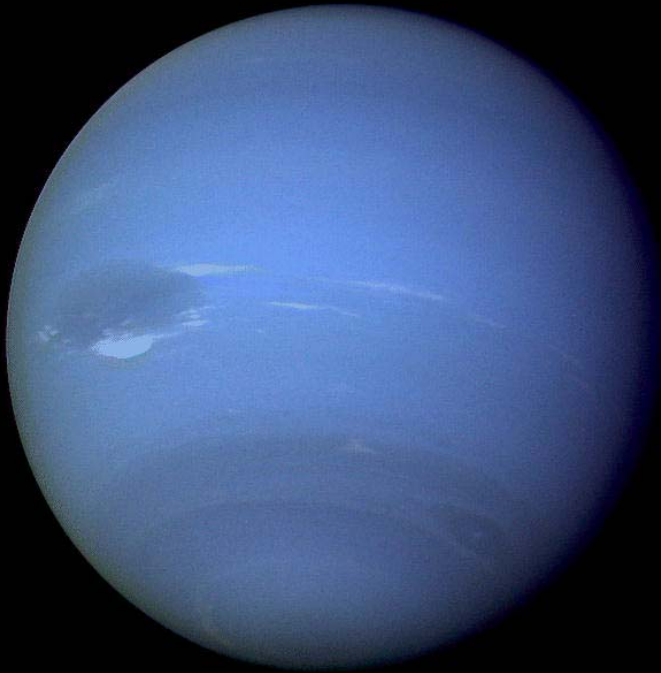
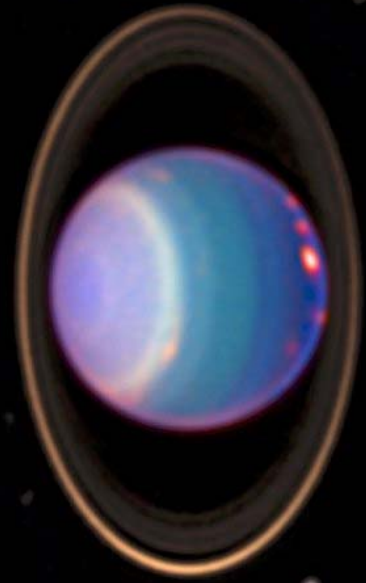


SOLAR & SPACE E-ZINE



**Issue 3
Volume 1
Autumn 07**

**On the Cover: Autumnal treats. Clockwise from top left:
M31, Uranus, M33 & Neptune.**

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Editorial.

You may just notice we have a new article. It's called Astronomy 101. What's this about I hear you cry? Basically it's my basic starters guide. Everything you need to know before you go out under the stars. Even if you're a veteran you could pick up new tips! Also I'll give you an easy target to look for. I'd



I'd like it if you could tell me if you found it o.k. Or if you sketched it send me a copy. Afterall I'm the editor and I want to know if my articles are useful. If they aren't then I could quite easily drop them. Don't forget you can add your own flavour to the e-zine by writing an article. Even if it's just an observing session. I like to think of this as yours, not mine. Articles don't have to be scientific, just about astronomy. Anyway I'm just rabbiting on, read on!

