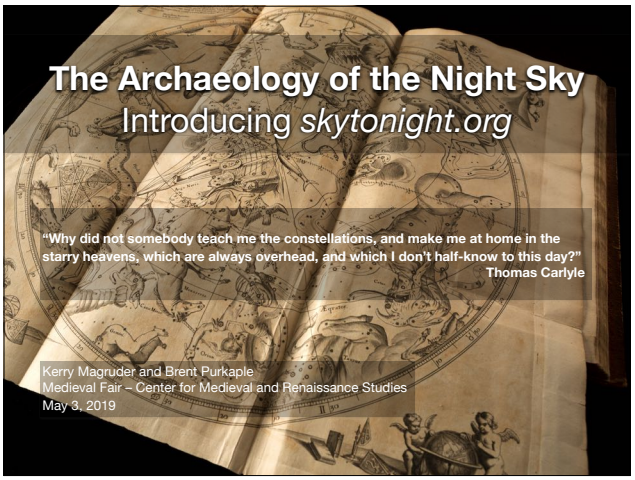


Final presentation in the 2019 Medieval Fair – Center for Medieval and Renaissance Studies series. Kerry starts off…

1

The night sky is filled with hundreds of stories which remind us that a knowledge of the heavens has always been part of what makes us human. Representations of these stories are the archaeology of the night sky. Before we explore them tonight, first, three clarifications.

First, Brent Purkaple is a doctoral candidate at OU in the history of science. Brent and I are both responsible for the research and work behind this presentation. The Sky Tonight project is a joint effort, and will be open to additional collaborators in the future.

In addition, Candace Magruder will participate in the presentation tonight by reading literary quotations.

Second, all book photos in this presentation tonight are taken from original copies held in OU Libraries special collections. No book photos are facsimiles, nor from any source other than OU Libraries.

5

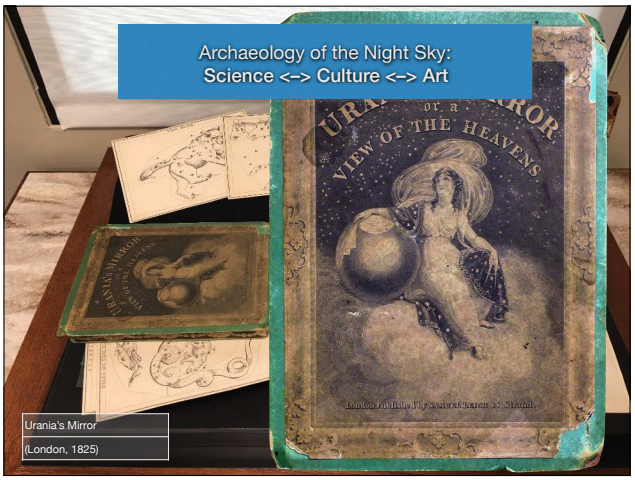
Third, every book which appears in this presentation tonight has been digitized in its entirety by OU Libraries. Eventually all will be added to the Libraries' digital repository at repository.ou.edu. Over the coming year, these beautiful sky portraits from the past will become available for free download in high resolution. The Library's decision to place these high resolution images in the public domain is momentous.

6

If by archaeology of the night sky we mean all the stories and representations of the night sky, then consider Urania's Mirror. This box of constellation cards (from the early 19th century) makes learning the constellations easy. Urania, the Muse of Astronomy, appears on the cover of the box.

http://lynx-open-ed.org/node/535

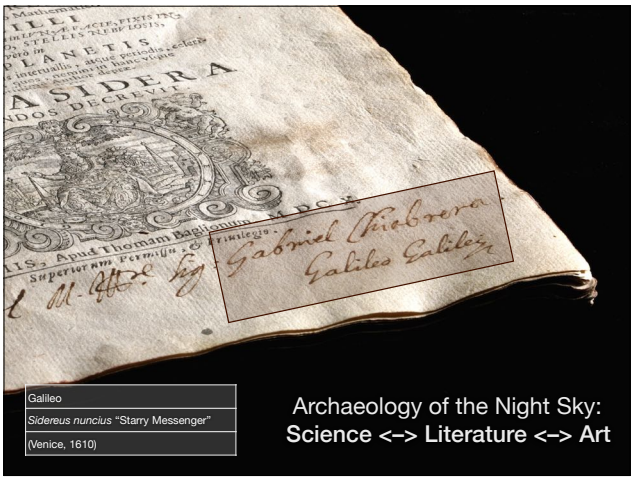
Holes are punched in the positions of bright stars. Hold any card up to a light and compare the star pattern with the constellation figure.



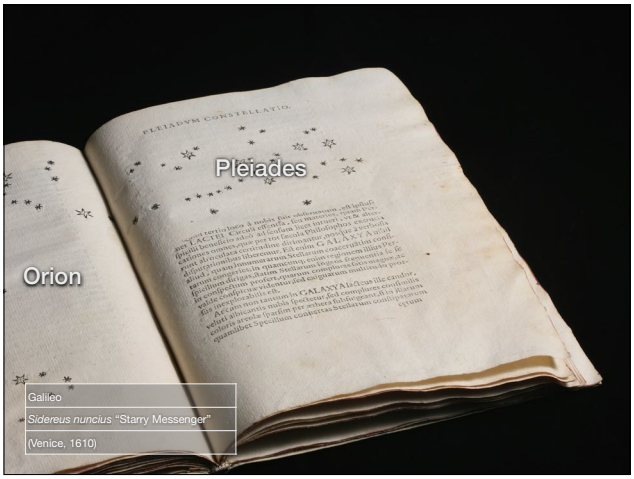
The creator of the cards remains a mystery. A companion book explains only that the cards “were designed by a lady.” The 66 constellations include several no longer recognized today. • In these representations, the archaeology of the night sky merges science, culture, art and education.

Or, for another story of the stars, think of the Pleiades. This photo is by Bob Star. I don’t know Mr. Star, but with a name like that, don’t you think he had to go into astrophotography!? But long ago…

http://lynx-open-ed.org/telescope
http://lynx-open-ed.org/node/366
http://lynx-open-ed.org/node/372



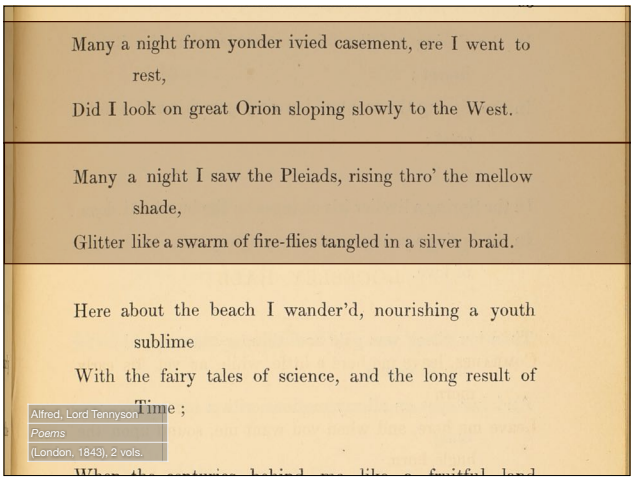
Galileo turned his telescope to The Pleiades in 1610, as reported in The Starry Messenger. • Galileo inscribed the Oklahoma copy to Gabriele Chiabrera, a poet. So here we have a connection between astronomy and literature. Art, literature and astronomy merge in creating the archaeology of the night sky.



Here is the Pleiades star cluster as Galileo represented it. A portion of Orion is visible on the left, part of the preceding page.

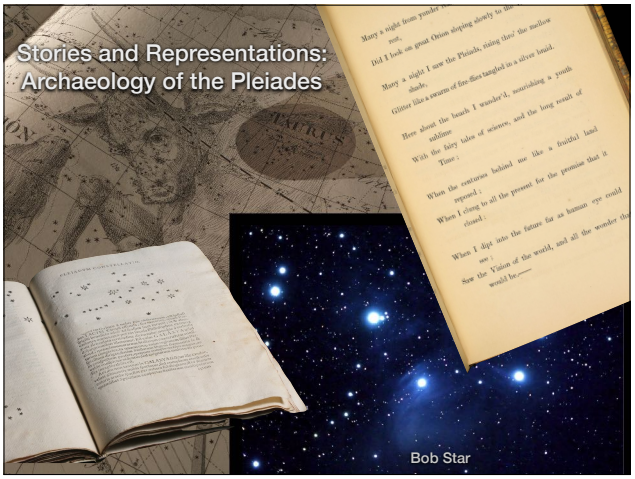
Galileo shows 6 stars of the Pleiades larger than the others. Most people can see 6 stars in the Pleiades nowadays, but in antiquity 7 were visible. Galileo documented 29 new stars, invisible to the unaided eye.

With binoculars you can see many more. Bode's star atlas, from 1801, shows where the Pleiades cluster is located in the constellation Taurus the Bull.



When visiting the home of his childhood, Alfred Lord Tennyson reminisced:
“Many a night from yonder ivied casement, ere I went to rest, | Did I look on great Orion sloping slowly to the West.
•Many a night I saw the Pleiades rising through the mellow shade, | Glitter like a swarm of fireflies tangled in a silver braid.”•

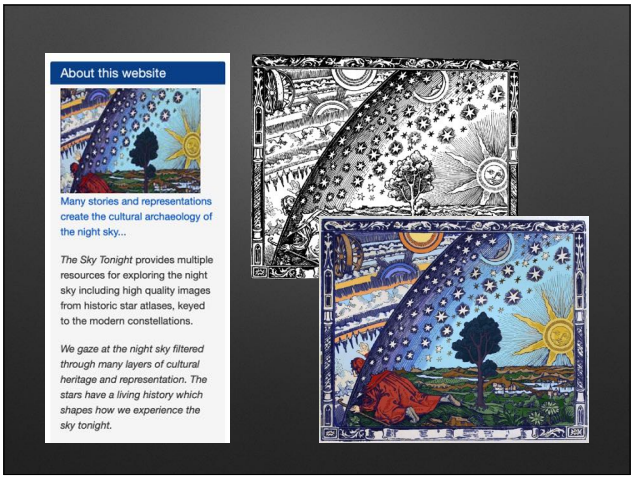
http://lynx-open-ed.org/node/531



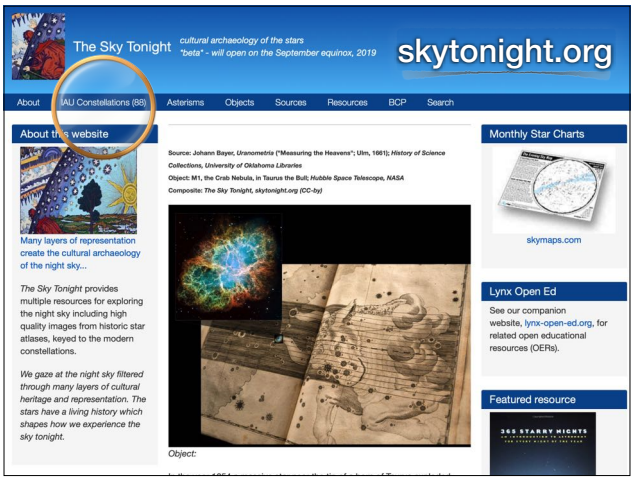
So representations of the Pleiades from all of these sources — Urania’s Mirror, Galileo, Bode, astrophotography, and Tennyson — create the archaeology of the night sky.

Here's what the skytonight website looks like at the moment. We are shooting for an official opening on the equinox this coming September, but we'd like to show you how it works behind the scenes now, while it is still in early development. • The block on the left side of *skytonight's* front page explains:

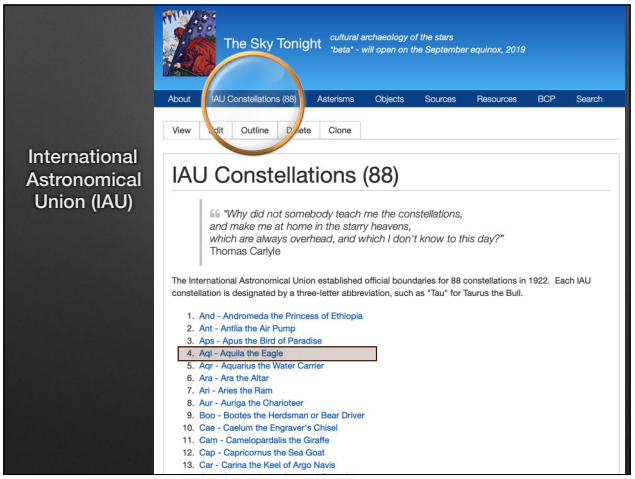
17



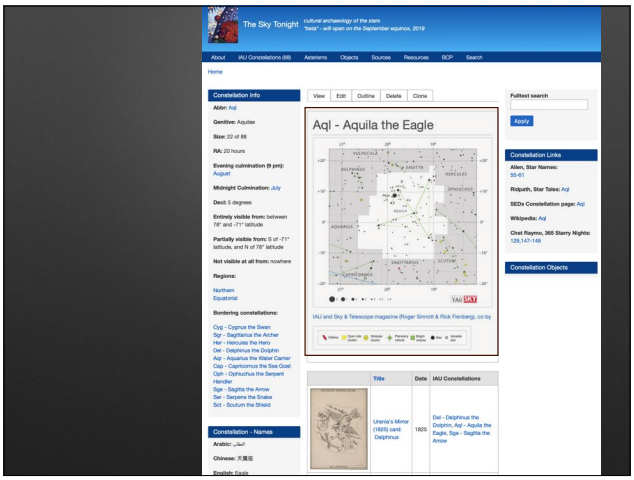
"Many stories and representations create the cultural archaeology of the night sky. The Sky Tonight provides multiple resources for exploring the night sky including high quality images from historic star atlases, keyed to the modern constellations. • We gaze at the night sky filtered through many layers of cultural heritage and representation. The stars have a living history which shapes how we experience the sky tonight."



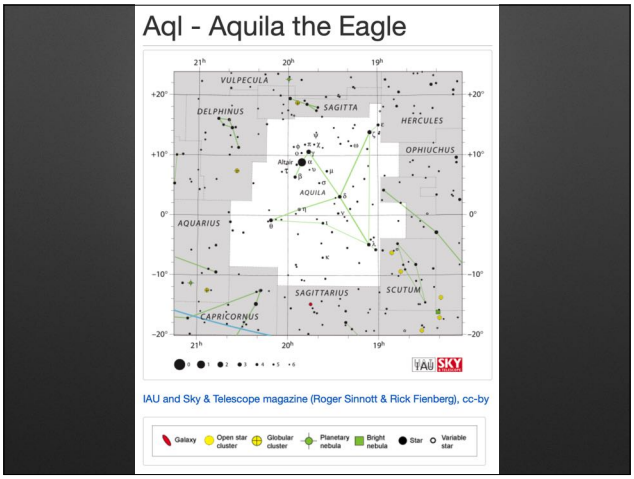
Hopefully a few screenshots will make the overall structure of the project clear. • If you click on the IAU Constellations tab, then you'll go to an index page …



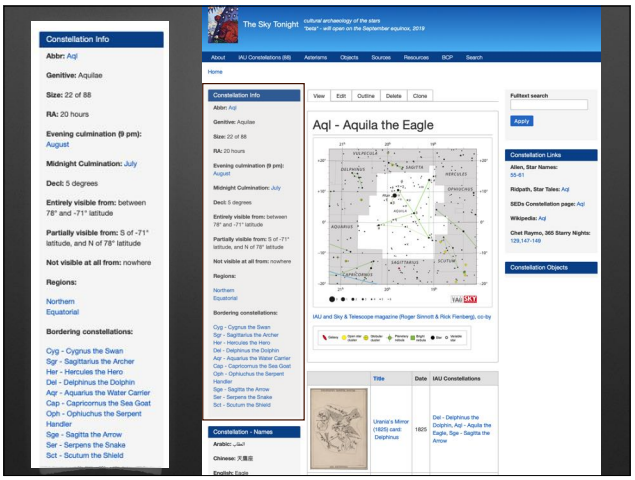
Here is the index page for the modern 88 constellations officially designated by the International Astronomical Union. • Suppose one is interested in the constellation Aquila the Eagle, then click here to go to Aquila's page.



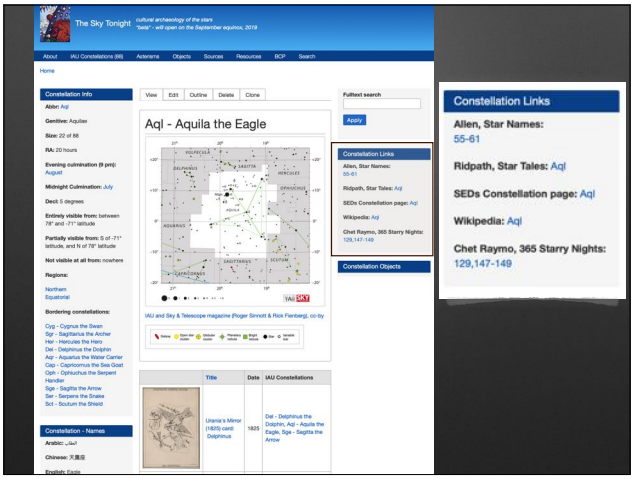
This is the individual constellation page for Aquila. • A modern map of the constellation appears at the top of any given constellation page.



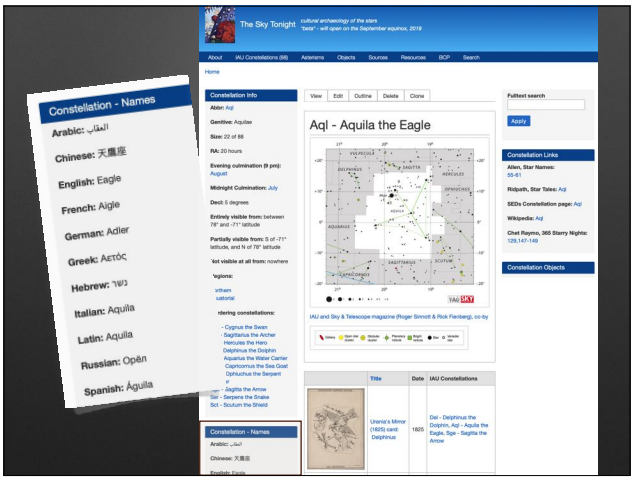
Maps like this, produced jointly by Sky and Telescope magazine and the International Astronomical Union, show the official boundaries of the modern 88 constellations, providing a comprehensive coordinate grid for mapping the entire sky.



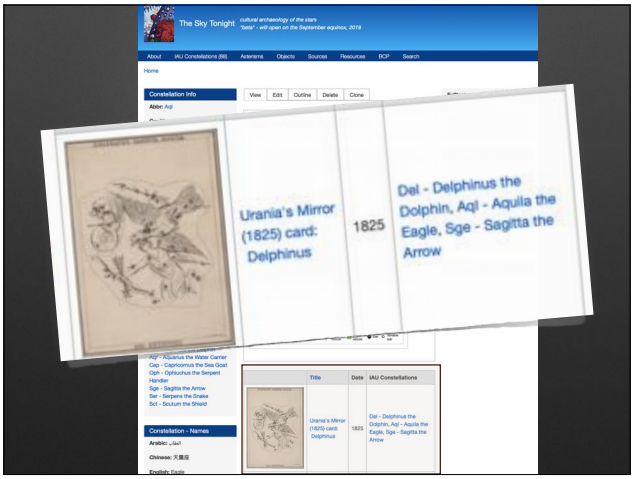
On the constellation page, browse basic information in the • Constellation Info block. This block shows its abbreviation, relative size, the month of evening culmination for easiest visibility, and so on, including the constellations it borders.



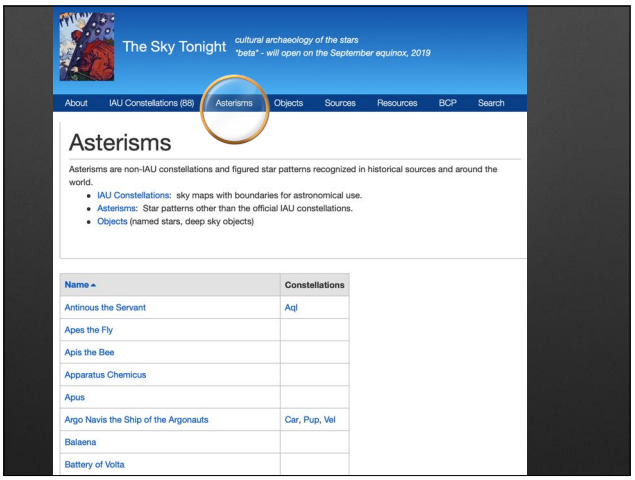
On the right is a Constellation Links block, which takes one directly to the most helpful sources for this constellation in Google Books, Wikipedia, and elsewhere on the internet. This list of links will grow significantly by launch time.



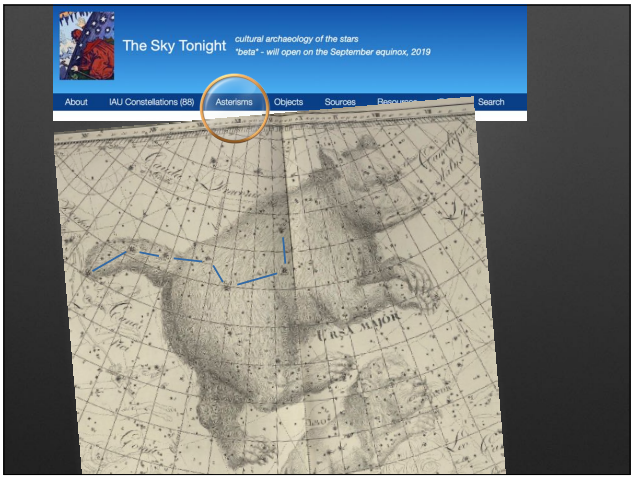
Suppose one encounters a historic star atlas written in French. No problem, for each constellation page has a handy key to its name in other languages.



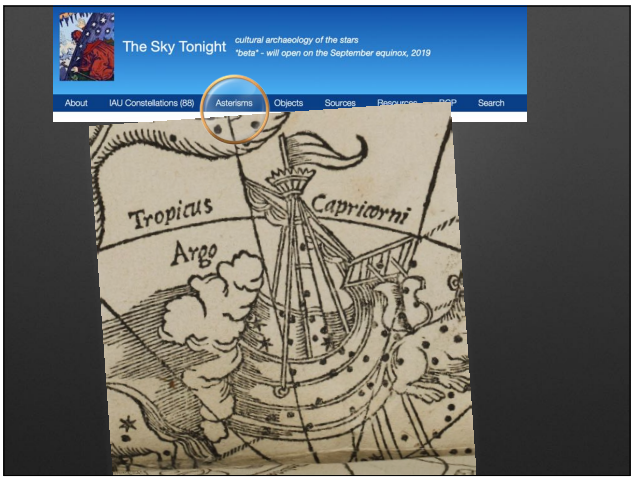
At the bottom, scroll down to explore all the representations for that particular constellation, from whatever source, ancient or new, regardless of how it is named. These representations might be images from star atlases, • like this one from Urania's Mirror, or representations of any form of cultural expression, such as artwork, architecture, or Tennyson's poem. To view additional representations pertaining to any constellation, continue to scroll down the main content area of that constellation page. To prepare for launch, our essential focus must be on star atlases, to lay a foundation. But The Sky Tonight is an open-ended project that will eventually include various cultural representations, historical and modern, — literature, architecture, art, music, and various kinds of astronomical data.



The next tab after constellations is for asterisms. Asterisms are any star patterns other than the 88 IAU constellations. These might be historical constellations that are no longer accepted, or they might be patterns that are smaller or larger than the official constellations.

