

The December night sky now sees the late autumn constellations prominent early evening and now heralds some familiar winter constellations. The late autumn / winter night sky contains many fine objects to view with both binocular and small telescopes. Jupiter and Saturn are visible low in the SW aspect in evening twilight some 40 minutes after sunset and the two planets steadily move closer heading towards the Great Conjunction on December 21<sup>st</sup>. The separation of only 0.1° (just 6 arc min) is the closest conjunction between the two planets since 1623. Binoculars will show the planets nicely, but telescopes on higher magnification show the two planets in the same field of view – a very rare event indeed. Conjunctions of these two planets of around 1° separation occur roughly every 20 years or so, but the next conjunction less than 0.2° separation occurs in 2080 and then 2417. [LAS Newsletter No 265]

Mars continues to shine brightly in the southern aspect in the constellation of Pisces early evening, the Earth – Mars distance is steadily increasing after the recent opposition in October and as a result the apparent diameter of Mars decreases to around 10 arc sec by month end. Also in Pisces during December periodic comet 156P Russell- LINEAR moves northward after perihelion and is a `faint fuzzy` 10.5m magnitude object [LAS newsletter No 270]

Comet C/2020 M3 ATLAS is currently a telescopic `fuzzy patch` at a faint 10th magnitude moving position night to night with the rich star fields of Auriga as a background requiring larger telescopes to see it visually although imaging techniques may prove more effective. [LAS Newsletter No 258A]

Look to the east mid evening to see the seven sisters' (Pleiades, M45) star cluster and constellation Taurus which heralds the autumn skies. The Hyades star cluster makes the characteristic `V` shaped asterism in the constellation of Taurus and is noted for the bright, red foreground star Aldebaren in Arabic Al Dabaran is `The follower` of the Pleiades across the skies`, in old English colloquially known as `the eye of the bull`.

The constellations of Cygnus and Lyra can be seen slipping into the west early evening; these are noted for the bright stars of Deneb and Vega. The Milky Way stretches from the constellation of Auriga, marked by the bright star Capella in the east up into Perseus and through the `W` shaped constellation of Cassiopeia high overhead and down along the cross shaped constellation of Cygnus low in the west. The Milky Way is seen as a faint band of stars best seen on dark moonless evenings away from artificial lights; binoculars easily show the rich star fields.

Auriga has the bright star Capella, which is circumpolar from UK latitudes and so is always visible. The constellation of Auriga contains some nice star fields and open star clusters visible in binoculars, notably M36, M37 and M38. Asteroid 13 Egeria at faint magnitude 10.5m object is difficult to spot even with a larger telescope as it moves westward through the rich star fields of Auriga.

The constellation of Perseus is well placed in December skies, high overhead. The constellation is noted for the group of stars (The Mirphak Association) a moving star cluster associated with the star  $\alpha$  Persei. Also in Perseus is the famous `Demon star` Algol ( $\beta$  Persei) – an eclipsing binary star with a dramatic dimming of brightness for 9.6 hours every 2.86 days. [LAS Newsletter No 269]. There is possible added interest in Perseus this month with a possible Nova Persei 2020 (10.5m magnitude in late November) – however this is a faint object in a very rich star field – difficult to spot.

High In the south the constellation of Pegasus, noted for its `Square` shape and the adjacent constellation of Andromeda noted for The Andromeda Galaxy (M31), visible to the unaided eye as a faint fuzzy patch on moonless evening can now be seen mid evening. The Square of Pegasus is a useful sign post constellation and also is a good test for sky conditions, (how many faint stars you see within the square indicates just how good your seeing conditions are). Another fine globular cluster is M15 in the constellation, best seen telescopically.

In the north Ursa Major or The Great Bear, known for The Plough asterism is seen low with its handle parallel to the horizon mid evening. Use the right hand pair of stars Dubhe and Merak (The pointers) to find the faint pole star Polaris currently marking a position close to the north celestial pole. (useful when polar aligning your equatorial telescope mount)

Uranus in the constellation of Aries is visible early evening and can be located using binoculars and a suitable finder chart. Uranus is notable due to the blue colour, telescopes show a tiny disc rather than the sharp pinpoints of stars in the field of view.

Neptune is located in the constellation of Aquarius and is also visible in binoculars a star like point, the planet is located close to the star phi Aquarii and is also noted for its subtle green colour, refer to notes. Telescopes show a tiny disc in a similar way to Uranus (above).