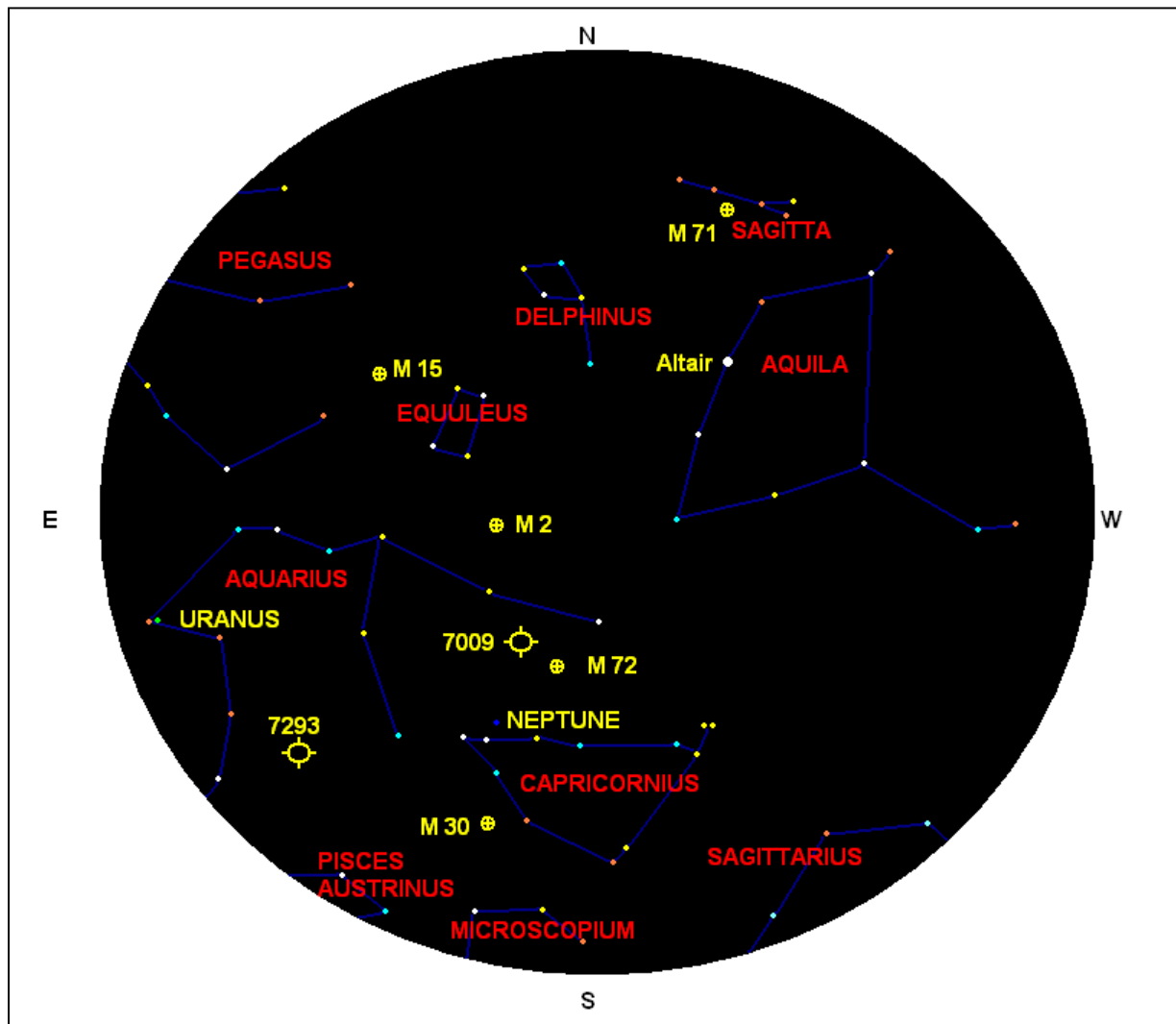
O.J. Tunnah

Oliver Tunnah
Editor

Comments, Questions, Pictures and Articles all welcome. Please send them to:
olivertunnah@gmail.com.
They don't have to be scientific, just astronomy related.

The Sky This Season.

All maps show the southern sky from 10:00pm mid month.

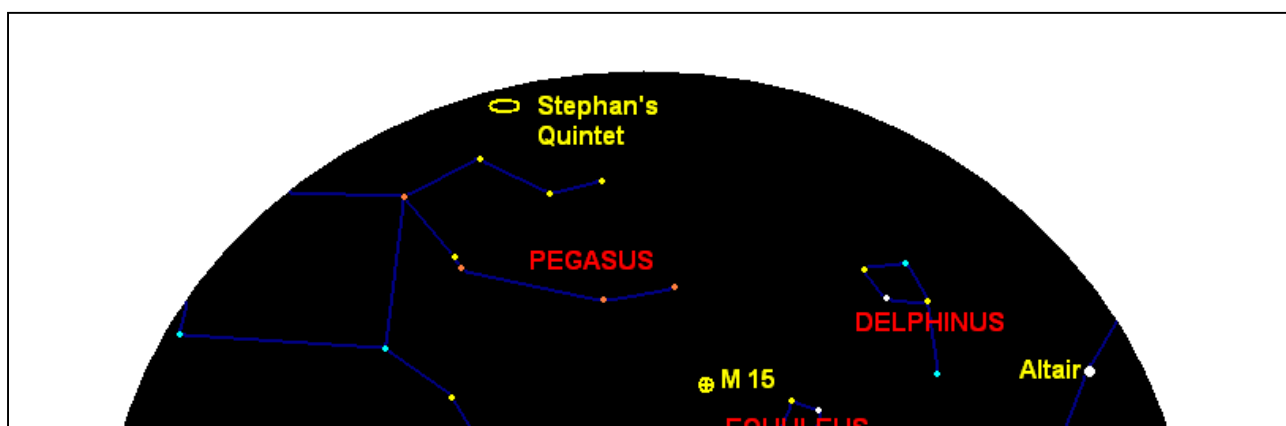


September's Sky:

