

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

10th October 2005

Dr Fraser Clarke – Oxford University:

“Future Professional Large Telescopes”

THE NIGHT SKY THIS MONTH

by Bob Dryden

The Planets:

The undoubted highlight of this session is the approach of **Mars**. It will be the largest and the brightest it is going to get for the next 13 years, so take this chance to have a look at it. It is now difficult to miss as it rises in the east at magnitude -1.8. Mars is easily the brightest object in that part of the sky. By November, it will have become even brighter at -2.3 mag!

Opposition is 7th November, by which time the planet will be visible all night. It is best to wait awhile though before pointing a telescope at it, so that the planet is higher in the sky, which will give you a steadier view. Incidentally, Mars will be closest to Earth on October 30th.

By opposition, Mars will be a whopping 20 arc seconds in diameter, and a good telescope (and good seeing conditions) will show you the disc markings and the southern polar cap. Once opposition has passed, Mars will begin to fade and diminish in size quite rapidly. You have a six week window when viewing is at an optimum, so make the most of any clear opportunities.

Venus is still about although many of you will not have noticed it even though it is a very bright -4.2 mag. The reason it is not so obvious is that it is still hugging the south western horizon and sets shortly after the Sun. The planet does get a little higher by November but not by much. Greatest eastern elongation occurs on 3rd November at 47 degrees, but as Venus is crossing Libra, Scorpius and Sagittarius, it will always remain low.

One observation you could try and make is to decide when Venus is exactly at half phase. In theory, this should be at the point of furthest elongation (i.e.: 3rd November), but during evening apparitions such as this, dichotomy (half phase) is usually early. You

need to establish how early by making your own observations.

Venus is not hard to see as long as you look low in the south west very soon after sunset. Binoculars are handy if you look immediately after sunset because the sky is still a bit bright then. A bit later, as it gets slightly darker, Venus stands out easily to the naked eye.

The only other evening planets are **Uranus** and **Neptune**. Uranus is in Aquarius while Neptune is hiding in Capricorn. Both are visible in binoculars if you have a finder chart.

Saturn is now in Cancer and is therefore only visible in the morning sky at the moment. The rings are beginning to close now slightly as their tilt angle is now only 17 degrees (it was 23 degrees last year). Because of our viewing angle, this is a favourable period for seeing the shadow of the globe cast across the rings. Obviously, you will need a telescope and steady seeing to see this, but it gives a nice three dimensional impression when you see it.

Comets, meteors, and asteroids:

There are two active meteor showers at this time of year, the Orionids and the Taurids.

The Orionids are active from October 16th to 27th, with the maximum on the 20th. With an hourly rate (ZHR) of 25, this shower is pretty good, but unfortunately this year there is a big, bright Moon (just past full) in the sky that spoils everything.

The other shower, the Taurids, lasts from October 20th to November 30th. Maximum is 3rd November, which is Moon free. Their ZHR is only 10 though but what they lack in numbers, they make up for in often having long, slow, bright meteors. As the shower is active for so long, we often see Taurids by accident when we are out observing other things, but a dedicated meteor watch on maximum night should produce some good meteors.

The shortage of bright comets continues and, again, the only reasonable comet on view at the moment is 101P/Chernykh. It reaches its brightest at the end of October but this is only about 10th magnitude so it will not be spectacular by any means. If you want to hunt it down, it is still around the borders of Pisces and Cetus.

There are no bright asteroids this period.

Occultations:

There are no lunar occultations this period.

MOON PHASES:

New (eclipse) 3rd Oct; First Qtr: 10th Oct.; Full: 17th Oct.; Last Qtr: 25th Oct.; New (eclipse) 2nd Nov.



WHERE NO SPACECRAFT HAS GONE BEFORE

by Dr. Tony Phillips

In 1977, Voyager 1 left our planet. Its mission: to visit Jupiter and Saturn and to study their moons. The flybys were an enormous success. Voyager 1 discovered active volcanoes on Io, found evidence for submerged oceans on Europa, and photographed dark rings around Jupiter itself. Later, the spacecraft buzzed Saturn's moon Titan—alerting astronomers that it was a very strange place indeed!—and flew behind Saturn's rings, seeing what was hidden from Earth.

Beyond Saturn, Neptune and Uranus beckoned, but Voyager 1's planet-tour ended there. Saturn's gravity seized Voyager 1 and slingshot it into deep space. Voyager 1 was heading for the stars—just as NASA had planned.