By late evening the familiar winter constellations of Orion (The Hunter) with bright red star Betelgeuse (top left), white star Rigel (bottom right) and the three stars of Orion's belt Mintaka, Alnilam and Alnitak. Below Orion's belt can be seen the misty patch that is M42 / M43, visible to the unaided eye, it is one of the gems of the winter skies when seen with a telescope. This nebula some 30 light years across is illuminated by a group of four hot young stars that is known as the 'Trapezium' asterism, visible under moderate magnification.

In the pre dawn skies Venus shines brightly and is visible very low in the east in dawn twilight, phase is around 93% by month end. The thin waning crescent Moon (2%) is close to Venus in dawn twilight (07:15 UT)

Comet C/2020 S3 Erasmus a magnitude 7m object heads from UK skies southward towards perihelion on December 12<sup>th</sup> but is not observable, lost in dawn twilight.

There are two meteor showers observable this month, the Geminids (range December 4<sup>th</sup> to 17<sup>th</sup>, maxima December 13<sup>th</sup> / pre dawn Dec 14<sup>th</sup> with a corrected hourly rate in excess of 70+ meteors per hour (possible). This year moonless conditions with New Moon on December 14<sup>th</sup> mean almost ideal observing conditions.

The second meteor shower is the Ursid meteor shower, range December 17<sup>th</sup> to 26<sup>th</sup>, maxima occurring from 03:00 UT to 22:00 UT on December 22<sup>nd</sup> rates are low (typically 10/hour. However several short outbursts are forecast for December 22<sup>nd</sup> (pre dawn) around 05:27 UT and 06:10 UT with rates of up to 490 / hour equivalent – as these events are short duration (minutes) a figure of 10's per minute may be more realistic.

To round off the December sky notes – the LAS Festive Five - Objects and celestial events to look at during the festive season.

- 1/ The Grand Conjunction – Jupiter and Saturn at 17:00 UT December 21<sup>st</sup>
- 2/ The constellation of Orion - The Belt stars (Collinder 70) star fields (Binocular)
- 3/ Orion - The sword of Orion – the Orion Nebula M42 and also M43 - Binocular / telescopic
- 4/ Taurus - The Hyades and Pleiades (seven Sisters) star clusters unaided eye /binocular
- 5/ The Geminid meteor shower (Dec 13<sup>th</sup> /14<sup>th</sup>)

## Planets in December 2020

Mercury is our morning twilight skies early in the month reaches superior conjunction Dec 20<sup>th</sup>

Venus is visible low in evening twilight skies shining brightly at -4.0m, telescopes show 93% phase

Mars is prominent in early evening, apparent diameter 10 arc sec by month end Syrtis Major visible Dec 15<sup>th</sup>

Jupiter is low in twilight 17:00 UT – Grand conjunction with Saturn Dec 21<sup>st</sup>

Saturn is positioned just north of Jupiter – separation just 0.1° at Dec 21<sup>st</sup>

Uranus is an evening object in the constellation of Aries; the planet shows a tiny blue disc telescopically.

Neptune is located in the constellation of Aquarius the planet shows a tiny green disc telescopically.

### Moons phases in December 2020

New Moon      Dec 14<sup>th</sup>      Moonless, best time for deep sky and comet observing.

First Quarter      Dec 22<sup>nd</sup>      Best days to see shadow details in lunar craters (early evening)

Full Moon      Dec 30<sup>th</sup>      Best days to see bright ray craters like Copernicus / Tycho.

Last Quarter      Dec 8<sup>th</sup>      Moon visible in daytime skies. Do not look directly at the Sun.

Winter solstice Dec 21<sup>st</sup> (10:02 GMT) - Shortest day / winter starts in Northern Hemisphere.

### Meteor showers

Geminid range December 8<sup>th</sup> to 17<sup>th</sup>, maxima pre dawn 14<sup>th</sup> Dec – 70+ /hr slow, bright meteors very favourable.

Ursid range December 17<sup>th</sup> to 25<sup>th</sup> maxima Dec 22<sup>nd</sup> – low rates ZHR just 10/ hour – favourable. / Outburst?

Quadrantid range December 28<sup>th</sup> to January 12<sup>th</sup> - , maxima Jan 4<sup>th</sup> ZHR 80/Hr bright with trails -unfavourable

### The highlights of the month.

Great Conjunction – Jupiter and Saturn - Dec 21<sup>st</sup> 17:00 UT low in SW aspect (Binocular /Telescopic)

Geminid meteor shower – maxima Dec 13<sup>th</sup> /14<sup>th</sup> (pre dawn)

December skies, Milky Way visible high overhead on moonless evenings in darker skies.

