Center or Pole being so disposed that the four Constellations URSA MINOR, DRACO, CEPHEUS, and CASSIOPEA, might be conveniently contained within a Map of the same Form and Size with the other, all appearing in their right Postures, and not in the least distorted, but as well as if they had been drawn in single and separate Maps.

For the foremention'd Reason the same Kind of Projection was made Use of in the *two Hemispheres*, where the Arctick and Antarctic Poles are made the Centers of the Projection, and these, as well as the other Maps, were prepared anew, and the Stars laid down by Mr. *Abraham Sharp*, who having Leisure and Time upon his Hands, readily offer'd himself for this Service.

And since the Maps are all drawn by one particular Scale, it will not be difficult, even by *Inspection*, to pronounce nearly the *mutual Distances* of the Fixed Stars themselves, and to judge of the Comparative *Magnitudes* even of the *Constellations*, which cannot be done by those which are formed by different Scales; and as the PARALLELS of DECLINATION are streight Lines equidistant and parallel to each other, and to the Equator, and drawn to every *single Degree* of *Declination* or *Distance* from the Pole, each Degree being equal to four Tenths of an Inch, the *Declination* of every Star may be very nearly determined by *Inspection*; but if the Distance of any one of their Centers from the nearest Parallel of Declination be applied to the *graduated Meridians* on each Side of the Chart, the Quantity of its *Declination* may be much more exactly determined.

And again, as the *Meridians* themselves are drawn to every *fifth Degree* of Right Ascension; the Right Ascension itself, of any Star may be had by *Inspection* only, and as the Lengths of the several Parallels of *Declination* are as the Circumferences of the several Parallels they represent on the Globe itself, and these being as their respective Diameters, which are as the Sines of the respective Distances from the Pole; if the Breadth of one or more Degrees upon the Equator be made equal to the Sine of 90 Degrees upon a Sector, the Sine of a Degree answering to its Distance from the Pole, or the Complement of its Declination, which is expressed in every Map by the Divisions on each Side of the Maps, will give the Length of one or the like Number of Degrees in that Parallel, whence the Right Ascension of any Star may be more exactly determined.

And again, as the ECLIPTICK itself is drawn in every Chart through which it passes, being divided into single Degrees, as also the Circles of Longitude, and Parallels of Latitude to every fifth Degree, the Latitudes and Longitudes of each particular Star may be had by *Inspection*.

And

And as each of these Charts are *Tangent Planes* to that Point of the Globe which corresponds with the *Center*, or *Middle Point* of the Chart, if held up, so that it may answer to its correspondent Part in the Heavens, each particular Star will thereby correspond with the Star it represents in the Heavens, whence People, who are not well versed in the Knowledge of the Stars, will soon be enabled to know them, which is not so easily to be attained by the *Cœlestial Maps* hitherto published, which being made to represent the *Convex Side* of the Heavens, the Spectator must either suppose himself placed above the Stars, or else carry his Imagination so far as to conceive the Stars which are placed on the *Right Side* of the Figure of those Maps to be viewed on the *Left Side* in the Heavens, and likewise the Stars that are on the *Left Side* in those Maps, to be viewed on the *Right Side* in the Heavens, and that the Planets or Stars which seem to move from *East* to *West*, or from the *Left* to the *Right* by their *Diurnal Motion*, when they are placed right before him must move upon those Maps on the Contrary, that is, from *West* to *East*, or from the *Right* to the *Left*: And as the Planets themselves in their *Revolutions* thro' their Orbs appear to move from *West* to *East*, or from the *Right* to the *Left*, must here be traced on the Contrary, from *East* to *West*, or from the *Left* to the *Right*, a Thing that to Persons not very well skilled in these Matters, will create very often some Difficulty.

And as the *Ecliptick*, and its several *Parallels of Latitude* are all drawn by the same Scale, it contributes very much to the reader Discovering of what Stars, the Moon, or any of the Planets will *Pass by*, or *Cover* in any of their *Revolutions* through their Orbs, and the *Parallels of Declination* being all drawn as before, it may be discovered at Sight what Stars will *Transit* the *Meridian* at, or near the same *Altitude* with the Moon, or any other Planet or fixed Star; and in as much as in this Case they are all subject to the *same Refraction*, and the Errors of the Instrument made Use of (if any there be) being alike in all, does not a little Contribute to the reader finding the *Declination* of any unknown Star, or the Moon, or any other Planet at that Time, by getting rid of some Uncertainties that otherwise Observations of this Kind would be liable to.

And that the Reader may be the better enabled to know the *Names* of the several Stars, and distinguish them one from the other, there are *Letters* annexed to the principal Stars in each Map, which refer to the Catalogue printed in the third Volume of the *Historia Cœlestis*, where, in the proper Constellations, he will find against the *Referential Letters*, the Name, Right Ascension, Declination, Latitude, Longitude, as well as Magnitude of each particular Star.

As Works of this Nature meet with but very few Encouragers, and as a great Part of the *Historia Cælestis*, as well as this Book, have been carried on at the *sole Expence* of the Executors, they were unwilling to proceed in one 'till the other was publish'd, which, together with the Difficulties and Delays that usually attend Performances of this Kind, has been the Reason why it has not appeared sooner abroad; but as neither Pains nor Expence have been wanting to render it as compleat as possible, there is Reason to hope that it will meet with a suitable Reception from the generous, candid, and unprejudic'd Part of Mankind.

And lastly, as the principal View of the Royal Founder of the Observatory was to obtain a *good Catalogue* of the fixed Stars, so it must be justly acknowledged that Mr. FLAMSTEED has fully accomplished that great End, having left behind him one of the largest and compleatest Catalogues that ever the World was enrich'd with, from which these Charts are deduced, containing almost double the Number of the Stars in that of *Hevelius's*, to the Honour of the *British* Nation, and the lasting Reputation of the AUTHOR; a Work that will render his Name famous to the latest Posterity, and perpetuate his Memory 'till Time shall be no more.



