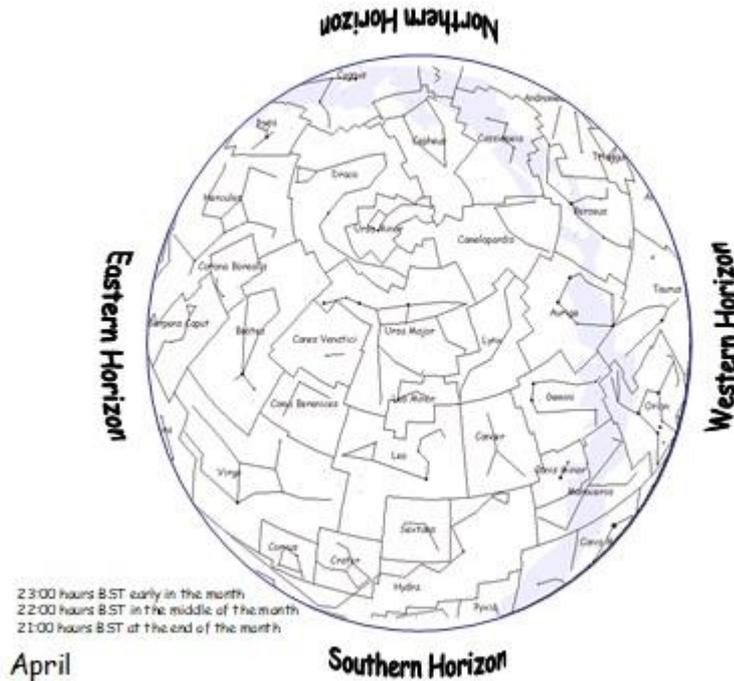




The Night Sky (April 2019)

BST (Universal Time plus one hour) is used this month.



The General Weather Pattern

Surprisingly rainfall is not particularly high in April, but of course heavy rain does occur, often with hail and thunder. Expect it to be cloudy. Temperatures usually rise steadily, but nights can still be chilly.

Wear multiple layers of clothes, with a warm hat, socks and shoes to maintain body heat. As always, an energy snack and a flask containing a warm drink might well be welcome at some time.

Should you be interested in obtaining a detailed weather forecast for observing in the Usk area, log on to

https://www.meteoblue.com/en/weather/forecast/seeing/usk_united-kingdom_2635052

Other locations are available.

⊕ Earth (E)

As the Earth moves from the vernal equinox in March, the days are still opening out rapidly. The Moon no longer raises high in the mid-night sky as it does in the winter, but relocations at lower latitudes for the summer. The Sun of course does the converse.

Artificial Satellites or Probes

Should you be interested in observing the International Space Station or other space craft, carefully log on to <http://www.heavens-above.com> to acquire up-to-date information for your observing site.

☉ Sun

The Sun is becoming better placed for observing as it climbs to more northerly latitudes, and, it is worth reminding members that sunlight contains radiation across the spectrum that is harmful to our eyes and that the projection method should be used. As discussed in February, the end of solar cycle 24 is imminent and there are very few and on many days no sunspots, filaments or prominences to be seen. The Sun continues to quieten, but if you have any news of sunspot activity other members would be interested, so let us know.

☾ Moon

New Moon is on 5th at about 08:50 in the constellation of Cetus.

First Quarter is on 12th at about 19:05 in the constellation of Gemini.

Full Moon is on 19th at about 11:15 in the constellation of Virgo.

Last Quarter is on 26th at about 22:20 in the constellation of Capricornus.

The Moon is at perigee (nearest Earth) on the 16th and at apogee (most distant from Earth) on the 1st.

At this time of year the first quarter Moon is well placed, high in the south-western sky at night-fall. Its light travels through less of the atmosphere to reach our telescopes than when it is low down, and even hand-held binoculars will find many impressive selenological features to observe at the terminator.

The Planets



♿ **Mercury (Me)** is at greatest western elongation on the 11th April when it will rise in the blaze of the morning twilight. It is unfavourable this month.



♀ **Venus (V)** is an unfavourable object as this month; it rises in the morning twilight and is lost in the Sun's glare.



♂ **Mars (Ma)** is an evening object, moving from the vicinity of the Pleiades in the early April, when it is best observed. It diminishes in magnitude from 1.45 to 1.63 during the month as it makes its way towards the other side of the Sun in early September.