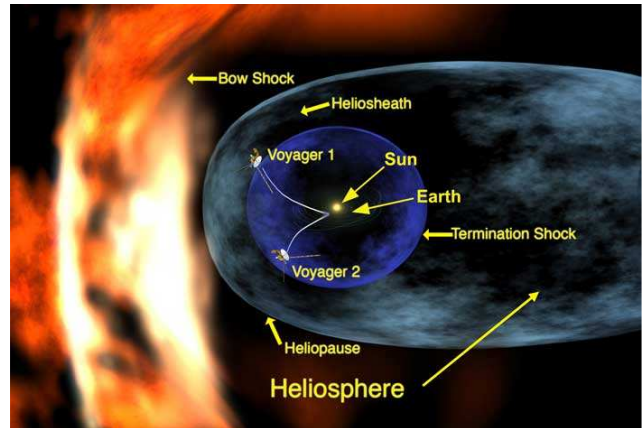
Now, in 2005, the spacecraft is nine billion miles (96 astronomical units) from the Sun, and it has entered a strange region of space no ship has ever visited before.

“We call this region ‘the heliosheath.’ It’s where the solar wind piles up against the interstellar medium at the outer edge of our solar system,” says Ed Stone, project scientist for the Voyager mission at the Jet Propulsion Laboratory.

Out in the Milky Way, where Voyager 1 is trying to go, the “empty space” between stars is not really empty. It’s filled with clouds of gas and dust. The wind from the Sun blows a gigantic bubble in this cloudy “interstellar medium.” All nine planets from Mercury to Pluto fit comfortably inside. The heliosheath is, essentially, the bubble’s skin.

“The heliosheath is different from any other place we’ve been,” says Stone. Near the Sun, the solar wind moves at a million miles per hour. At the

heliosheath, the solar wind slows eventually to a dead stop. The slowing wind becomes denser, more turbulent, and its magnetic field—a remnant of the sun’s own magnetism—grows stronger.



Voyager 1, after 28 years of travel, has reached the heliosheath of our solar system.

So far from Earth, this turbulent magnetic gas is curiously important to human life. “The heliosheath is a shield against galactic cosmic rays,” explains Stone. Subatomic particles blasted in our direction by distant supernovas and black holes are deflected by the heliosheath, protecting the inner solar system from much deadly radiation.

Voyager 1 is exploring this shield for the first time. “We’ll remain inside the heliosheath for 8 to 10 years,” predicts Stone, “then we’ll break through, finally reaching interstellar space.”

What’s out there? Stay tuned...

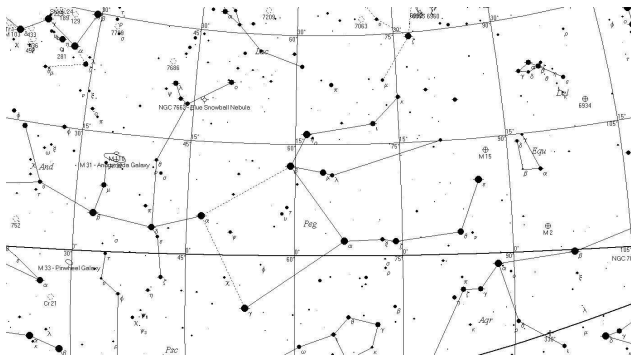
For more about the twin Voyager spacecraft, visit voyager.jpl.nasa.gov. Kids can learn about Voyager 1 and 2 and their grand tour of the outer planets at spaceplace.nasa.gov/en/kids/vgr_fact3.shtml.

THIS MONTH'S DEEP SKY OBJECT

This month’s deep sky object is a firm favourite of mine for this time of year, the globular cluster M15 in the constellation of Pegasus. I usually associate the globular cluster M3 in Canes Venatici with spring, and so I also associate M15 with autumn. Pegasus is well placed for the observer at this time of year.