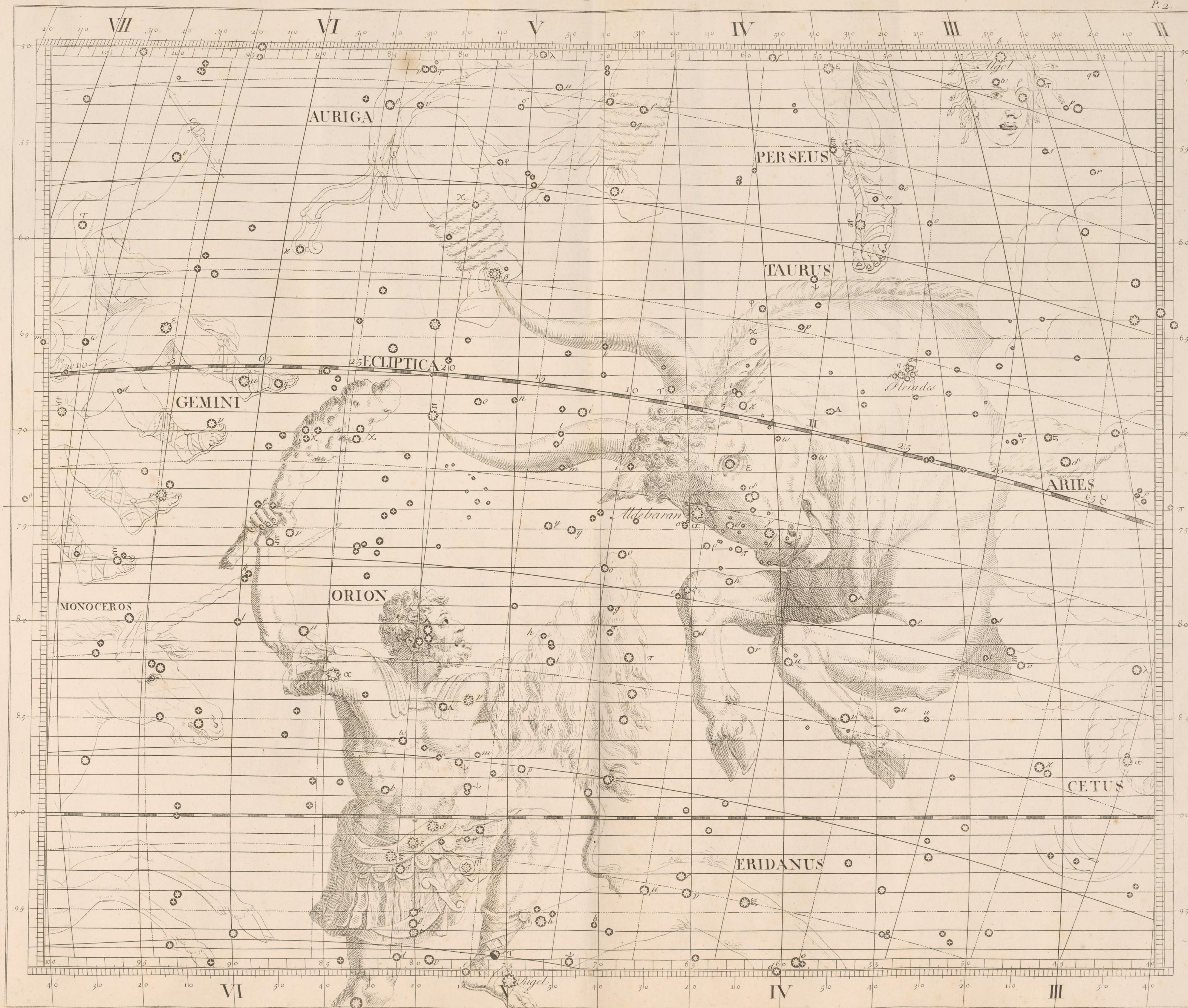
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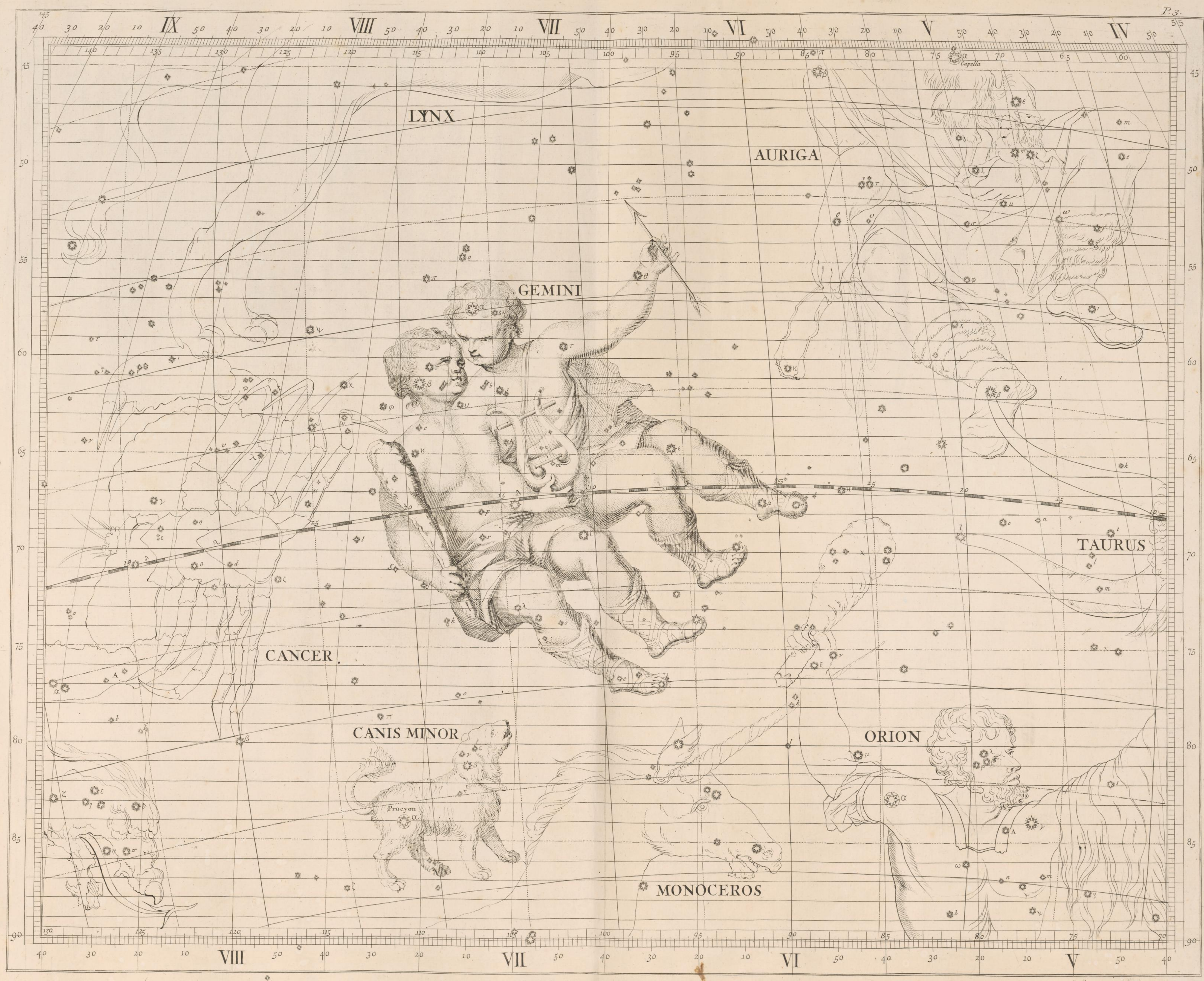
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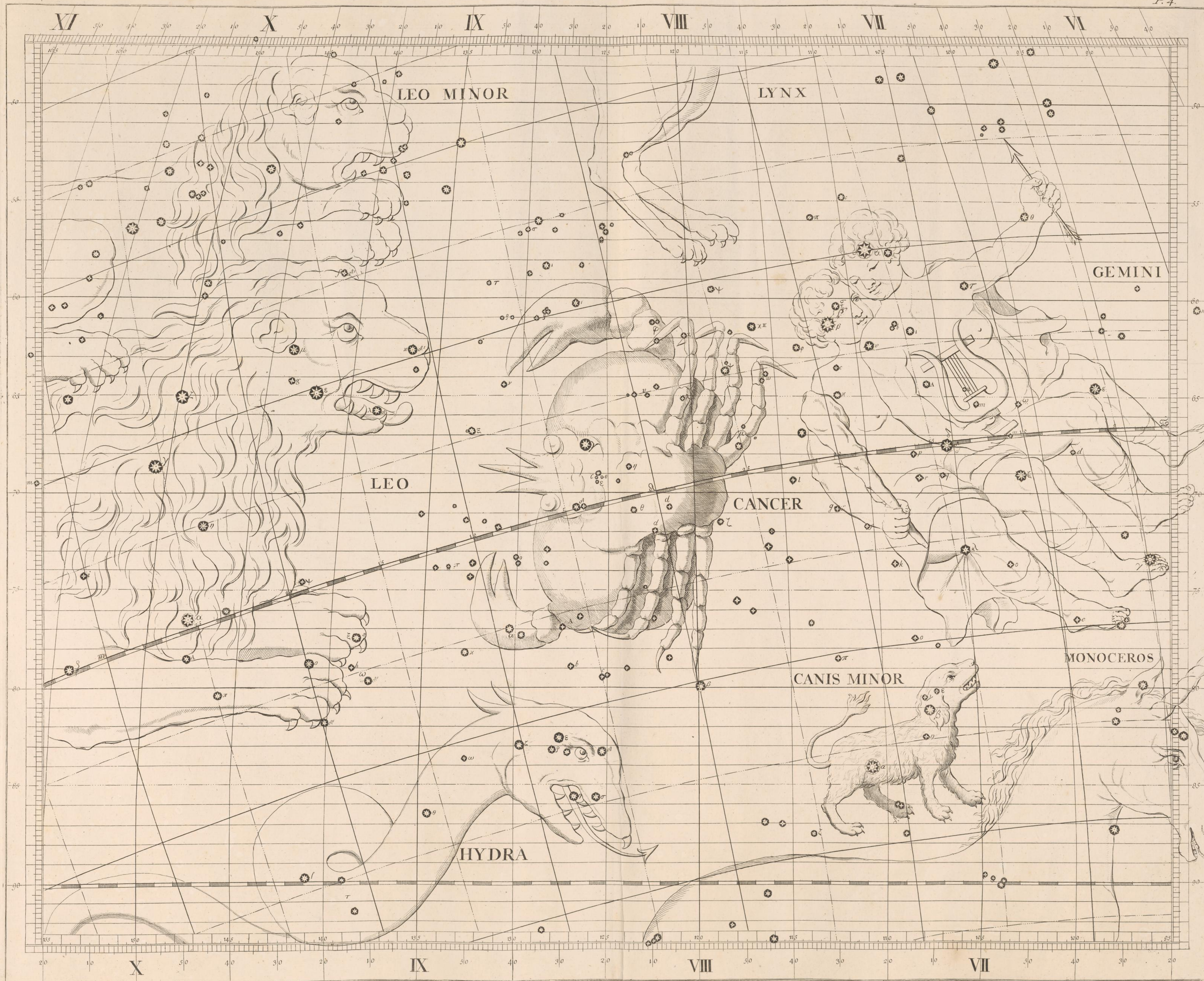


TAURUS

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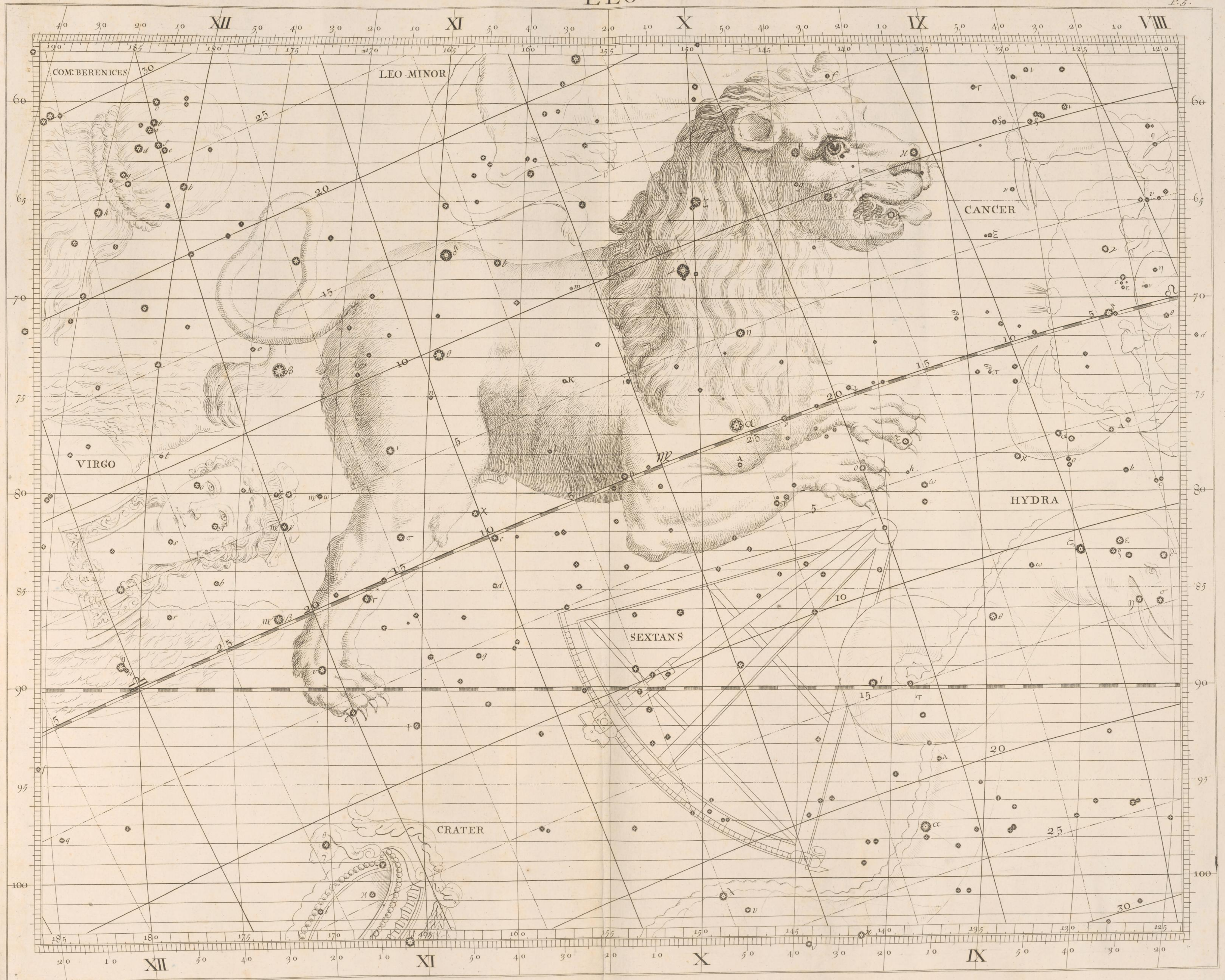






