SPACEWATCH

the newsletter of the Abingdon Astronomical Society

10th January 2005

Prof. Richard Harrison – Rutherford Appleton Laboratory

"Oxfordshire's Space Centre"

A Happy New Year to you all. I hope you are managing to do some observing in between the showers, and that your telescope or observatory roof has not been blown away!

THE NIGHT SKY THIS MONTH

by Bob Dryden

The Planets:

Saturn: Now easily visible in the evening sky, Saturn is a stunning sight in virtually any telescope. Still in the constellation of Gemini, it is easy to find, being just below the bright stars Castor and Pollux. The planet reaches opposition (ie: is opposite the Sun in the sky) on 13th January and rises as the Sun sets. The rings are still wide open, although they are starting to close up now, and the disc will soon be visible above the edge of the rings again.

Jupiter: In Virgo, Jupiter still does not rise until late in the night but it is unmistakable once it is above the horizon being at magnitude -2.3.

Uranus and **Neptune** are now too close to the Sun to be visible at the moment. The other three main planets are all fairly close together in the morning sky. However, as it doesn't get light until relatively late at this time of year, it is quite easy to step outside before it is too light to look for them. They are all very low in the south-east, in and around Sagittarius. Venus and Mercury are close together in the middle of January before Mercury moves too close to the Sun to be seen. In fact on January 12th and 13th the two planets are only 19 and 20 arc minutes apart. It will probably take a determined observer to find them though. Venus actually reaches its most southerly point in the sky on January 13th, and it is now moving ever closer to the Sun and will soon be lost in the glare. Mars is slightly higher than the other two but is relatively faint. If you can see them, Mars passes between M8 (Lagoon Nebula) and M20 (Trifid nebula) on February 7th and 8th.

Comets: While there are four comets brighter than 11th mag visible this period only one will attract the attention of most of you. The three fainter ones, 62P Tsuchinshan, 69P/Taylor and C/2003 T4 Linear were all mentioned last month. They are in Coma Berenices, Cancer/Lynx, and Lyra/Vulpecula respectively. Tsushinshan and Taylor are about 10 to 10.5 mag while Linear is brightening from 9.5 to about 8.5 by the middle of February so this one could be of more interest (it is actually going to get to about 6th mag in March)soon. The best comet is **C/2004 Q2 Machholz** which has put on an excellent show through the first part of January. It easily reached naked eye brightness and while it is now past its best, it should still be easily visible in binoculars as it passes through Perseus and Camelopardus. Whether it develops a decent tail we will have to wait and see.

Occultation: For those who like occultations, there is a fairly easy one to watch on the evening of 18th January. The Moon occults a 5.4 mag star in Aries at 16.50 UT, and any small telescope will show you the event.

MOON PHASES:

Last Qtr: 3rd Jan.; New: 10th Jan.; First Qtr: 17th Jan.; Full: 25th Jan.; Last Qtr: 2nd Feb, New: 8th Feb.

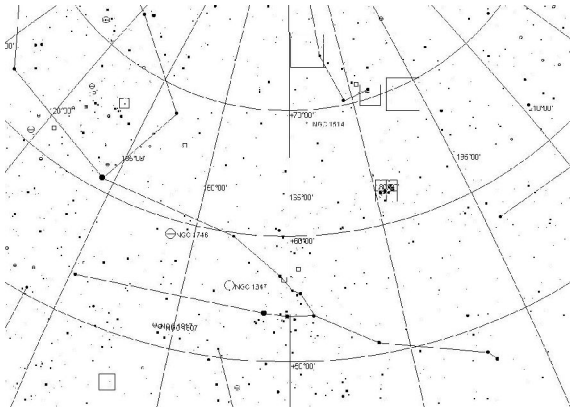
THIS MONTH'S DEEP SKY OBJECTS

"Grabbing the Bull by the Horns..."

by Paul Warren

This month I'm going to take you on a little tour of the constellation of Taurus. Also, I'm going to omit its two most obvious deep sky objects (M45 and M1) and concentrate on its not-so-well-known offerings.

I won't be describing how to find the DSOs this time. They're all marked on the finder chart, but if you want to observe them yourself, then I suggest you use a proper chart for the job (Star Atlas 2000, Norton's, computer generated one etc.).



All of my observations in the following paragraphs were made with a Celestron C8 SCT [8" Schmidt-Cassegrain]. Unless indicated otherwise, I think that all of the DSOs should be within the grasp of a 5 inch scope.