Highlights: M 2

M15

NGC 7293



October's Sky:

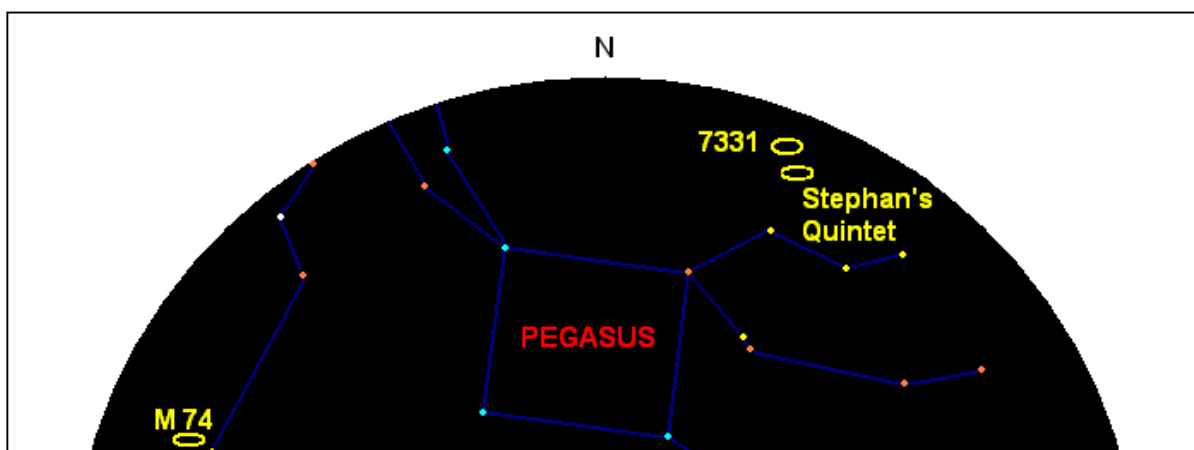
Highlights: Uranus

M15

Stephan's Quintet

Autumn has little in the way of Bright stars. Look out for Fomalhaut though. It's the one exception and shines brilliant white and at mag. 1.2. It's 22 light years distant, twice the size of the sun and has 14 times the luminosity. At that distance the Sun would shine at mag 3! However if you have a dark sky you will see loads of stars. If you're looking for some great globulars those of late summer and early autumn are your treats. M2 and M15 are exceptional and though not as good, M30 and M72 are also worth a look. M30 being distant shows no detail in any but the larger scopes. Death reigns in Aquarius. NGC 7009 and NGC 7293 are good examples of planetary nebulae. NGC 7009 is named after a planet. Saturn. With larger scopes ansae extend from the disk. This makes it look like a ghostly green version of Saturn. The object is mag 8 and will show in small/medium scopes. However to see the colour or ansae will require bigger scopes. NGC 7293 is

your more typical planetary nebula. It looks like M57 the ring nebula. However it's bigger. That's because it's closer. Its distance allows us to view more detail. Cometary dust spikes can be seen extending from the outer shell towards the central star. How it got its name the Helix nebula is beyond me, however its ghostly glow can be glimpsed from dark skies on a good night with binos. A telescope will allow for a better view. Pegasus comes into view, this constellation provides a good example of learning your own sky. Most people imagine the horse chasing M15. Its nose is the red star near Equuleus. However I imagine it as the hoof. The spokes above are his wings. Some constellations such as Pegasus allow us to see our own shapes. Others like Ursa Major are so alike they can't be seen any other way. There are many faint galaxies in the autumn sky. However in the late autumn there are several brighter ones. These are the Messier ones of M77, M74, M33, M31, M32 and M110. All bright enough to be seen with small scopes, but will need large scopes for detail.



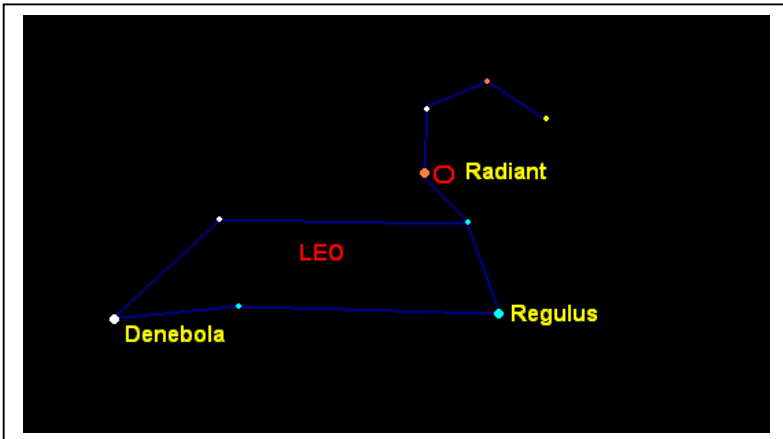
November Highlights:

M74

NGC 7331

M31

Eye On The Sky.