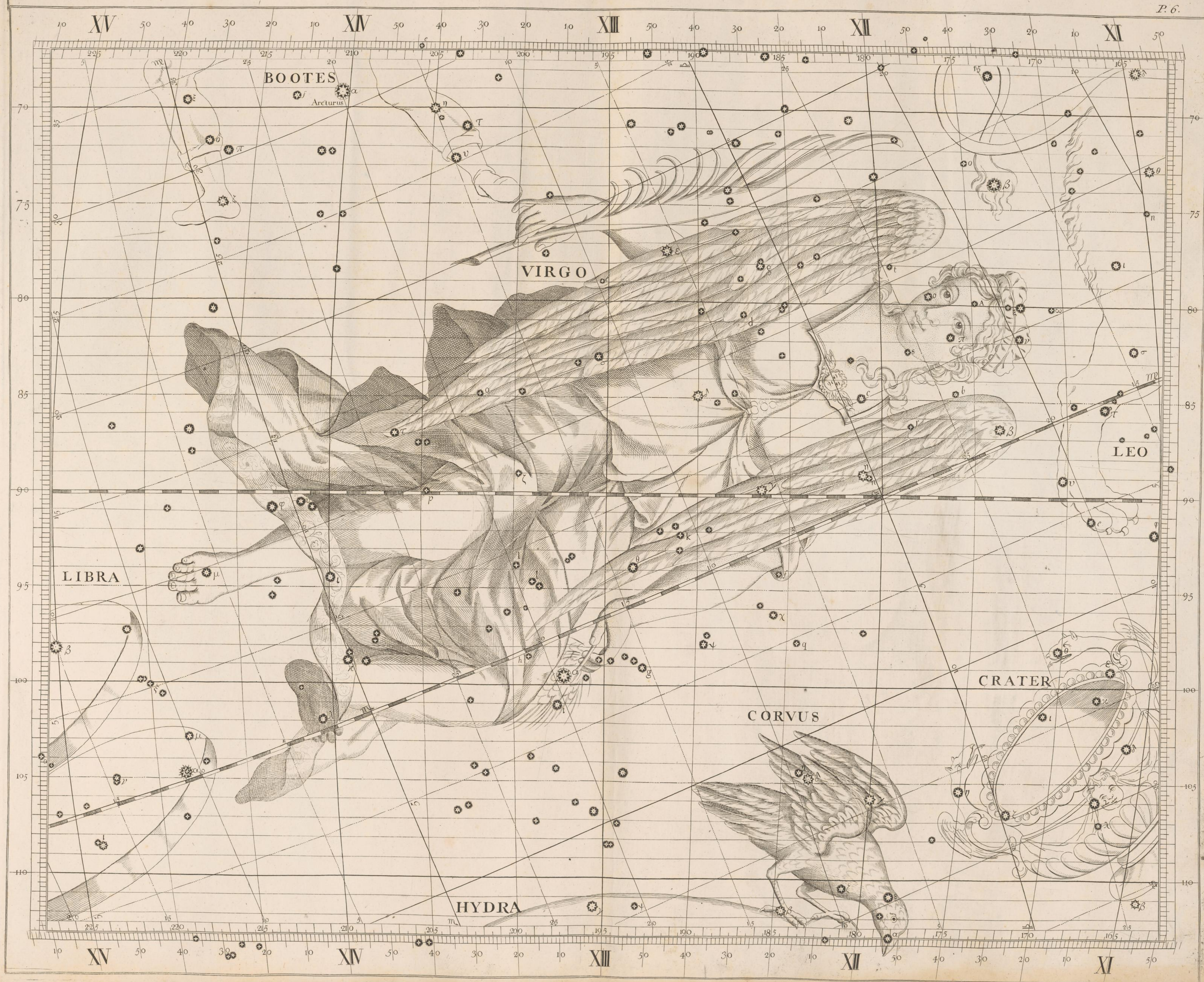
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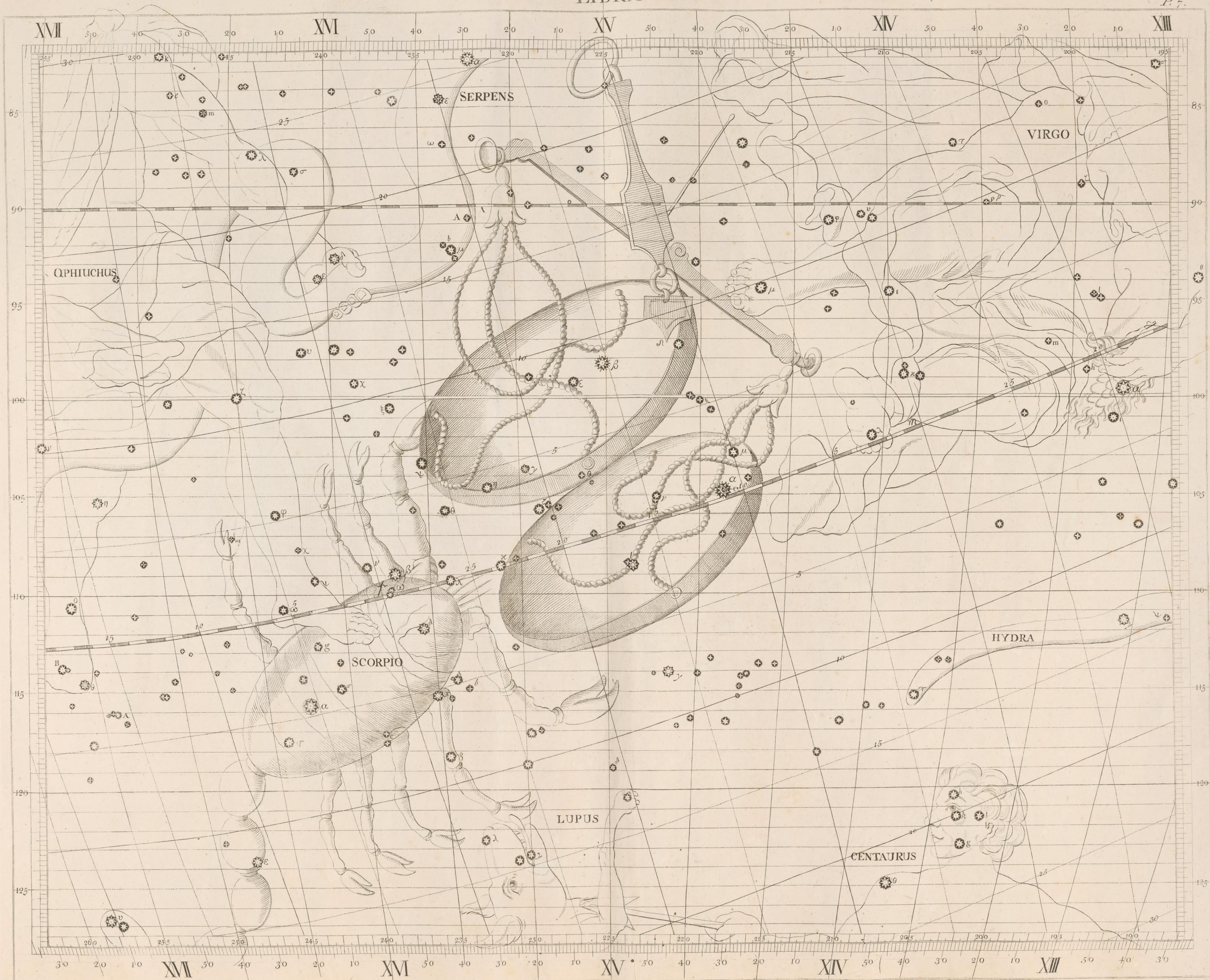
VIRGO

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LIBRA

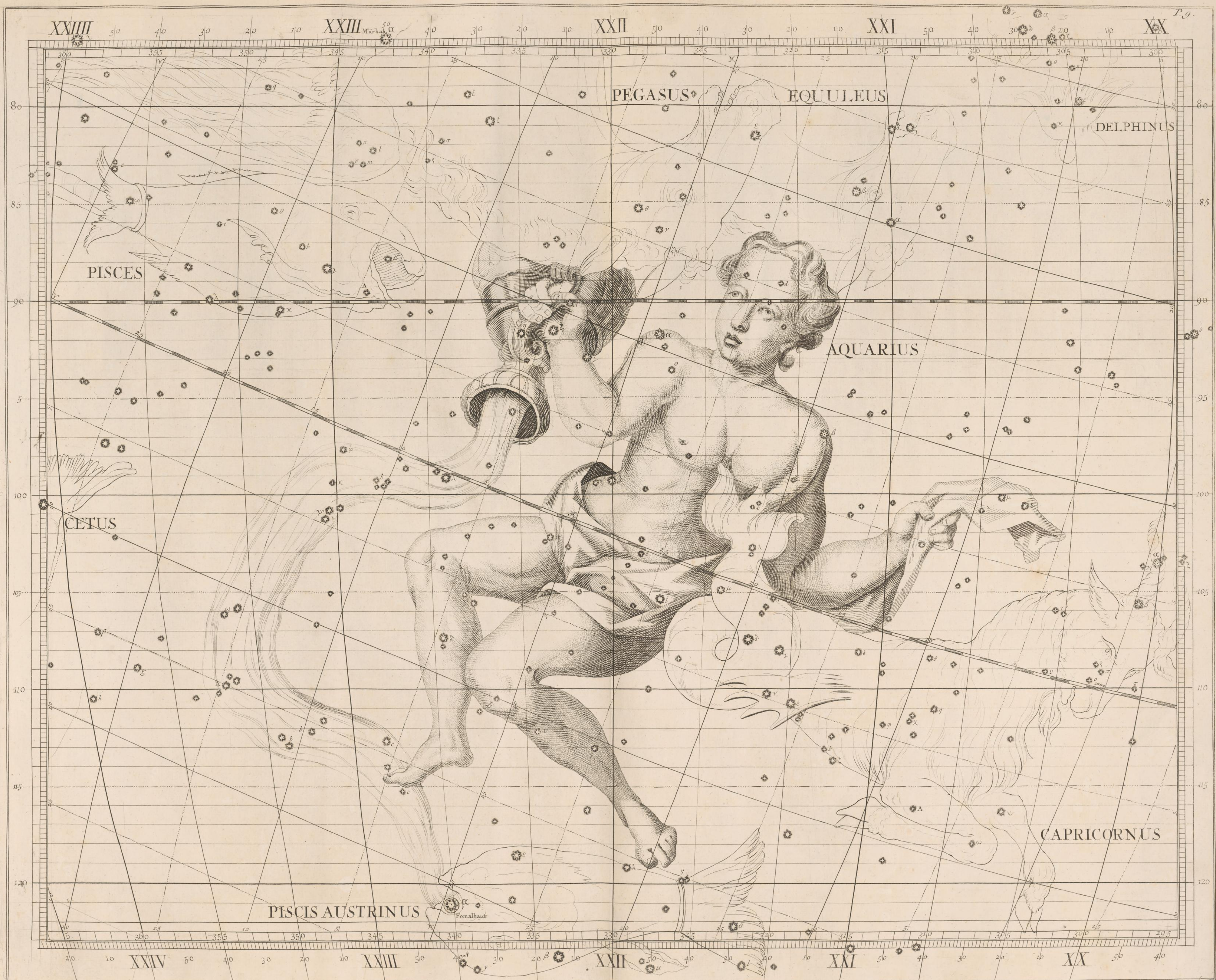
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SAGITTARIUS