M31 the Andromeda Galaxy is visible on moonless evenings, best seen in binoculars.

Double cluster, on the Perseus / Cassiopeia border, nice pair of star clusters.

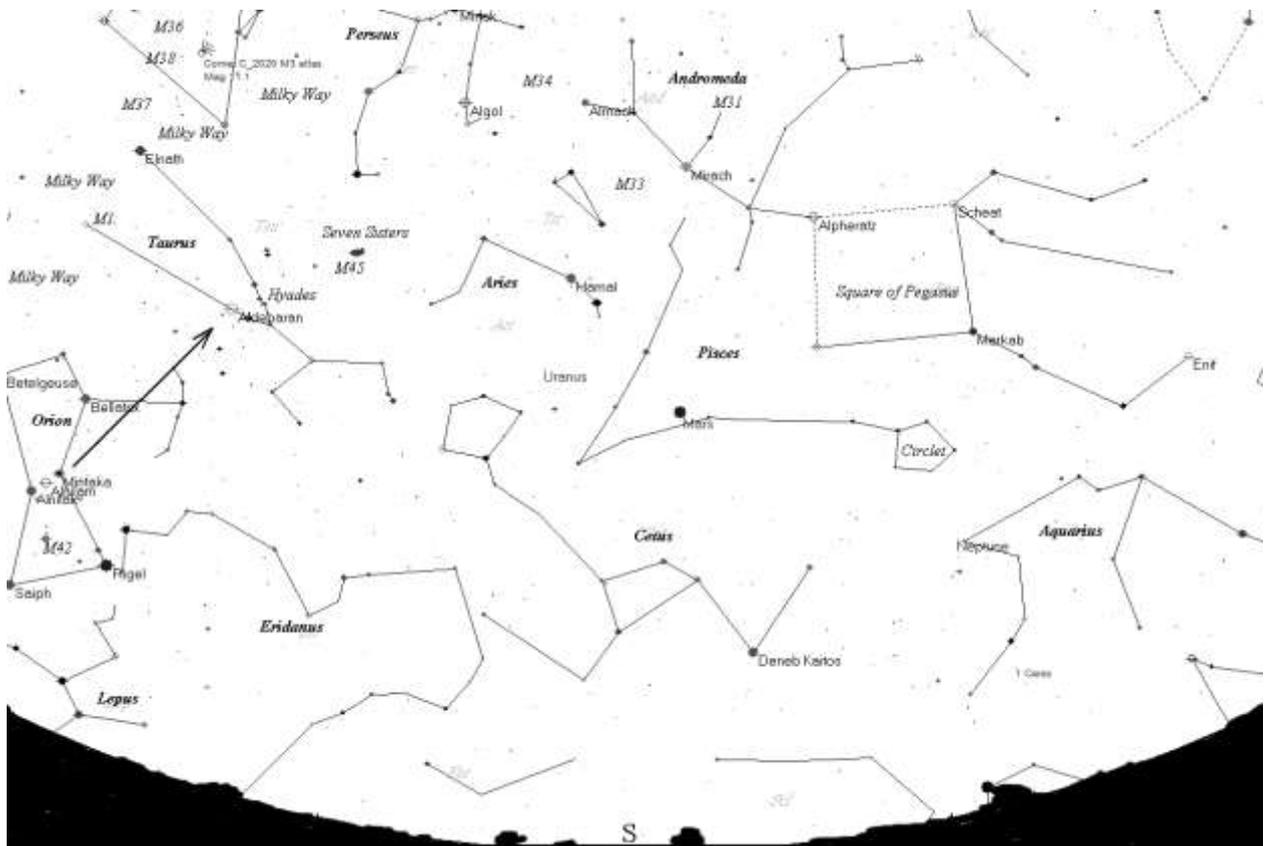
Pleiades (Seven Sister's) star cluster (M45) rising in the east best seen with binoculars.

Orion Nebula (M42) is a beautiful sight seen telescopically.