Meteor showers are something everybody has to see once. Meteors are rocks from space which when they enter our atmosphere glow with intense heat and disintegrate. Each swansong provides us with an excellent opportunity to make a

wish. Who knows it may come true. However when the Earth passes through the orbit of a comet it meets more of this space debris. The planet sweeps up the fragments. In November the Earth does that with the Leonid shower. The planet passes through the orbit of comet Temple - Tuttle. The showers peak is between 14th - 20th of November. The best time to see meteor showers is from midnight to early morning. More meteors will hit the planet from its forward facing surface. In November that means freezing cold. Wrap up warm for this. In November Leo rises after midnight anyway. The ZHR or Zenithal Hourly Rate is around 15 - 20. The ZHR is calculated by counting the meteors seen and then subtracting the background or sporadic rate. The Leonids can flare up and produce meteor storms or even fireballs. Fireballs are meteors that reach up to mag -10. The Radiant is within the Sickle asterism of Leo, Usually near Gamma. The Radiant is where the meteors appear to come from. There are two other showers in autumn, however the Leonids are usually the best!
Autumn Showers:

Orionids: Oct 15 - Nov 2

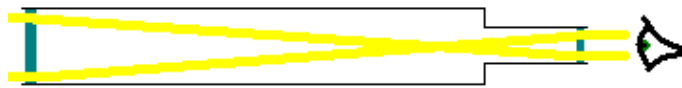
Taurids: Oct 20 - Nov 30

Leonids: Nov 14 - Nov 20

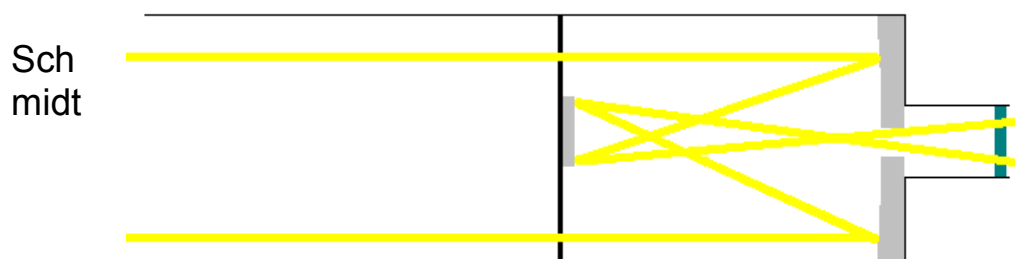
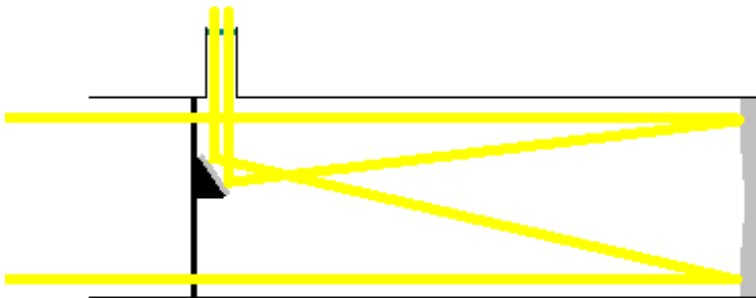
Astronomy 101

Welcome to the first of a beginners series called Astronomy 101. This season I'll guide you through what sort of telescopes there are out there.

Refractors: These use lenses to magnify and focus the object. Light goes in one end and comes out the other. This is the typical scope seen cartoons. They provide us with sharper images but building them big is a problem. The lens can only be supported around its rim. Building big lenses creates a problem. The lens may break under it's own weight. The biggest refractor is the 1metre Yerkes Observatory at William's Bay in Wisconsin.



Reflectors: These use mirrors instead of lenses to collect the light and pass it back up the tube towards a secondary mirror assembly. This secondary mirror directs the light into the eyepiece. Different eyepieces are used to magnify and change the field of view. Because a mirror can be supported from behind reflectors can be built bigger than refractors.