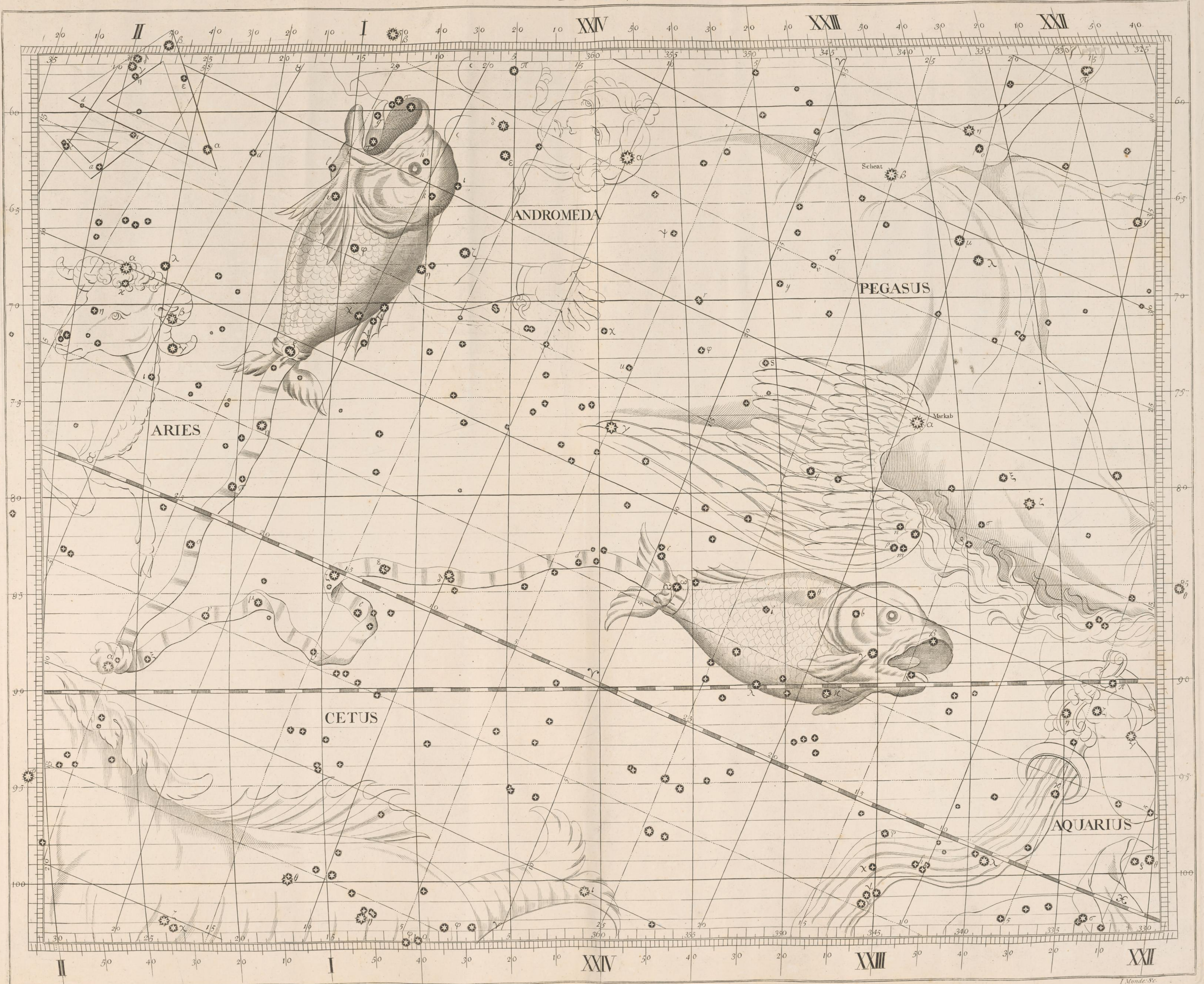
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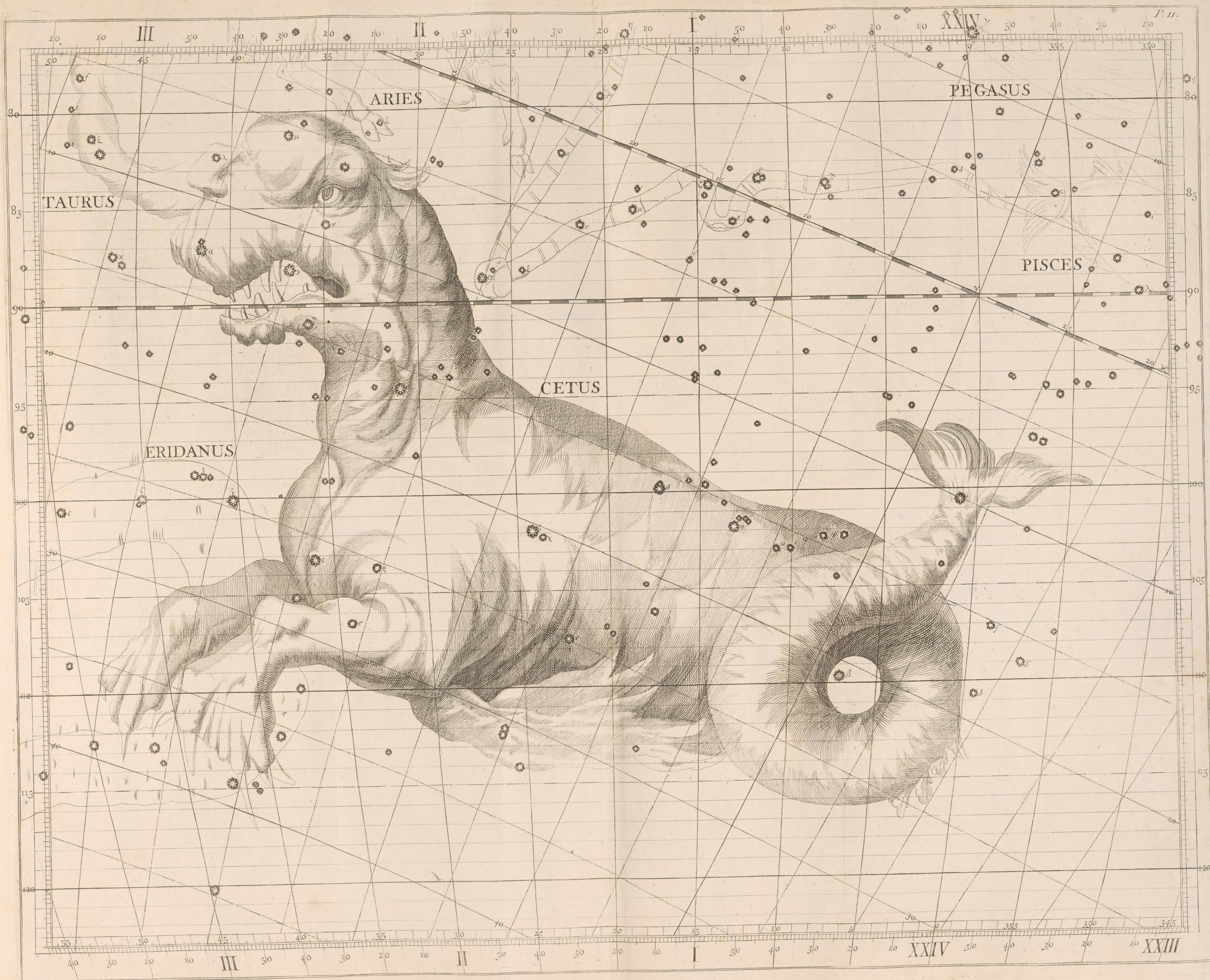