We'll start off with NGC 1514, which is a nice little planetary nebula. When I first looked at this object, all that I could see was the central star, a white dwarf. In my experience, this is an unusually bright central star. With some effort I could only just make out a little of the surrounding nebulosity. However, with a nebula filter in place, the surrounding nebulosity was immediately obvious. Whilst the central star will be visible in a 5 inch scope, I'm not at all sure if the nebulosity will be seen, even when equipped with a nebula filter and using averted vision.

The next port of call is NGC 1647, which is a large, loose and bright open cluster. It stands out quite readily and I counted more than 60 stars in it.

Our next stop is NGC 1746, and this is a tricky cluster! Not because it is faint, but because it is so large and has condensations within it. Therefore it is easy to think that one of the condensations is the cluster itself. Thus you want to view it with as large a field of view as you can manage. There are some nice bright colourful stars in this cluster.

And finally, keeping the best to the end, we come to the double cluster. No, I'm not confused! Taurus really does have its very own double cluster, though it's not on the same scale as The Double Cluster in Perseus. NGC 1807 and NGC 1817 are two open clusters, sitting side by side and fit comfortably in the same field of view. They make an interesting study of contrast, as NGC 1807 is a relatively sparse cluster, though with brightish stars in it, whereas NGC 1817 is much richer, but with fainter members. I counted about 20 stars in NGC 1807 and whilst I could only count around 40 for NGC 1817, there were a lot of unresolved stars there. More stars can be seen by increasing the magnification, though you'll no longer be able to see both clusters at the same time.

So the next time that you're out observing in Taurus, go and grab the bull by the horns and search out its lesser known denizens!

WHAT'S THIS MAGNITUDE THING?

Part 2 of an article by Guy Yeates

In Part 1 of this article last month, Guy explained the meaning of magnitude and talked about early visual observations. This month he goes on to talk about the way the advent of photography affected our definition of magnitude.

To get better data on star brightness along comes photography. This technology was employed to allow objective measurements of stellar brightness to be made. At last human subjectivity (& associated arguments) can be put to one-side. But this technology raises a further problem. Photographic emulsion and the human eye respond to different ranges of colour in the spectrum: the human eye is towards the red and the photographic emulsion towards the blue. Magnitude estimates made by eye therefore differ from those made by photography since stars differ in the distribution of light they emit across the electromagnetic spectrum. The difference in magnitude estimated visually versus the estimate made photographically gave astronomers a colour index and thus a handle on stellar colour. The UBV system was shortly introduced, This is a combined magnitude measurement and is an average of values determined light intensity measured at 3 points along a star's spectrum: 350 nm (U, ultra violet), 435 nm (B, blue region), and 555 nm (V, visible region). Infrared astronomers have adopted a similar method for their preferred end of the spectrum.

Since magnitude is a relative value a standard or baseline star was required against which other stars and objects could be compared. The first choice was Polaris but shortly afterwards this star was found to be a variable and therefore unsuitable as a 'standard zero (0) magnitude star'. The star eventually chosen was Vega and it was assigned 'magnitude 0' for both magnitude systems centred on the visible and infra-red parts of the spectrum.

Yet another round of formalisation was introduced in the 20th century with the expansion of the existing magnitude into three types to account for both differences in stellar distance and colour.

The original magnitude system was based on the brightness of stars as seen from Earth and is referred to as the apparent magnitude ('m'). Since starlight is dimmed as it travels through the atmosphere, light is dimmed less from stars overhead than from those seen near the horizon. Therefore measured magnitudes need to be 'normalized' to an equivalent value if the atmosphere was not present.

Stars vary in both size (and therefore intrinsic brightness) and also distance from the earth and both these factors influence apparent magnitude. To eliminate the distance factor the absolute magnitude ('M') was introduced which is the equivalent 'm' value of a star when placed at 10 parsecs (32.6 light years) from Earth. The Sun's 'm' value is about –24 but its 'M' value is only 5. A third, less well-known, magnitude is the m[bol] or bolometric magnitude which is the brightness of an object when adding up all the light emitted by the star at all frequencies. This method removes the influence of colour (spectral distribution differences) so allowing comparisons to be made between a hot UV intense blue star and a faint infra–red heavy brown dwarf. This is the most "academic" of the three types of magnitude and as such you rarely see this value in astronomy books. [By the way a bolometer is a device that measures the emission of light across a broad range of frequencies all at once. Its spectral range is only limited by the nature the detector being used.]