♃ **Jupiter (J)** in the constellation of Ophiuchus throughout the month moves towards opposition in June. It culminates just after 06:00 at the start of the month and reaches first stationary point on April 10th and engages in retrograde motion until 11th August. There is much to see in a decent telescope, even though it gets no higher than 15°. The Galilean Moons with their accompanying phenomenon are often to be observed. If you have good seeing you may well make out the North and the South Equatorial Belts, and the Great Red Spot is visible at times too.

To calculate when the great red spot will transit across the face of Jupiter and plan your observing there is a calculator here <https://www.skyandtelescope.com/observing/interactive-sky-watching-tools/transit-times-of-jupiters-great-red-spot/>



♄ **Saturn (S)** rises less than two hours after Jupiter at around 04:00 at the start of the month, in the constellation of Sagittarius. The Moon makes for an extra interest in the morning of the 25th. Saturn reaches first stationary point on the 29th and proceeds in a retrograde motion until the 9th July. Dedicated observers will be pleased with the open ring system, but for less enthusiastic and casual observers Saturn continues to become more convenient over the next few months as it moves towards opposition on 27th June. By the end of April Saturn rises just after 02:00. Saturn will rise earlier as the year progresses and casual observers might try in June/July.



♅ **Uranus (U)** is at conjunction with the Sun on the 23rd April and is unobservable this month.



♆ **Neptune (N)** sets at a steep angle and rises at shallow angle, in the glare of the Sun, and is unobservable this month.

Dwarf Planets

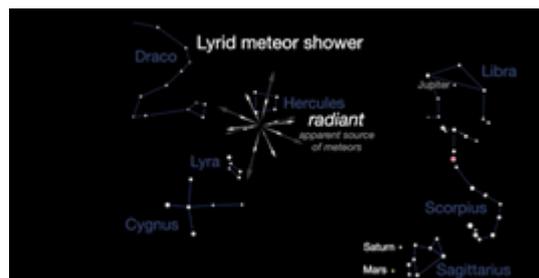
Dwarf planets are very dim, and even the second brightest, Pluto gets no brighter than 14.8 at opposition in July.

The brightest, Ceres, at a visible magnitude of about 7.02, can be found in the constellation of Ophiuchus throughout April. A decent telescope is needed, but at the end of the month it will present itself north-west of Jupiter and due north of Antares at around 01:15 at RA 16h 31m 34s, Declination -18° 21' 55".

Meteors

The first half of April gives us an opportunity to find meteors from Virgo. The **Virginids**, with an average fall rate of about 1 or 2 per hour, are not easy to spot. They are slow but bright meteors, emanating from near Spica with its maximum around the 11th and 12th.

The **April Lyrids** are seen from the 18th to the 25th of April. The radiant is on the border of Lyra and Hercules. The shower is associated with Comet Thatcher, and has been observed since about 500 BCE, although it has been getting less active over the past 200 years. These meteoroids hit the Earth's atmosphere at around 49 km/s, so some bright, fast meteors can be seen, some leaving vivid trains in their wake. The maximum occurs on the evening of April 22nd, with a usual ZHR of about 10 to 15. Very occasionally the rates can be as high as 200, so is usually worth



observing. However, the waxing gibbous Moon rises around midnight sits about 60° west of Lyra in the sky so this year is unfavourable.

Culmination of Constellations

Culmination, the highest point an astronomical target like a constellation can reach in the sky, occurs on the north-south line at your observing position; the local meridian. All things being equal, this is the best time to observe the constellations. Northern circumpolar constellations, those that circle around the north celestial pole, will cross the meridian above and below the pole, it is the upper culmination that is best.

| Constellation | Convenient Culminations | Midnight Culminations | Observability |
|---------------|-------------------------|-----------------------|---|
| Hydra | 22:00 Early April | Late February | Northern stars visible - partially hidden |
| Antilia | 22:00 Mid-April | Late February | Unfavourable and partially hidden |
| Sextans | 22:00 Mid-April | Late February | Whole |
| Leo Minor | 22:00 Mid-April | Late February | Whole |
| Leo | 22:00 Mid-April | Early March | Whole |
| Crater | 23:00 Mid-April | Mid-March | Whole |

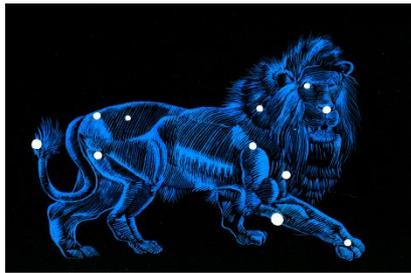
Leo (pronounced lee' owe)

In Welsh

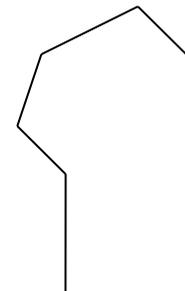
Y Llew *nm.* literally 'the Lion'.