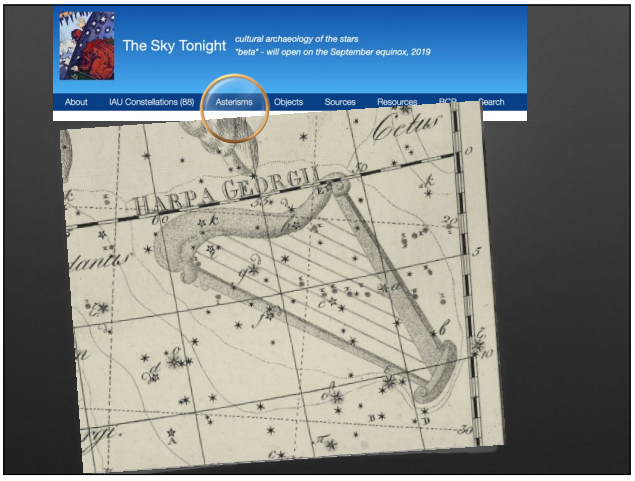


The Big Dipper is an asterism in Ursa Major the Big Bear.



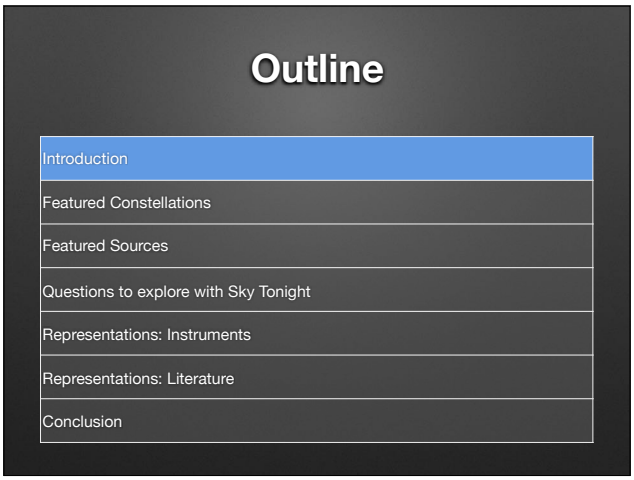
Another asterism is Argo Navis the Ship of the Argonauts, the only one of Ptolemy's ancient constellations that was broken up into smaller constellations.

29



The Harp of King George III is another asterism, a historical star pattern no longer numbered among the 88 official constellations. Brent and I are doing the research to identify historical asterisms and tag them on the star atlas plates. Once they are tagged and uploaded, then using the website, anyone will be able to access the images by constellation, asterism, or historical names that are now obsolete. Far richer searching than just by author and date.

30



Next we'll look at some featured constellations, then some featured sources, then we'll consider the kinds of questions one might explore with skytonight, then consider the examples of Instruments and Literature, and then we'll stop.
(Kerry steps away from mic)

BRENT:
Let's move on to our featured constellations.

Featured Constellations

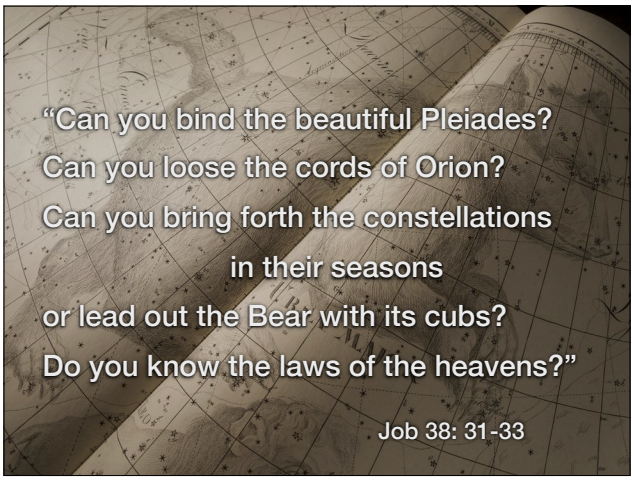
Ursa Major	The Big Bear	Year-round
Ursa Minor	The Little Bear	Year-round
Orion	The Hunter	Winter
Leo	The Lion	Winter
Sagittarius	The Archer	Summer
Scorpius	The Scorpion	Summer

Six constellations are easy to learn and will orient one to the night sky throughout the year: Ursa Major the Big Bear, Ursa Minor the Little Bear, Orion the Hunter, Leo the Lion, Sagittarius the Archer and Scorpius the Scorpion.

33

Johann Bode
Uranographia "Map of the Heavens"
(Berlin, 1801)

Ursa Major the Big Bear is the third largest of the 88 modern constellations. It is included in the ancient star catalogs long before Ptolemy… and in the Hebrew book of Job:

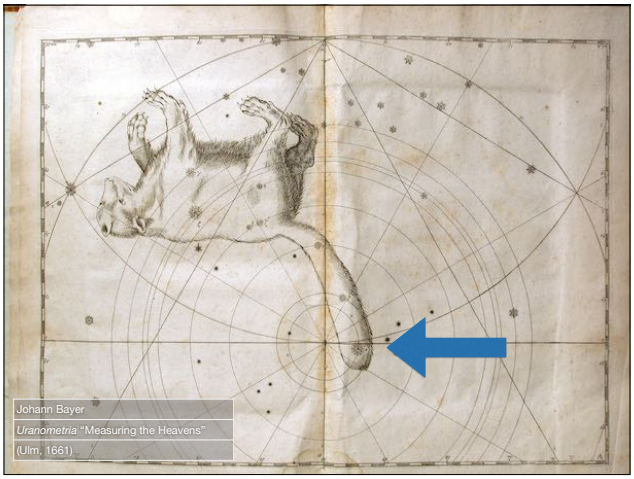


(Candace)

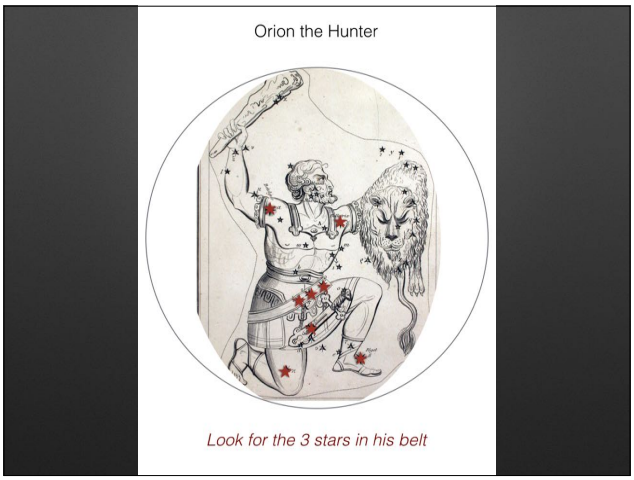
35

Only the most imaginative can see a bear in the area of the Big Dipper! But if you can find the Big Dipper in the sky, you can use it to orient yourself both on the Earth and in the Heavens.

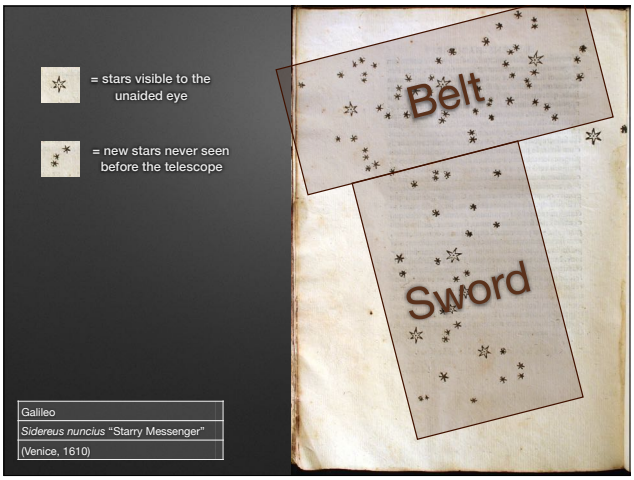
To find Ursa Minor, the Little Bear, look for the Little Dipper. The "handles" of the dippers represent the "tails" of the bears on ancient star maps—even though modern bears don't have long tails! The Big Bear was regarded as a bear before Homer, and an ancient Greek story explains why the Big and Little Bears have such long tails. • Zeus stretched out their tails by whirling them around and around, as he tossed them up into the sky!



The tip of the tail of the Little Bear is the North star, Polaris. Due to the daily rotation of the Earth, the Big and Little Dippers rotate around the north star every twenty four hours.



Here's Orion the Hunter. Three stars in a row make up Orion's belt, within a rectangle of four bright stars for his shoulders and feet.

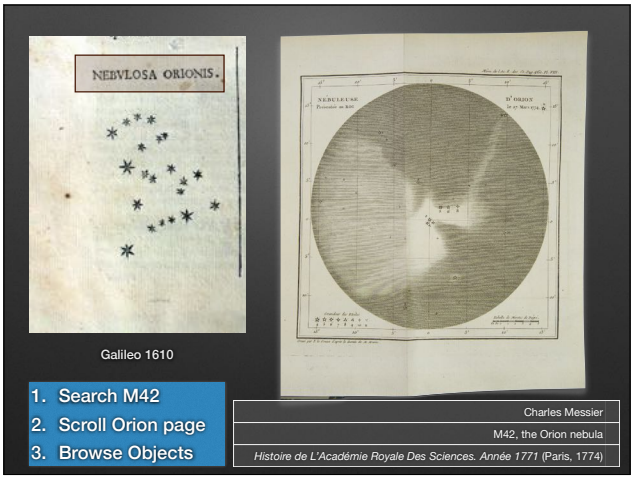


On this page Galileo depicted 80 new stars near the belt and sword of Orion that had not been documented before.

http://lynx-open-ed.org/node/370

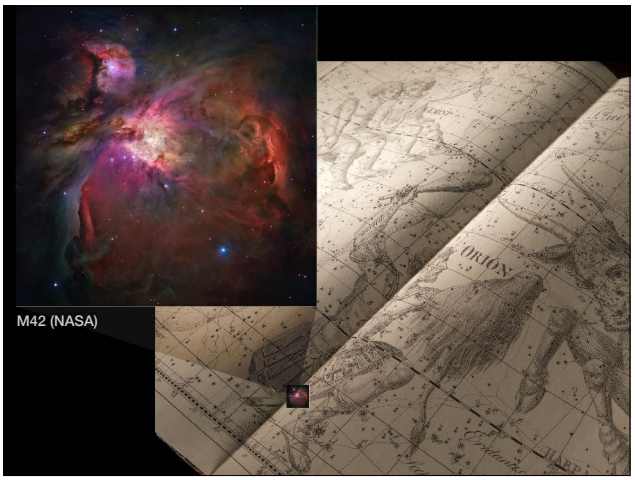
A sword hanging from Orion's belt at first sight looks like three stars, but the middle one is ill defined. Galileo depicted it separately as a small cluster of previously unknown stars.

http://lynx-open-ed.org/node/370

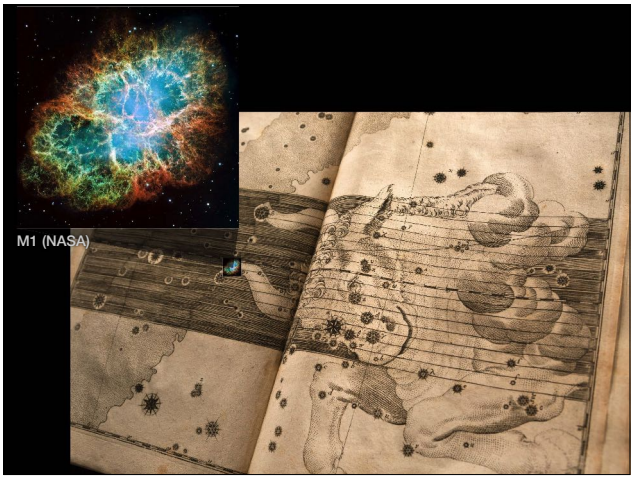


With binoculars one may discern that it is not a star, but a cloudy region. • The Latin word for cloudy is "nebula." Galileo labeled these faint stars the "Nebulosa Orions," or cloudy patch. • More than a century later, in 1774, Charles Messier published the first edition of his catalog of nebulae, in which the Great Orion Nebula was #42 out of a total of 45.
How might one explore M42 at skytonight? • Search for M42, or scroll down the Orion constellation page, or browse in the Objects tab.

http://lynx-open-ed.org/node/514
Charles Messier, "Catalogue des Nébuleuses et des Amas d'Étoiles," Histoire de L'Académie Royale Des Sciences. Année 1771 (Paris, 1774), pp. 435-461. Plate between p. 460-461.

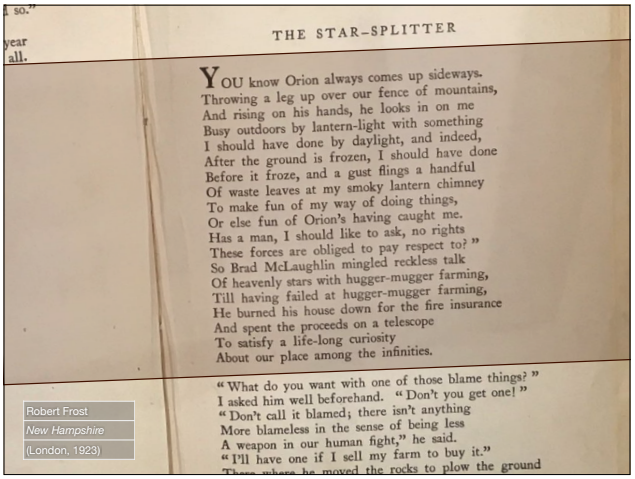


Here are other images that would turn up. A powerful telescope reveals the Great Orion Nebula to be a giant cloud of luminous gas, a cosmic nursery where stars are now being born. Through the Hubble Space Telescope the Great Orion Nebula becomes a colorful and awesome spectacle, over 20,000 times larger than our solar system.



The first nebula in Messier's catalog is near the lower horn of Taurus the Bull. There are now 110 so-called Messier Objects, and you can see some of them at a skywatch on any night of the year. Historical and modern representations of all the Messier Objects will be discoverable on skytonight.

When Orion rises in the east at sunset it is a marker of autumn. • As Orion comes up over the horizon, Orion's belt rises straight up, nearly vertical.



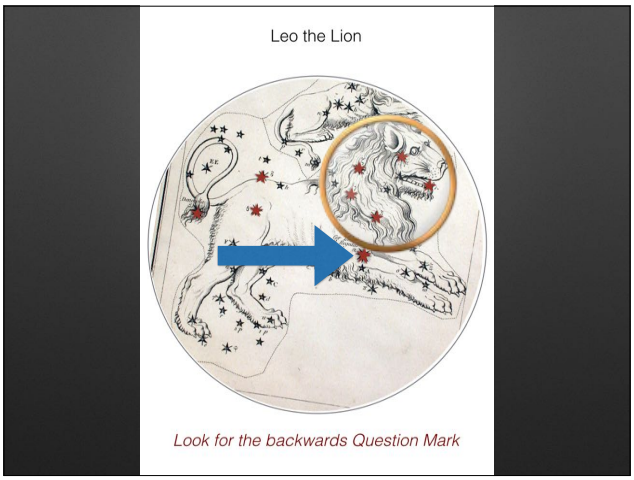
THE STAR-SPLITTER

YOU know Orion always comes up sideways.
Throwing a leg up over our fence of mountains,
And rising on his hands, he looks in on me
Busy outdoors by lantern-light with something
I should have done by daylight, and indeed,
After the ground is frozen, I should have done
Before it froze, and a gust flings a handful
Of waste leaves at my smoky lantern chimney
To make fun of my way of doing things,
Or else fun of Orion's having caught me.
Has a man, I should like to ask, no rights
These forces are obliged to pay respect to? "
So Brad McLaughlin mingled reckless talk
Of heavenly stars with hugger-mugger farming,
Till having failed at hugger-mugger farming,
He burned his house down for the fire insurance
And spent the proceeds on a telescope
To satisfy a life-long curiosity
About our place among the infinities.

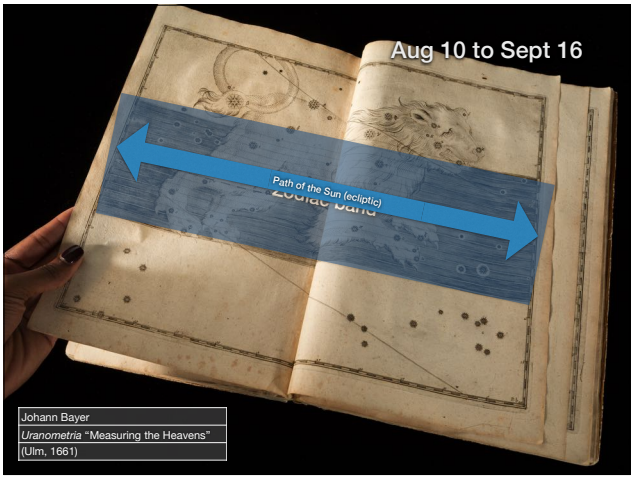
"What do you want with one of those blame things? "
I asked him well beforehand. "Don't you get one! "
"Don't call it blamed; there isn't anything
More blameless in the sense of being less
A weapon in our human fight," he said.
"I'll have one if I sell my farm to buy it."

Robert Frost
New Hampshire
(London, 1923)

In a comical ballad called "The Star-Splitter," Robert Frost described a man outdoors splitting firewood *after* the first frost of autumn:
• (Candace read whole page)
The story goes on for three pages! Frost was an avid amateur astronomer who believed that every town should have its own telescope. In this poem he shows that a telescope, or "star splitter," will change a town and all its people for the better. One should spend all one has to get a telescope, no matter the cost, right? How many know this poem? I hope everyone else will look it up to read later.
http://lynx-open-ed.org/node/534

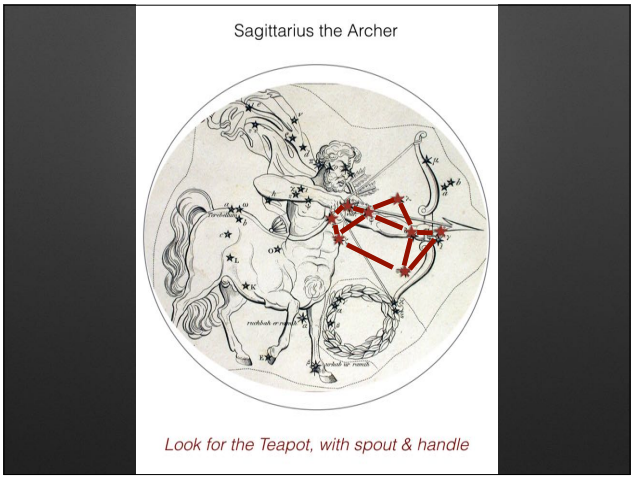


Let's look at another winter constellation, Leo the Lion. Leo's mane looks like a backward question mark, an asterism known as the Sickle. • Regulus, the "dot" at the bottom of the mark, lies nearly on the ecliptic, the path of the Sun. • Leo is perhaps as ancient a constellation as Taurus the Bull, and was associated with kings of Mesopotamian city states in the third millenium B.C.E.

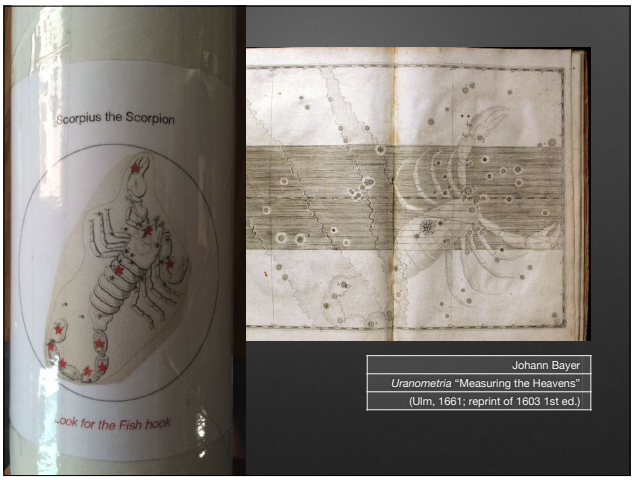


Leo is a Zodiac constellation. • That means it contains the Sun's path, year after year. •

Compare Sagittarius the Archer. • The dotted line shows the ecliptic. While many star-patterns might make geometrical shapes like triangles or dippers, there are very few star patterns that actually look like bears or centaurs or humans! Constellations were named to *honor* particular figures in ancient stories, not because the star pattern *actually looked like* the figure being honored. It took imagination to invent them a long time ago, and it takes imagination to see them now.



To find Sagittarius in the summer sky, look for a teapot, with spout and handle.
• Can you imagine a teapot up there in those red stars?



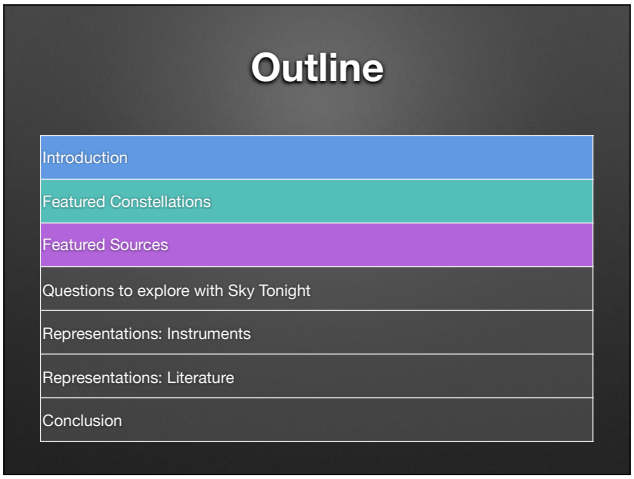
Here's Scorpius the Scorpion, a constellation of the Zodiac best seen on summer nights. It looks like a fishhook, which is what the Polynesians call it. Like the Big and Little Dippers, the fishhook and teapot are asterisms.

Featured Constellations

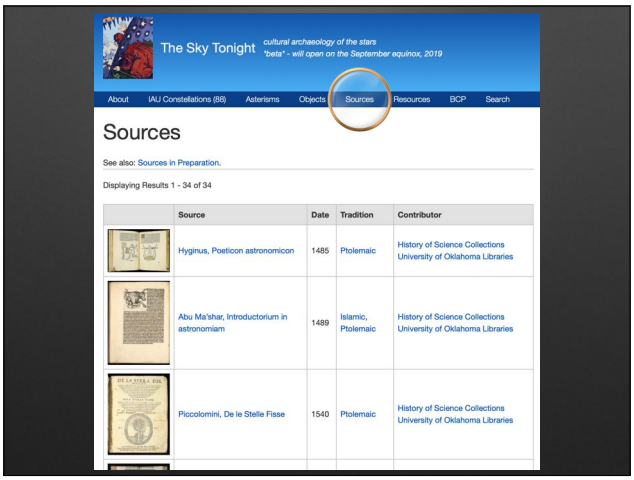
Ursa Major	The Big Bear	Year-round
Ursa Minor	The Little Bear	Year-round
Orion	The Hunter	Winter
Leo	The Lion	Winter
Sagittarius	The Archer	Summer
Scorpius	The Scorpion	Summer

So these six constellations will give you a place to start any time of year.

So that's featured constellations. (Brent steps away from mic)



KERRY
Now let's take a look at some featured sources, in this case, historic star atlases.
(15 mins for this section)



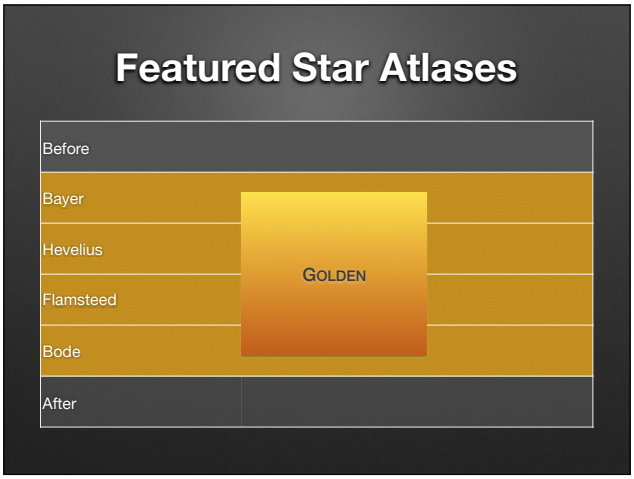
Under the Sources tab, there's an index of sources, and a list of sources in preparation.

Click on any source to go to its page, such as this page for Kepler, De stella nova, the New Star. • The central area of the page indicates the contributing library, repository or curator; in this case the History of Science Collections of the University of Oklahoma Libraries. Also indicated are an attribution or credit statement for the images from this source, and the type of permission to distribute; in this case, Public Domain.