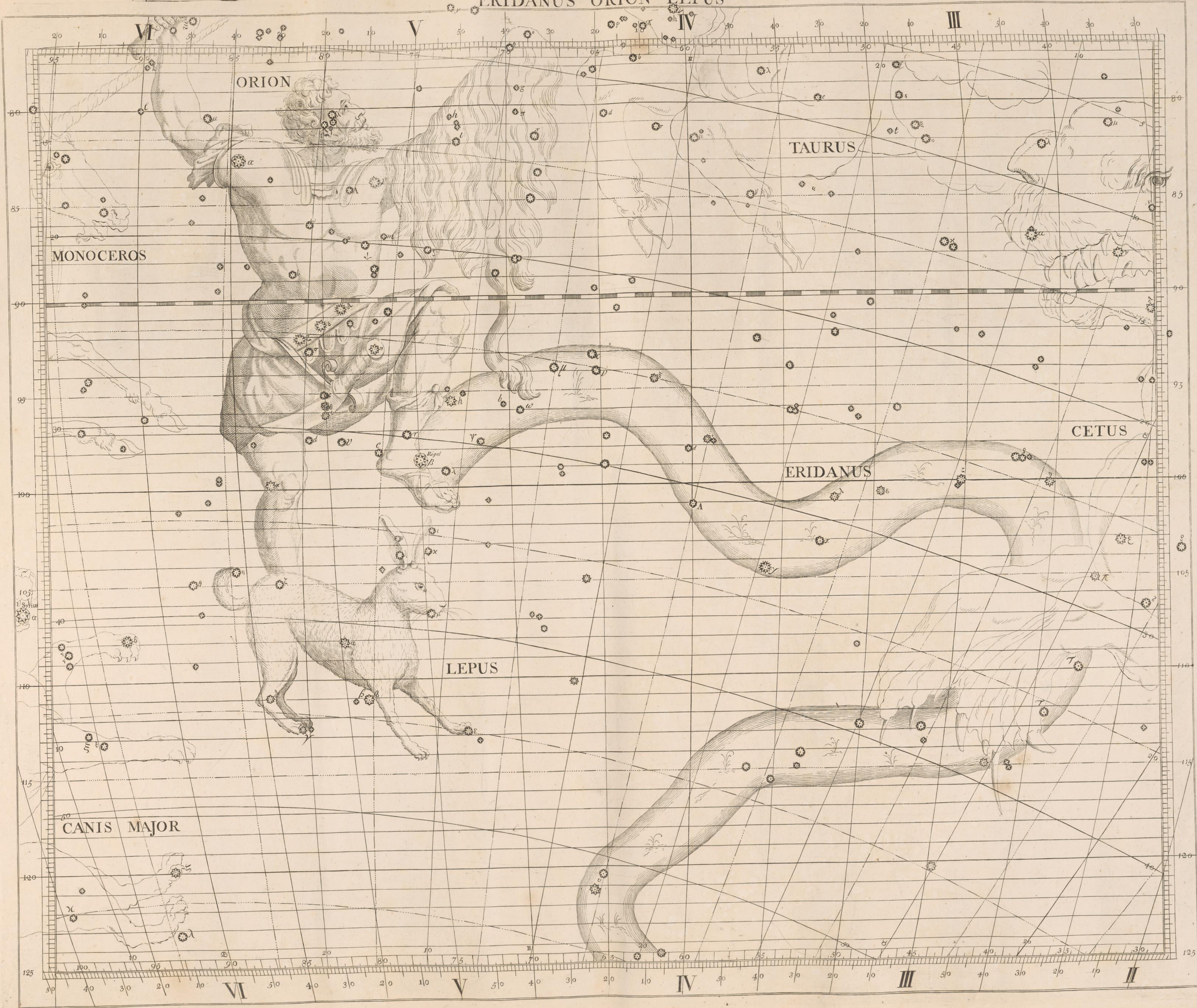


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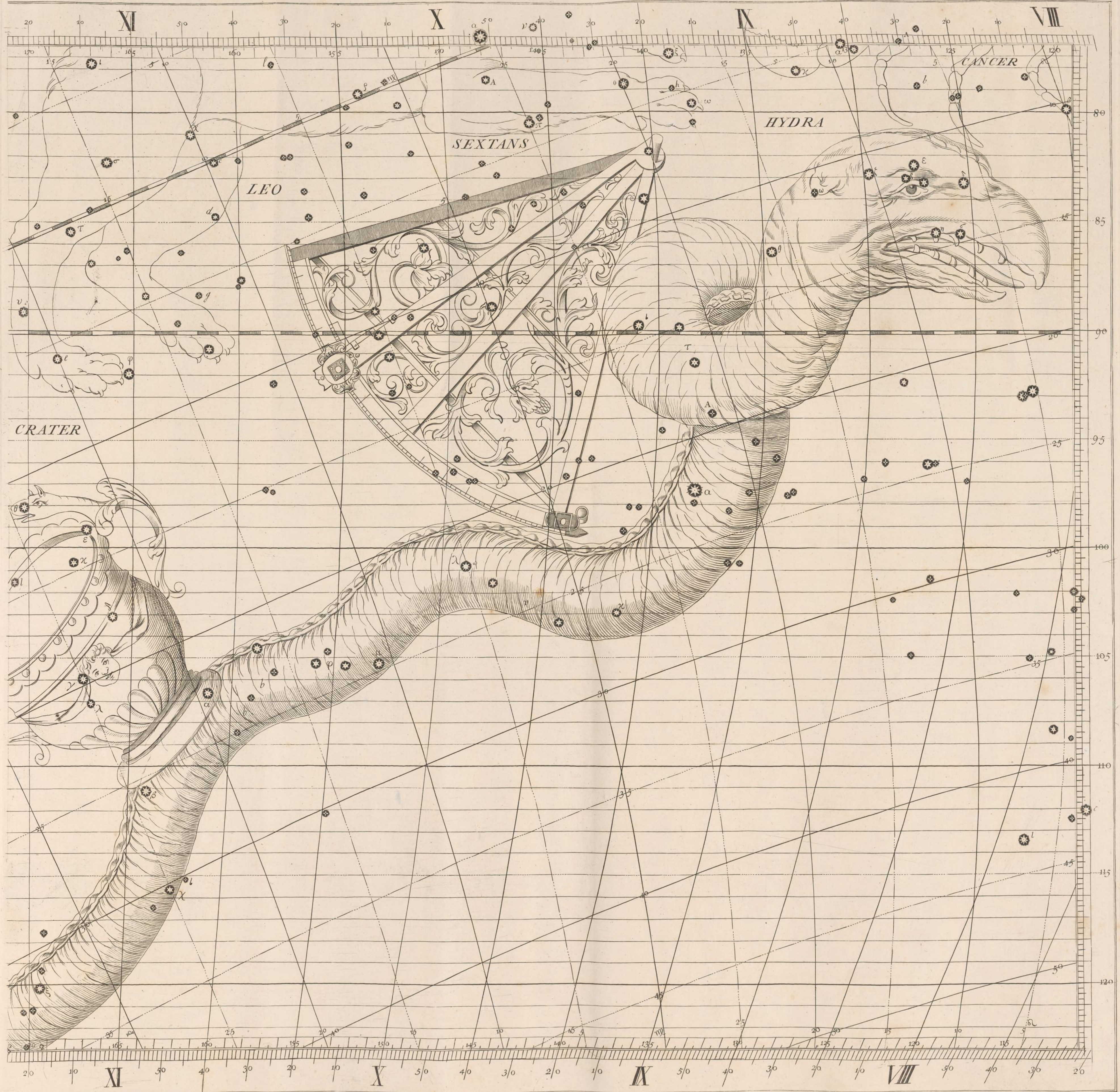
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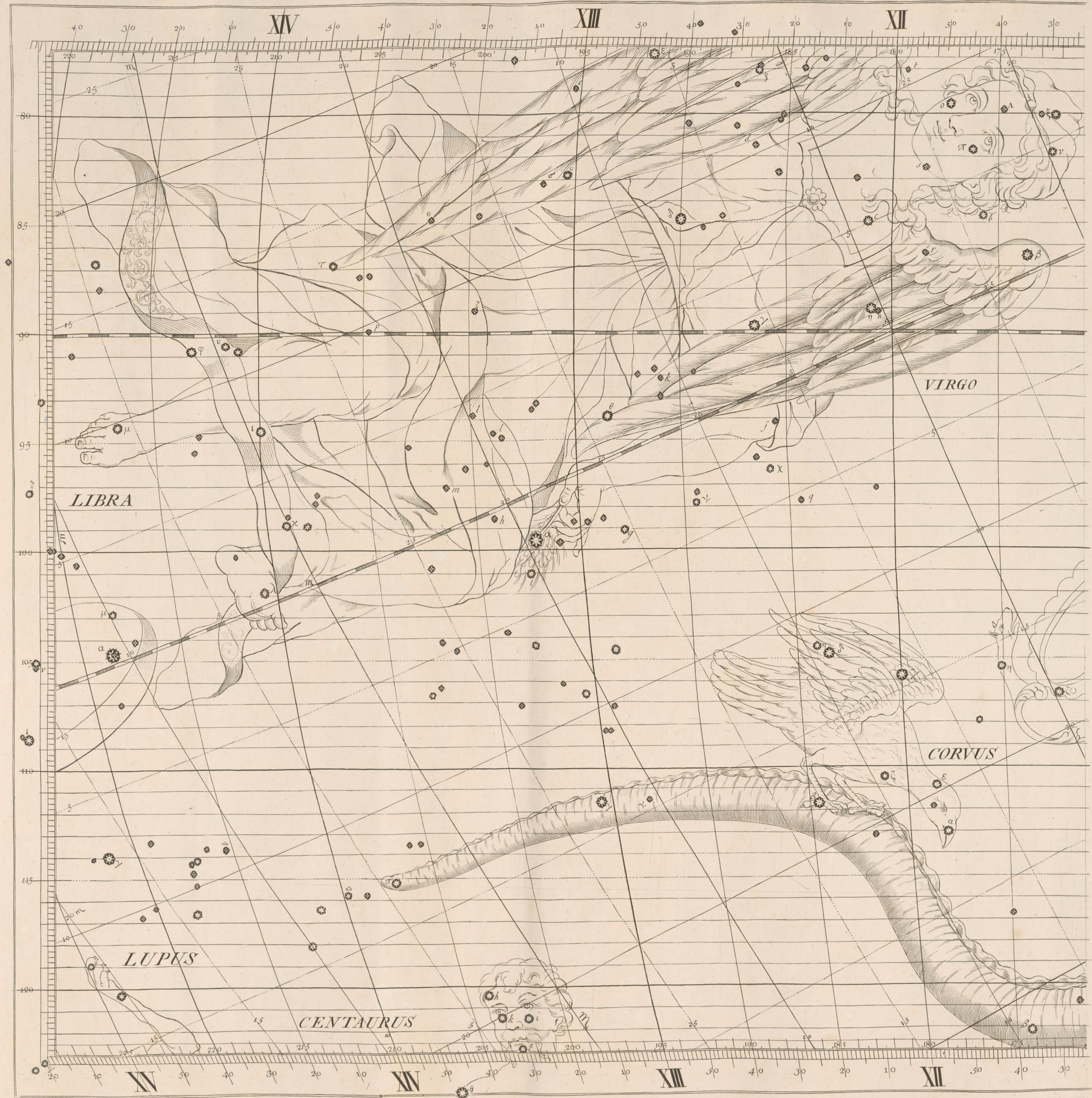