Crescent Moon visibility, a 5.2% waxing crescent moon is visible in twilight in the south west from around 20 minutes **after sunset** (from 16:10) with moonset by 17:35 on December 16<sup>th</sup>

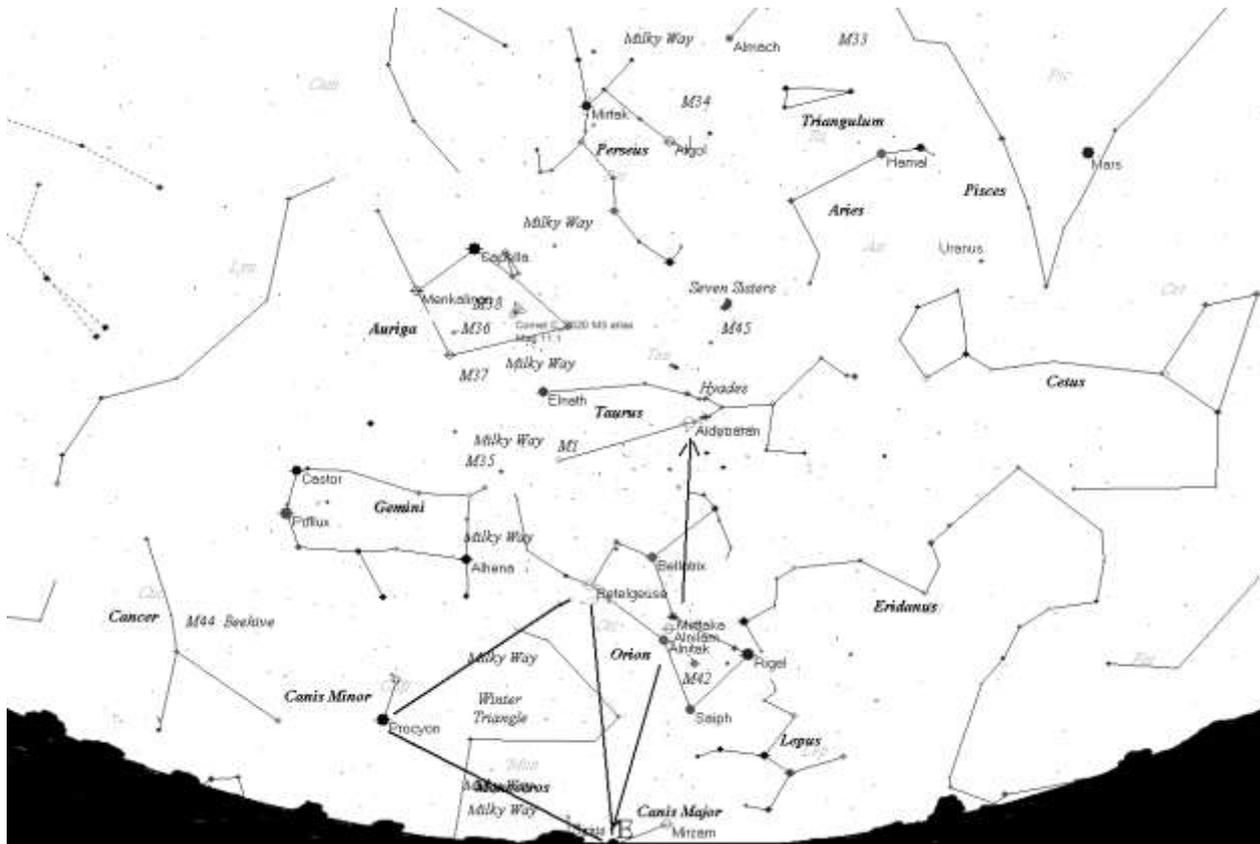
More detailed sky notes and LAS Newsletters, Finder charts are available to LAS members via the Members` page on the LAS Website [www.lutonastrolink.org.uk](http://www.lutonastrolink.org.uk)