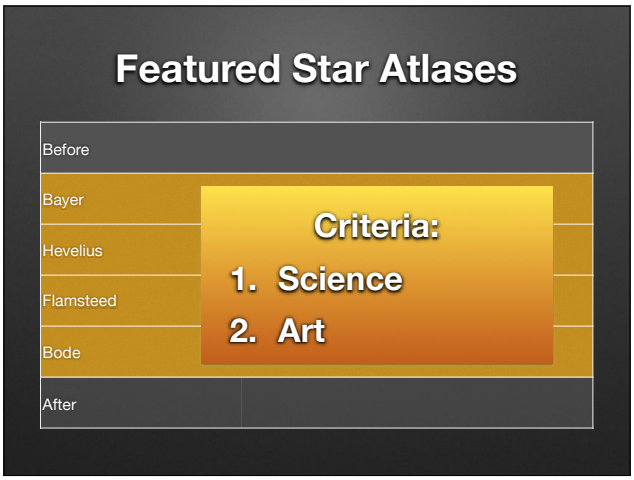
Beneath are notes on the source, describing its interesting features and historical context.

The Sources Info block gives a full citation, which tells us that it was published in Prague in 1606. It's written in Latin, and it represents the Modern and Ptolemaic traditions of constellation names.

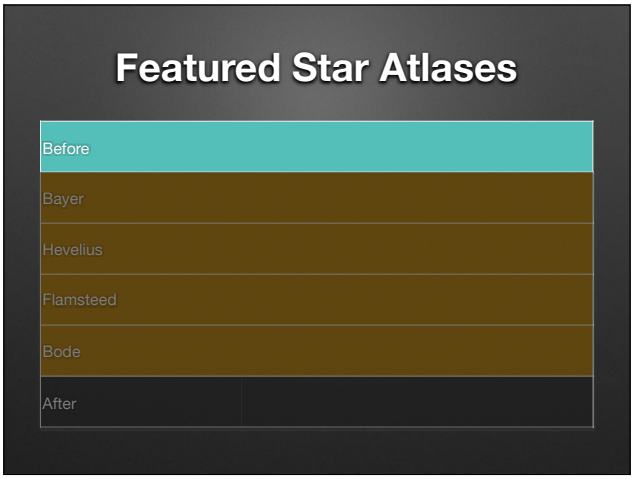
The Sources Links block links out to various resources on the internet. For this record, the links include exhibit gallery information in which this book was displayed; a direct link to the source at the OU Libraries repository; a link to the fantastic guide to historical star atlases at Linda Hall Library; related open educational resources at the Lynx Open Ed website; and Wikipedia.



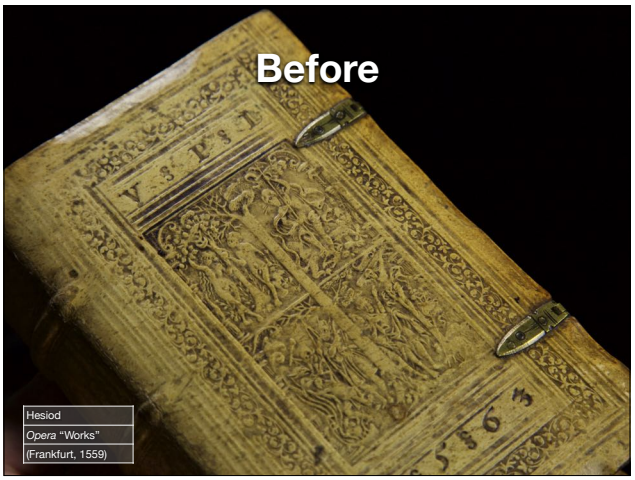
What are some of the sources one can find at Sky Tonight? Let's focus on the 4 most influential star atlases • from the so-called Golden Era: Bayer, Hevelius, Flamsteed and Bode. We'll toss in a few others to illustrate before and after.



These four atlases fulfilled two criteria: simultaneously, they were each scientifically up-to-date, showing everything astronomers knew about up in the sky, AND they were artistically influential, having an impact on painting and iconography.
(Kerry steps away from mic)

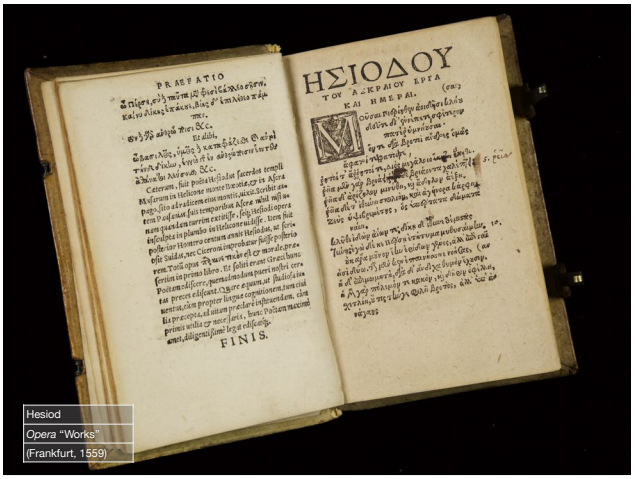


So let's start with some background.



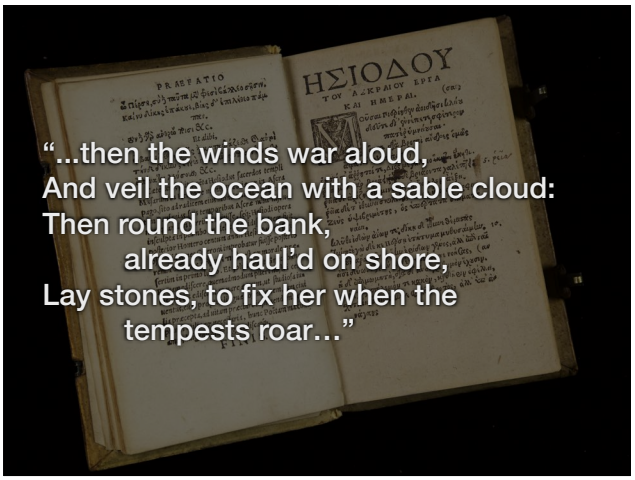
BRENT
Long before the four golden atlases, ancient star catalogs described the constellations and their meanings. In *Works and Days*, the poet Hesiod, a rough contemporary of Homer, compiled guidelines for living according to the stars.

63



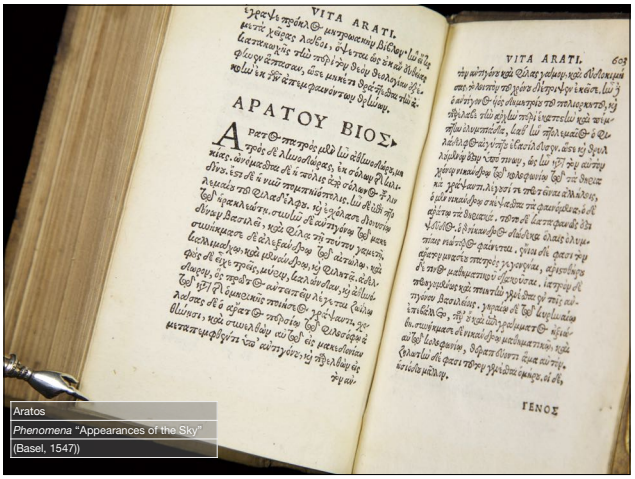
Hesiod explained, for instance, that when Orion rises at sunset, it's time for autumn storms, and time for sailors to bring their ship to land:

http://lynx-open-ed.org/node/521



(Candace)
“…then the winds war aloud, And veil the ocean with a sable cloud: Then round the bank, already haul’d on shore, Lay stones, to fix her when the tempests roar…”

http://lynx-open-ed.org/node/521



Aratos
Phenomena “Appearances of the Sky”
(Basel, 1547))

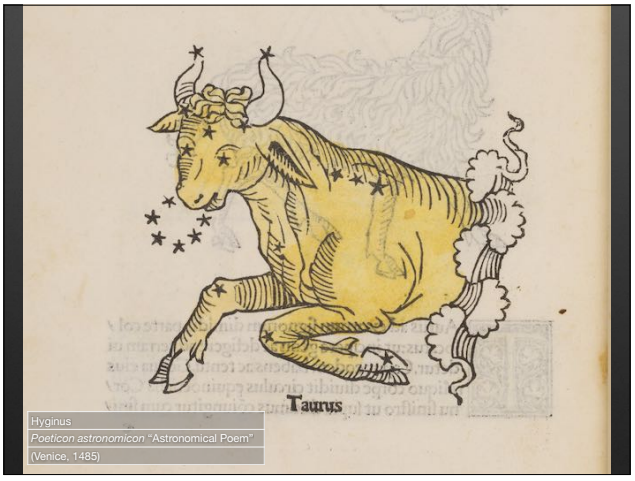
Aratos, a Greek scientist and poet of the 3rd century B.C.E., offered similar practical advice based on the seasonal changes heralded in the changing constellations.
———————

http://lynx-open-ed.org/node/522

Hyginus
Poeticon astronomicon "Astronomical Poem"
(Venice, 1485)

Hyginus, a Roman poet, conveyed this practical astronomy of Hesiod and Aratos into Latin. Isn't he a handsome lion?

http://lynx-open-ed.org/node/523



Hyginus
Poeticon astronomicon "Astronomical Poem"
(Venice, 1485)

Taurus, a happy bull, has a ring of stars near his nose, and what might be the Pleiades on his shoulder.

Hyginus
Poeticon astronomicon "Astronomical Poem"
(Venice, 1485)

Virgo, the goddess of Justice, could not tolerate the anguish of living among unjust people, so she needed wings, as shown here, to escape us and fly up into heaven.

Hyginus
Poeticon astronomicon "Astronomical Poem"
(Venice, 1485)

The Big and Little Bears are wrapped around by Draco the Dragon.

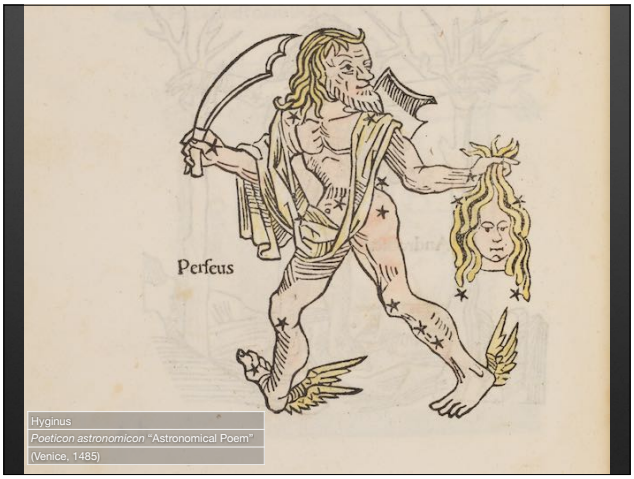
Charming constellation figures… some hand-colored in the OU copy.

Cassiopeia, the Queen of Ethiopia. Why are her arms tied? Since she goes around and around the north star, without ever setting below the horizon, those ties help her stay on her throne, and keep her from falling off! She's riding a roller coaster.

Here's Centaurus, prepared with incense and an offering for the nearby altar.

———-

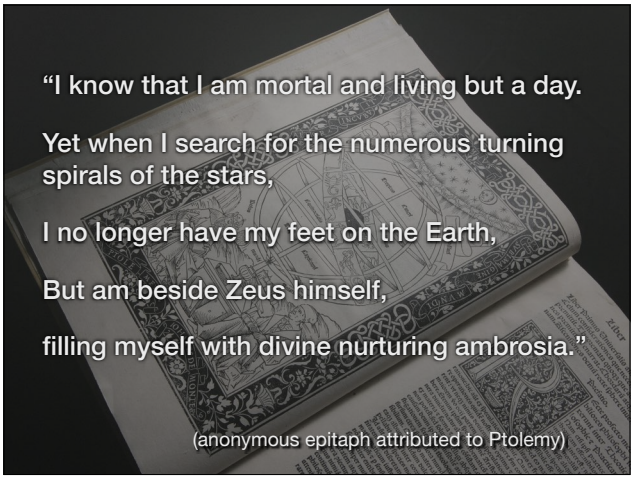
[This edition was printed by Erhard Ratdolt, a renowned early printer of works in astronomy and geometry.]



And finally, Perseus, a happy fellow after slaying the Medusa. Don't look at her eyes!

Ptolemy lived in Alexandria, Egypt, in the 2nd century. Ptolemy's Almagest represents the culmination of ancient Babylonian and Greek mathematical astronomy. It achieved an unparalleled degree of accuracy in predicting the motions of the planets. An anonymous epitaph attributed to Ptolemy reads…

http://lynx-open-ed.org/node/227



(Candace)
"I know that I am mortal and living but a day. Yet when I search for the numerous turning spirals of the stars, I no longer have my feet on the Earth, But am beside Zeus himself, filling myself with divine nurturing ambrosia."

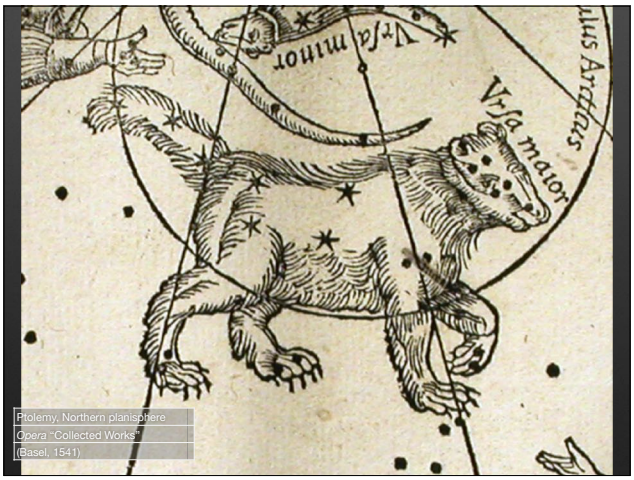
Ptolemy, Northern planisphere
Opera "Collected Works"
(Basel, 1541)

In this edition of Ptolemy, the constellation figures were drawn after the manner of Albrecht Dürer. The figures appear in contemporary dress rather than in a classical style. Although the stars are positioned on a grid, unfortunately the coordinates were misaligned and constellations are shifted by 30°.

http://lynx-open-ed.org/node/377

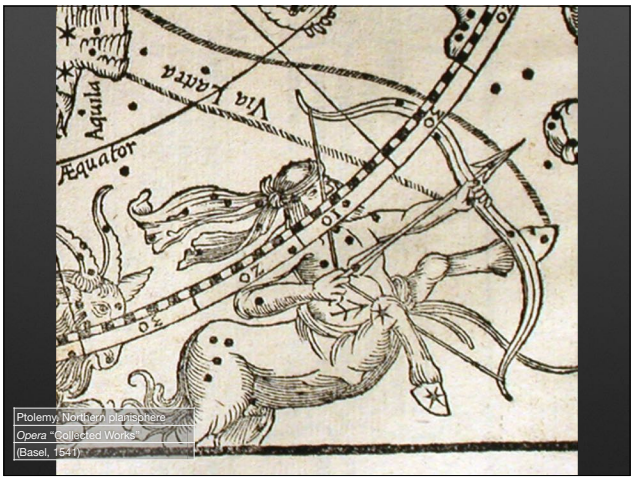

Ptolemy, Northern planisphere
Opera "Collected Works"
(Basel, 1541)

Taurus the Bull is shown with the path of the Sun, or ecliptic.



Ursa Major the Big Bear.

Leo the Lion, with the ecliptic.



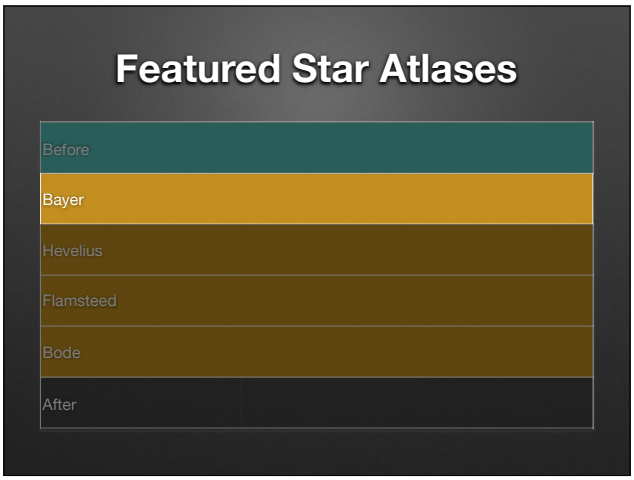
Ptolemy Northern planisphere
Opera "Collected Works"
(Basel, 1541)

Or, Sagittarius the Archer, again shown on the ecliptic.

Featured Star Atlases

- Before
- Bayer
- Hevelius
- Flamsteed
- Bode
- After

So that's a little background.
(Brent steps away from mic)

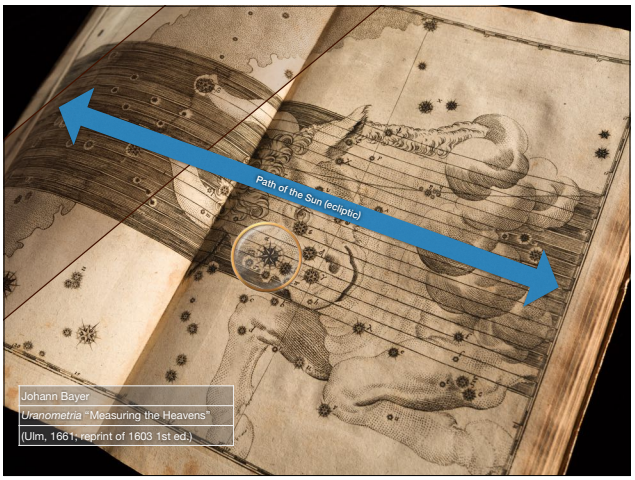


KERRY
Now we come to Bayer…

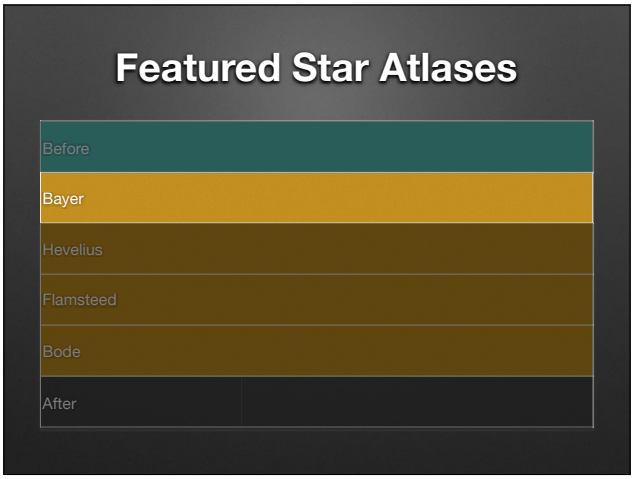
…the 1st of the 4 major atlases of the golden era, first published in 1603. Bayer's star catalog, bound at the front, was based on that of Tycho Brahe.
— — — —
http://lynx-open-ed.org/node/379

Bayer's artfully-drawn constellation figures influenced every subsequent star atlas. Each figure is superimposed upon an accurate star map, plotted on a one-degree grid. By fusing science and art, Bayer inaugurated the golden age of the celestial atlas.

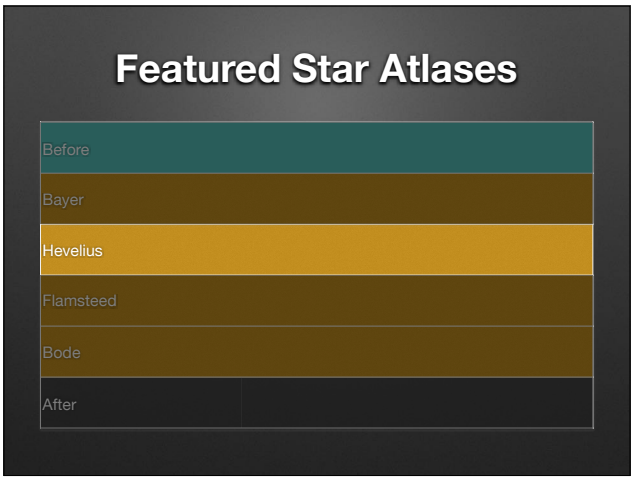
Science and art meet in astronomy, old and new. We can juxtapose old star atlases and new visions of the universe.



In the constellation of Taurus the Bull, the “ecliptic” runs across the middle of the dark Zodiac band. • The Milky Way angles down the left side. Bayer labeled the stars with Greek letters, • according to their apparent magnitude, so that the brightest star in Taurus is alpha-Tauri. This convention is still used today.

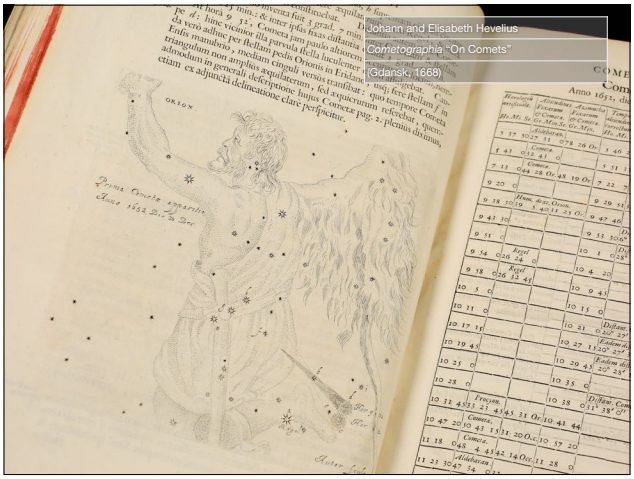


(Kerry steps away from mic)

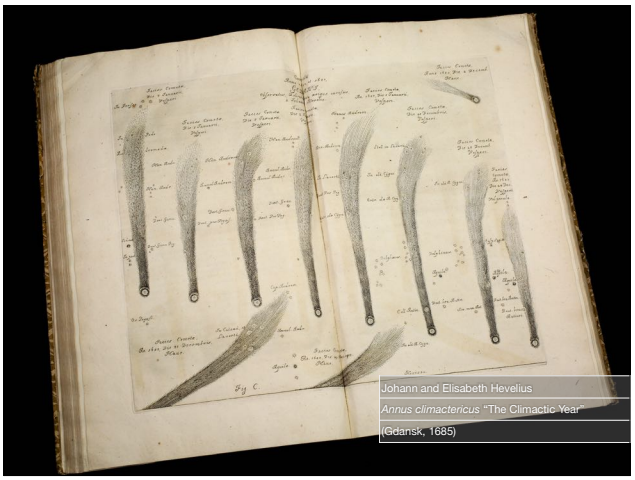


BRENT
Next we turn to Johann and Elisabeth Hevelius…

89



They operated what was the greatest observatory in Europe a generation after Galileo. Star charts often appear in reports of comets, as in their *Cometographia*.

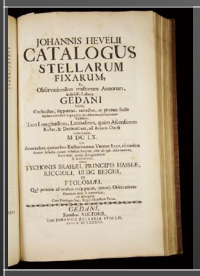


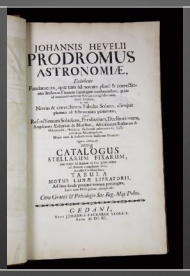
Johann and Elisabeth Hevelius
Annus climactericus "The Climactic Year"
(Gdansk, 1685)

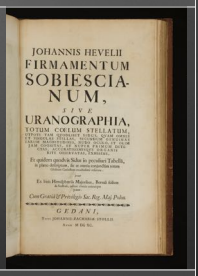
In astrology, a "climactic year" marks a turning point, a moment of greatest risk. The preface explains that 1679 was their climactic year, for in that year their observatory burned. Fire destroyed many manuscripts, books, and instruments. Johann was 67 years old, and lost heart to continue the work. After his death six years later, his wife and fellow astronomer Elisabeth published this book reporting the disaster.

http://lynx-open-ed.org/node/326

Elisabeth and Johann Hevelius







Catalogus stellarum fixarum	*Prodromus Astronomiae*	*Uranographia*
"Star catalog"	"Methods"	"Star atlas"
Gdansk, 1687	Gdansk, 1690	Gdansk, 1690

Over the next two years, Elisabeth restored the manuscripts, finished the books, and saw them through publication. Although Johann regarded Elisabeth as a colleague and astronomer in her own right, Elisabeth, perhaps out of deference to his memory, chose not to include her own name on the title pages of these three works. In the OU copy, all three — the star catalog, methods and atlas — are bound together in one volume.

