SPACEWATCH
the newsletter of the Abingdon Astronomical Society

13th June 2005

Darren Baskill - Leicester University:

"X(-rays) Mark the Spot"

Night time observations are rather difficult for many of us at this time of the year. However, there are one or two events this summer that you may like to make a special effort to see.

The summer solstice occurs on June 21st at 06.46UT when the Sun reaches its highest point in the northern sky. After that, the nights start to get longer, although you will not notice much change for a month or so.

On July 5th at 05.00UT the Earth reaches its furthest point from the Sun (the Earths orbit is elliptical, not round) at a mere 94,512,036 miles (152,102,378 kms for our younger members).

THE NIGHT SKY THIS MONTH

by Bob Dryden

Planets:

Jupiter is the only obvious bright planet after darkness falls, shining brightly at -2.0 mag towards the south and, later, south west. Nothing out of the ordinary is happening on the planet at the moment but it will still be a favourite target for viewing as it is so magnificent in a telescope.

Perhaps more interesting is the meeting of **Venus**, **Mercury**, and **Saturn** in late June. From June 22nd to the 29th, all three planets will fit within a 3 degree circle. On June 26th Mercury and Saturn are only 1.5 degrees apart. ***The most interesting date though is June 27th when Venus and Mercury will be a tiny 4 arc minutes apart and both will easily fit in the same field of view of a medium powered eyepiece.*** It will be very interesting to compare the two planets. Mercury will be -0.1 mag, be 66% illuminated and 6.6 arc seconds across. Venus, on the other hand, will be a bright -3.9 mag, 90% illuminated and 11 arc seconds across.

All this action, however, is going to take place very low in the west so you will need a clear horizon. You will also need to look shortly after sunset because all the planets set about an hour after the Sun. Scan low along the western horizon about 15 minutes after sunset with binoculars and you should be able to find Venus. This will give you a guide to finding Mercury which will be in the same field of view. Saturn will be much, much harder to see as it is fainter and lower then Venus (in fact I will be surprised if anybody does see it)

At the end of June Mercury is in fact just beginning a poor evening apparition. It will be furthest from the Sun on July 9th at 26 degrees but it will always remain very low near the south western horizon. Inferior conjunction is on August 5th after which the planet quickly reappears in the morning sky with greatest western elongation on August 23rd at 18 degrees. This will be Mercury's best morning apparition of the year and it will be easy to see in the east just before dawn.

As already mentioned, Venus is now in the evening sky, but it does not get very high in the sky. In fact it moves along the horizon towards the west and the south west as the summer progresses. Although it is low, thankfully it is very bright so you should be able to find it easily before it sets.

Venus meets another planet on September 2nd when Jupiter is just 1.5 degrees away. You have the brightest and the second brightest planets close together low in the south west – you should have no trouble finding them. During the first week of September watch as the two planets move apart.

With all this attention in the twilight evening sky, you may have missed that **Mars** is now starting to brighten (at last!). It moves through Pisces and Aries during the summer and brightens to -1.1 by September so it is easily the brightest object in that area then. Its apparent size increases from 8 to 15 arc seconds over the summer so you will now be able to discern the disc markings in a good telescope. If you need a guide to find Mars, on June 29th at 02.00UT the Moon will be 54 arc minutes north of the planet.

Those of you who enjoy hunting down the fainter planets, **Uranus**, **Neptune** and **Pluto** are all becoming better placed now. Pluto reaches opposition on June 14th so will be well placed for finding just before dawn in Serpens.

Neptune and Uranus reach opposition on August 8th and September 1st respectively. They are both in Aquarius, so both are visible in the morning sky, and both can be seen in binoculars.

Meteors:

While there are several minor meteor showers during the summer, the one we all wait for is the Perseids. Active from July 23rd to August 20th, the maximum this year is on August 12th at 13.00UT. The best time to see Perseid meteors is after midnight (although you will still some before midnight) so the morning of the 12th would be the very best time to observe. Under ideal conditions you can hope to see about 80 meteors an hour, but realistically, 40 or 50 are to be expected. This year, on the 12th, the Moon sets at 21.41 UT so the sky will be nice and dark for the morning hours. Sit back and watch the show.

Occultations:

There are two occultations over the summer that will be easy to see. The first occurs at the rather unsociable hour of 02.47UT on July 2nd when delta Aries (mag 4.5) reappears from behind the crescent Moon. The Moon will be low in the east so a fairly clear horizon will be needed. The second is more favourably timed at 21.53UT on July 11th. Magnitude 4.1 sigma Leo will disappear behind the dark portion of the Moon, which will be about 15 degrees above the western horizon.