-Cassegrain: Effectively a reflector but the light isn't passed at a 45-degree angle to an eyepiece at the side. It is passed back through a hole in the main mirror. This like a refractor gives the impression of the light going all the way through.

The diagrams may look confusing but try and follow one line instead of both.

These scopes maybe mounted on one of three mounts.

Altazimuth: Simply a mount that moves in two directions. One in altitude and the other in azimuth. Azimuth is the direction west from north. Basically this scope moves up and down. And also left to right.

Equatorial: Scopes mounted on these can follow the sky's movement so long as they have a motor. One of the axis must point to the pole. This axis doesn't move. The other axis follows right ascension.

Dobsonian: This is a mount reserved for Dobsonian telescopes only. A Dobsonian or Dob for short. Is a reflector mounted on a simple Altazimuth mount. They are easy to set up and use. They are also cheaper than their reflecting cousins.

Now the average astronomer may only be asked one thing in their life.

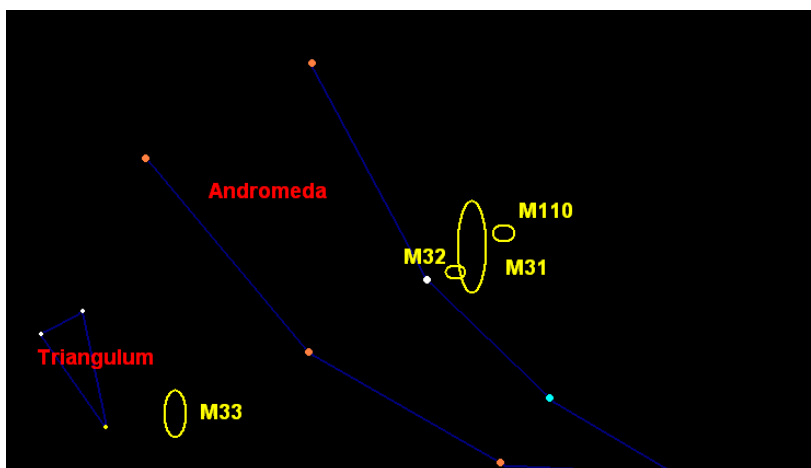
'What Telescope should I buy for a beginner?' This makes some of us pull their hair out. However there is no easy answer. For a start it depends on the age of the beginner, the amount you're willing to pay, and accessibility.

For a child a simple refractor is all you need. No bigger than 3". This will provide many nights of enjoyment. The moon and planets will be easily seen. Even some of the brighter DSO's will show up.

If the beginner is more adult then a reflector should do the trick. For teenagers no bigger than 6". Two reasons. One they might get bored of it and anything bigger would be a waste of time. Two any bigger may be a pain for them to lug outside all the time. Alternatives are dobs. You can get a 10" for well under £1000. Most dobs are cheap. However the back garden will be the only place beginners will have. That's fine and telescopes are easy to bring outside. Just make sure the young un's have supervision.

Target of the Season.

Now I will provide a target for you to look for. Any telescope will pick it up, and if your lucky maybe binos too! This season the target is mag 5.5, M33. I've never seen it and will also be trying. Tell me if you see it or not.



M33 with Glowing Nebulae along its spiral arms.

The Twine Planets.

Uranus and Neptune are two similar planets. They are roughly around the same size as each other. They differ by 2,410 Km. That's not much in the planetary stakes. They were both discovered via telescopes. Both were also found before being discovered. How? Well both were logged in observation logs. Uranus was even classified as a star! Voyager 2 has also visited both. No other craft has done so, yet. Let's look at each one individually.

Uranus: This is a greeny blue planet. It's a strange planet, simply because it orbits on it's side. So a day lasts around 42 years. Half of its 84-year orbit. Strange weather is seen on Uranus. Voyager revealed nothing, but Hubble has seen dark spots. This must arise from an external source as Uranus doesn't have the necessary internal heating. Uranus has 27 known satellites, the largest Titania is mixture of ice and rock some 1,580 in diameter. Uranus also has 11 fine rings.