So overall the magnitude system may be considered as arcane and annoying with its seemingly arbitrary 'baselines' and negative values, but the system closely resembles the way your eye reponds to light [as a non-linear detector]. So when a star atlas shows a 4th magnitude star close to a 1st magnitude star you know roughly in your mind how the star will look in comparison to its brighter sibling. The human eye and magnitude system have a highly dynamic range and one implication of this is that small numbers can represent 'huge'

brightness ratios e.g., a magnitude difference of 20 corresponds to a brightness ratio of 1 to 100,000,000. To some extent these low numbers can be misleading by making the reader underestimate the faintness of a star observed with the Hubble telescope as compared to a 6" Newtonian telescope after all mag 24 doesn't sound all that much dimmer than magnitude 13 ?!.

I've mentioned above that magnitude values have been determined for our Sun which is an extended, i.e, non point-like, object, as is the Moon. But with faint extended objects such as galaxies and other deep sky objects the magnitude system then seems to trip-up. The magnitude is often quoted as parameter with which to rate a telescope and as a rule of thumb: the 'bigger the objective', the 'bigger the magnitude' (which actually equates to 'the fainter the star'). It's a nice basic relationship which can be tested and relied upon whichever star you're hunting down. But galaxies are a different kettle of fish. There may be two galaxies of the same quoted magnitudes: one is visible the other not. There are many examples like this where a simple magnitude value is no guide as to whether the object can be seen. In fact magnitude is not even half of the story as to why M74 for example is nigh-on impossible to see at mag. 9.2 whereas I've seen NGC 6229 quite clearly from Didcot. Well there is an explanation, not a complete one mind you, but one worthy of a future article.

DARK SKIES IN OXFORDSHIRE

By Deborah Hambly

I took on the role of CfDS rep for Oxfordshire last April, because of the increasing problem with light pollution first of all in my village, but also throughout our county and country.

I have been offering assistance in dealing with relatively minor street-lighting issues on a one-by one basis, while I am also getting involved at the national level with lobbying the DIY stores to make lower wattage bulbs available for 500W fittings, and to provide proper information about light pollution to customers before they buy such products.

However, I'm aware that throughout Oxfordshire we have various sites with massive amounts of light pollution, which could be improved. I would like to get your feedback on what you believe are Oxfordshire's lighting "hot spots."

It would be preferable, but not necessary, if you would make suggestions about solving lighting problems that are relatively near to where you live, eg. Are there any Wallingford members who are interested in improving the angle of the lights on the Wallingford sports pitch? If you don't want to send your address details to the group, then please feel free to send these details to me privately. If you have access to a digital camera and can take some photographs of the lighting, this would also be useful.

I will be taking suggestions at a this meeting, but please feel free to e-mail suggestions to the mailing list so that we generate the best targets and those which affect our members the most. If someone makes a suggestion to a problem area which also affects you, please write me privately to confirm your interest.

NOTICES

Programme Change

There is a change to the published programme: On June 13th, we have a change of speaker. Dr Darren Baskill of Leicester University will give a talk entitled 'X(rays) Mark the Spot'. This replaces the advertised talk on Stonehenge by committee member Deborah Hambly, who is shortly emigrating to New Zealand. I'm sure you will all join me in wishing her the best of luck 'down under', and we look forward to hearing tales of light-pollution-free southern skies from her in due course.

If anyone would like to take over from Deborah on this society's committee, then please see Bob, or contact any committee member.

CfDS Local Co-ordinator – Oxfordshire

Deborah is also looking for a volunteer to take over as the Oxfordshire local representative for the Campaign for Dark Skies, a BAA initiative to reduce the amount of light pollution in the skies of Britain. Please see Deborah at this meeting or contact her over the next month.

Observing site

We would still like to find a suitable permanent observing site. It needs to have car parking, be dry, easily accessible, and fairly dark. Obviously, the last requirement is relative as it's difficult to find a truly dark site anymore. We would be willing to pay an annual rent for the use of a site, but we are not rich so the sum would have to be moderate. Does anyone know of an organisation/farm/charity, etc. with some bit of land/car park/similar, that they don't use at night who might be willing to let us go there? Ideally, we would like to stay close to Abingdon but our option may not be that great. Please note, we do NOT want to build an observatory, or anything else for that matter. We just want somewhere to set up the telescopes, as we do on an observing evening at the moment.