Sky looking south 8pm in mid December



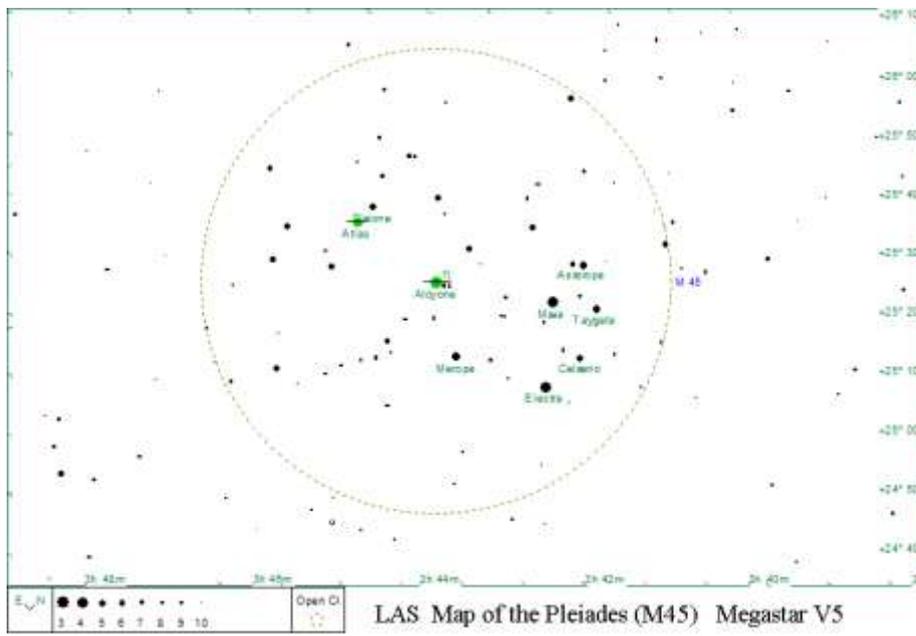
Mars shines brightly, obviously red in colour. Orion rising (refer to finder charts overleaf for Uranus and Neptune )

Sky looking east at 8pm mid December

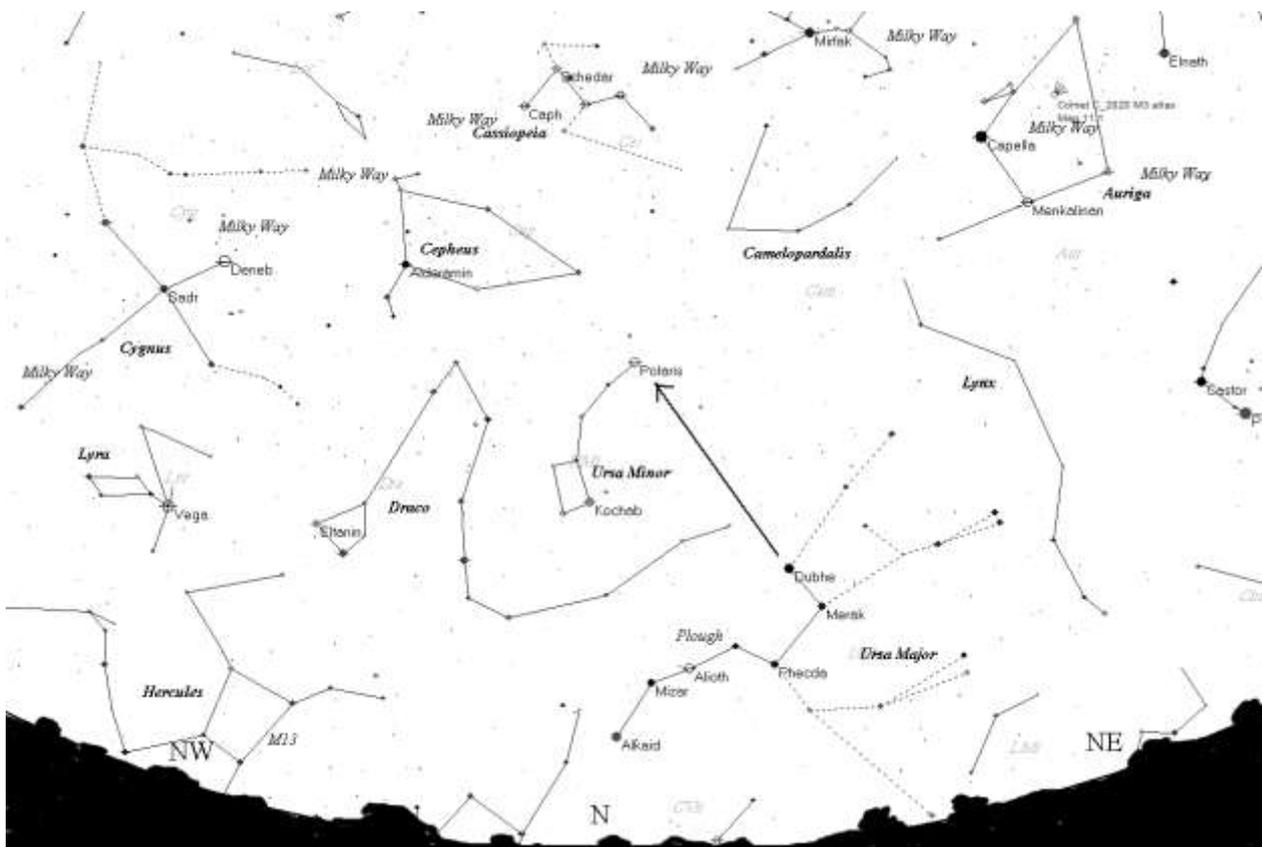


The constellations of Taurus, Auriga, Gemini and Orion can be seen rising mid evening in December.