Astronomy

Leo, the spring and the twelfth largest constellation, has a distinct outline that looks something like the animal it is supposed to represent, the lion. Finding it should be no problem during the spring in the northern hemisphere. At ten in the evening in mid-April you will find the Great Bear, Ursa Major, immediately above you at the zenith. Follow the 'pointers' due south (in the opposite direction to the pole star) to find Leo. It culminates around 55° elevation at about this time.



Leo has within it the well-known asterism the 'Sickle', which comprises the most luminous stars in the face, mane and chest of the lion's image.

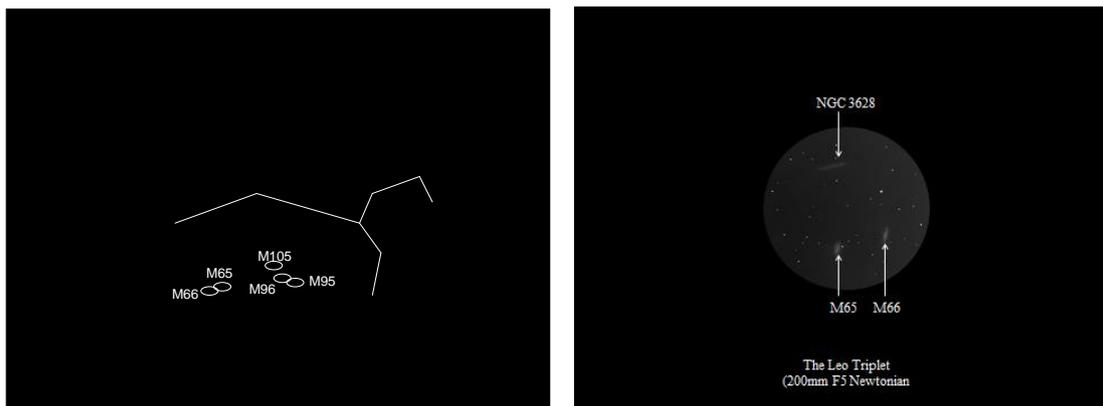


At the end of the handle of the sickle is the prominent and brilliant star, Regulus, lying within half a degree of the ecliptic at some 85 light-years distance. In this position it is occulted occasionally by the Moon. It is a blue-white star of spectral type B7, radiating

about 130 times as much light as the Sun and seen from Earth at magnitude 1.35. Regulus has an orange K1 companion which has the same proper motion suggesting they formed in the same cloud. They appear as a wide double, and, with a magnitude of 7.7 the companion is easy to separate with a small telescope. The companion is itself a close double but this is more difficult to separate because of the glare from Regulus and the low magnitude of the star.

Denebola the A3 type star at the end of Leo's tail is about 39 light years away, and, in these times, shines with a magnitude of 2.14. However, up until about 400 years ago, Denebola was recorded as a first magnitude star. The reason for this is still something of a mystery. Were observations inaccurate, or has Denebola diminished in luminosity? Since A3 stars do not usually behave this way, the former seems most likely. Amateur astronomers sometimes observe Denebola in the hope that they may detect changes that will shine light on this apparent anomaly.

Gamma Leonis (γ Leonis) also called Algieba is a showcase binary star and a very popular target for observers with telescopes; it is the star at the base of the neck of the lion (even though its name is believed to come from *Al-Jabhah* – Arabic for the forehead). It is a bright binary system with an orange-red and yellow or greenish-yellow pair that are just over 4" apart, so quite close but generally easy to separate with modest power. The pair are a true binary, orbiting each other every 500 years or so. They are about 130 light years away.



There are a number of galaxies to be found in Leo; five of them are Messier galaxies with magnitudes between 9 and 10 in the region between Denebola and Regulus. M105 is an elliptical galaxy, and close to it is another pair of spiral galaxies M95 and M96.