Observing Evenings Organiser

We are also asking for a volunteer to take over the organising of the Observing Evenings. The new organiser would take over from this coming September as the present programme has already been arranged. Whoever takes over does not have to keep to the present arrangements of 'the first clear night' etc, or just one observing week a month. He/she can do as they like in this regard, and even organise the events at the actual evening if they want to. We are really going to need a volunteer because without one there will be no observing sessions

next season at all as Bob definitely cannot continue in this role. So, if you want to have a chat with Bob about the job, even if you are only considering the position, feel free to phone or email, or see him at one of the meetings.

FURTHER DISCUSSION

The society's e-mailing list is used by members to comment on all things astronomical, as well as other related and not-so-related subjects. The list is also used to publicise "first-clear-night" observing evenings and for alerting members to hot observing news.

To view the messages on the web go to:
http://www.smartgroups.com/groups/abastro .

To subscribe to the list either go to this web page and click on "Join the Group" or send an email to abastro-subscribe@smartgroups.com . You will then receive all e-mails sent to the list. To post e-mails on the list: send an email to abastro@smartgroups.com . To unsubscribe: send an email to abastro-unsubscribe@smartgroups.com

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

Our webmaster, Chris Warwick 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.

DATES FOR YOUR DIARY

17th Jan: 8pm. Beginners' Meeting in the Perry Room.

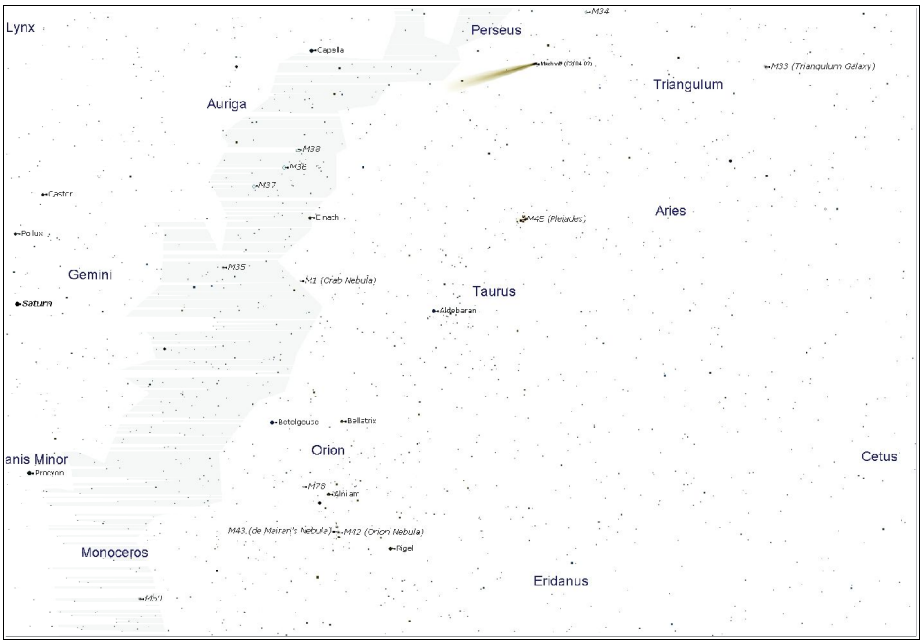
7th – 9th Feb. (FCN*): 8pm Observing Evening at Abbey Meadow, Abingdon [FCN = 'first clear night' – ring Bob on 01491 201620 to confirm before setting out.

14th Feb.: 8pm. Speaker Meeting: Dr. Andrew Ball (Open Univ.), "Landing on a Comet".

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your help and contributions. Please send any news, observations, photos, etc. to:

Mail: A.T.Ramsey, 35 Cope Close, OXFORD, OX2 9AJ.

E-mail: AbAstro@ATRamsey.com Phone: 01865 245339



STAR CHART

View looking south(ish) at 8pm next Saturday (12th January).

From Orion's belt, follow the line of the three stars westwards (to the right) until you find the bright reddish star Aldebaran – the red eye of Taurus, the Bull, surrounded by the very open cluster, the Hyades.

Beyond there, continue to the tighter cluster, the Pleiades, or Seven Sisters. To the right of those, and rising slightly every night is Comet Machholz. Sweep the area with binoculars and you will easily find it. It is currently about 30 million miles away from Earth. Go to a dark site, and you'll see it with your naked eye.

It appears as a fuzzy blob – this is due to all the gas and dust coming off it as the Sun heats it up during this, its short approach into the inner Solar System, before it once more returns to the freezing outer parts.