The Seven Sister's cluster (M45, Pleiades) is an easily identified star cluster. Some people with keen eyesight may see up to 13 stars, but a telescope will show over 200 faint stars in the cluster.

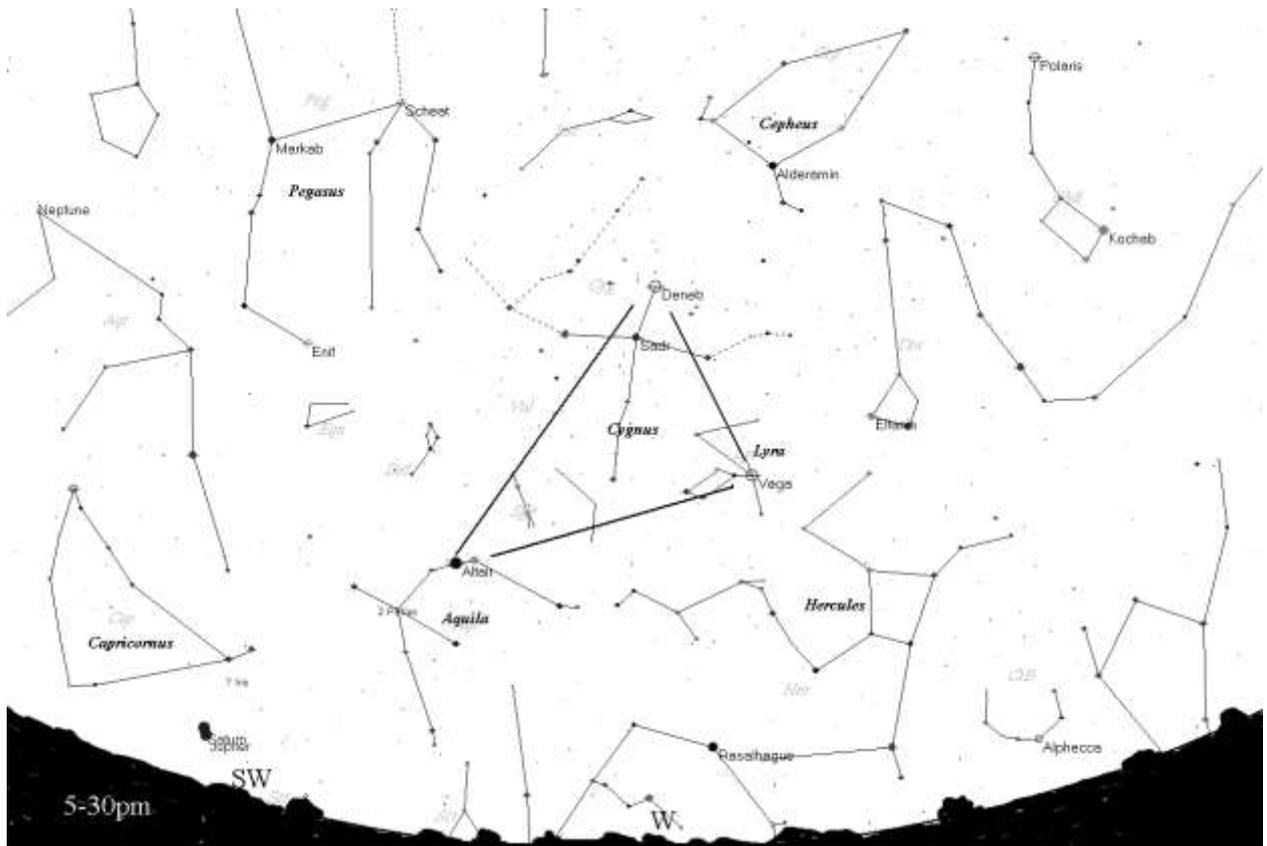


Sky looking north at 8pm mid December



Follow the pointer's Dubhe and Merak to find the polestar Polaris

Sky looking west by 5pm 21<sup>st</sup> December 17:00 UT \*\* To watch the Great Conjunction look from 40 min after sunset



The summer triangle asterism of Altair, Deneb and Vega slip westward