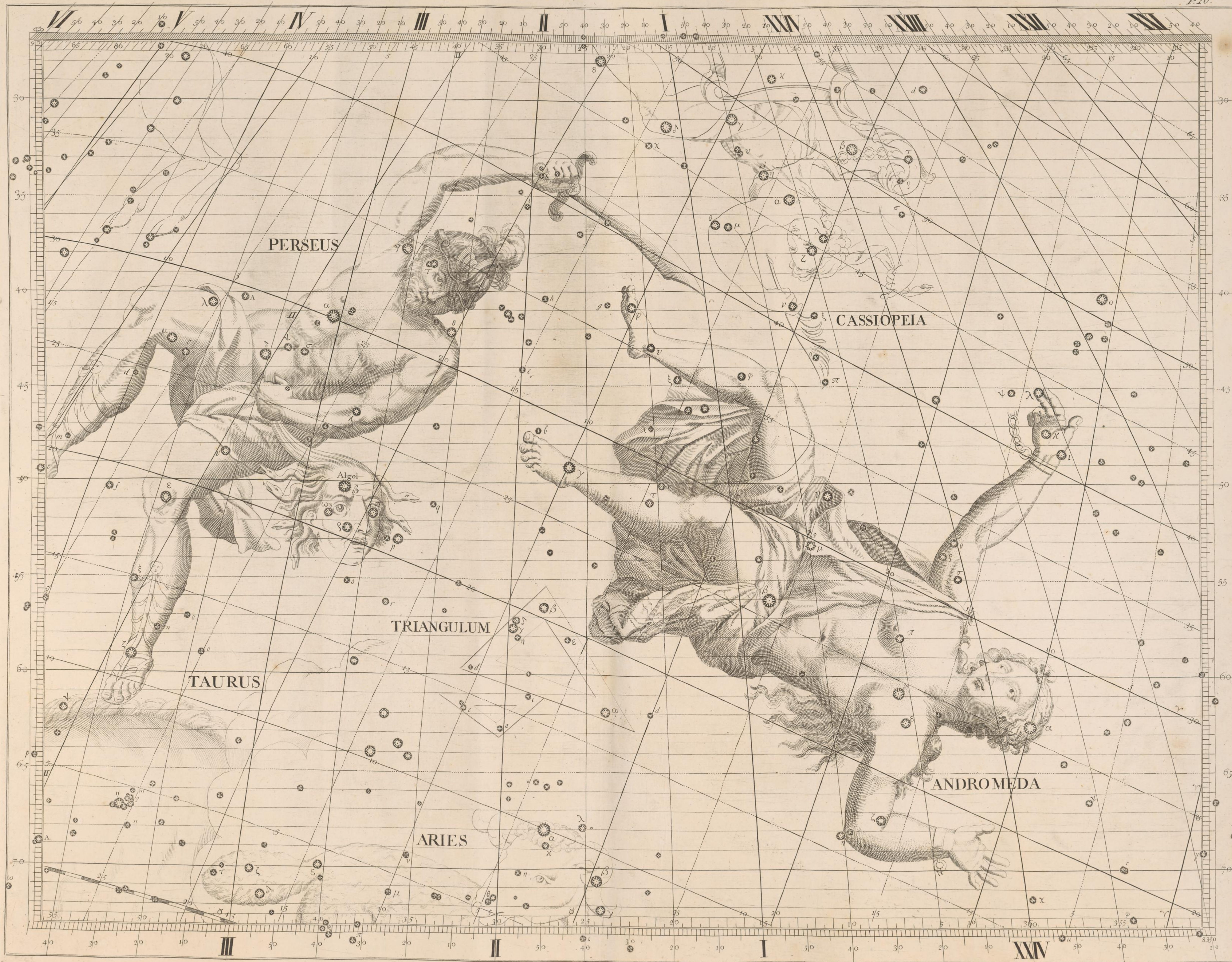
CASSIOPEA CEPHEUS URSA Minor DRACO

P.15



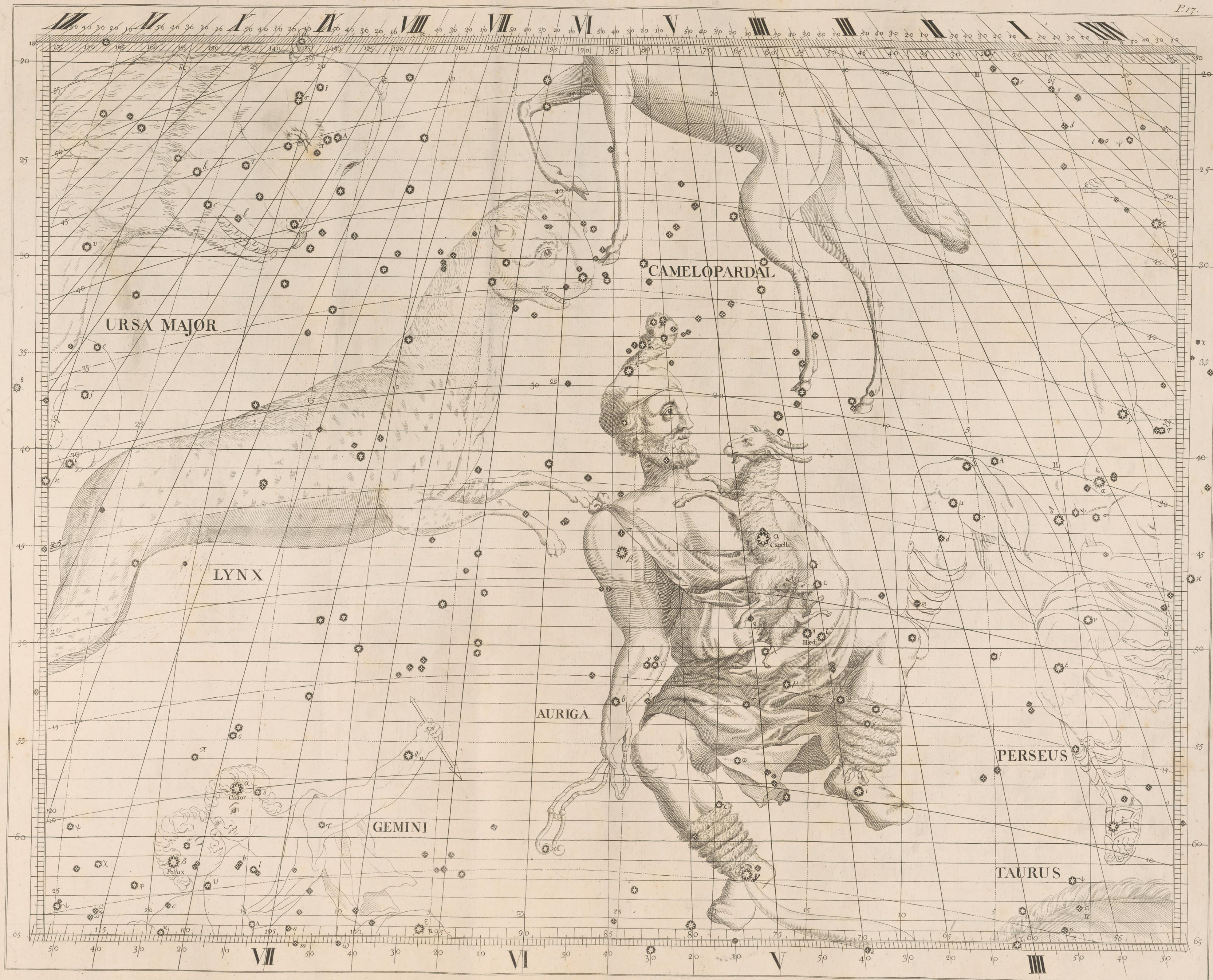
ANDROMEDA PERSEUS TRIANGULUM

P.16.



CAMELOPARDAL & AURIGA

P. 17.



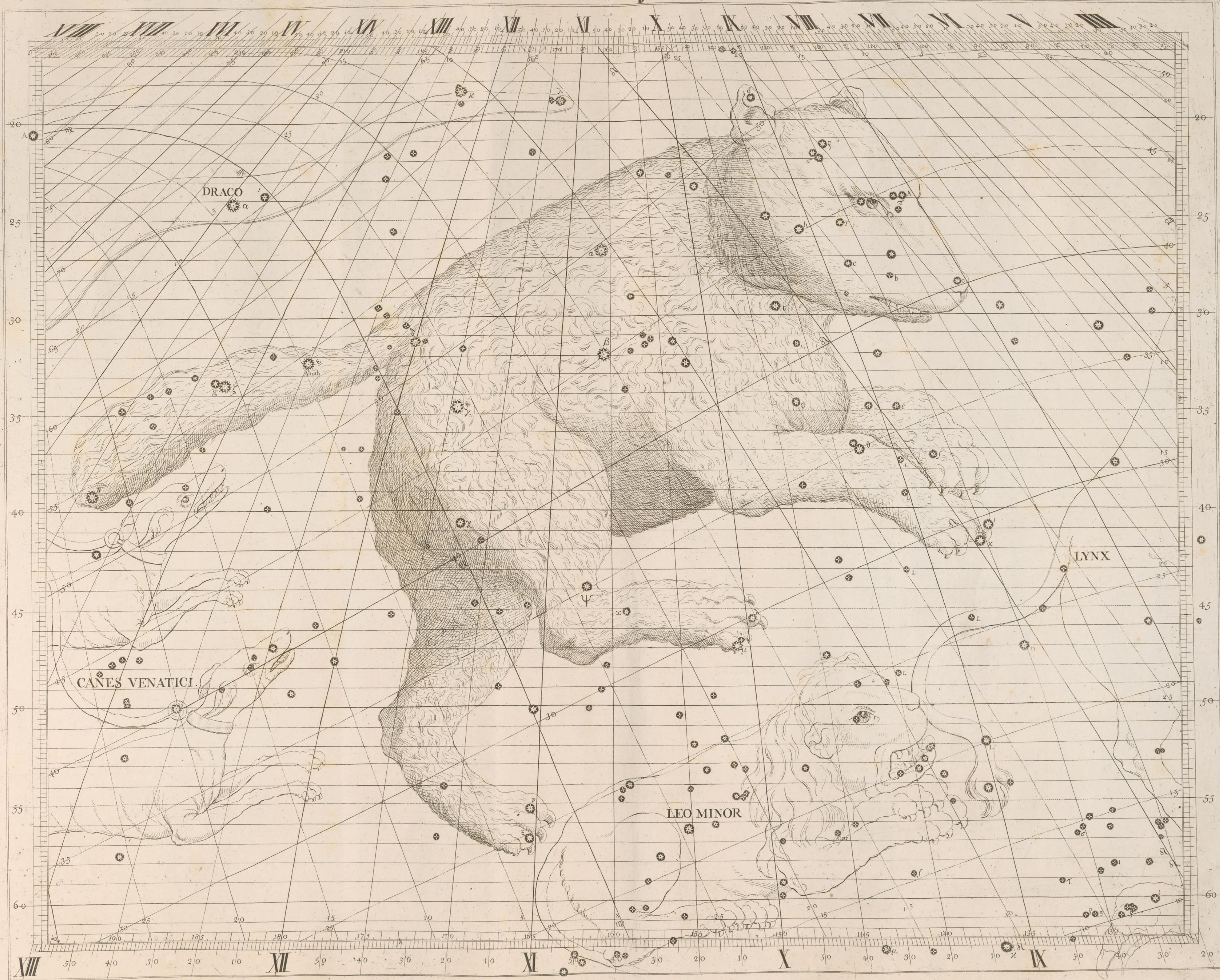
LYNX & LEO MINOR

P.18.