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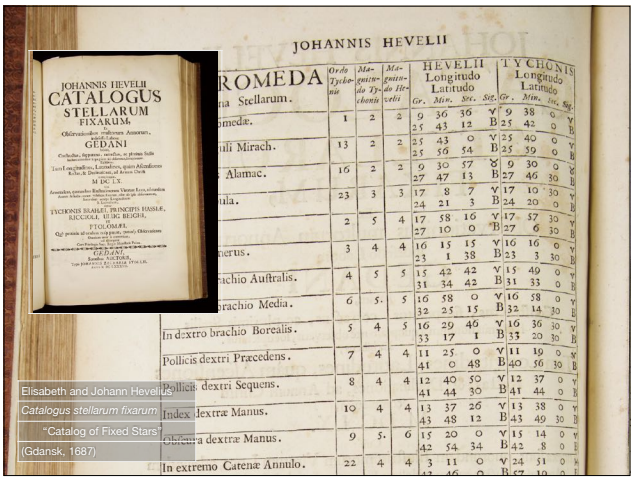
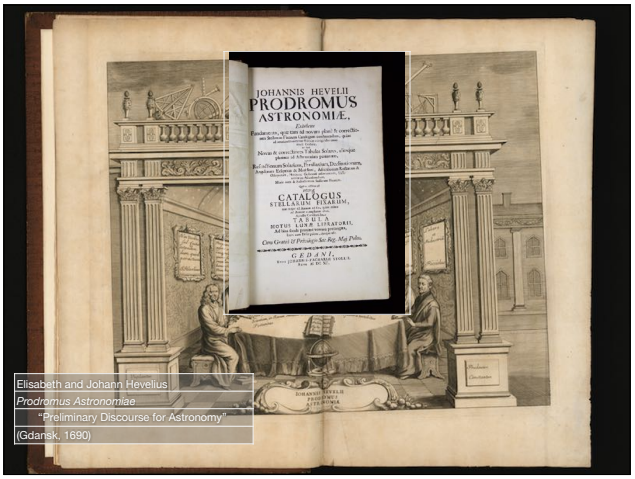
http://lynx-open-ed.org/node/383



The star catalog includes coordinates for more than 1,500 stars, about 600 of which were new.

http://lynx-open-ed.org/node/384 Catalog



In the Methods of Astronomy, Elisabeth explained the instruments used to produce the star catalog.
http://lynx-open-ed.org/node/383 Prodromus

Elisabeth and Johann Hevelius
Prodromus Astronomiae
"Preliminary Discourse for Astronomy"
(Gdansk, 1690)

In the frontispiece, Johann Hevelius joins the table of Urania, the Muse of astronomy, around which are seated some of the great figures in the history of astronomy, including Ulugh Begh and Tycho Brahe.

http://lynx-open-ed.org/node/383 Prodromus

Elisabeth and Johann Hevelius
Uranographia
"Map of the Heavens"
(Gdansk, 1690)

Finally, for the star atlas, the frontispiece shows Johann appearing before a tribunal of great astronomers. In this great star atlas, …

http://lynx-open-ed.org/node/382 Uranographia

Elisabeth and Johann Hevelius
Uranographia Fig. FF
"Map of the Heavens"
(Gdansk, 1690)

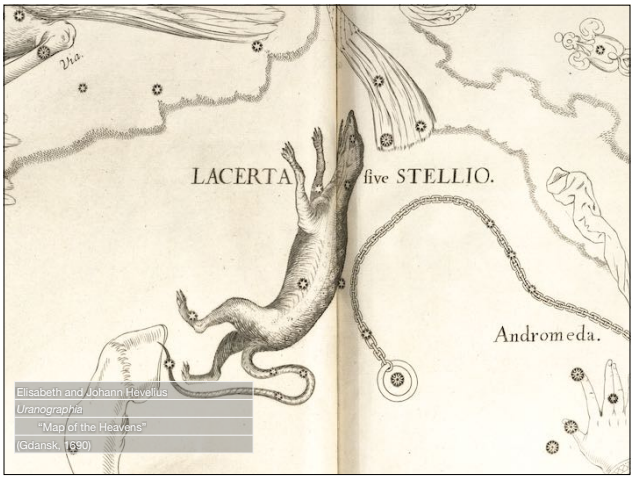
…beneath Leo the Lion, notice the sextant.

Elisabeth and Johann Hevelius Fig. VV
Uranographia
"Map of the Heavens"
(Gdansk, 1690)

The sextant is again featured on this plate, with the paws of Leo at the top. The Hevelius observatory in Gdansk, named "Stellaburg," was inspired by Tycho Brahe. Like Tycho, they constructed large precision instruments. They honored their favorite instrument by picturing it in the heavens.

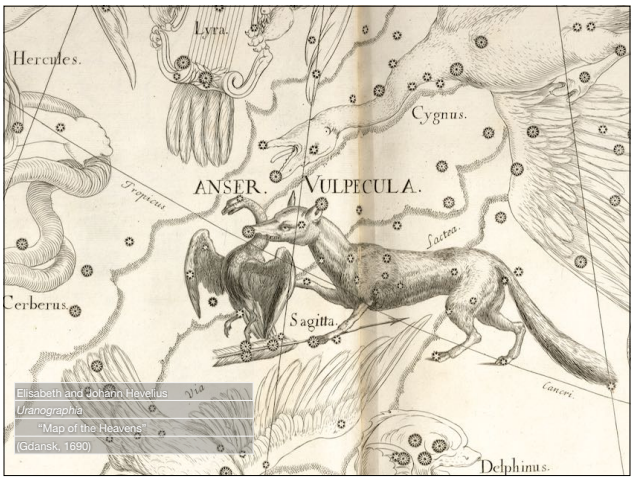
Elisabeth and Johann Hevelius
Uranographia
"Map of the Heavens"
(Gdansk, 1690)

The full title of the Uranographia pays tribute to the Polish king. To honor him, Johann and Elisabeth created a new constellation, Scutum, the "Shield of Sobiesci."

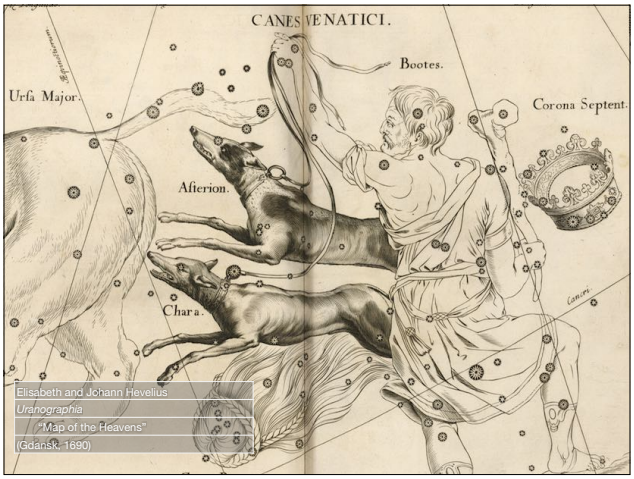


Elisabeth and Johann Hevelius
Uranographia
"Map of the Heavens"
(Gdansk, 1690)

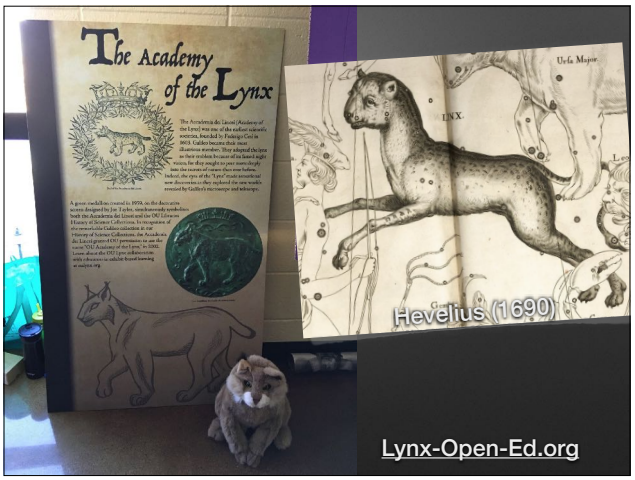
Little Lacerta the Lizard, between Cygnus and Andromeda. Does anyone here have a pet lizard?



Vulpecula and Anser, the Fox and the Goose.



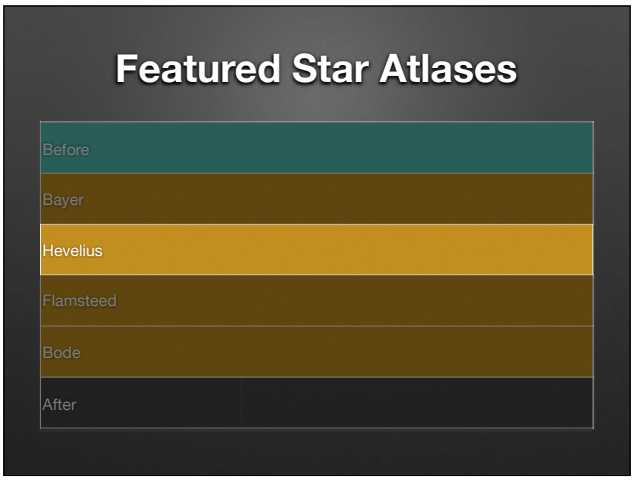
Of the 12 constellations they created, 7 are still recognized today, including Canes Venatici, the hunting dogs.



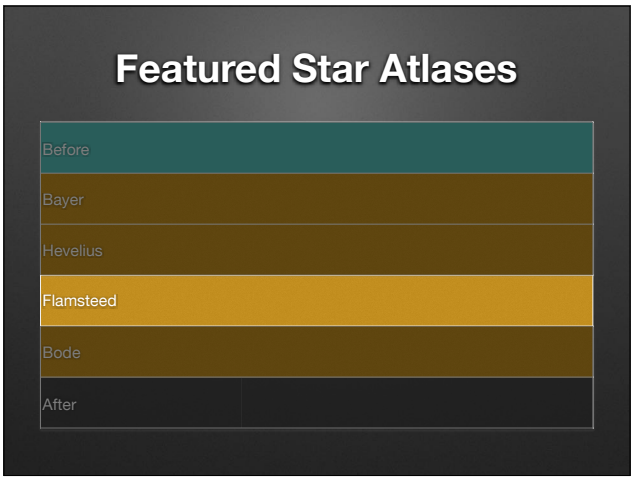
The Lynx, because of its fabled night vision, in recognition of the far-seeing eyes of astronomers. And we might add, of educators as well. By the way, Lynx Open Ed is our companion website for educators.

On the frontispiece, Johann humbly brings their proposed new constellations before the great astronomers. • He carries Scutum the shield, • and the sextant. Animals trailing behind include • the hunting dogs, Canes Venatici, • the Lynx, • the Fox and the Goose, • and Lacerta the Lizard.•

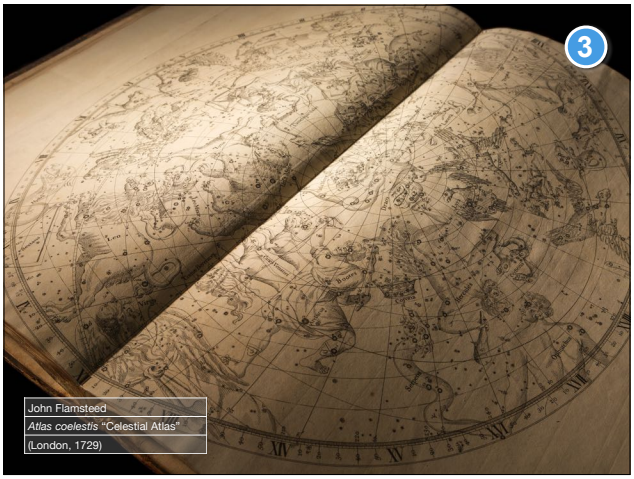
No wonder that the Uranographia of Johann and Elisabeth Hevelius was the most detailed and influential celestial atlas of the 17th century.



(Brent steps away from mic)

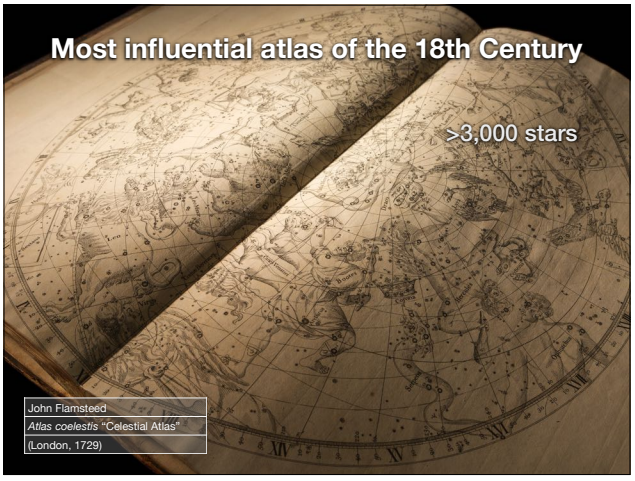


KERRY
Now we come to John Flamsteed…



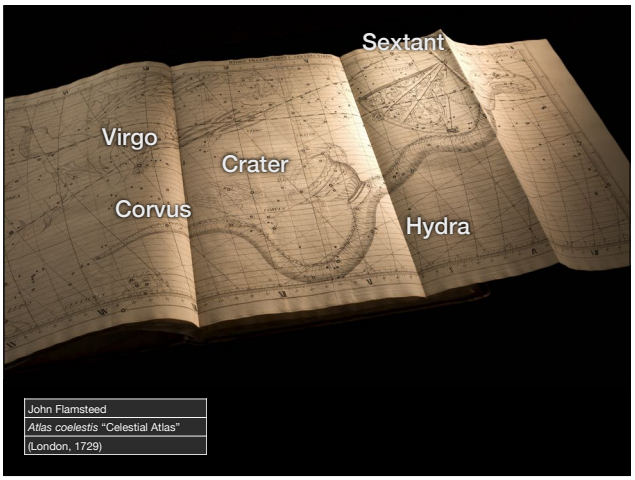
…the third golden era atlas. Flamsteed was England's first Astronomer Royal. He built the renowned Greenwich Observatory.

Flamsteed's star atlas, the largest ever printed up to that time, became the most celebrated and influential star atlas of the 18th century.



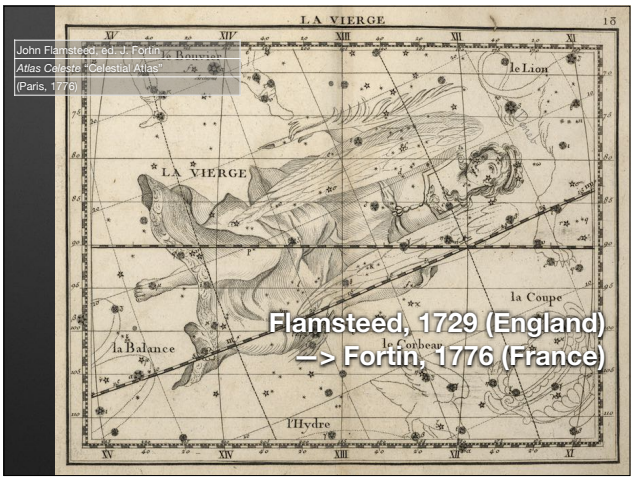
It contained more than 3,000 stars (double the number of previous atlases). Isaac Newton relied on Flamsteed's star coordinates, made available to him at an earlier date, for his theory of gravity.

http://lynx-open-ed.org/node/387



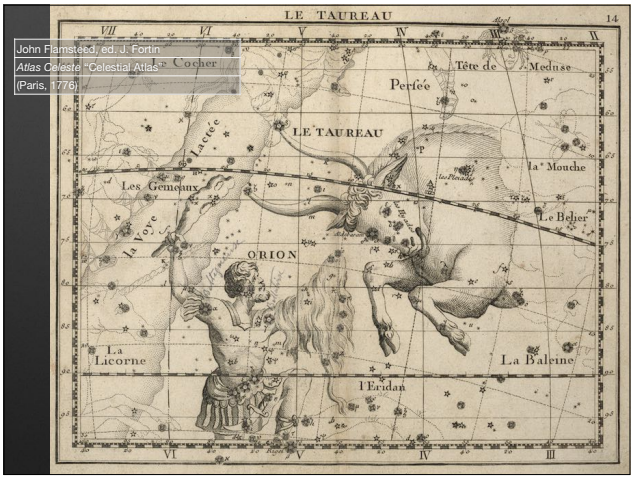
On this fold-out plate of Hydra the water snake, we see • The constellations of Virgo, Corvus the Crow, Crater the Cup, and the Sextant of Hevelius as well.

Here's a closer look at Virgo.



In this later edition, much smaller, Flamsteed went to France. J. Fortin prepared it, based on Flamsteed. You can see the similar style of the Virgo constellation figure.

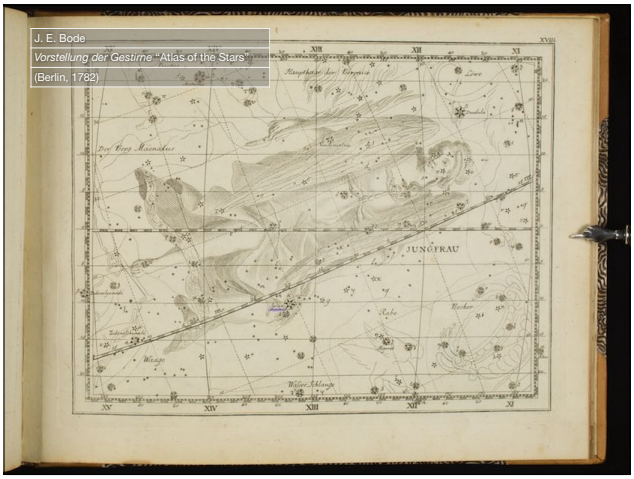
http://lynx-open-ed.org/node/529



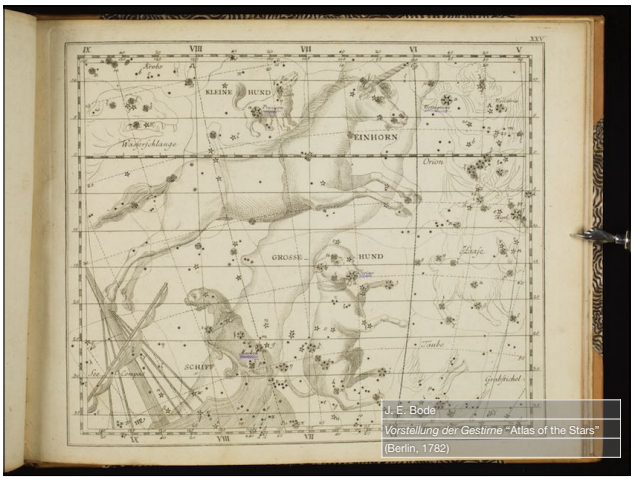
Fortin crafted celestial globes for the French royal family. Fortin's edition is a tiny volume; you can pick it up with one hand.

In this little atlas, Flamsteed went to Germany. It is based on Fortin's Paris edition. It was printed in Berlin by Johann Bode in 1782.

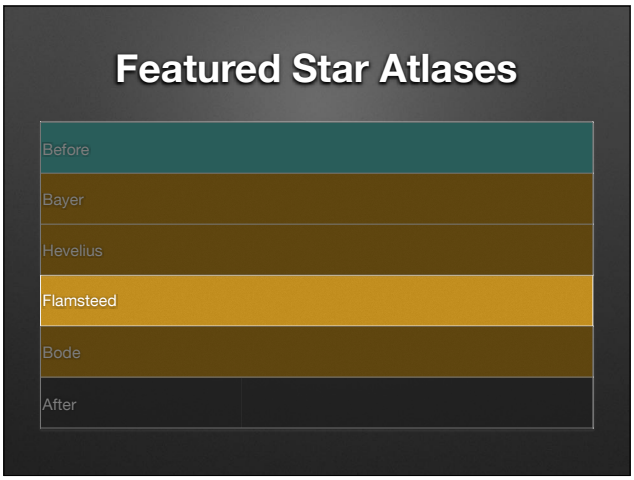
http://lynx-open-ed.org/node/530



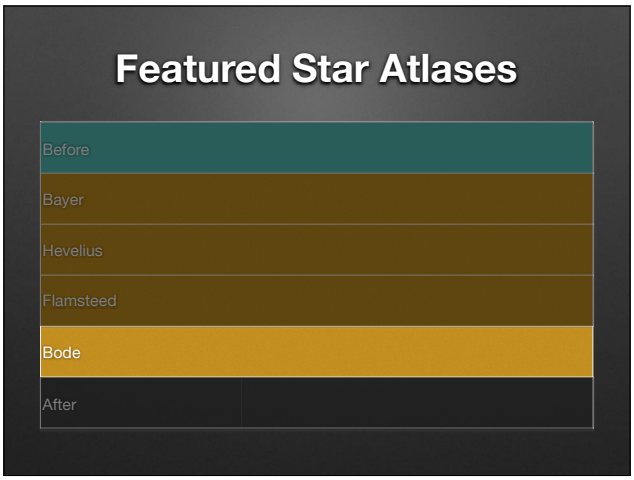
Again we see the Virgo constellation figure in the Flamsteed style. Bode included additional stars not found in the English or French editions.



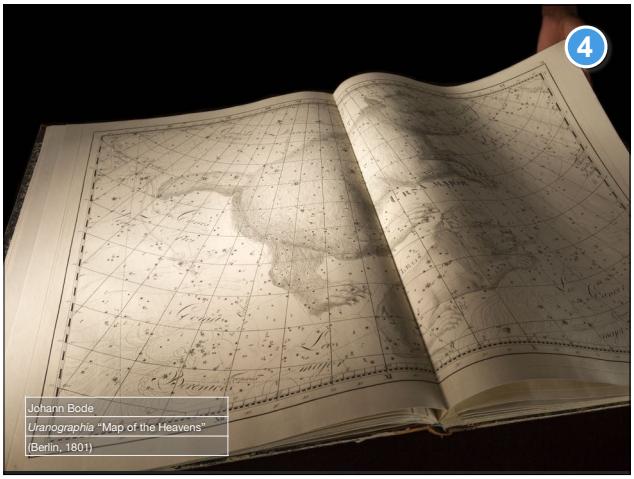
Here is Bode's Unicorn. Bode was director of the Observatory for the Berlin Academy of Sciences.



(Kerry steps away from mic)



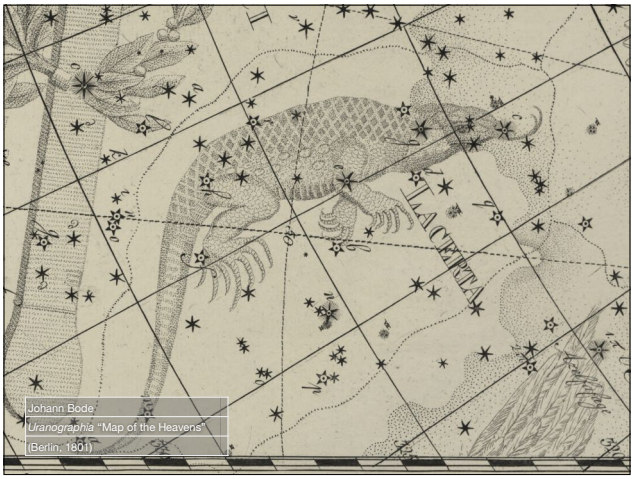
BRENT
Nearly 20 years later, …



the very same Johann Bode published this masterpiece, larger even than Flamsteed's atlas. This is the fourth and last of the golden era celestial atlases which fused artistic beauty and scientific precision.

http://lynx-open-ed.org/node/388

20 large copperplate engravings plot more than 17,000 stars, far more than any previous atlas. Bode depicted more than 100 constellations, compared with 88 officially recognized today.