Comets:

There are three comets worth mentioning this session. 21P/Giacobini-Zinner is still on view in the morning sky and it is still brightening. It reaches mag 9.4 by late June and then starts to fade, reaching about 11th magnitude by September. All this time it crosses Pisces, Aries, Taurus, Orion and Monoceros. The second comet is P1983 V1 (Hartley-IRAS) which starts in Triangulum, and then crosses Perseus, Cassiopeia, Camelopardus, Draco and Ursa Major. It reaches its brightest around July 9th when it will be mag 9.9, before fading to mag 11.7 by September. The third, and final, comet is potentially the most interesting for years. Comet 9P/Tempel is actually fading now from mag 9.5 in June to 11.4 by September. So why is it interesting? Well this is the comet that the Americans have decided to target with one of their spacecraft, and on July 4th they are going to fire a probe into it to see what the comet is made of. Nobody actually knows what is going to happen when the impactor hits the comet, but the idea is that a crater will be formed, debris will blast upward, and instruments on the watching spacecraft can analyse the chemical components of the comet. There is a possibility that the comet will brighten considerably upon impact. At the time, the comet will be about 10th magnitude, but quite how bright it might get, nobody knows. YOU WILL HAVE TO LOOK TO FIND OUT. The impact will occur at 06.00UT on July 4th, daylight here. So you will have to wait until the evening to see what has happened.

It will not be dark enough to see anything until about 11.00 BST, and if the comet is still faint then you may have to wait closer to midnight to see it. At 11.00 BST the comet will be low in the south west at about 15 degrees above the horizon. By midnight it will be only about 10 degrees high. All this happens in the constellation of Virgo, and, in fact, quite close to the bright star Spica, so you should be able to find the comet fairly easily.

Noctilucent Cloud:

Keep an eye out towards the northern horizon during summer. Low down (probably below the bright star Capella) you may see bright, spidery like, cloud. This is noctilucent cloud, and it is probably the only cloud astronomers like to see. It is extremely high altitude cloud that can only be seen in the summer months. No one is sure yet how, or why, it forms, so any observations are useful. If nothing else, note down the date and time you see any. Any description of type, form, shape, etc, is also useful. It is quite rare to see any from the southern UK, and do not confuse ordinary, low cloud for noctilucent cloud. Noctilucent cloud will still be bright when the sky is dark, normal cloud will not be.

MOON PHASES:

New: 6th June; First Qtr: 15th June; Full: 22nd June; Last Qtr: 28th June; New: 6th July; First Qtr: 14th July; Full: 21st July; Last Qtr: 28th July; New: 5th Aug.; First Qtr: 13th Aug.; Full: 19th Aug.; Last Qtr: 26th Aug.; New: 3rd Sept.; First Qtr: 11th Sept.

SEEING IN THE DARK WITH SPITZER

by Patrick Barry and Tony Phillips

Have you ever gotten up in the middle of the night, walked to the bathroom and, in the darkness, tripped over your dog? A tip from the world of high-tech espionage: next time use night-vision goggles.

Night vision goggles detect heat in the form of infrared radiation—a "color" normally invisible to the human eye. Wearing a pair you can see sleeping dogs, or anything that's warm, in complete darkness.

This same trick works in the darkness of space. Much of the exciting action in the cosmos is too dark for ordinary telescopes to see. For example, stars are born in the heart of dark interstellar clouds. While the stars themselves are bright, their birth-clouds are dense, practically impenetrable. The workings of star birth are thus hidden.

That's why NASA launched the Spitzer Space Telescope into orbit in 2003. Like a giant set of infrared goggles, Spitzer allows scientists to peer into the darkness of space and see, for example, stars and planets being born. Dogs or dog *stars*: infrared radiation reveals both.

There is one problem, though, for astronomers. "Infrared telescopes on the ground can't see very well," explains Michelle Thaller, an astronomer at the California Institute of Technology. "Earth's atmosphere blocks most infrared light from above. It was important to put Spitzer into space where it can get a clear view of the cosmos."

The clear view provided by Spitzer recently allowed scientists to make a remarkable discovery: They found planets coalescing out of a disk of gas and dust that was circling—not a star—but a "failed star" not much bigger than a planet! Planets orbiting a giant planet?

The celestial body at the center of this planetary system, called OTS 44, is only about 15 times the mass of Jupiter. Technically, it's considered a "brown dwarf," a kind of star that doesn't have enough mass to trigger nuclear fusion and shine. Scientists had seen planetary systems forming around brown dwarfs before, but never around one so small and planet-like.