URSA MAJOR

P. 19.

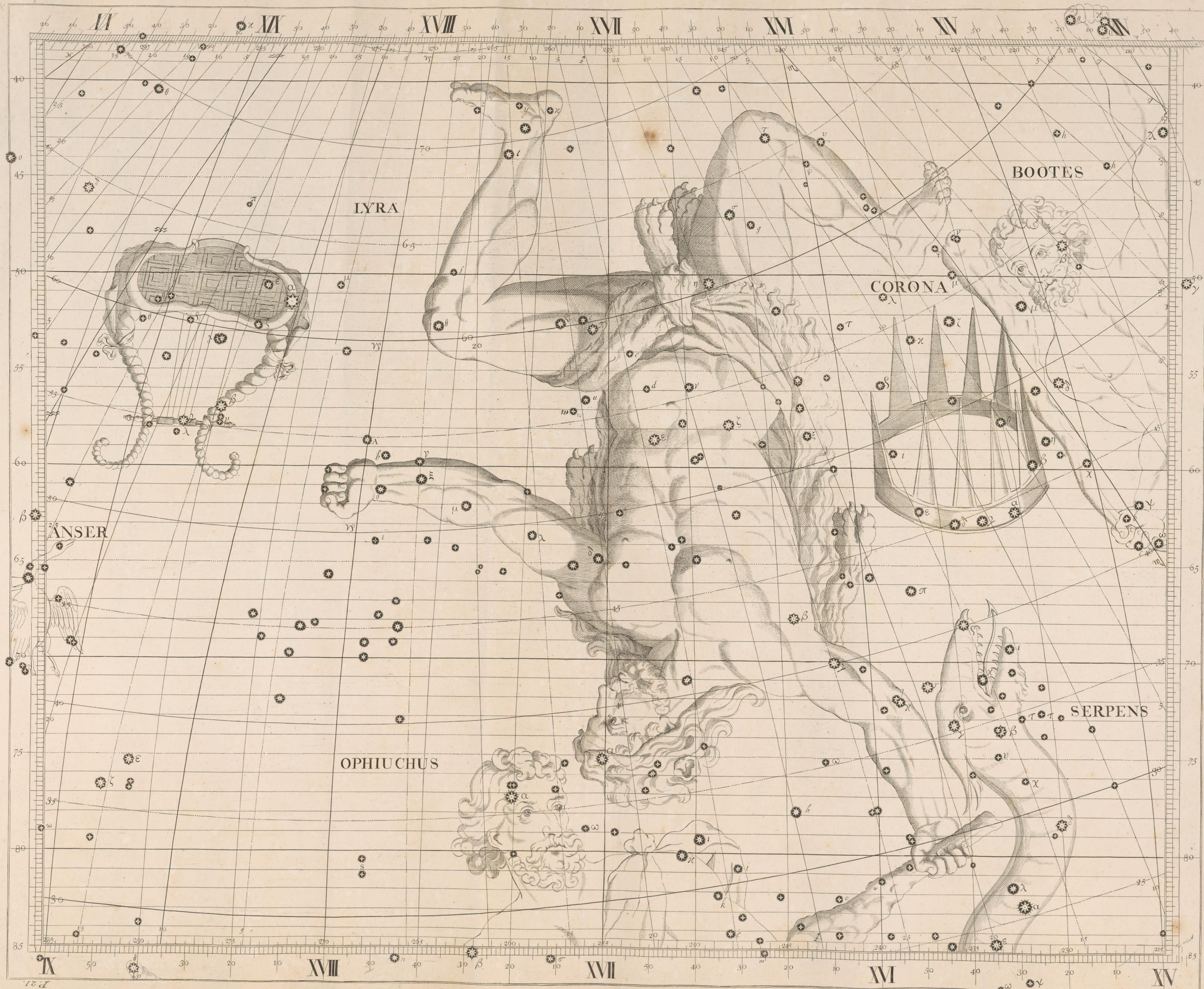


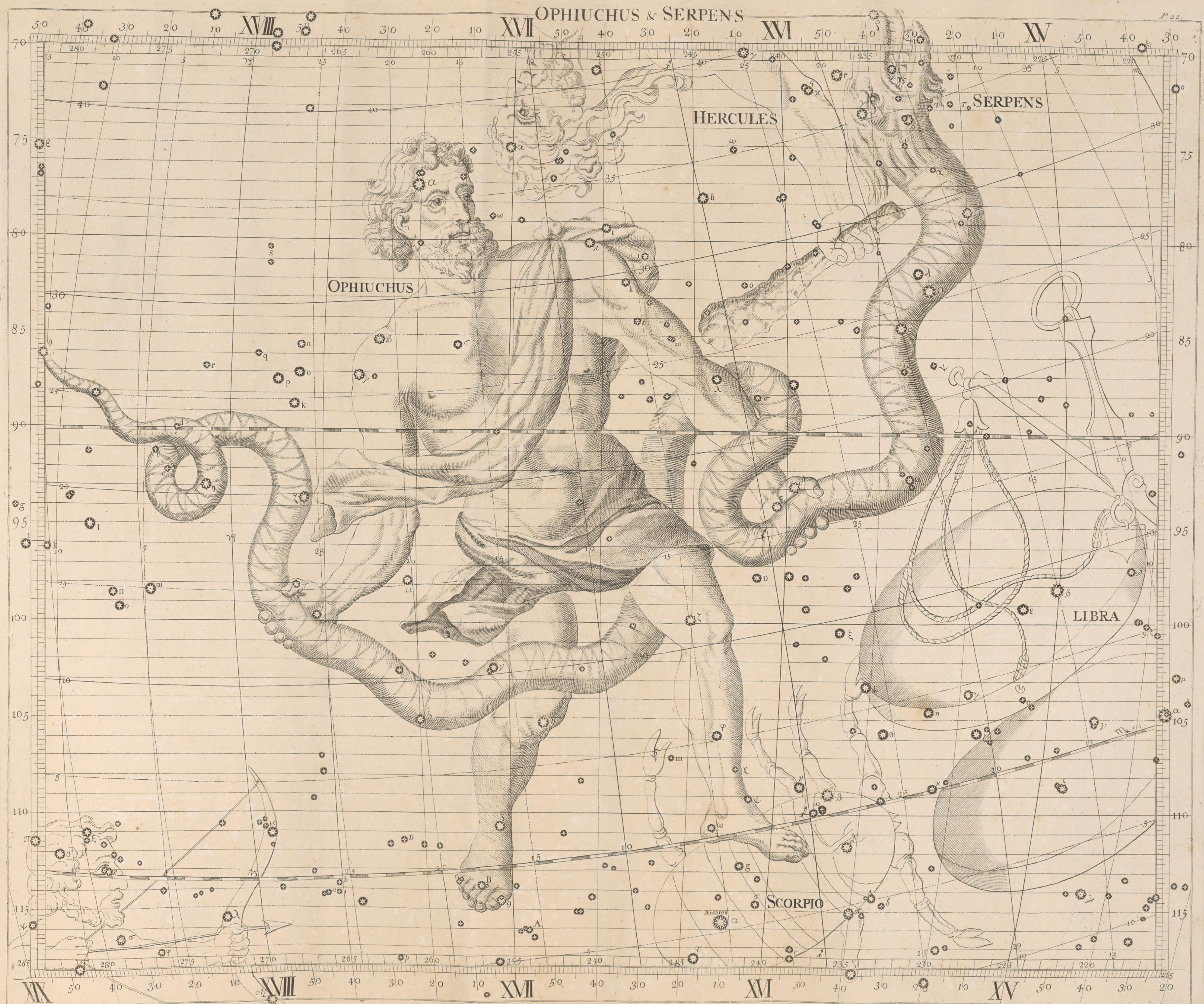
COMÆ BERENICES BOOTES CANES VENATICI

P. 20.



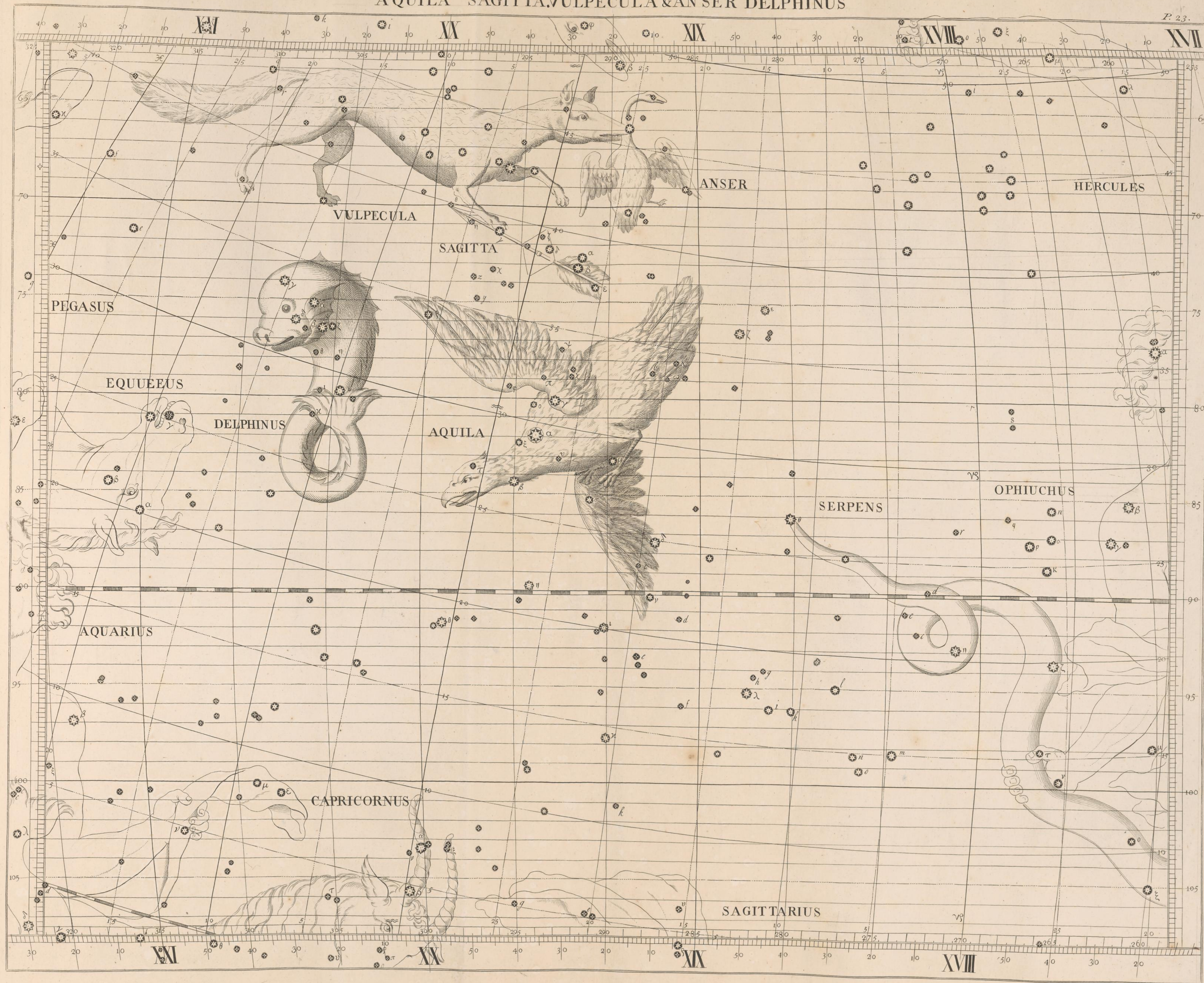
HERCULES CORONA & LYRA.