Here's Bode's version of Lacerta the Lizard.

His new constellation Felis the Cat, for incomprehensible reasons not officially recognized today.

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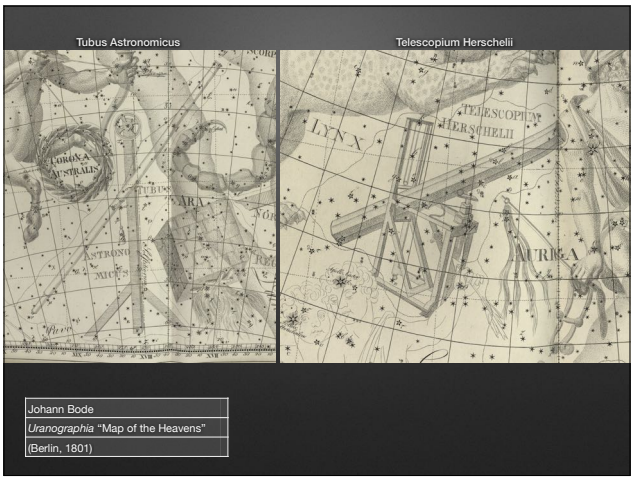
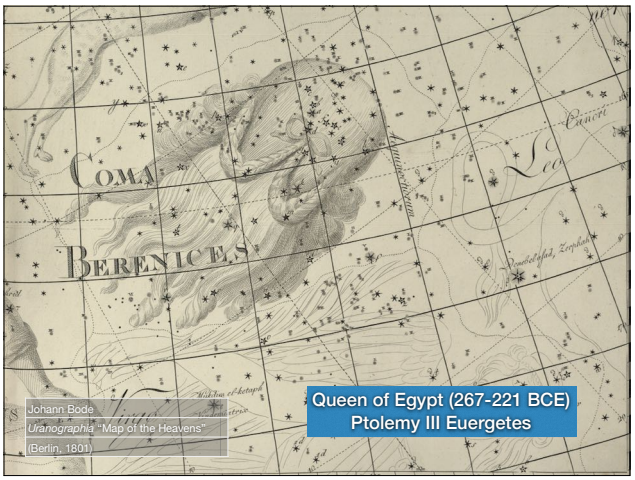
In honor of all the books we're showing you tonight, here's the constellation of The Printing Press. It is not officially recognized today, either. • Note also a couple ink droplets floating in space. Bode included 2,500 such cloudy patches, or "nebulae," cataloged by William and Caroline Herschel.

124



Here's the constellation Tubus Astronomicus, or Telescope. • And Herschel's Telescope, a constellation Bode invented.

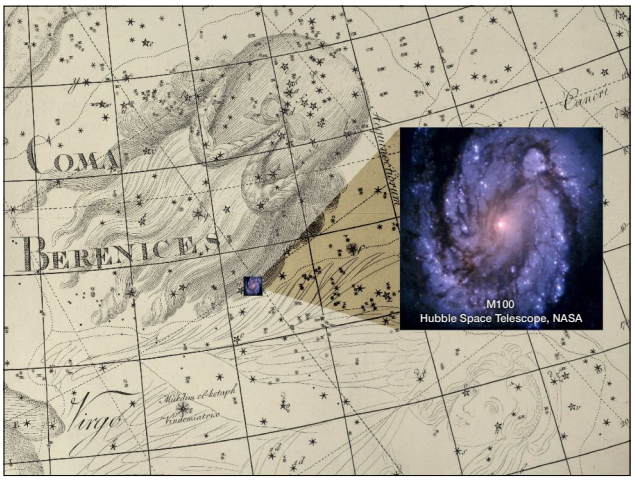
Just above the constellation Virgo is an ancient asterism or star pattern, Coma Berenices.



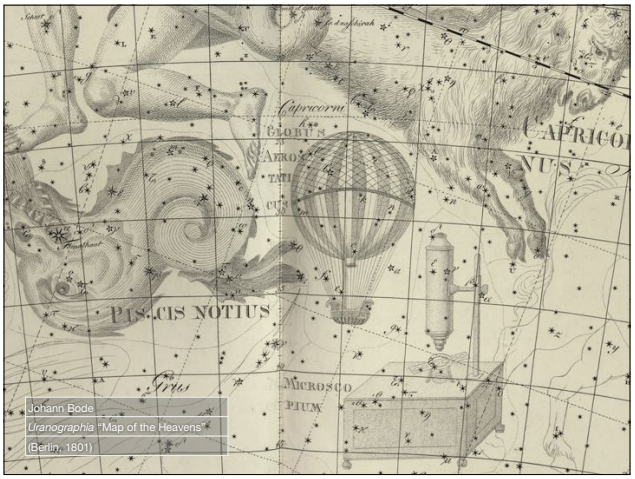
A beautiful cascade of stars makes up Coma Berenices, it's unforgettable once you see it. Imagine it as braided hair streaming down the back of Bernice's head. This is the only modern official constellation named after a historical person.

• Bernice was Queen of Egypt in the 3rd century BCE, who reigned with the third king in the Ptolemy line. The Ptolemy line extended from the successor to Alexander the Great all the way down to Cleopatra, the last Ptolemy Queen, so Bernice lived rather early in that respectable lineage. Bernice's hair, elevated to the heavens from the Temple of Aphrodite, is mentioned in the ancient writings of Aratos and Ptolemy. Yet Bernice was known for her skill with horses as well as her beautiful hair. She and her handmaidens kept and trained horses. Hyginus recounts the amazing story that Bernice, with all her handmaidens, rode to her father's defense, and rallied the army against overwhelming odds. Now who does this remind us of — a woman with famous hair, who fought with great skill, courage and strength?

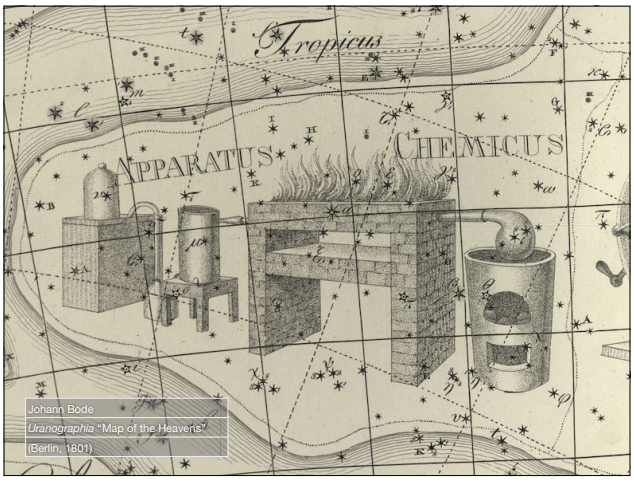
Yep. Next time when you see the constellation Coma Berenices, think of General Leia Organa.



The Virgo Cluster is located on the boundary of Virgo and Coma Berenices. It contains more than 1,000 galaxies! M100 was first observed in 1781 by Messier's assistant, Pierre Méchain. 15 galaxies of the Virgo Cluster were included in Messier's list.

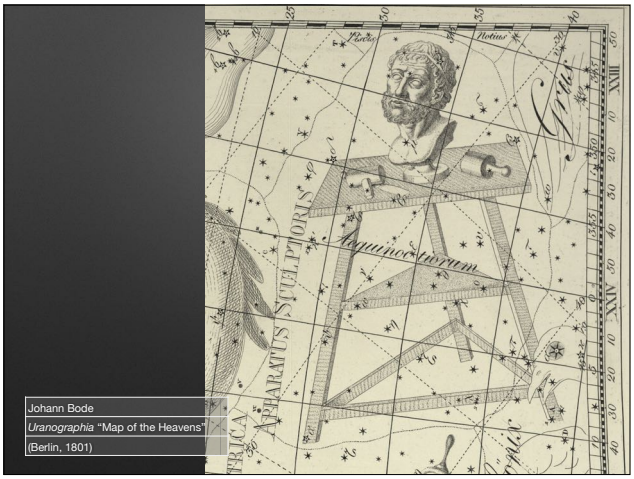


The Hot Air Balloon and the Microscope are two constellations that were new to Bode's atlas. The Hot Air Balloon is not officially recognized today.



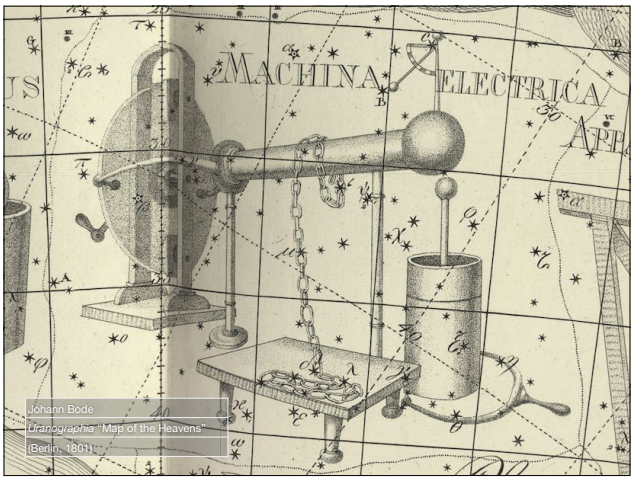
Johann Bode
Uranographia "Map of the Heavens"
(Berlin, 1801)

Here's the chemical laboratory, a stroke for science.

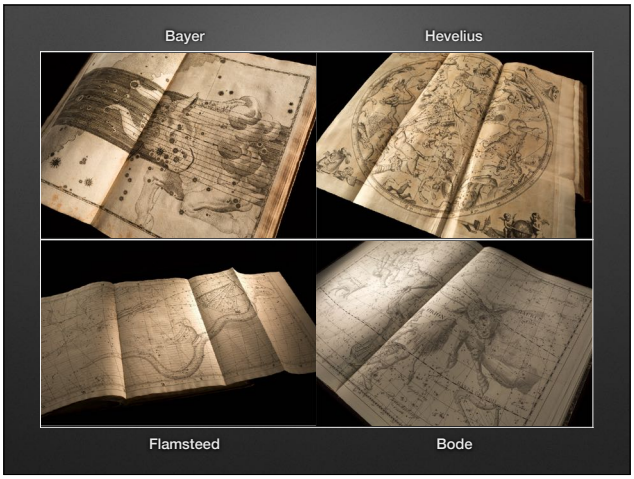


Johann Bode
Uranographia "Map of the Heavens"
(Berlin, 1801)

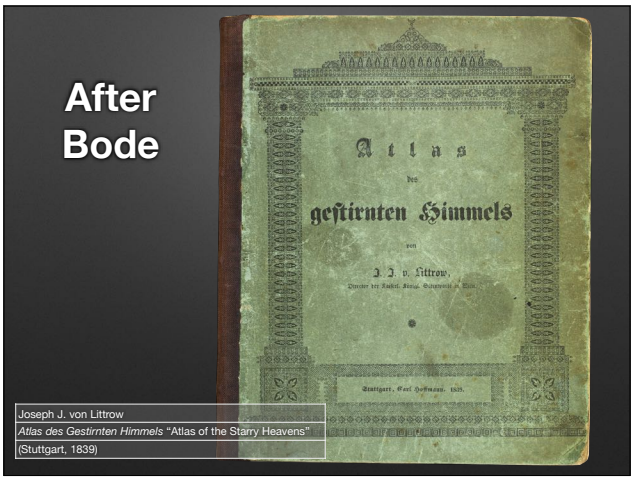
And the Sculptor's workbench, a stroke for art.



The electric generator, also not officially recognized today.

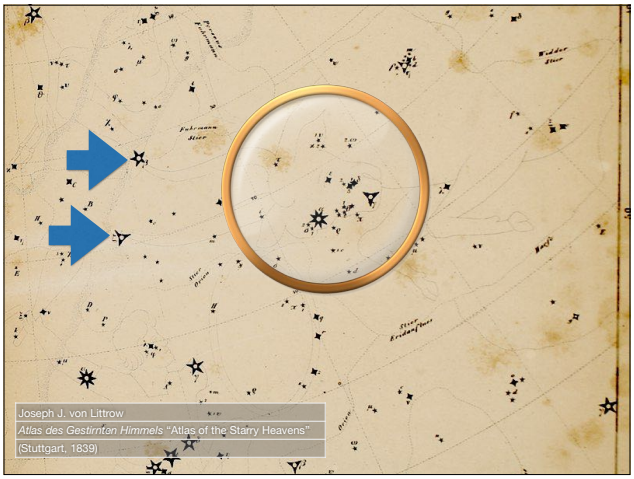


The four great celestial atlases of Bayer, Hevelius, Flamsteed and Bode were each distinctive in their artistic style as well in their scientific importance. After Bode, this fusion of art and science in celestial atlases ceased, as scientific atlases no longer could print plates large enough to accommodate full-size, artistic depictions of constellation figures.

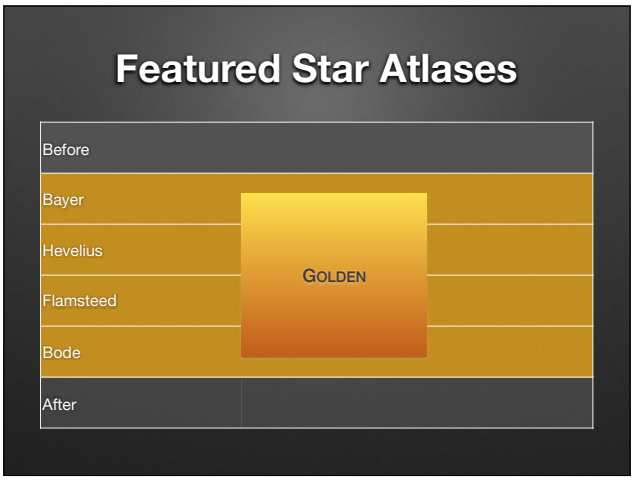


For example, Von Littrow, Director of the Vienna Observatory, adopted Bode's star positions and constellation figures…

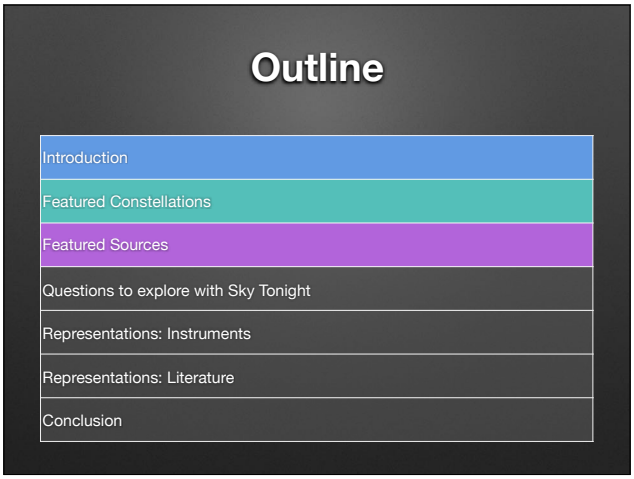
http://lynx-open-ed.org/node/389



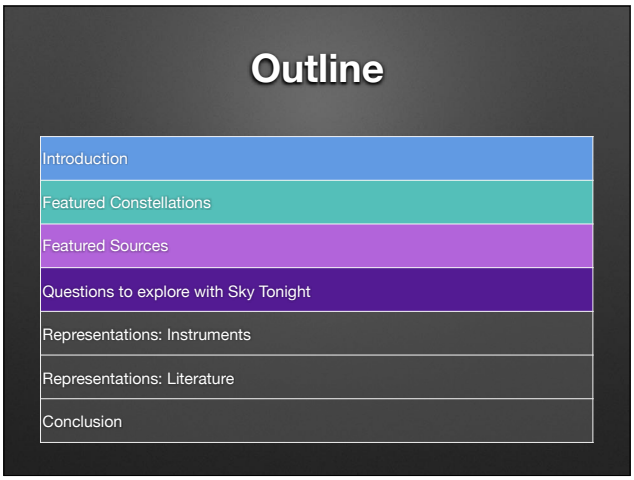
But his constellation figures are fading away and only appear faintly in the background. Can you make out the head of Taurus the bull? • And the two stars at the tips of his horns? • You may not be able to see them at all without the physical book in front of you. After Bode's monumental production, scientific star atlases became more specialized in scope. They soon dispensed altogether with the artistic depiction of constellation figures.



So Bayer, Hevelius, Flamsteed and Bode are the four most significant “golden era” celestial atlases.

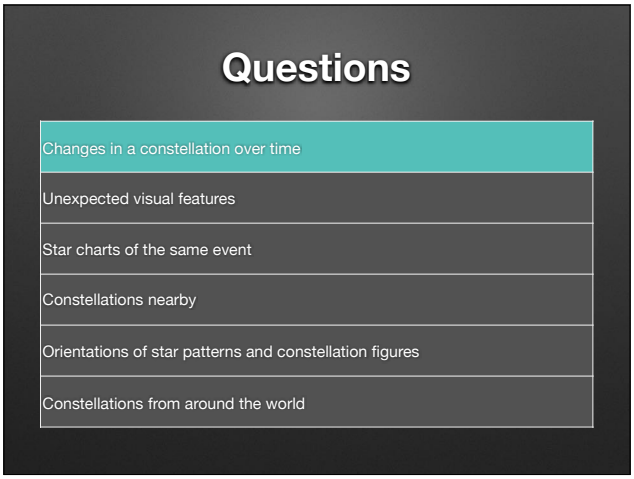


So that’s featured sources, with the four golden star atlases.
(Brent steps away from mic)

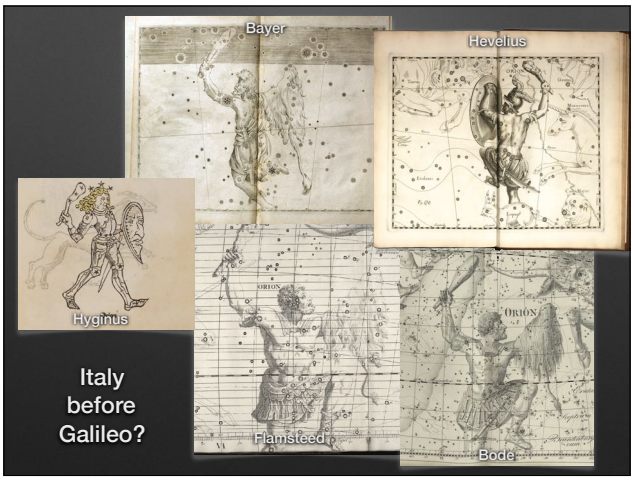


KERRY
Next up is Questions to explore with Sky Tonight. How might you use Sky Tonight to explore the archaeology of the night sky for research, education, school projects, or personal interest?

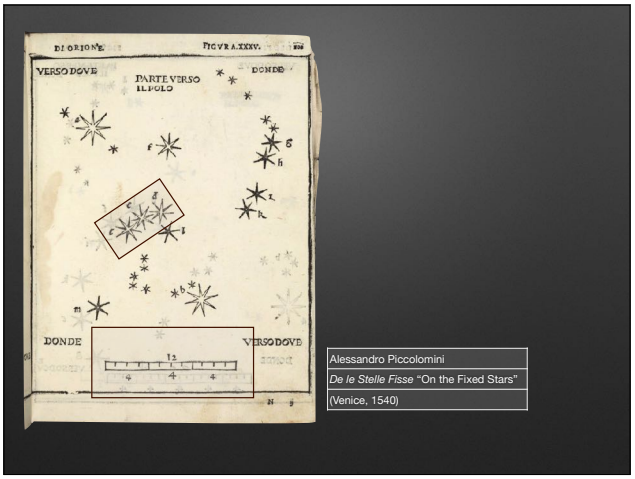
———————————-
If running late (7:20): “In the interests of time, we’ll jump to Literature.” #199



We’ll look at several scenarios. First, tracking changes in a constellation over time.

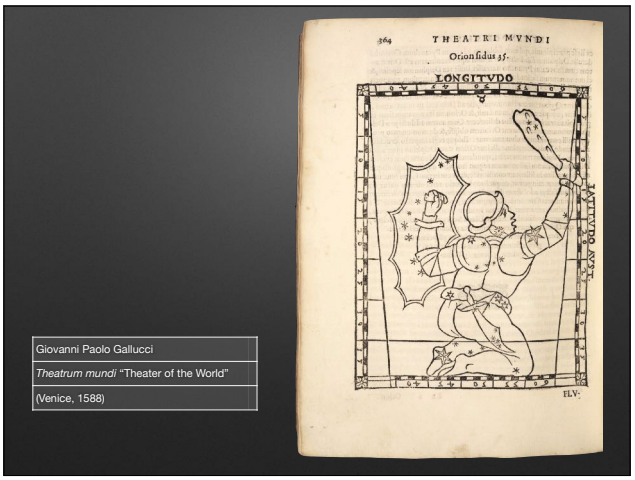


These are images of Orion from sources we've already seen. But what if one were to ask how Galileo's star map of Orion compared to atlases printed in Italy a century before the Starry Messenger?



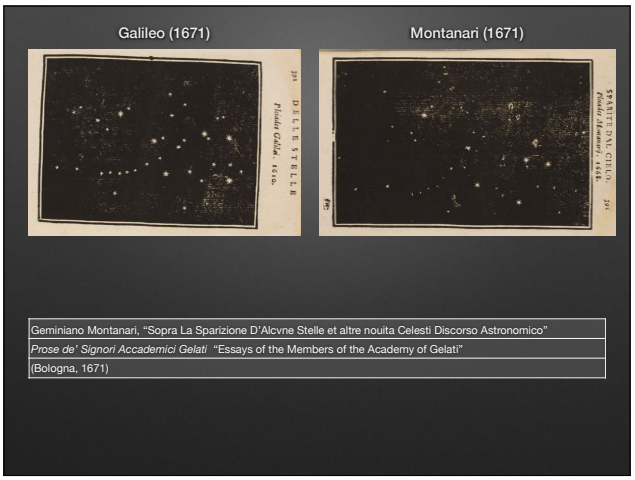
One might then pick out the star atlas of Piccolomini. Piccolomini concentrated on making as accurate a star map as possible, without being distracted by constellation figures. This is Orion; • can you see the three stars of Orion's belt? • He measured positions of the stars according to an indicated scale, specific to each plate.

http://lynx-open-ed.org/node/376



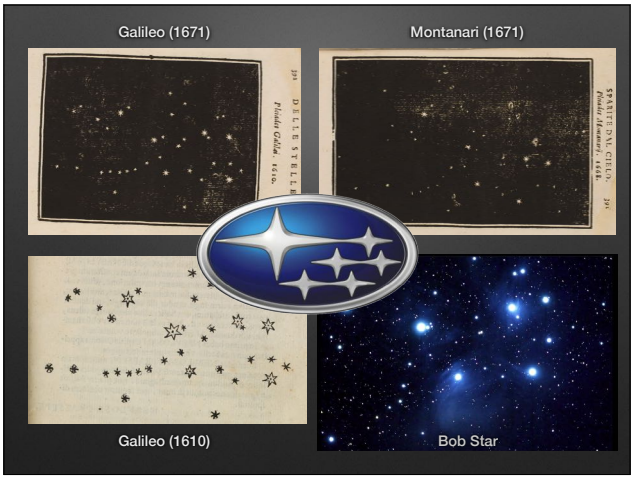
Or the star atlas of Gallucci. Gallucci took his star positions from Copernicus. He provided not a single scale, but rulers along all four borders. The trapezoidal shape of the grid better approximates the curved surface of a sphere.
http://lynx-open-ed.org/node/584

Galileo's Orion chart only covers the area of the belt and sword. Nonetheless, a comparison may be instructive. Comparisons of this sort are possible using the sky tonight.

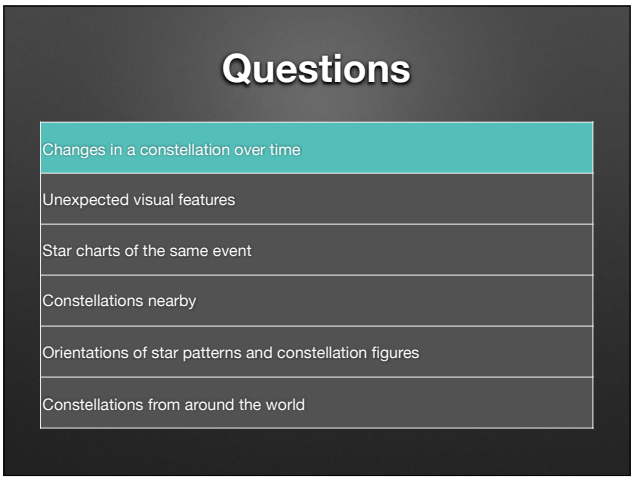


One generation after Galileo, Montanari compared Galileo’s observations of the Pleiades (left) with his own (right).