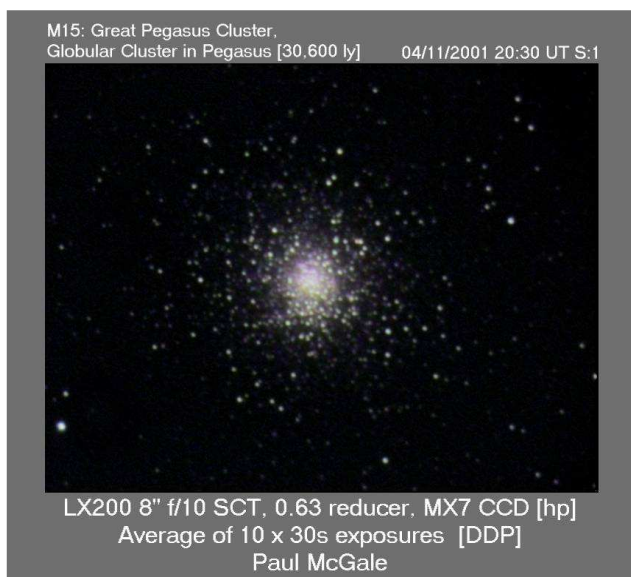
The easiest way to find M15 is to locate theta (θ) Peg and epsilon (ϵ) Peg. Now project a line running from theta past epsilon and carry it on for half that distance. This takes you to the immediate vicinity of M15, and it should show up easily enough in the

finder scope. For those of you with Go To scopes, just let the technology do the work for you!



M15 is one of the best globular clusters in the northern hemisphere. It is quite bright, with a magnitude of around 6.5, so it should be possible to see it naked eye from a dark sky site.

M15 lies some 30,000 light years away from us. At low power (40x), the 12.3 arc minute disc appears as a milky glow, while higher power (100x or more) resolves it edges into dozens of tiny pinpoint stars. It is a fine specimen and well worth more than just a cursory glance. Take your time over it, and let your eye wander round the field of view.



M15 is an unusual globular cluster for several reasons. It is an intense X-ray source, leading some astronomers to speculate that it contained a central black hole. The Hubble Space Telescope dispelled this by resolving the cluster down to its core and revealing nothing extraordinary about it. Astronomers now believe that the x-ray energy might be coming from one or more supernova remnants. It contains a huge number of variable stars (in excess of 100). It is the only known globular cluster to contain a known planetary nebula (too faint to be picked out with backyard scopes).

STARGAZING FROM THE SOUTH PACIFIC

by former member Deborah Hambly in New Zealand

I'm writing to you from Norfolk Island, in the South Pacific, which forms part of Australia. The best thing about Norfolk Island is that it doesn't have any streetlights! The population of the Island is less than 2000 and it is an ideal place for an astronomer to experience dark skies. It has reminded me just how lucky I am to live in an area of New Zealand equally unaffected by light pollution, as the sky is just as dark here as it is there.

You can imagine my surprise when I noticed two telescopes in the communal area of the apartments, a bulky 10" scope on wheels as well as a 4.5" Japanese scope. Although my visit coincides with moonless observing nights, unfortunately there are several bright lights on the buildings so I haven't able to see any improvement over my 8" scope.

Last month I shared 'The Swan,' a nebula which can only be appreciated in a telescope. This month, I will focus on 'The Tarantula' or NGC 2070, one of the largest emission nebulas in the sky. It is located on one side of the Large Magellanic Cloud (LMC), and is circumpolar.

For explanatory purposes and for observers who have never seen The Tarantula, it is useful to compare it with the Orion Nebula. Both nebulas have an apparent magnitude of 5. In actual size, The Tarantula is more than 100 times the size of the Orion nebula. However, the Orion Nebula is only 1600 light years away, whereas the Tarantula is 179,000 light years away. The Tarantula measures 30 arc minutes diameter, whereas M42 covers 48 arc minutes. The Tarantula's central cluster was originally identified as a star (30 Doradus) and is visible to the naked eye as a star with haze just off the side of the LMC. The Tarantula resembles its namesake as it has a central cluster of bright young stars and gaseous extensions which project like legs from the core. With the aid of binoculars or the extra magnification and light collection of a telescope, the view of the Tarantula is equally impressive.

Rather ironically, as I'm typing this up, there is a black and orange striped spider which measures close to 10 degrees (the size of one's fist) hanging nearby. I hope that I get to see more of the Tarantula tonight, but I hope I don't walk into the earthly live version in the dark on the way!

NOTICES

22nd October 2005: 'The Astronomer' AGM in Basingstoke. Day of talks. £7

FURTHER DISCUSSION

Don't forget the Society's web site:
www.abingdonastro.org.uk

Our webmaster, Andrew Ramsey, is always on the look-out for members' photographs to put on there. Don't forget you can read back copies of SpaceWatch on the web site too. New on the web site is the item "Space News", astronomy news which changes every day, brought to you courtesy of "Universe Today".

You can also find details of our e-mailing list there.