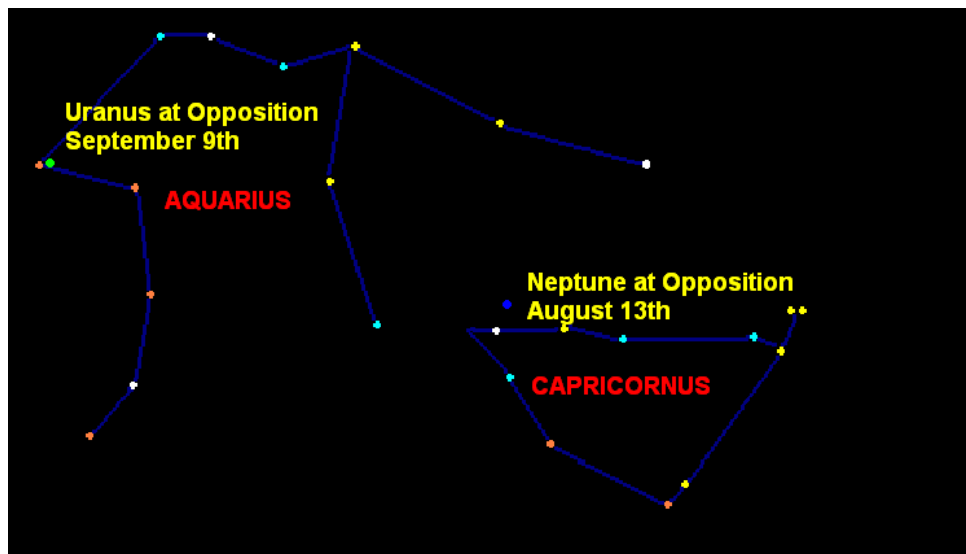
Uranus is around magnitude 5. Look for it without optical aid from a dark site. Binos will easily pick it out. Small scopes should show Uranus from suburb skies. However no features will be seen. Just a green disk. Large scopes may reveal the largest satellites. Titania is a meagre 13.5 when Uranus is at opposition. Still beats the 24.1 of 20Km Stephano!

Neptune: A dark blue compared to Uranus' aqua. Neptune was found by maths. People discovered something was pulling Uranus. With some calculations they charted a position of a massive planet. Neptune was close to the point they calculated. But does this mean a bigger, darker planet went unfound? Probably not, but you never know. Neptune has 13 satellites, the largest is Triton. Triton is mostly rock with a small part ice. Triton orbits in retrograde, meaning the wrong way around the primary body. (Neptune) Triton is some 2705Km across and mag 13.5 at Neptune's opposition. Neptune had broad faint rings.

Neptune generally hangs around at mag 8. Look for a bluish disk with binos or telescopes.

Both planets are made up of a similar composition. Both were also found in Gemini. The list of similarities goes on.

Both planets reach opposition in Autumn. Both are in neighbouring constellations. Uranus is Aquarius and Neptune in Capricornus. Both planets will follow a retrograde loop. That is they will move eastwards and then slow. Finally they will move westwards. After a few weeks they will move eastwards once more. This is caused by the Earth catching the planets up and overtaking them. The illusion is similar to overtaking a car.



Autumnal Treats.

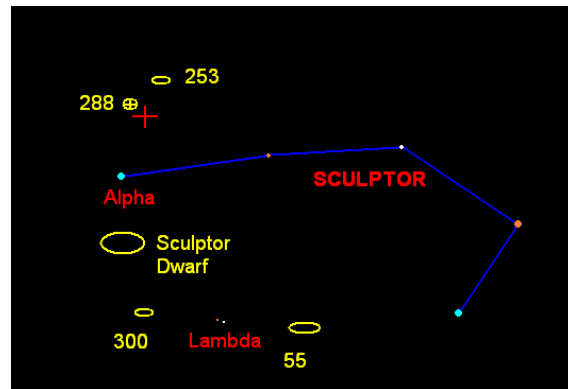
This season we don't have a top ten. It's not that I couldn't make a list from autumn's galaxies, but rather most of the best aren't best suited to northern viewers. So I'll take you on a tour of the best sights for northerners.

There are a few Messier galaxies lying around but we'll start at the extreme south.

Sculptor lies east of Pices Austrinus and Fomalhaut.

Sculptor contains many galactic treats. 4 are named and brighter than mag. 9! First start with NGC 55. (Cigar Galaxy) This is a edge on galaxy that show its stars to be offset of centre. If your brave enough to slide a nebula filter in you maybe rewarded. Side eastward past The orange and white double of Lambda Sculptoris, A little further north-eastwards from the double lies NGC 300. This is called the Southern Pinwheel Galaxy. It looks like M33 the Pinwheel galaxy in Triangulum. However it's arms are fainter and are best seen with a wide field eyepiece. Head northwards towards Alpha Sculptoris. You may notice a brightening of the background around halfway. This is the sculptor Dwarf. It lies the same distance away as the SMC. However it's a little bigger. That makes it's surface brightness low. Therefore is harder to detect. Now on to Sculptors showpiece. Head northwest of Alpha Sculptoris. You pass over the south galactic pole. This is due south. The Earth's tilt makes the south pole point elsewhere. Close to the pole is NGC 288, a globular cluster. Just northwest of that is NGC 253. (The Silver Coin Galaxy)