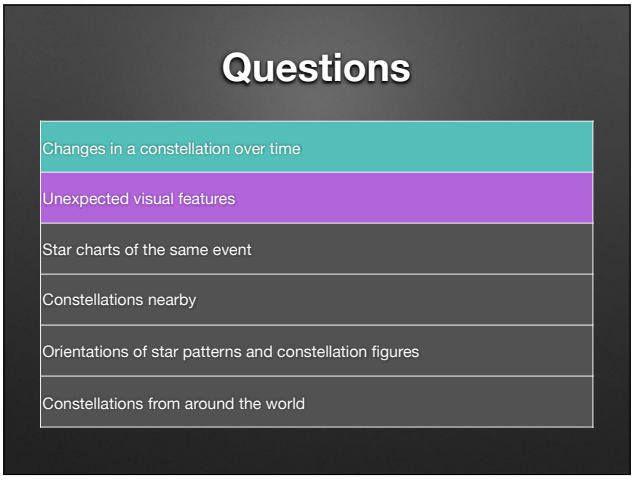
http://lynx-open-ed.org/node/525



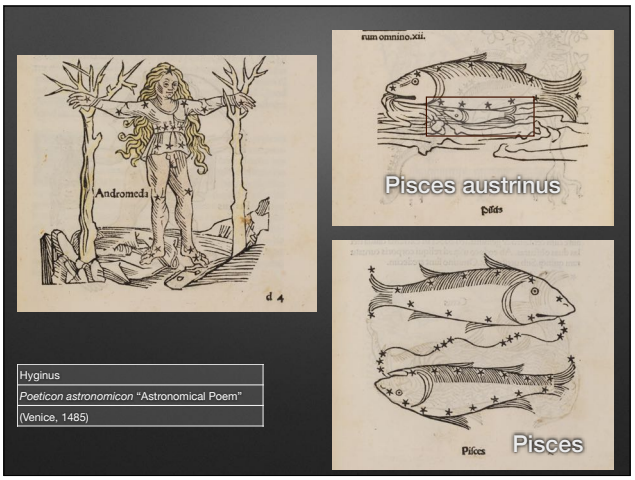
Let’s add Galileo’s original report and the modern astro-photograph by Bob Star. These are the kinds of investigations one might undertake, for research and for recreation.
Speaking of recreation, what car manufacturer is named after the Pleiades? • That’s right, Subaru.



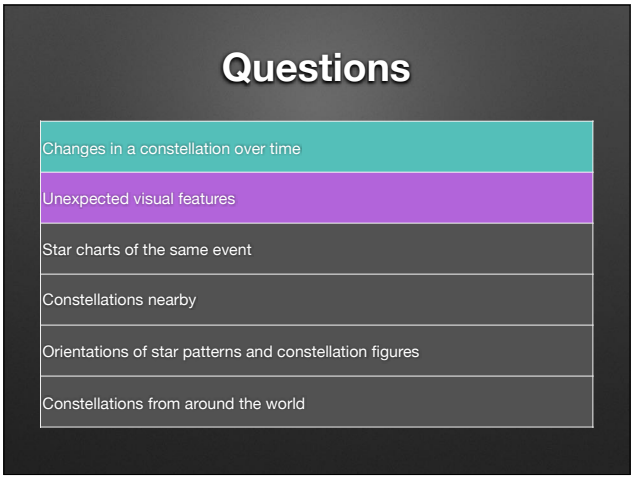
So next up…
(Kerry steps away from mic)



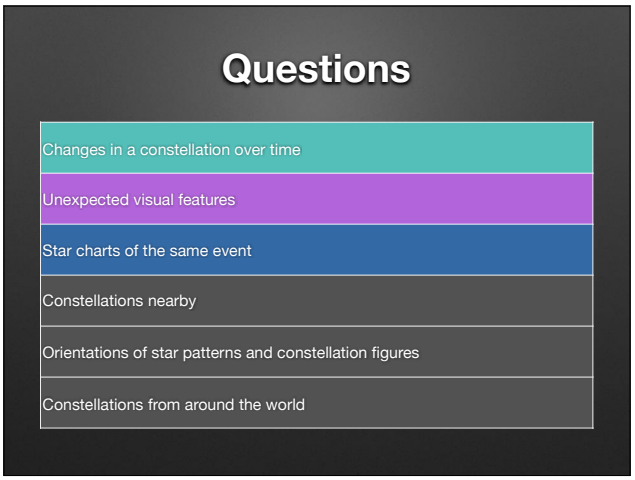
BRENT
Unexpected visual features.



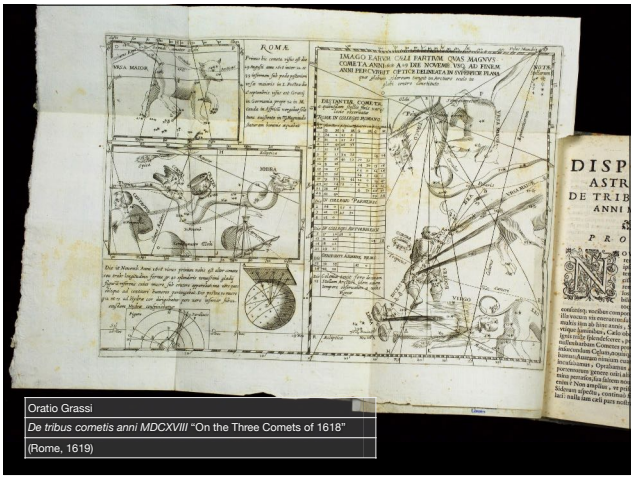
Let's take an early atlas, the Hyginus, with its simple constellation figures. Top left, one might ask why Andromeda is depicted as androgynous? That's an unexpected visual feature! The accompanying text is silent about it; this is visual information, only obtained when one has access to the images. Another rarity is the depiction of the southern fish as shown top right. There are many fish constellations in the sky. The most familiar one, Pisces, is always shown as a pair. But Pisces Austrinus the Southern Fish is just one fish, • yet this edition of Hyginus shows a second fish underneath. Every unexpected visual feature like these opens new research directions waiting to be pursued.



Brent steps away from mic



KERRY
So how about exploring…star charts of the same event as recorded in diverse publications?



For example, in 1618, three bright comets appeared. These were the first comets to be observed with the telescope. This book provides the account of Grassi, a Jesuit astronomer in Rome. Grassi demonstrated that these comets were located farther away than the Moon.

http://lynx-open-ed.org/node/328

In England, John Bainbridge studied the same comets. This book contains the first telescopic observations published in England, and the first recorded use of the word “telescope” in English. Grassi and Bainbridge agreed that comets are farther away than the Moon, but this conclusion was vigorously opposed by Galileo in what became known as the Controversy over the Comets.

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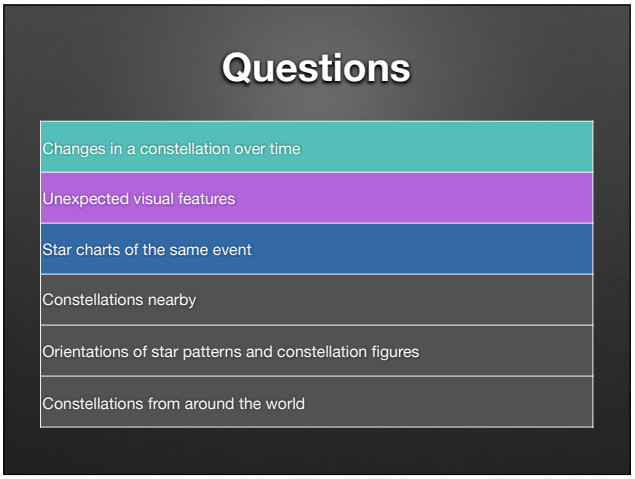
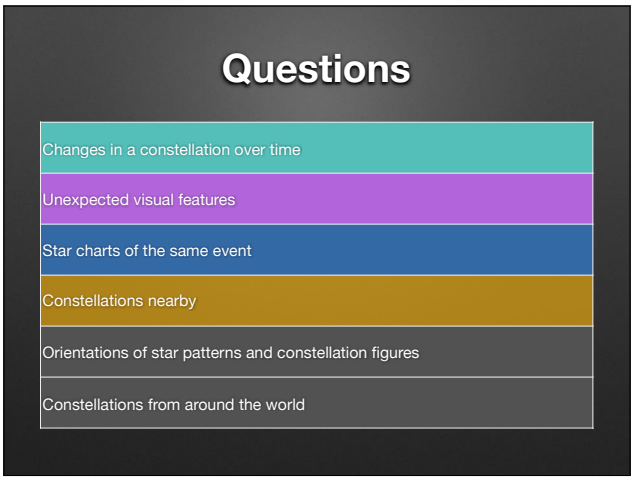
http://lynx-open-ed.org/node/330



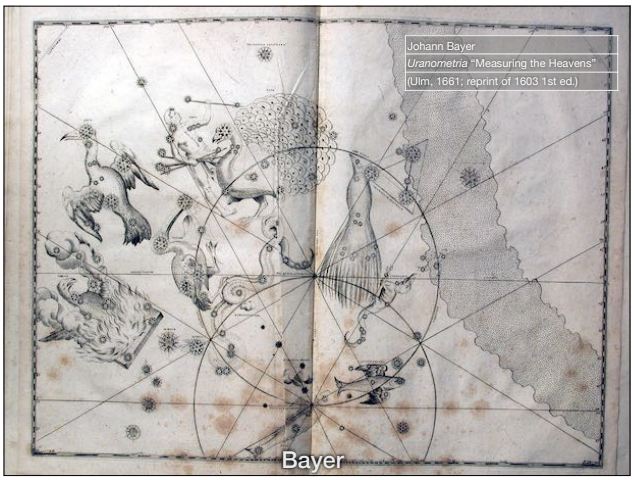
Kerry steps away from mic



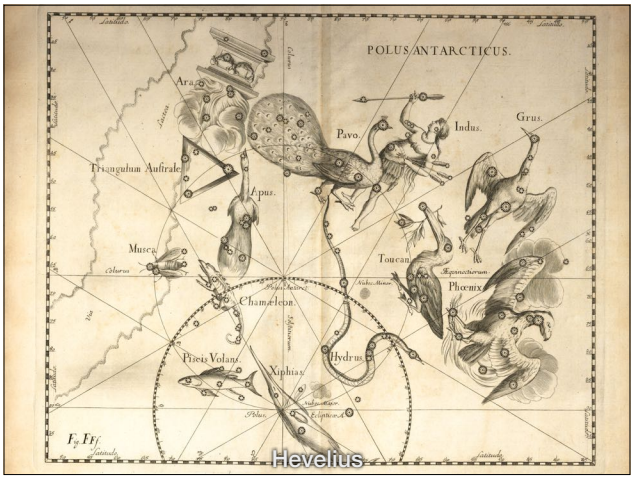
BRENT
Another possibility is to explore constellations from the same region of the sky.

This is the southern planisphere from Ptolemy's Collected works, published in 1541.

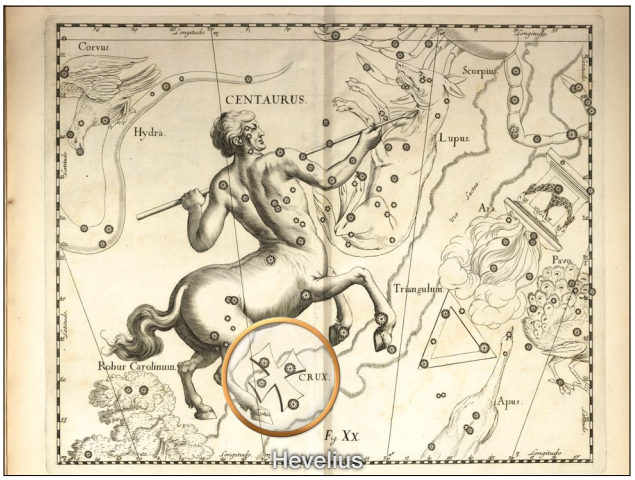
http://lynx-open-ed.org/node/377



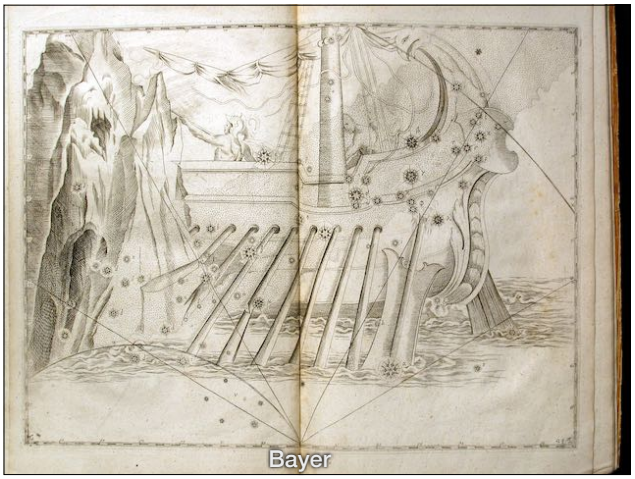
A half-century later, Bayer's plate for the southern skies includes 12 new constellations.



Another half-century later, the southern skies appear in the Hevelius atlas. What stories might we tell about these constellations?

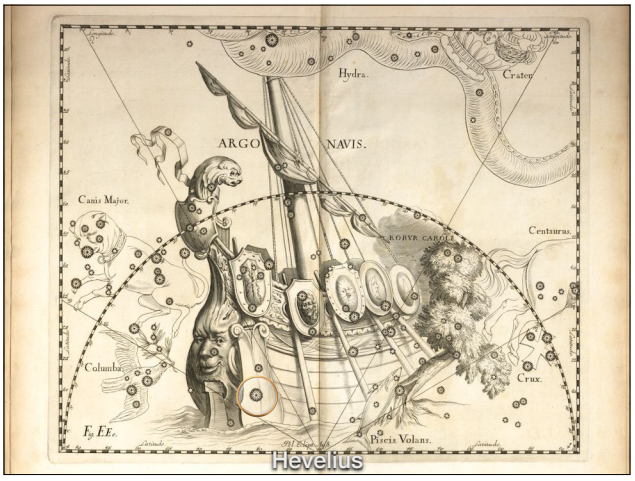


Nearby are the Centaur and the beautiful Southern Cross.

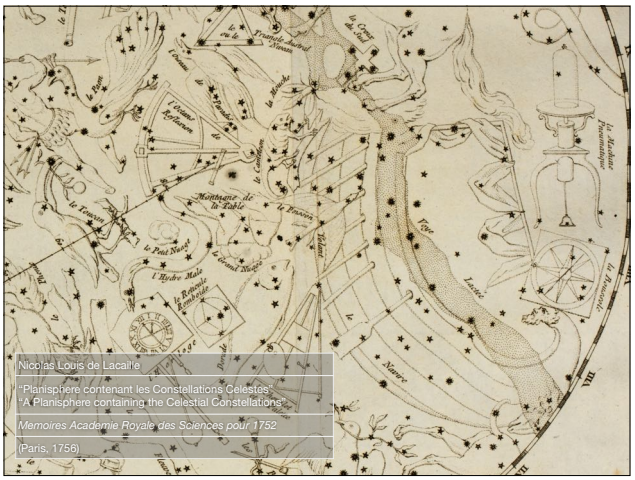


And Argo Navis, the ship of the Argonauts. Argo Navis was the ship which Argus built, to carry Jason and his crew on their quest for the Golden Fleece.

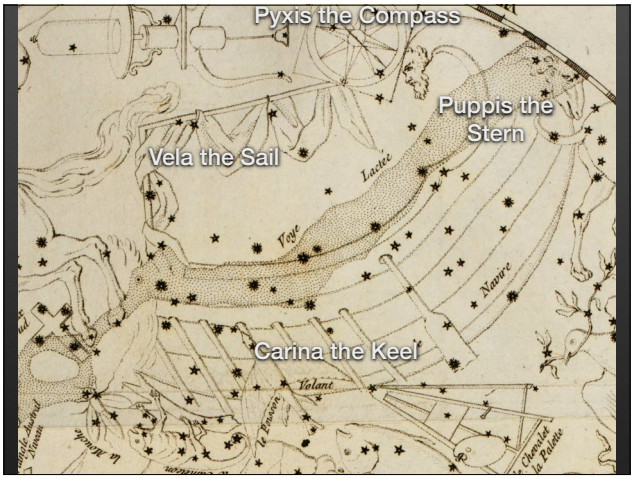
In the Hevelius atlas, the mast of Argo Navis reaches up to Hydra the water snake.



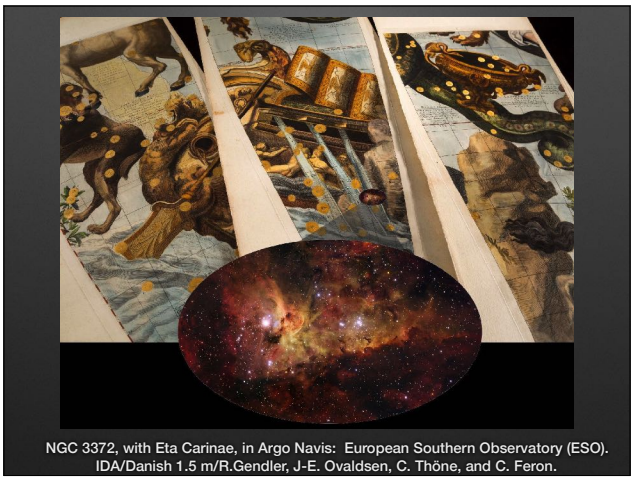
This plate is devoted to Argo Navis. • The bright star Canopus is the second brightest star in the entire night sky – only Sirius shines more brightly. Argo Navis is an ancient constellation, the only one of Ptolemy's 48 constellations that is no longer used.



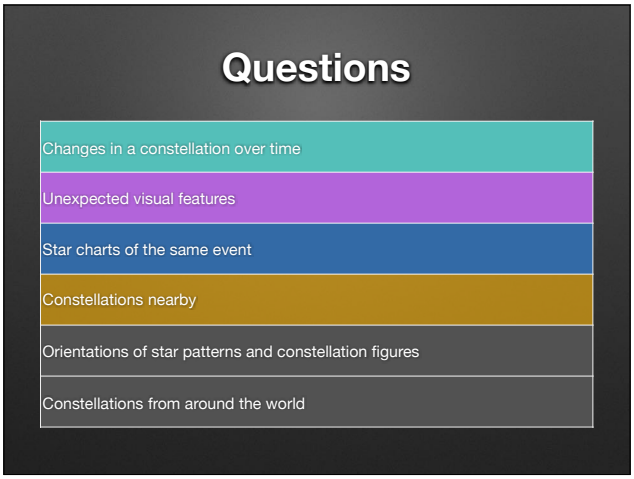
In the 18th century, the French astronomer Lacaille observed the southern constellations from the Cape of Good Hope. Lacaille created 17 new constellations.
http://lynx-open-ed.org/node/528



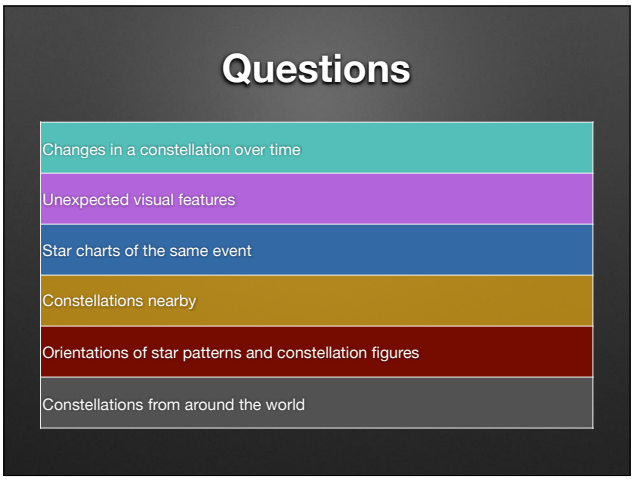
In the process, he dismantled Argo Navis into three smaller constellations: Carina the Keel, Puppis the Stern, and Vela the Sail. Small Pyxis the Compass is located nearby.



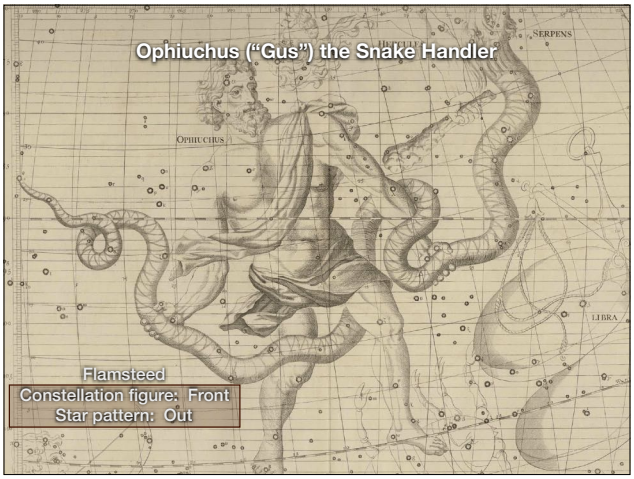
In the constellation Carina, Lacaille discovered a nebula which, as it turns out, surrounds an irregular variable star, Eta Carinae. Eta Carinae is one of the most massive, luminous and mysterious of stars. In 1843, it became brighter than Canopus, brighter than any star except Sirius.



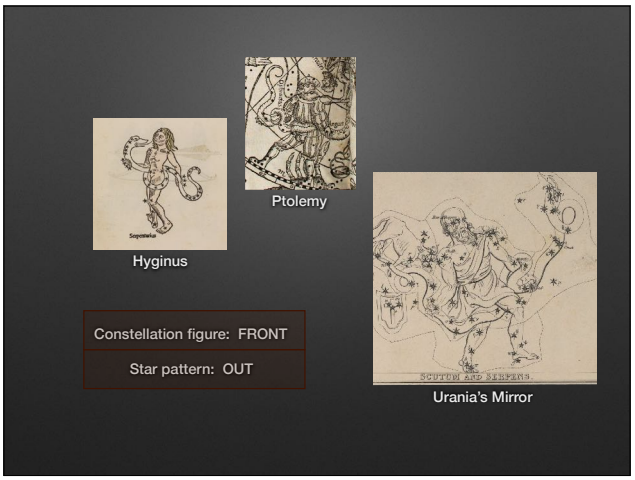
BRENT steps away from mic



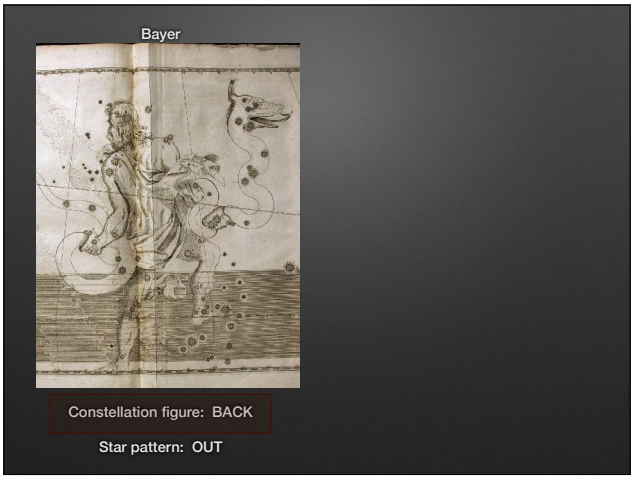
KERRY
Another aspect one may compare among different star charts is the orientation of star patterns and constellation figures.
—- Skip to “Comparing constellations from around the world.” 176



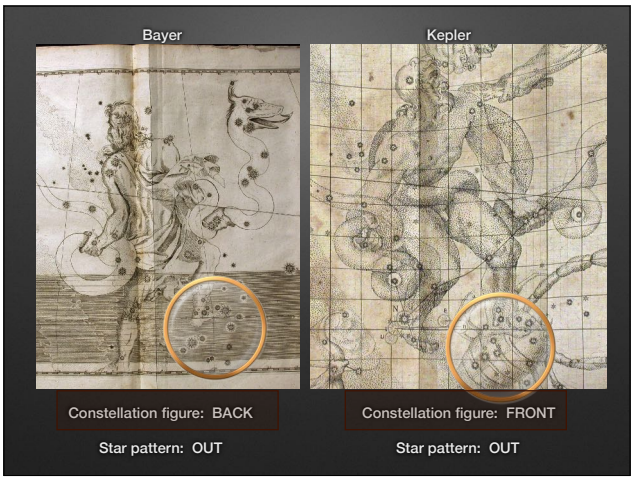
Let’s take Ophiuchus the Snake-Handler as our example, “Gus” for short.* Here in a plate from Flamsteed, we see him in a typical posture, • viewed from the front, which matches the traditional names of his stars. The star pattern is shown as we see it in the night sky, looking out from Earth into space.
——
*Gus is the only non-Zodiac constellation that sometimes contains a wandering planet. He dips his toes into the region of the Zodiac and touches the ecliptic, even though he is not counted among the astrological Zodiac signs.