The pair of spirals M65 and M66 can be just seen using decent binoculars in good seeing conditions. In a 200mm telescope, NGC 3628 makes up a trio, the Leo Triplet. Use low power to see the triplet – say 20 to 30x magnification; it is then usually possible to get all three in the same field. NGC3628 can be a bit tricky if the transparency is not good, in an inverting telescope such as a Newtonian it will appear below M65 and M66 at the edge of the field. The figure above shows the galaxies as they appear in the sky. Try gently tapping the telescope. to move it slightly and the faint galaxy will often reveal itself. The eye notices things that move more than stationary objects. You will also find that it is easier to see when you are not looking directly at it. This is called averted gaze

If you are interested in observing galaxies then behind Leo, that is to the east of Denebola, lies the Virgo Cluster, which at around 55 million light years distance is the nearest galactic cluster to our own Local Group. The Supercluster of galaxies to which we belong is centred on the Virgo Cluster.

The reason that so many galaxies are observable in the spring skies looking south is not that there are particularly more galaxies in that part of the sky but because we have now moved away from the Milky Way, that passes between Orion and Gemini and up through Auriga (hence we find many open clusters there). The Milky Way contains interstellar dust and gas and that hides the galaxies that lie beyond it.

The Leonid meteor shower can be seen emanating over the eastern horizon at about 11:00 pm from the 15th to 20th November. Its maximum is on the 17th. With a ZHR ~ 15, the Leonids can provide very fast, magnificent displays, with persistent trains from its radiant around the neck of Leo. The rates are variable, but generally good. The Leonid meteor shower is not one of the best, but it does produce a spectacular meteor storm every 32/33 years when the Earth passes through its meteor swarm. Many thousands of meteors per hour can be seen for a short period of time, shooting across the sky. The next such storm is expected in the early 2030s. The Leonids are associated with Comet P/Tempel-Tuttle.

Leo is a very ancient constellation; there is archaeological evidence of its existence six thousand years ago. It was the eighth sign of the Babylonian zodiac, and known to them as ‘the Great Lion’, and Regulus was ‘the Star of the King’. In their time, this region of sky presented a strong connection with the Sun; the summer solstice was located within it.

Greek Myth

According to Greek and Roman legends, Heracles (Latin Hercules) was obliged, as penance, to serve King Eurystheus of Mycenae for some twelve years and was given twelve tasks referred to as the Labours of Hercules. The first labour involved that progeny of monsters, the Nemæan lion, reared by Hera. The lion’s skin was resistant to all known weapons so Hercules, who had phenomenal strength, strangled the creature to death. The impenetrable pelt he removed with the lion’s own claws and made into armour and its head he wore as a helmet. Amongst other legends, Leo is commonly said to be that Nemæan lion. Other authors refer to Leo simply as the King of Beasts.

There are a number of stars in Leo which have Arabic names making reference to its feline origins. The highest star in the head is Rasalas from *Ra's al-Asad* meaning ‘Head of the lion’. Forward of the face is Alterf, *At-Taraf*, which means the ‘Glance’ (of the lion). In the mane of the Greek constellation is Algieba translated into ‘Forehead’ (of the lion) from Arabic *Al Jabhah*. Regulus, *Qalb al-Asad*, is the ‘Heart of the Lion’, and we must not forget Denebola, *Dhanab al-Asad* meaning ‘Tail of the Lion’.

Coma Berenices (Pronounced COE-muh BER-uh-NICE-eez) - Bernice's Hair

In Welsh

Traditional name; Nad y Forwyn *nf.* ‘Nad the Maiden’.

Modern name: The International Astronomical Union's designation, Coma Berenices is used.

Astronomy



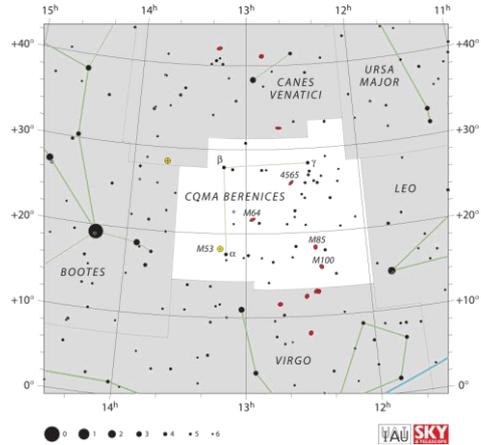
Berenice II of Egypt

Coma Berenices is the only constellation named after an historic individual, Berenice II, the wife of Ptolemy III. In the third century BCE, the asterism was known as 'Berenice's Hair' to Eratosthenes and was, until the sixteenth century, considered to be part of the constellation of Leo. Coma Berenices was not one of the 48 constellations identified by Ptolemy in his *Almagest*, and is therefore considered one of the first modern; post Ptolemaic, constellations.