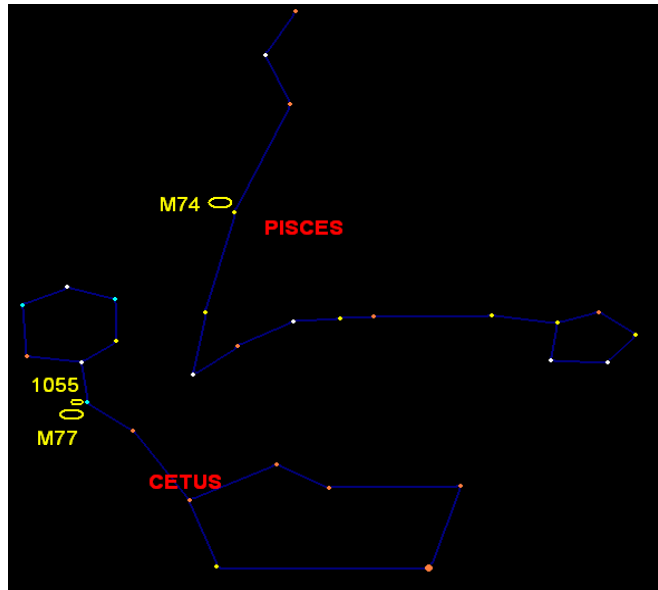
This is mag. 7, so if the conditions are really good then you may see it with the naked eyes. Binos will easily reveal it. Explore this galaxy for a few moments, the sight may never leave you.



Sculptor is full of bright galaxies.

Next we move on to two messier galaxies. The two water constellations of Pices and Cetus. M74 and M77 lie within their borders. M74 lies near Eta Piscium. The core is bright and even a two inch scope reveals half the galaxies extent. A medium scope may reveal the spiral arms. A large scope will show the nebulae within the galaxy's arms. Several Milky Way stars lie superimposed on the disk.

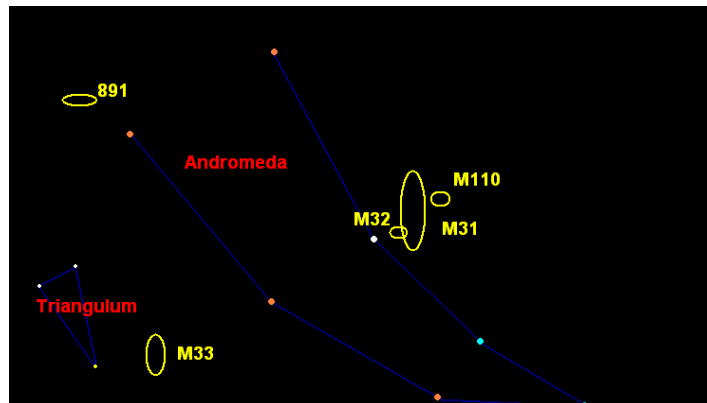
M77 is an entirely different galaxy. Within this galaxy's core lies a monster. M77 is a seyfert galaxy. Extremely active, this galaxy contains a super massive black hole at the centre. It munches upon the old stars at the galaxy's centre. A 4" scope shows a faint disk. Near M77 lies another galaxy. Whilst M77 shows a good example of a face on view, NGC 1055 shows a good example of edge on. Insert an eyepiece that shows the whole moon and you'll see both together. Now we're ready for brighter game.



Move north towards Andromeda. First stop off in Triangulum. M33 resides there. However its magnitude 5.5 brightness is spread over a big area. This makes it appear fainter. From a dark sky you won't miss the galaxy, you can see it with the naked eyes. Use a medium to big scopes, to see the spiral arms. M33 is part of our galaxy cluster, called the local group. M33 is slightly smaller than the Milky Way. In fact if M33 had a bar it would almost be a carbon copy. With a 12" scope you may see NGC 604. This is an emission nebula that lies in M33.