DATES FOR YOUR DIARY

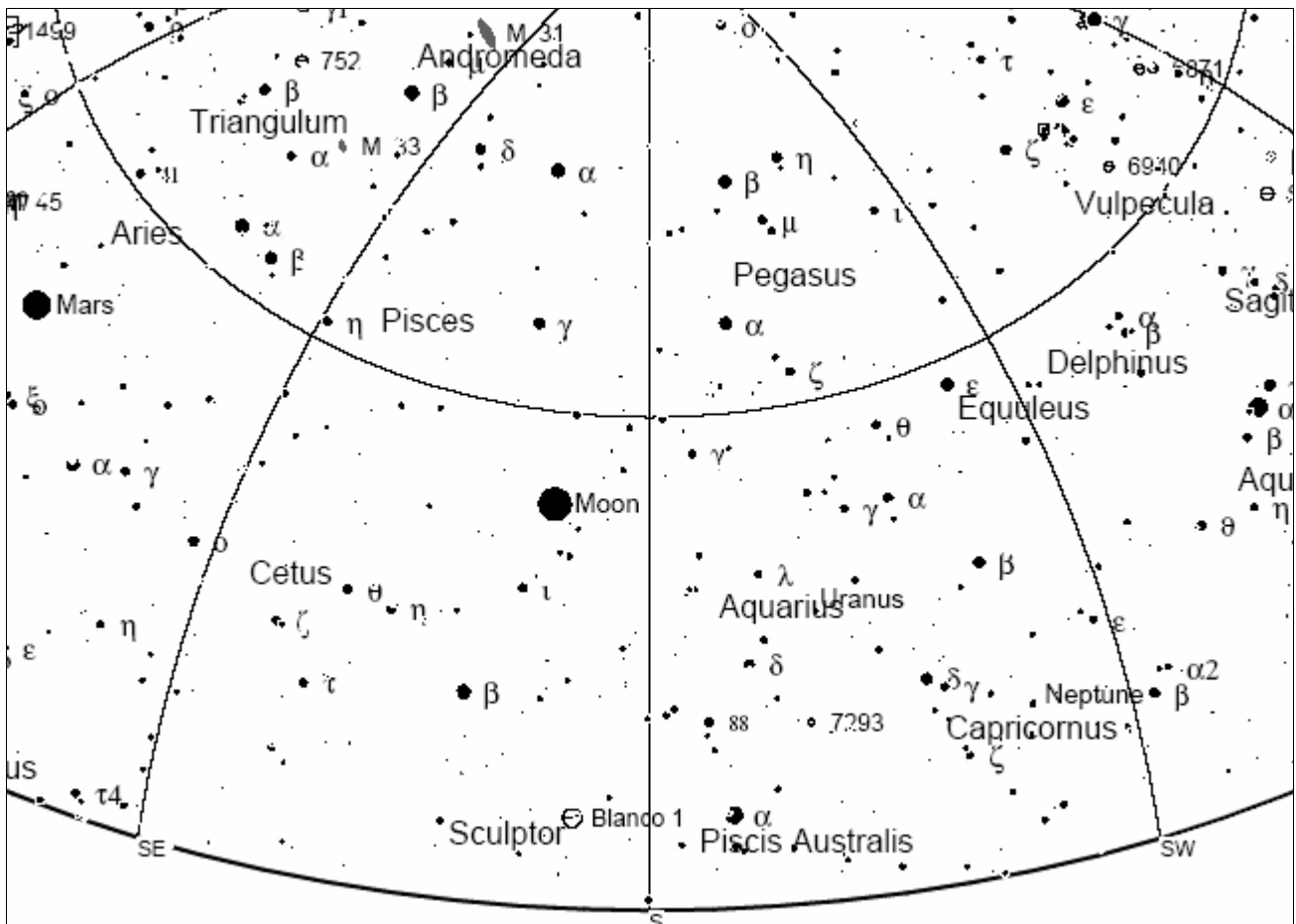
24th October 8pm. Beginners' Meeting in the Perry Room.

31st October– 2nd November (FCN*) 8pm. Observing Evening at Britwell Salome. Contact Ian Smith on 01491 824266 for details.

14th November 8pm. Mr Peter Birtwhistle "Chasing Near Earth Asteroids".

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your help and contributions. Please send any news, observations, photos, etc. to:
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E-mail: AbAstro@ATRamsey.com Phone: 01865 245339

STAR CHART



Looking south from Abingdon at 11.00pm (BST) next Saturday (15thOctober)