By the turn of the sixteenth-seventeenth century, German cartographer Caspar Volpel on a globe and astronomer Tycho Brahe in a star catalogue both designated the asterism as a constellation. This at a time when various astronomers and Dutch cartographers studied, mapped and christened the southern sky with a more modern nomenclature.

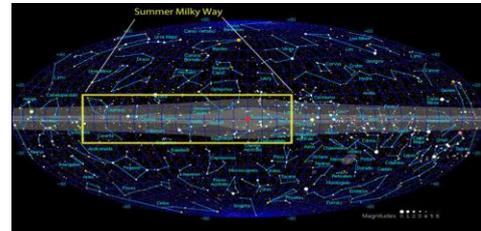
Coma Berenices is not a particularly bright constellation. β Com, at magnitude 4.2, the brightest star in the constellation exemplifies the occasional mismatch between the order of magnitude and it's Bayer designation; α (alpha) is usually the brightest star. The second brightest star in 'Berenice's Hair' is Diadem - α Com; appropriately, a jewelled small crown worn by a sovereign such as queen Berenice. Diadem has a magnitude of 4.3 and is a binary star system with an orbital period of 25.87 years. They happen to have an orbital plane which lines up with Earth, and it is hoped someday to witness an eclipse of these stars.

The stars α Com, β Com and γ Com form an isosceles triangle with 45° angles. γ Com has a magnitude of 4.35. The easiest way of finding the constellation is by looking for the Coma Berenices cluster. This appears to the unaided eye as a milky patch in the north of the constellation. Binoculars will show the large cluster well (it is about 7.5° across, i.e. 15 times bigger than a full Moon) as a 'vee' shaped formation of around 40 stars that are about 280 light years away.

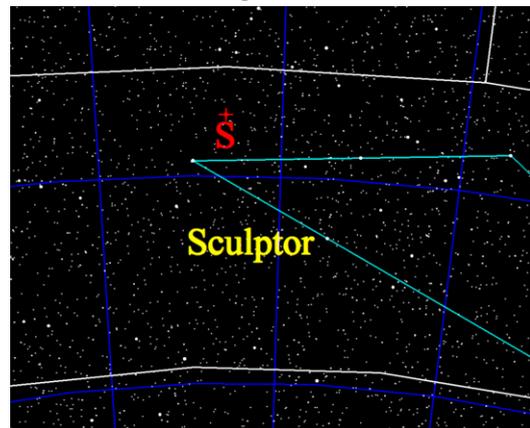
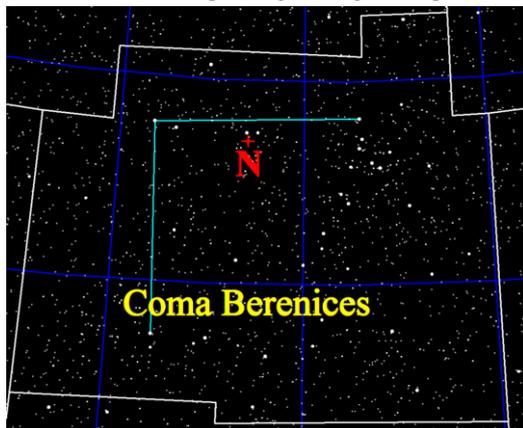


The north galactic pole

Our Galaxy rotates in a plane identified by us as the plane of the Milky Way. Observe along this plane and you can find stars, clusters of stars and dust within it but our view beyond is obscured somewhat, particularly towards the centre which is known as the 'Zone of Avoidance'.