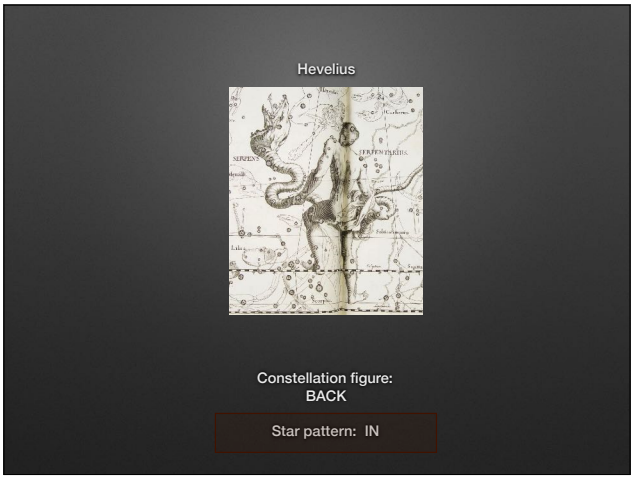
The same is true for these illustrations. • Each shows the constellation figure from the front. • And each shows the star pattern looking out.



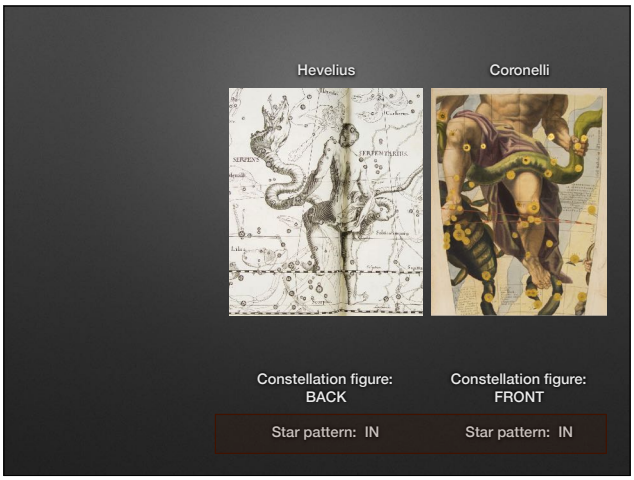
Yet Bayer is different. • Bayer shows Gus from the back, which created confusion about traditional star names that might refer to the left foot or right armpit or other body parts.



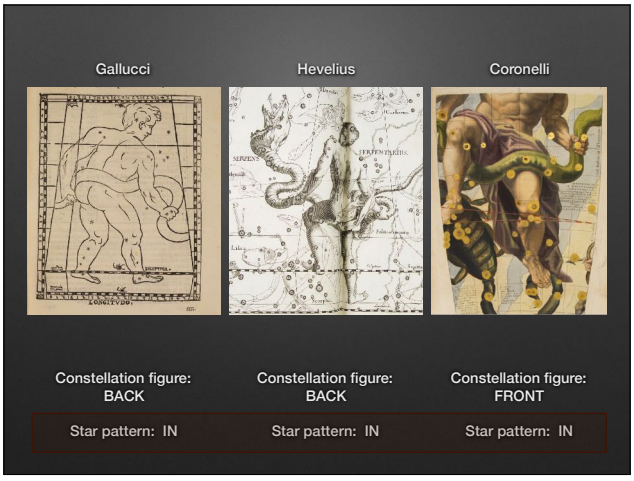
Let's compare with this plate from Kepler. • If you examine the stars near the foot on the lower right, can you see that Bayer and Kepler have the same star pattern? Both show the same star pattern, looking from Earth out into space. Yet unlike Bayer, Kepler drew Gus from the front, facing toward us. Kepler wanted the constellation figure to match the traditional star names of his feet and shoulders.



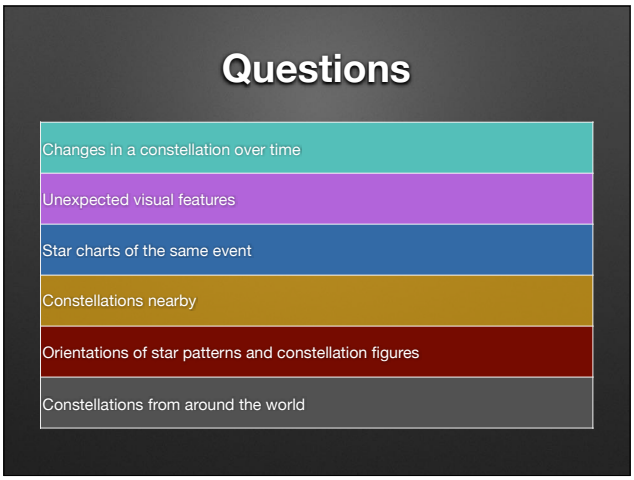
Unique among the major star atlases, Elisabeth and Johann Hevelius changed the star pattern — not just the constellation figure. • The Hevelius atlas depicts the star patterns as if from the outside looking in, not as seen when looking up into the night-time sky.



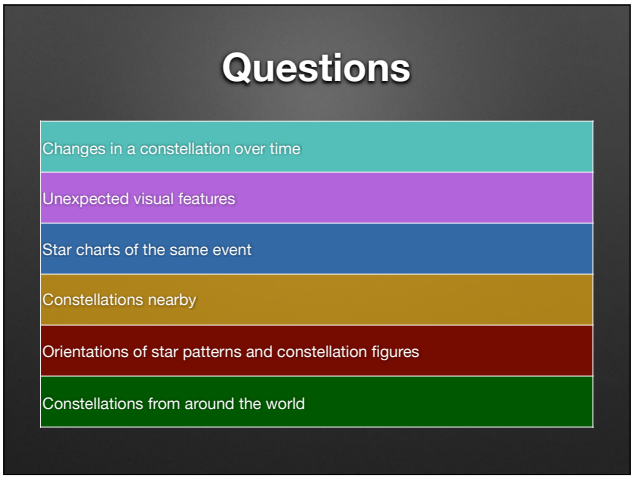
That's why the Hevelius star patterns were so helpful to globe-makers such as Coronelli.



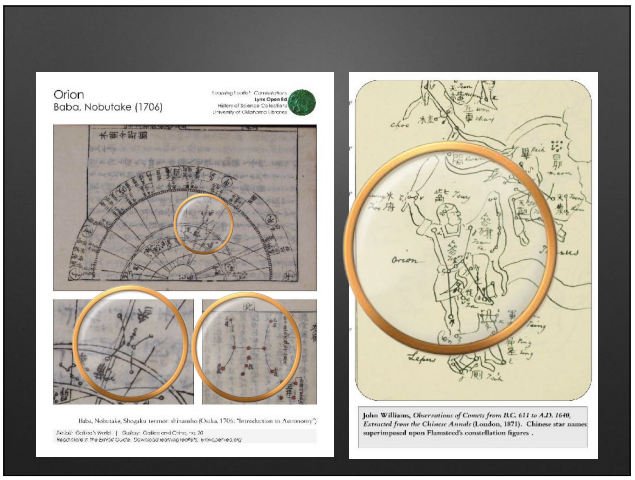
Gallucci had done the same thing. Is this confusing? • The point is that constellation figures can be drawn front or back, and star patterns looking out or looking in, and they can vary in any combination.



That one was complicated, but the last one is easy.
(Kerry steps away from mic)



BRENT
Comparing constellations from around the world.

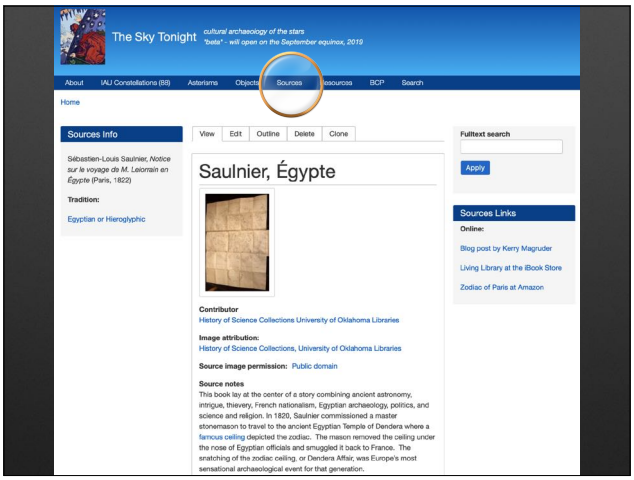


Here are representations of the stars of Orion from two books illustrating Asian constellations.

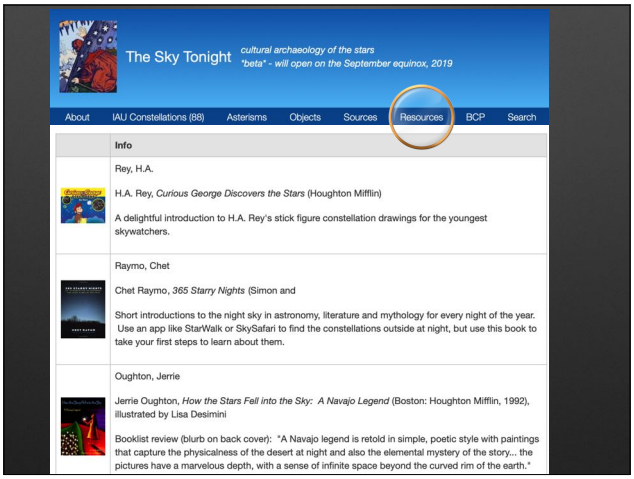
177

And here's Orion from the Temple of Dendera, in Egypt, dating from the Hellenistic period. Who was Sébastien-Louis Saulnier, who wrote the book containing this chart?

178

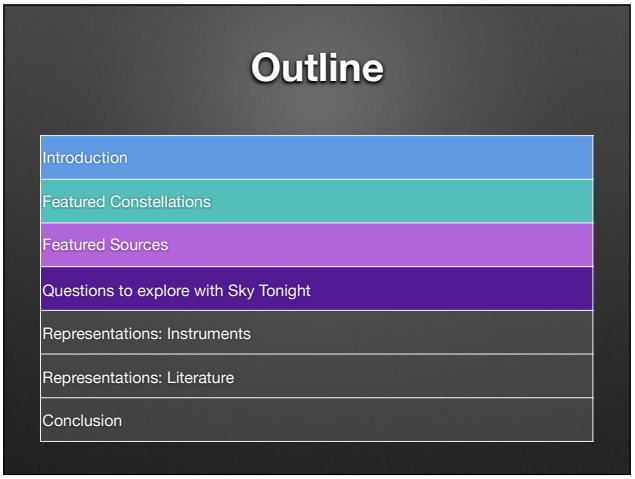


Under the Sources tab, we learn that “This book lay at the center of a story combining ancient astronomy, intrigue, thievery, French nationalism, Egyptian archaeology, politics, and science and religion. In 1820, Saulnier commissioned a master stonemason to travel to the ancient Egyptian temple of Dendera where a famous ceiling depicted the zodiac. The mason removed the ceiling under the nose of Egyptian officials and smuggled it back to France. The snatching of the zodiac ceiling, or Dendera Affair, was Europe’s most sensational archaeological event for that generation.”
So this book is part of the story of why you can still see the Temple of Dendera in Egypt today, but you must go to the Louvre in Paris if you want to see its ceiling.

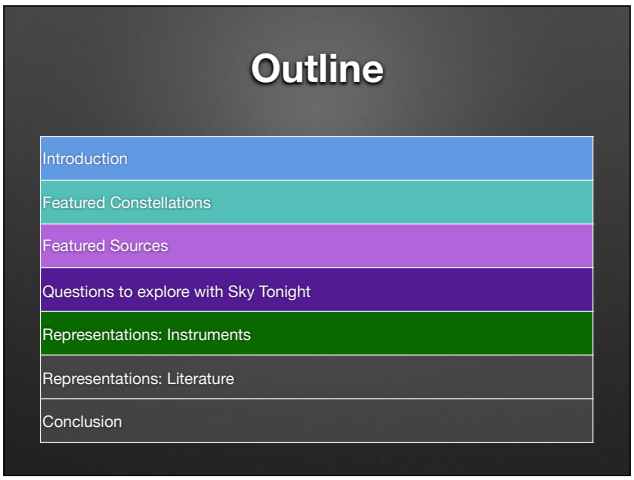


What if one wants to find out more? Then go to the Resources tab
…to find print and online resources, about the constellations and their history…

… for kids and adults, for science, history and art.



So that's a look at some types of questions one may explore using skytonight.org.
(Brent steps away from mic)
———————

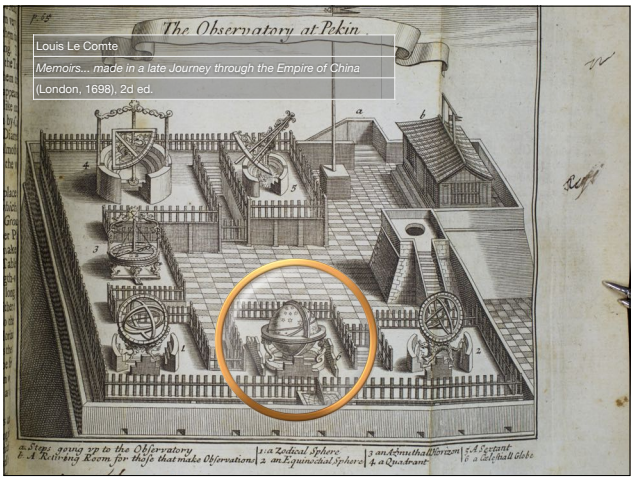


KERRY
Representations: Instruments.

So far we've focused on representations from star atlases. Sky Tonight might include representations in any form of cultural expression, such as architecture, painting, sculpture, or instruments.

Before 7:22? aok — So let's take instruments.

OR: If running late: "In the interests of time, we'll jump over representations in instruments and go straight to Literature." #199
Instruments requires 3 mins — Literature requires 5 mins, #199 —
Skip to Conclusion, #214.

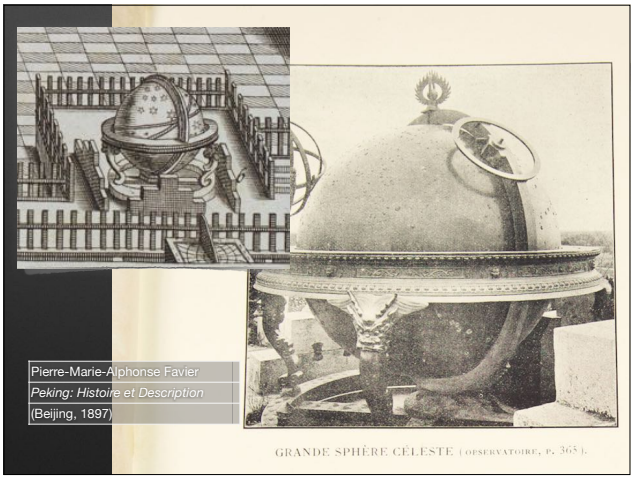


Consider this celestial globe, one of the astronomical instruments built in the Jesuit observatory in Beijing at the end of the 17th century.

———————

http://lynx-open-ed.org/node/290

Starting from the lower right and going counter-clockwise, the astronomical instruments are the armillary sphere, celestial globe, equinoctial sphere, azimuth horizon, quadrant, and sextant.



Photographs of the Beijing observatory show what remained of the astronomical instruments in 1897.

http://lynx-open-ed.org/node/291

A scholar could not afford a celestial globe, but Shickard designed this "astroscopium," so that anyone could calculate the positions of the stars for any day and hour of the year. • Print the plates and assemble your own Astroscopium.

———-

http://lynx-open-ed.org/node/351

A closeup of the Astroscopium's northern planisphere shows Draco the Dragon and the Little Bear.

Coronelli was the most important globe maker of the 17th century. To make a celestial globe, you need prints like these. • Each slice is called a "gore." Cut them out, paste them down, and you'll have a three-dimensional globe.
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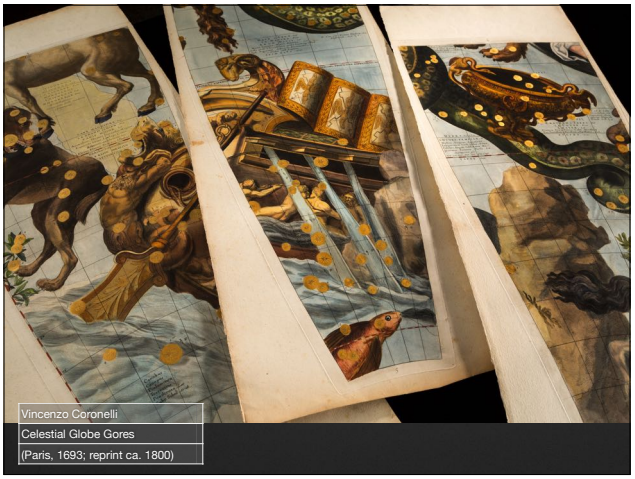
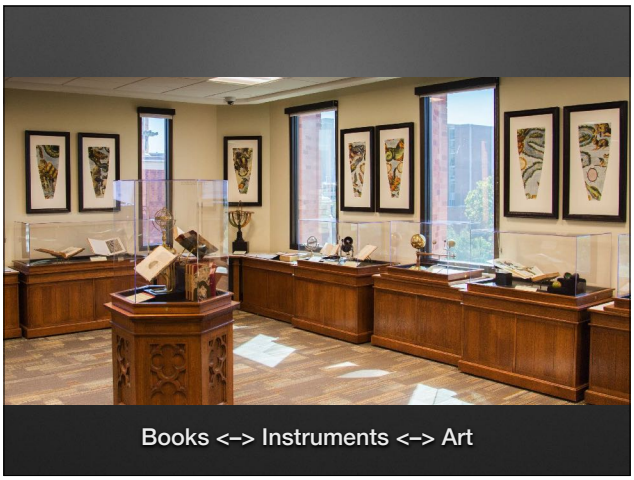
http://lynx-open-ed.org/node/526



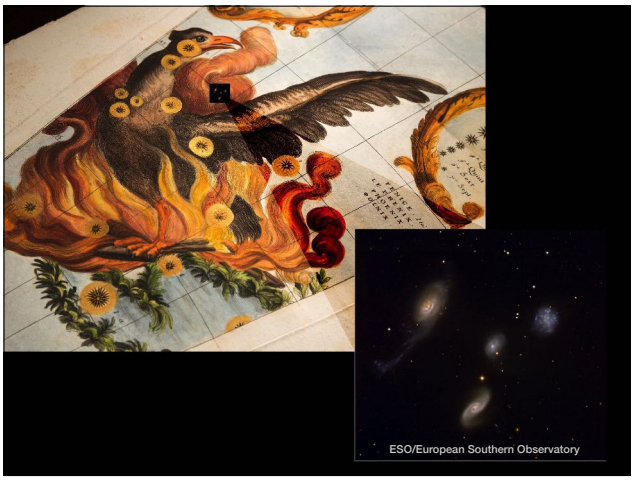
These Coronelli gores were printed 200 years ago using original 1693 plates. They were part of a set to make a globe 3 and a half feet in diameter. At the time, this globe by Coronelli was the largest and most accurate printed celestial globe.

http://lynx-open-ed.org/node/385

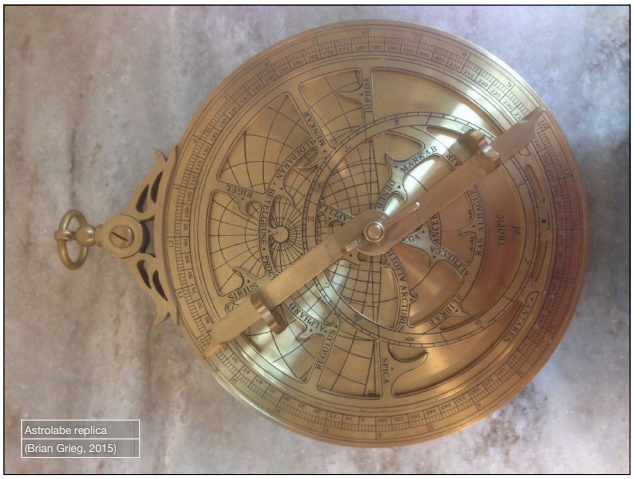


The Coronelli gores show that there was no clear boundary between books, instruments, and art.

Here’s the constellation Phoenix the Fire Bird. • The legends are in Italian, French, Latin and Greek. The mythical Phoenix would end its life in a burning conflagration, only to rise once more from its ashes and live again.



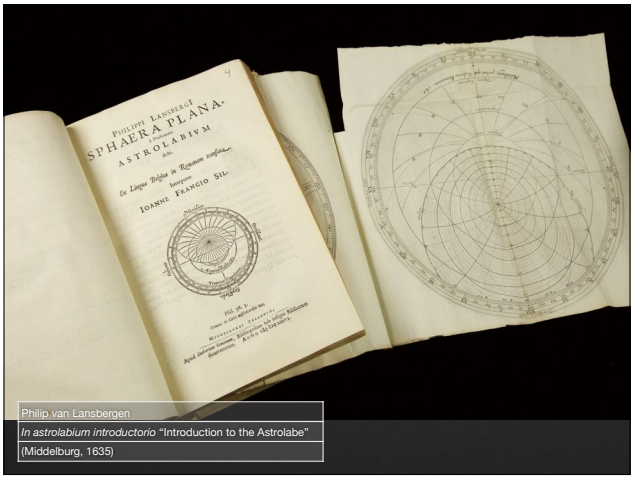
These four interacting galaxies, known as Robert's quartet, are in the process of colliding and merging. Like the Phoenix, they are a conflagration and burning, from which new stars will rise once more.



The astrolabe is a fundamental instrument for observational astronomy. It's a fusion of science and art.

http://lynx-open-ed.org/node/241

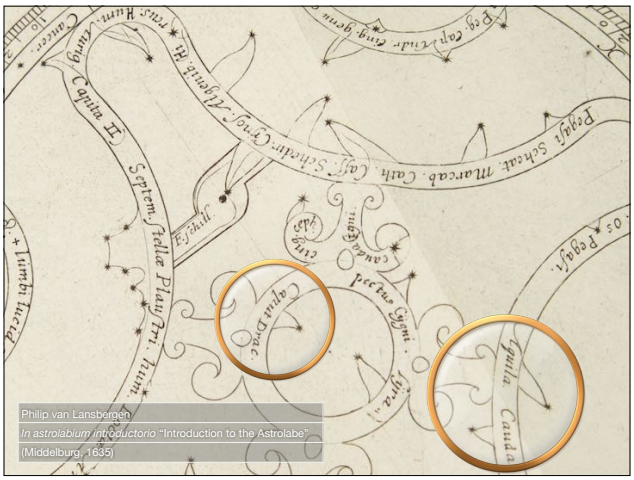
The rete or star wheel of this astrolabe replica displays 29 stars, such as • Arcturus, • Capella, and • Vega.