Spitzer promises to continue making extraordinary discoveries like this one. Think of it as being like a Hubble Space Telescope for looking at invisible, infrared light. Like Hubble, Spitzer offers a view of the cosmos that's leaps and bounds beyond anything that came before. Spitzer was designed to operate for at least two and a half years, but probably will last for five years or more.

For more about Spitzer and to see the latest images, go to http://www.spitzer.caltech.edu/spitzer. Kids and grown-ups will enjoy browsing common sights in infrared and visible light at the interactive infrared photo album on The Space Place: http://spaceplace.nasa.gov/en/kids/sirtf1/sirtf_action.shtml

THIS MONTH'S DEEP SKY OBJECTS

How do you do your observing? I am a deep sky nutter, and there is no shortage of objects for me to look at. I have observing lists for each constellation, and work my way through a constellation (which can span many observing sessions).

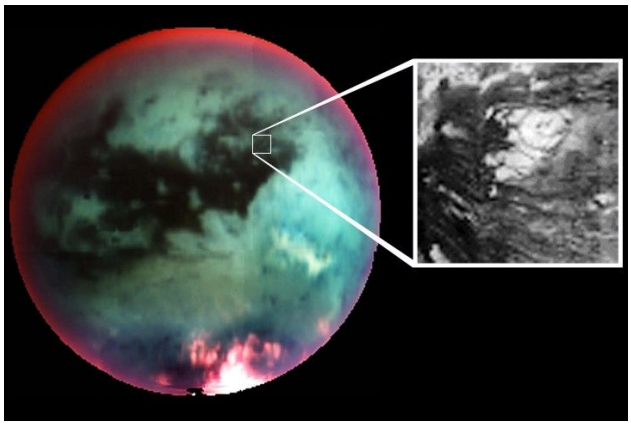
As is apparent from my notes below, a lot of the objects, galaxies in particular, are just grey blobs. It isn't unusual not to be able to make out a shape from them, you can tell that there's something there and that's about it. However, although this may seem to be somewhat unexciting, it does have the benefit of sharpening your eyes, so that when you do come across something more exciting, there's detail to be seen which you might otherwise miss. Also, every now and then you come across something quite delightful which isn't mentioned by any of the guide books.

One thing which is apparent from my notes is that increasing magnification makes the fainter objects easier to see. The usual wisdom is that low magnifications are the norm when it comes to deep sky observing, yet quite often I found that faint galaxies showed up better in my 9mm eyepiece than they did in my 13mm eyepiece.

Here's a subset of my notes whilst I was observing in the constellation of Canes Venatici last month. Unless indicated otherwise, all objects are galaxies. My scope is an 8 inch Schmidt Cassegrain Telescope (SCT), fitted with a 0.63 focal reducer, giving an effective focal length of 1260mm. You'll notice that most of them are noted to be faint. My guide books indicate that a lot of them are magnitude 11 or fainter.

ngc4111 – Faintish. West of double star. Averted vision suggests it's aligned n/s. Shows up better in 9mm than 13mm.
ngc4138 – Faint blob, sitting below triangle of stars.
ngc4143 – Faint blob. Bright centre surrounded by faint halo. Best using 9mm eyepiece.
ngc4145 – Very faint - only just detected (reliably). Low surface area brightness? Seemed large-ish.
ngc4151 – Faintish and small.
ngc4244 – Faint, but it's big (long and thin). Aligned e/w.
ngc4214 – Brightish and large-ish. Aligned nw/se?
ngc4217 – Very faint - only suspected seeing it.
m106 – Bright. Large halo running n/s. Non-stellar core. Looks like a real galaxy!
ngc4346 – Faint and small galaxy. Forms near isosceles triangle with 2 faint stars S. Galaxy in a void.
ngc4389 – Very difficult - pops in and out of view. Wind helps with this one!
ngc4449 – Bright and easy. Brightness fairly uniform. Kink on west end?
ngc4460 – Faint, and glare from double star west of it doesn't help. Best with 9mm eyepiece. Aligned nearly e/w?
ngc4485/4490 – ngc4490 easy and bright, aligned ~nw/se. Brightness nearly, but not quite uniform. ngc4485 nearly perpendicular to ngc4490 at nw end. Very close. ngc4485 much fainter.
ngc4631 – Bright, easy and large. Long and thin. Star just north of centre. Very impressive.
m94 – Abnormally bright galaxy. Core particularly bright. Halo pretty bright too. Reminiscent of a globular cluster.
ngc5005 – Pretty looking galaxy. Aligned e/w(?). Mottled core when using 9mm eyepiece?
m63 – Bright galaxy - brightish core and obvious halo. Nicely set with field stars.
Upgren1 – Coarse open cluster. Not obvious where boundary is. 12 - 20 stars depending on where boundary is. Bright. Who says that this constellation doesn't have any open clusters?!
m3 – Breath taking globular cluster. 7mm eyepiece gives best view. Arcs on west and north sides. Southeast side slightly flattened. Gives impression of hurtling south wards through space!
ngc5353/5354 – Faintish but delightful pair of galaxies – reminiscent of "poor man's m51". Nice backdrop too.
ngc5194/5195 – m51. Super! Core surrounded by extensive halo. Two arms pop in and out with averted vision. No sign of bridge connecting the two galaxies.