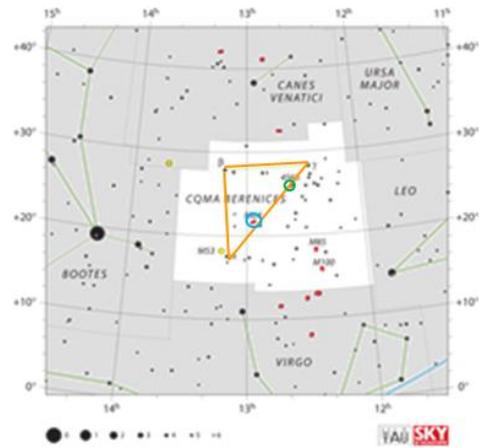


Naturally, the galactic poles lie at 90° to the Milky Way, and it is not surprising we can more easily observe distant galaxies and clusters of galaxies in these regions. The north galactic pole is found in the constellation of Coma Berenices and its position is defined as RA 12h 49m, Declination 27° 24'. There is a corresponding south galactic pole in the southern constellation of Sculptor.



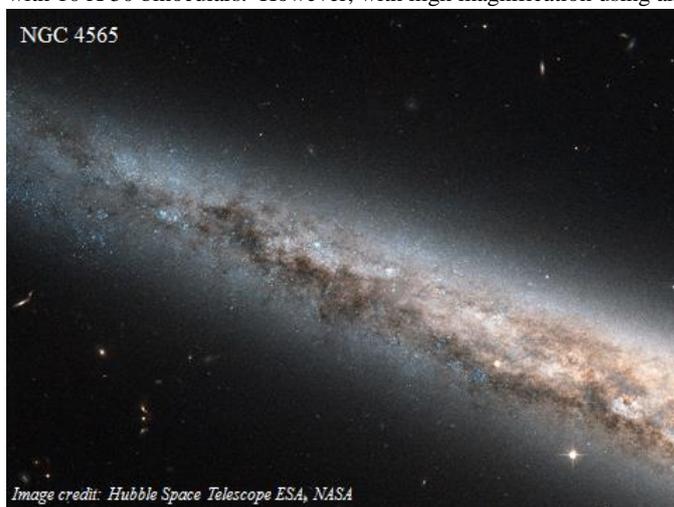
The 'Season for Galaxies' runs from February through to early July, when, amongst the constellations of Coma Berenices, Virgo and behind Leo there is much to see. Observe 'the Realm of Galaxies', on the meridian, at a most convenient evening time in late April.

M64, the Black Eye Galaxy, is a popular object with amateur astronomers, due to a feature which is easy to find even in a small telescope. Reminiscent of a black eye, a gas cloud lies within the galaxy, between us and its bright nucleus. M64 can be found one third of the distance from α Com to γ Com along the hypotenuse of the triangle.



NGC 4565 can be found four fifths of the distance from α Com to γ Com along the hypotenuse of the triangle.

NGC 4565, the Needle Galaxy, one of the brightest galaxies of the Coma I group of galaxies, is not easy to observe with 10 X 50 binoculars. However, with high magnification using an 80mm telescope a sliver of brightness can be discerned. With a 200mm telescope at a high magnification it can be seen as a needle of luminosity. It is in fact a stunning, large spiral galaxy (which may contain around a trillion stars) seen edge on, and one of the best deep sky objects not found in the Messier catalogue.



History

As mentioned earlier Coma Berenices is connected to Egyptian history rather than its myths. Queen Berenice II (267/266 BCE to 221 BCE) was the hereditary Queen of Cyrene, located in the north-east of present day Libya, and subsequent Queen of Egypt, when she married her cousin Ptolemy III, the third ruler of the Ptolemaic dynasty of Egypt. She was an accomplished horse-rider and warrior in her own right, and knew the dangers of battle. During the Third Syrian War, when Ptolemy III was away fighting she surrendered her own beautiful locks in sacrifice to Aphrodite for his safe victory and return. The hair disappeared and, some say, was transported to the heavens.

Thus a possibly enhanced account of this gesture gave the name 'Berenice's Hair' to part of sky in which an asterism existed. An asterism is a group of stars which is easy on the eye and recognised by many people; a visually obvious group of stars. On the one hand, modern constellations are designated by the International Astronomical Union as officially recognised groups of stars. On the other, asterisms are patterns of stars with no

endorsed standing. Also, constellations are bounded areas of the sky whereas asterisms are not bounded but are just patterns which can be within a constellation or included in a number of constellations.

The region of Coma Berenices formed an asterism, part of the tail of Leo and was still regarded as such until around the turn of the sixteenth-seventeenth century when it became published by German cartographer Caspar Volpel on a globe, and astronomer Tycho Brahe in a star catalogue, when both designated the asterism as the constellation Coma Berenices.