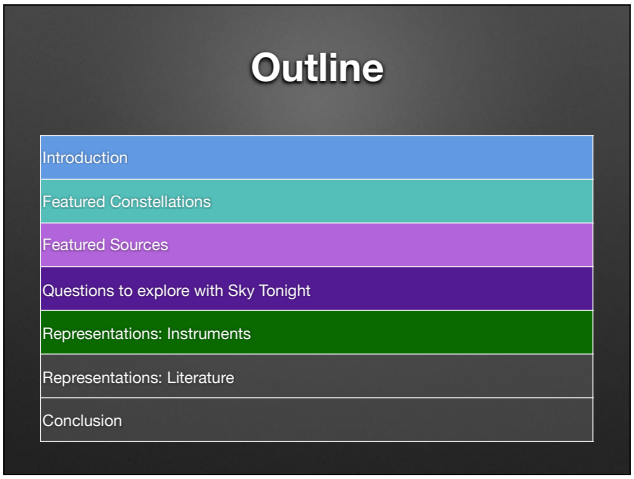
Philip van Lansbergen
In astrolabium introductorio "Introduction to the Astrolabe"
(Middelburg, 1635)

This introduction to the astrolabe contains a full-size, detailed template to construct your own.

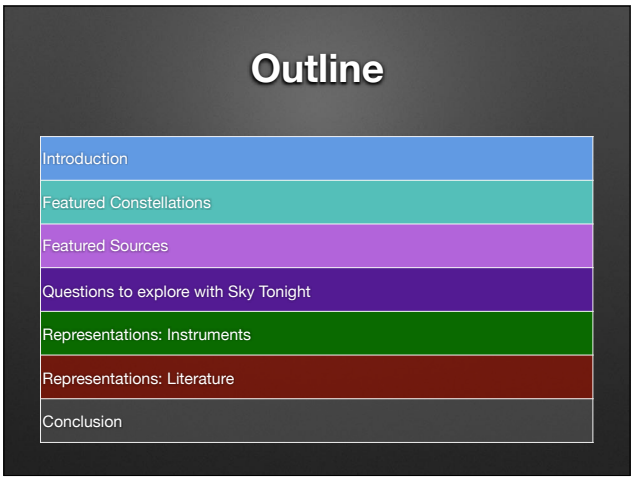
http://lynx-open-ed.org/node/243



Here's a closeup of its star wheel, showing, for instance, • the stars Caput Draconae (head of Draco the Dragon) or • Aquila Cauda (the tail feathers of Aquila the Eagle).



So those are just a few examples of representations on instruments.
(Kerry steps away from mic)



BRENT
Another form of cultural representation is literature. We've already encountered examples of poetry tonight. Let's look at two additional examples of literary representations of the night sky.

(This section: 5 mins)

First is the astronomy of Middle Earth. Orion was known by several names in J.R.R. Tolkien's languages.

At a point of greatest difficulty and weariness, in the thick of their troubles in Mordor, Sam saw a single star break through the clouds. The sight of it kindled a transcendent hope from beyond the bounds of the world. Great literature, from Dante to Tolkien, abounds in references to the stars, if we can learn to appreciate them.

(BTW, Venus was the bright light of the jewel of Eärendil the Mariner, the Silmaril.)

Lindë Elenion, the Song of the Stars (excerpt)
by Rachel Magruder Folmar

- Even-time is drawing nigh
  And in the fastly dimming sky
  Bright **Anor** sinks her flaming head — • **Sun**
  And silver **Ithil**, round and fair, — • **Moon**
  Ascends once more the starry road
  Of night, and mighty figures high.

- The stars of **hrívë**, clear and bright — • **Winter**
  Surround the swordsman of the sky
  Arrayed in silver and in blue
  Upon his shoulder a scarlet jewel.
  Menelvagil, **Telumehtar** fair, — • **Orion**
  Shakes his sword at the frostbit air.

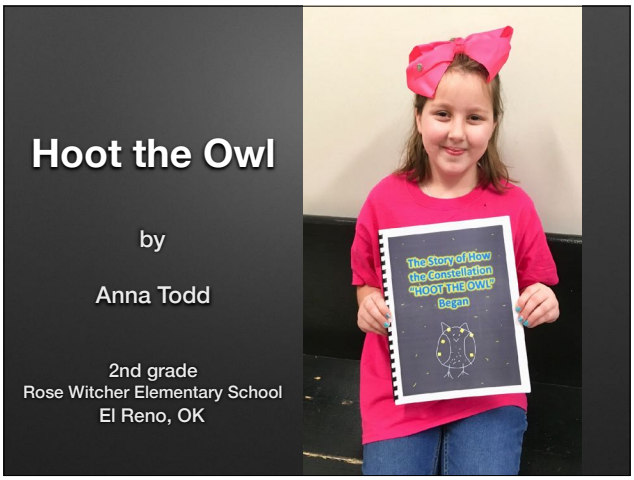
To serve as an introduction to the astronomy of Middle Earth, Rachel Folmar created a poem.
(Candace: Read).

- Most of the stars of Orion are silvery or bluish, except for the bright red star on his shoulder, the “scarlet jewel” referred to here.

This is just an excerpt. The entire poem will be found at skytonight.org.

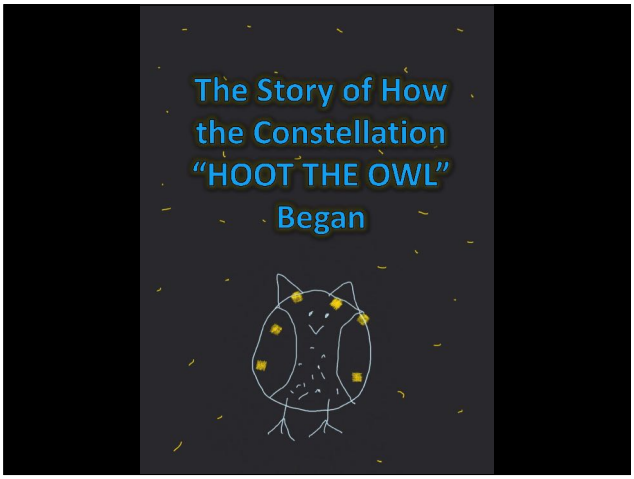
A second dramatic constellation story we owe to Stacey Stevenson. Special thanks to Stacey and the other students of Mission to Planet Earth. This photo was taken in 2017 during a NASA educators workshop at the Library to introduce constellation learning activities.

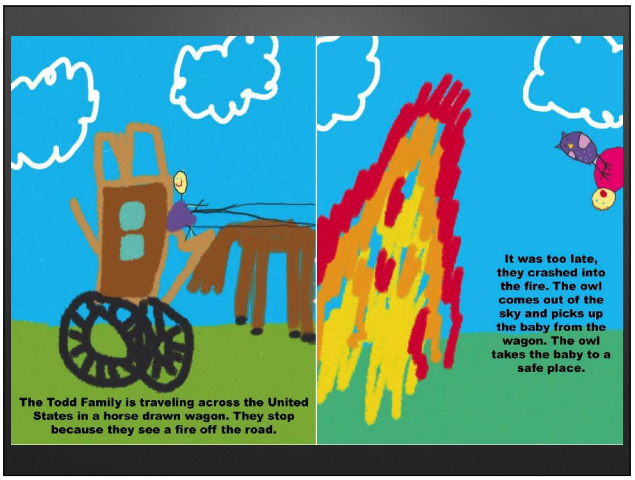
That Fall, Stacey was tutoring Anna Todd, who wrote her own constellation story.



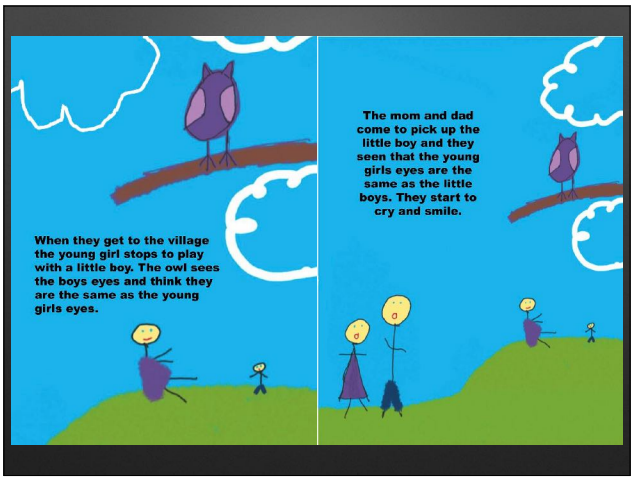
Anna was a 2nd grade student at Rose Witcher Elementary School in El Reno. Anna became so interested in constellation stories that she learned to read in order to study the stars. She created her own constellation, Hoot the Owl. And then she wrote a book to tell its story. With permission from Anna and her family and teachers, we'd like to share it with you now, just the way she wrote and illustrated it herself.

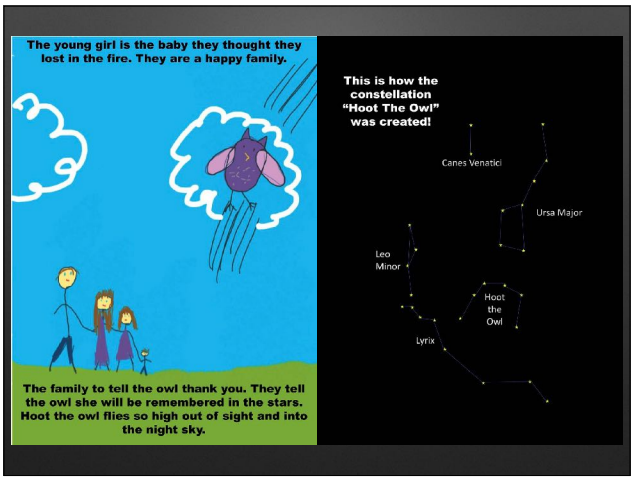
http://lynx-open-ed.org/AnnaTodd
http://lynx-open-ed.org/hoot




The Todd Family is traveling across the United States in a horse drawn wagon. They stop because they see a fire off the road.
It was too late, they crashed into the fire. The owl comes out of the sky and picks up the baby from the wagon. The owl takes the baby to a safe place.

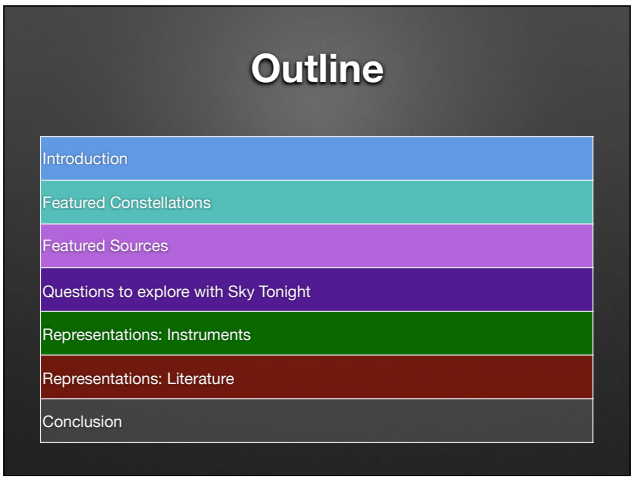

The owl teaches the baby to walk, talk, play, write, and find food as she grows up.
The baby growed up to be a young girl. The owl thinks she needs to be with people and takes her to a village.


When they get to the village the young girl stops to play with a little boy. The owl sees the boys eyes and think they are the same as the young girls eyes.
The mom and dad come to pick up the little boy and they seen that the young girls eyes are the same as the little boys. They start to cry and smile.

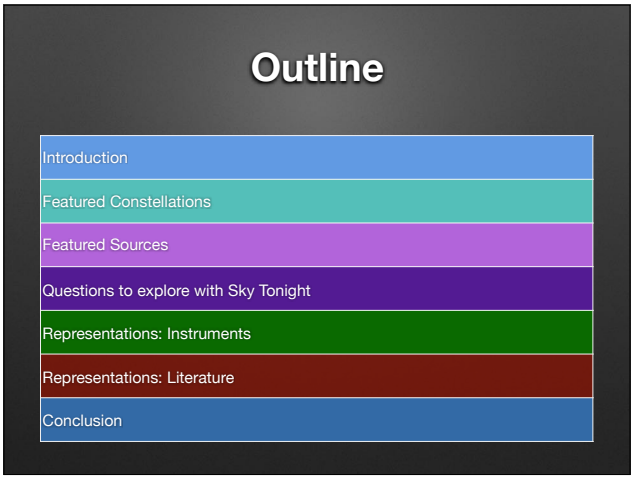

The young girl is the baby they thought they lost in the fire. They are a happy family.
The family to tell the owl thank you. They tell the owl she will be remembered in the stars. Hoot the owl flies so high out of sight and into the night sky.
This is how the constellation "Hoot The Owl" was created!
Canes Venatici
Ursa Major
Leo Minor
Hoot the Owl
Lyrix

Working with Stacey, Anna fell in love with the stars. That is what motivated Anna to learn to read.

What is your favorite constellation story? Maybe, like us, it will be Hoot the Owl. Download Hoot the Owl from skytonight, and even now from lynx-open-ed.org, our companion website for educators.



So that's two representations of the night sky through literature.
(Brent steps away from mic)



KERRY
Finally, to conclude,

What is the cultural heritage of the sky at night?

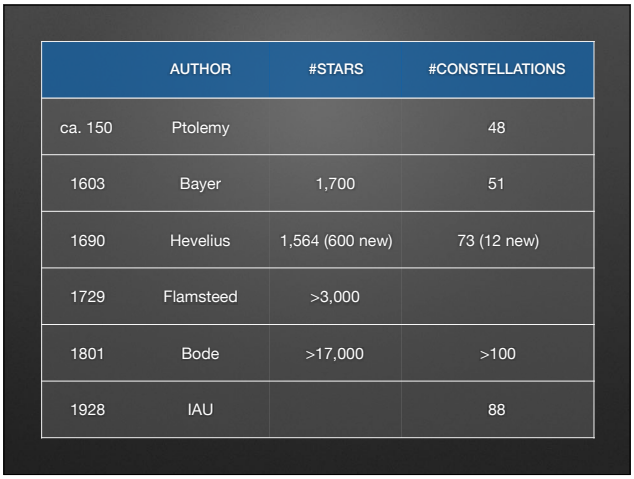
- What draws you to the stars? (Pause.)
- Thank you. [End of presentation; following slides for Q&A if needed]

Q&A

skytonight.org is now in beta, and not yet open to the public. We are still researching the images, and developing the website. We hope it may be ready for launch this September.

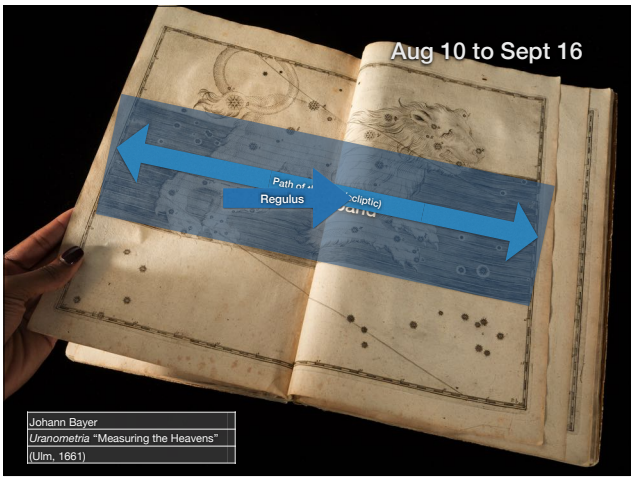
TO WEB DEMO

Features of Sky Tonight, distinguish it from other sites and projects.
“Cultural archaeology of the stars.”

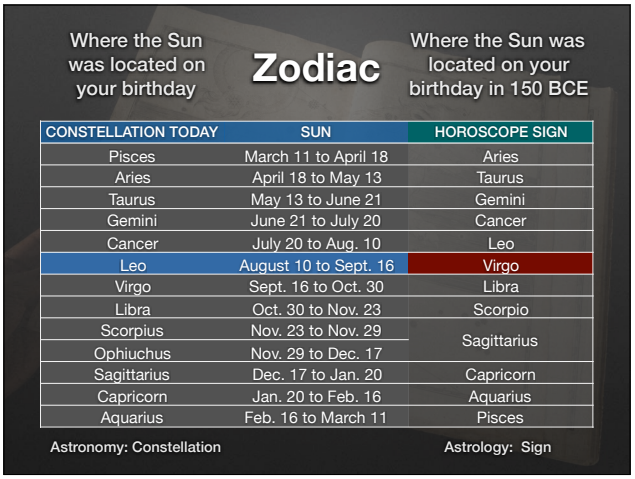


	AUTHOR	#STARS	#CONSTELLATIONS
ca. 150	Ptolemy		48
1603	Bayer	1,700	51
1690	Hevelius	1,564 (600 new)	73 (12 new)
1729	Flamsteed	>3,000	
1801	Bode	>17,000	>100
1928	IAU		88

http://lynx-open-ed.org/node/6

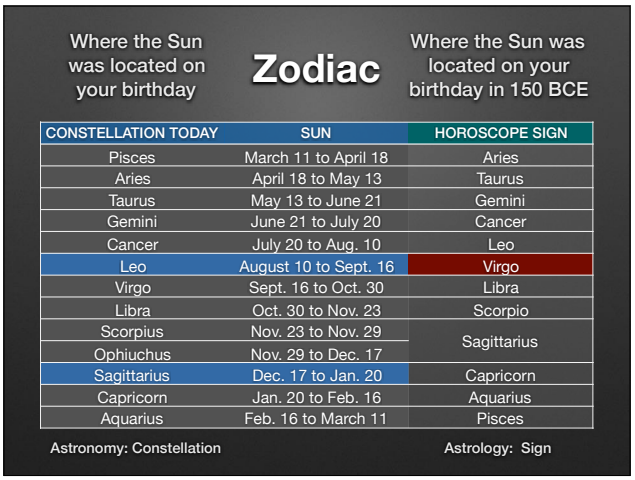


Leo is a Zodiac constellation. • That means it contains the Sun's path, year after year. •
The Sun now travels through Leo in late August, passing very close to Regulus.
• Raise your hand if you were born between Aug 10 and Sept 16? I was. If you were born between these dates, then the Sun was in Leo on your birthday.

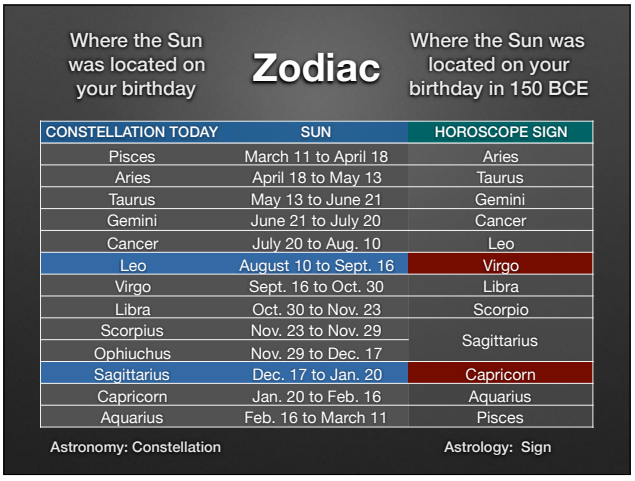


CONSTELLATION TODAY	SUN	HOROSCOPE SIGN
Pisces	March 11 to April 18	Aries
Aries	April 18 to May 13	Taurus
Taurus	May 13 to June 21	Gemini
Gemini	June 21 to July 20	Cancer
Cancer	July 20 to Aug. 10	Leo
Leo	August 10 to Sept. 16	Virgo
Virgo	Sept. 16 to Oct. 30	Libra
Libra	Oct. 30 to Nov. 23	Scorpio
Scorpius	Nov. 23 to Nov. 29	Sagittarius
Ophiuchus	Nov. 29 to Dec. 17	
Sagittarius	Dec. 17 to Jan. 20	Capricorn
Capricorn	Jan. 20 to Feb. 16	Aquarius
Aquarius	Feb. 16 to March 11	Pisces

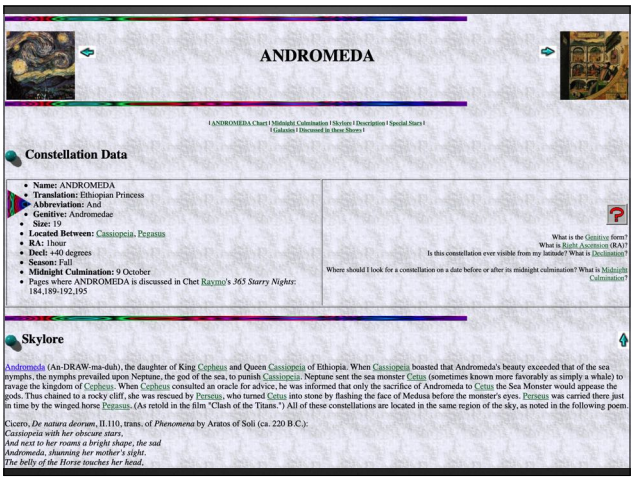
But wait a minute — if I look at a horoscope, it will tell me my sign is Virgo. That's one constellation out of date. Look in the center column for your birthday.
•The actual constellation where the Sun was located is on the left.
•The sign for the horoscope is on the right. Modern astrologers calculate your sign based on where the Sun was located back in 150 B.C.E. The dates don't line up exactly, but horoscope signs have shifted out of phase.
• Signs and constellations are not the same. In *astrology* the zodiac refers to signs as abstract constructions; in *astronomy,* the zodiac refers to the actual constellations you can see in the night sky.
— — — — —
[Hipparchos discovered this slow shifting motion, or precession, back in 150 B.C. If you were born back then, your sign and constellation would have been the same. But now enough time has elapsed to make your horoscope sign about one constellation out of phase!]



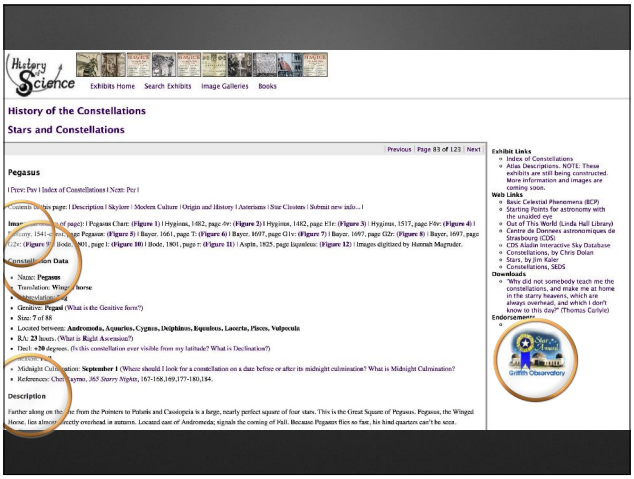
Let's take another example. If you were born between Dec. 17 and Jan. 20, then the Sun was in Sagittarius on your birthday.



Yet your horoscope sign may be Capricorn, since that's where the Sun was located back in 150 BCE on the same date. The dates listed here are for the actual constellations; the dates for your horoscope sign may differ somewhat.



Many years ago, when I (Kerry) was a planetarium director, I (Kerry) created a website on the constellations…



As it went through various revisions, it provided • images from star atlases, • basic constellation data, • and descriptions or commentary. • The effort seemed to be widely appreciated, • even receiving a Star Award from the Griffith Observatory.


The Sky Tonight
cultural archaeology of the stars
"beta" - will open on the September equinox, 2019
skytonight.org
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About this website
Many layers of representation create the cultural archaeology of the night sky...
The Sky Tonight provides multiple resources for exploring the night sky including high quality images from historic star atlases, keyed to the modern constellations.
We gaze at the night sky filtered through many layers of cultural heritage and representation. The stars have a living history which shapes how we experience the sky tonight.
Source: Johann Bayer, Uranometria ("Measuring the Heavens"; Ulm, 1661); History of Science Collections, University of Oklahoma Libraries
Object: M1, the Crab Nebula, in Taurus the Bull; Hubble Space Telescope, NASA
Composite: The Sky Tonight, skytonight.org (CC-by)
Object:
In the year 1054 a massive star near the tip of a horn of Taurus exploded, creating a spectacular cloud of gas. It appeared as a faint smudge of light in
Monthly Star Charts
skymaps.com
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