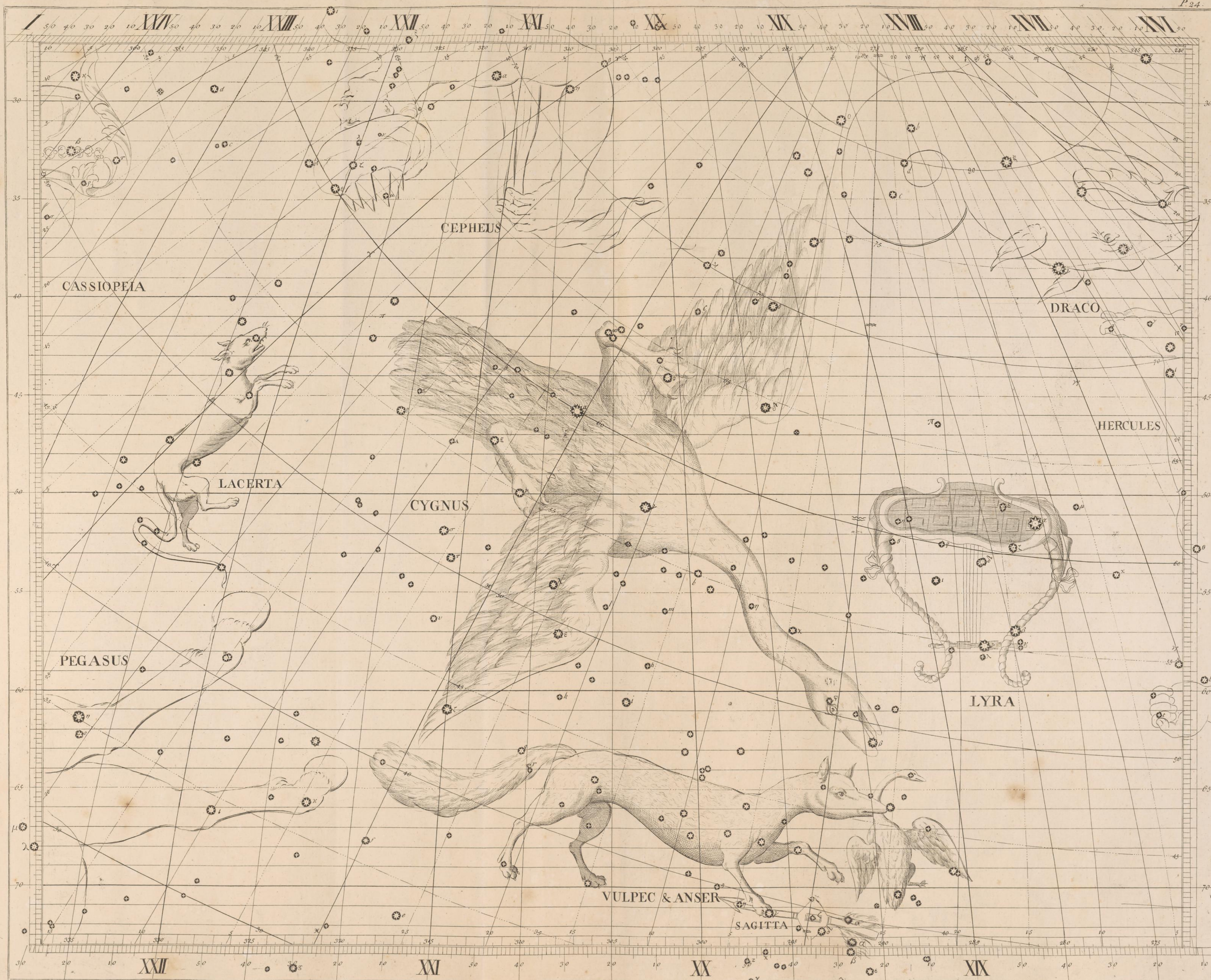




AQUILA SAGITTA VULPECULA & ANSER DELPHINUS

P. 23.

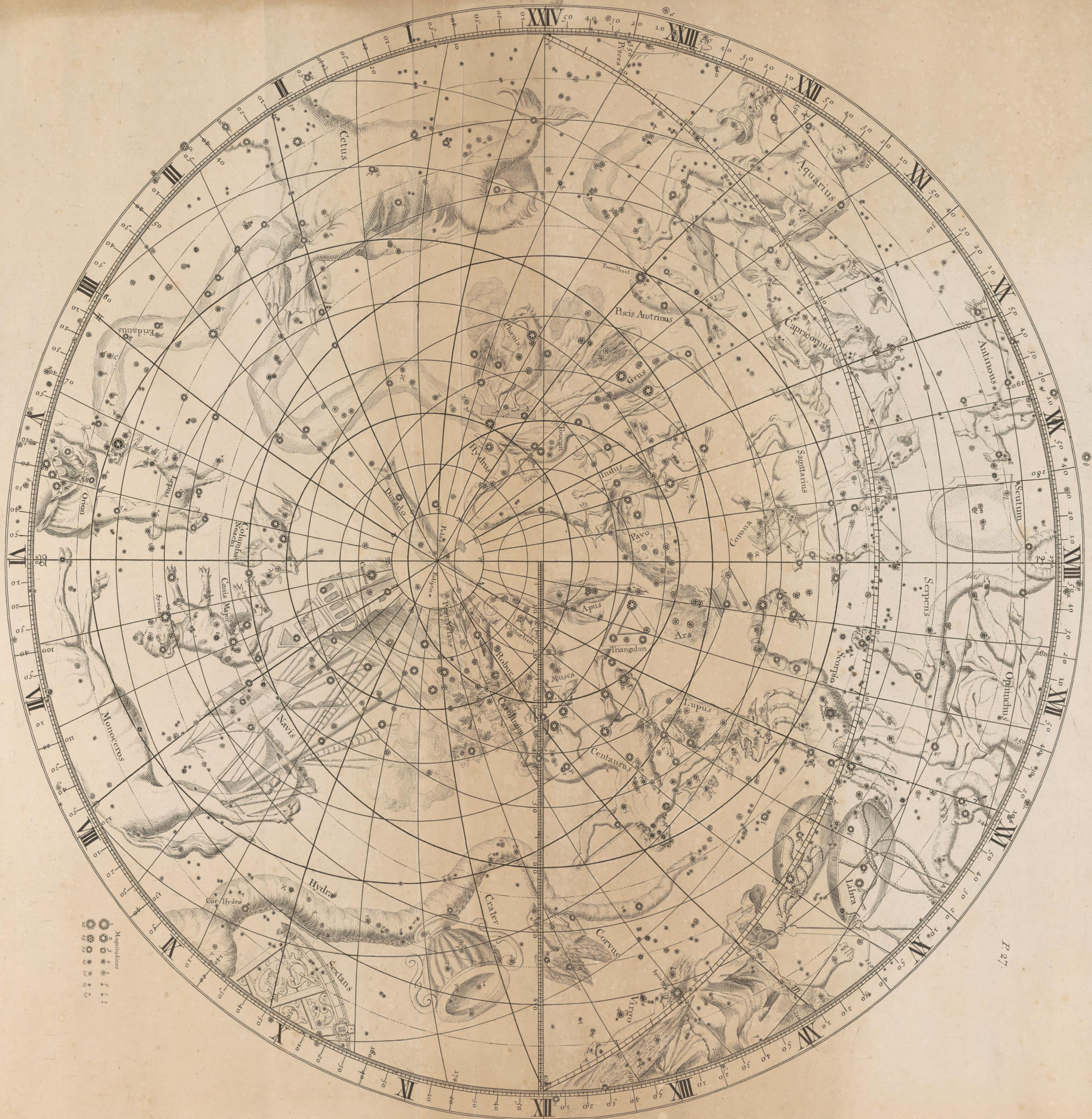


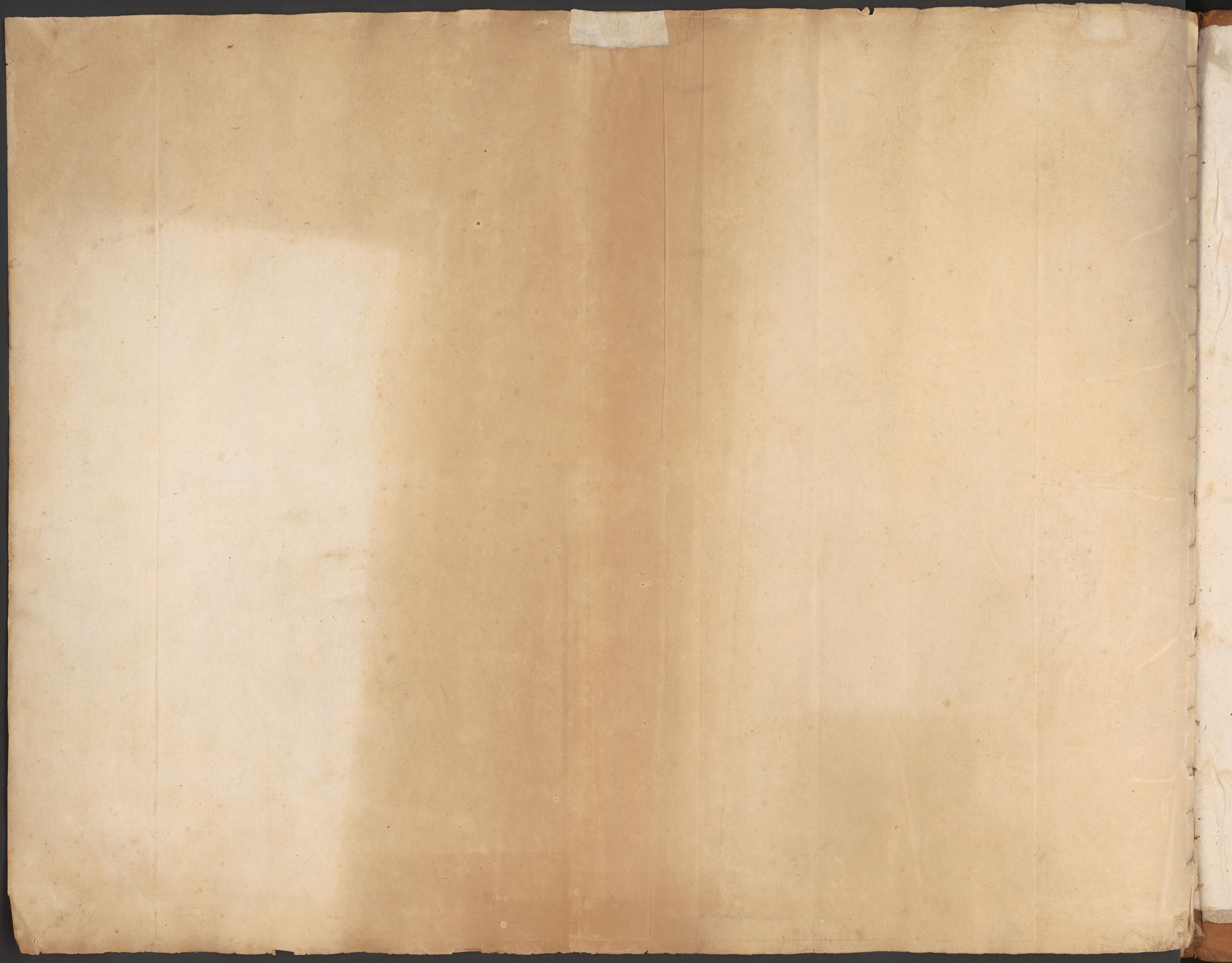






P. 26.







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