Next move into Andromeda. The next three messier galaxies are also part of the Local Group. M31 you just can't miss. Point a telescope at it and you will be rewarded. M31 is twice as big as the Milky Way, that makes it the head galaxy in the Local Group. (Though the Milky Way is at the Centre.) With a 6" scope two dust lanes should pop into view. M32 and M110 are M31's two satellite galaxies. Both ellipticals. M33 is brighter but lies closer to M31. M110 lies beneath the galaxy but is fainter because it's more diffuse. Unlike Earth any planet within M31 would have a satellite galaxy to view in either hemisphere. M31 is on a collision course. With us! In several hundred million years M31 and the Milky Way will join to become 1 giant elliptical galaxy. Many stars and planets would be thrown out into a cold death in space. The two super massive black holes would also merge into one super-super massive black hole. One good thing for any astronomers who will watch the first million years of the collision. A multitude of Nebulae will spring up in both galaxies.

And now for something completely different. Relative calm and tranquillity inhabits NGC 891. This edge on galaxy is in the must target and snap list. It's not hard to see why. It appears in a 6" scope but the dust lane pops into view with a 8".



Enjoy many galaxies in Autumn. Winter marks the return of Nebulae!

For The North.

Although autumn is choc full of galaxies, those living above 50° north can find some brilliant nebulae and clusters.

Cephus the king is where we will spend our time. If you have a 6" or larger scope then look for Mu Cephei. Lying in the constellation's south, this very red star is hard to miss. Mu marks the northern edge of IC 1396. A large 2 degree nebula. IC 1396 is crossed by many dark nebulae, such as the Elephant's Trunk Nebula. These are areas of the beginning of star birth. The stars have yet to ignite and light the nebula. The temperature here is bitterly cold, around 2K!

Head westwards to NGC 6939. This is a pretty open cluster. However those with big scopes will notice another blur before you come across NGC 6939. That's NGC 6946, a spiral galaxy. Point the scope at Beta Cephei. Now head southwest. You may happen across NGC 7023 or the Iris Nebula. This is a brilliant example of a reflection nebula. WARNING: Don't use a nebula filter on NGC 7023. This is reflected starlight, not emitted starlight! However if you do own a nebula filter and want a target head east to NGC 7380. That's an open cluster. However surrounding it is Sharpless 2-142. Sharpless 2-155 lies a little to the north also. Finally from gamma Cephei head towards delta Cassiopae. NGC 40 is a red planetary. Use an 8" to reveal the red hue.

For The South.

In my first e-zine I accounted for the Magellanic Clouds in this article. This season they ride their highest. I'll show you a few sights in and around them.

Let's start with the Large Magellanic Cloud. (LMC) The most obvious place to start is NGC 2070. This is an extremely large extra galactic nebula. You can see it with your naked eyes! This region is massive. It would cover a huge portion of sky of any planet in the LMC. Near the nebula lies NGC 2100. This is a compact open cluster. See if you can see a globular amongst the stars of the LMC. NGC 1835 is mag: 9.8. Many nebulae and clusters abound this galaxy, 400 of them in fact! Look for new bright stars. In 1987 a bright supernova blazed from NGC 2070.

The Small Magellanic Cloud (SMC) is over 2 magnitudes fainter, but probably easier to see. There is only one treat here, but let's save the best till last.

Look north of the galaxy for globular NGC 362.

It's compact and pretty. Remember its part of the Milky Way. Several open clusters abound the galaxy. NGC 330 is almost central. Look west of the cloud for a treat. From a dark sky you would have seen it as a mag. 4 star. This is NGC 104 or 47 Tucanae. I'm sorry Omega fans, but this is the best globular, but due to its southerly location it's left out! Certainly more compact and circular than Omega. This means it's better at being a globular.

The Planets.

Problems mean I can't use my solar system maps this season.

Mercury – The inner most planet lies in Virgo near spica on September 21st. The planet sweeps in front of the sun and appears in the morning sky by the seasons end.

Venus – The brightest planet gleams in the Cancer/Leo border. It's appearance in the morning sky is pretty obvious.

Mars – Mars moves through Taurus. Midway through the season it appears above Zeta and M1.

Ceres – The planet lives near omricon Tauri this month. Watch it move over several nights.

Jupiter – The gas giant will slowly set as the days draw on. The planet lives in Ophiuchus. Vesta lies nearby.

Saturn – The ringed wonder appears in the morning sky in Leo.

Uranus & Neptune – see the above article.

Pluto – The 9th planet lies in serpens cauda. It lies roughly 8.8 degrees west of M17.

Eris – The planet lies in Cetus. Northwest of Zeta.

Sedna – Lies in Pisces.

Next Season.

The top ten non messier nebulae.

A true Messier moment.

Take up your arms. Mars season is here.

Finding your way around: Astronomy 101.

Open clusters and galaxies.

Winter out end of November.