VULCANISM ON TITAN?



The domed feature photographed above by the Cassini probe in orbit around Saturn is suspected to be an ice volcano, or cryovolcano. The photo was taken infrared light through the hazy atmosphere on Titan, which is the largest satellite in the solar system – in fact larger than the planet Mercury. The surface temperature on Titan is around -180 degrees Celsius, so lava welling up to form the volcanic mound will be very cold indeed. It could be a slurry of methane, ammonia, and water ice combined with other ices and hydrocarbons. The circular feature is about thirty kilometres in diameter. If it is indeed a volcano, then the discovery of cryovolcanism on Titan could explain the origin of methane in Titan's atmosphere. Before the Cassini-Huygens mission to Saturn, a popular explanation for replenishing Titan's concentration of atmospheric methane was the presence of an extensive, methane-rich, hydrocarbon sea. But Cassini's instruments and the Huygens surface probe have failed to find such a global ocean.

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

12th September 8pm. Our first speaker meeting of the new year.

Watch the AAS web site for the new programme:
http://www.abingdonastro.org.uk

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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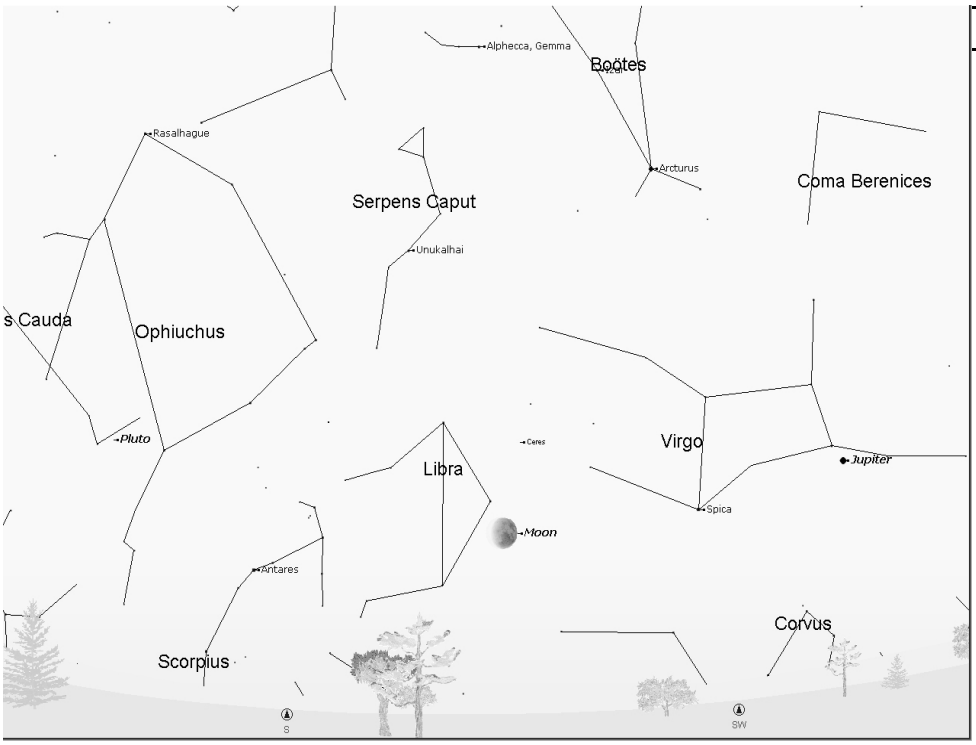

STAR CHART

Looking south at 11.30pm next Saturday (18th June):

Although Jupiter is bright in the south in the early evening, by the time it gets dark enough to see many stars, it is already getting low in the south-west. The Moon is almost full this weekend. If you haven't yet seen Ceres, the largest of the minor

planets between the orbits of Mars and Jupiter, then try searching for it this week to the east of red Spica.