

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

8th March 2010

Allan Chapman (Oxford University),
'Astronomy and the Early Royal Society'

Tonight we welcome back a very popular speaker – Allan Chapman, professor of the History of Astronomy at Wadham College, Oxford. Tonight he is going to talk about the early history of that most eminent scientific institution, the Royal Society.

THE NIGHT SKY THIS MONTH

by Bob Dryden

Sun: The 20th March see the Sun in Pisces, and at 17.32 UT it crosses the celestial equator heading north. The name for this moment, of course, is the equinox, when the length of the day and the night are equal, and spring begins in the northern hemisphere.

Mercury: After passing behind the Sun on 14th March, Mercury reappears in the evening sky into what is the best evening apparition of the year. It reaches Greatest Elongation East on 8th April, at a distance of 19° from the Sun. So the best time to see the planet will be the last week of March and the first week of April. It will still be visible outside of these times but harder to see. At the end of March Mercury will be below and to the right of Venus, but in early April it will be just to the right of Venus.

Venus: Now visible in the evening sky, Venus is low in the south west after sunset. In early March Venus is about 10° above the horizon at sunset, but this has increased to 20° by early April. At magnitude -3.8 the planet will not be hard to see. In a telescope, the phase of the disc is nearly full (about 95% sunlit) but its apparent size does increase from 10.1" to 10.8" during this session as Venus approaches Earth in its orbit. On the evening of 16th March there will be a thin crescent Moon just to the right, and below Venus. By the 17th the Moon will have moved to above and right of the planet.

Mars: Now well passed opposition, Mars is at a good height as night falls and, in fact, is above the horizon for most of the night as it slowly moves amongst the stars of Cancer. It fades from mag. -0.5 to mag. +0.4 as Earth gets further away, and so the apparent size of the disc shrinks to 8.5" by mid April. This is getting rather small for views of detail on the surface, so this is probably your last chance to see anything this apparition.

Jupiter: Jupiter is too close to the Sun for observation for most of this session. It does start to creep into the morning sky by mid April though, and on 11th and 12th April there is a crescent Moon nearby to help you find the planet. At magnitude -2.0 Jupiter is bright, but very low down so expect to have to use binoculars to find it.

Saturn: At opposition on 22nd March, Saturn is in Virgo and visible for the best part of the night. In early March Saturn rises around 19.30 UT and by mid April it is already about 20° above the horizon as the Sun sets. It is nice and easy to see at magnitude +0.5, and a telescope will show you that the rings are closing slightly during early spring, going from an angle of 3.7° to 2.3°.

Uranus + Neptune: Both these planets are too close to the Sun during this session although Neptune may be visible very low in the south east just before sunrise by mid April.

Occultations: There are two occultations of fairly bright stars this session:

The first is on 9th March at 05.03 UT when the mag. +2.9 star, Lambda Sagittarius is occulted by the crescent Moon. Just over an hour later, at 06.17 UT, the star reappears, although this may be a slightly harder observation as sunrise will not be far away by this time. The Moon will be about 10° high in the south during this time so you will need a fairly clear horizon.

The second occultation is of Omicron Leo on 27th March. This star is magnitude +3.8 and it is hidden by the gibbous Moon at 01.59 UT. As the Moon will be rather bright, you will probably need a small telescope to watch this event. The Moon will be in the west, about 20° high at the moment of occultation.

Comets: For yet another session, the two comets on view are the same as the ones mentioned in the last two Spacewatch. This will be your last chance to see comet 81P/Wild even though it is still brightening at the moment. It reaches mag. +8.5 by early April as it continues to cross Virgo, just north of the bright star Spica. However, by the end of April it is fading very rapidly and will soon be very faint.

The second comet, 2007 Q3 Siding Springs, while not so bright as comet Wild, is circumpolar, so on view all night. It fades from magnitude +9.4 to +10.1 which means it is definitely a telescopic object. Again, this is your last chance to see it really as it drops below 11th magnitude by the end of April. It can be found in the constellation of Draco, not far from the bowl of Ursa Minor.

Asteroids: Our old friend, 4 Vesta, is still around, to be found within the Sickle of Leo. Now past its best, it is fading as it moves away from Earth. It goes from magnitude +6.3 in March to +7.0 in April. This still means however that you only need a pair of binoculars to see it if you know which 'star' it is.

We have a different asteroid to look at this session as 2 Pallas starts to brighten. Still a reasonably faint magnitude +8.7 by April, Pallas is crossing a constellation many of you may not know, Serpens Caput, which is next to Boötes and Hercules. Unfortunately this apparition, Pallas will increase in brightness by a fraction, so will remain a slightly difficult target for binoculars.

Algol: With Perseus still in a good position, watching eclipses of the star Algol are still possible. Eclipse minima are on 23rd March at 03.0UT: 25th Mar at 23.8UT: and 28th Mar at 20.6UT.

MOON PHASES:

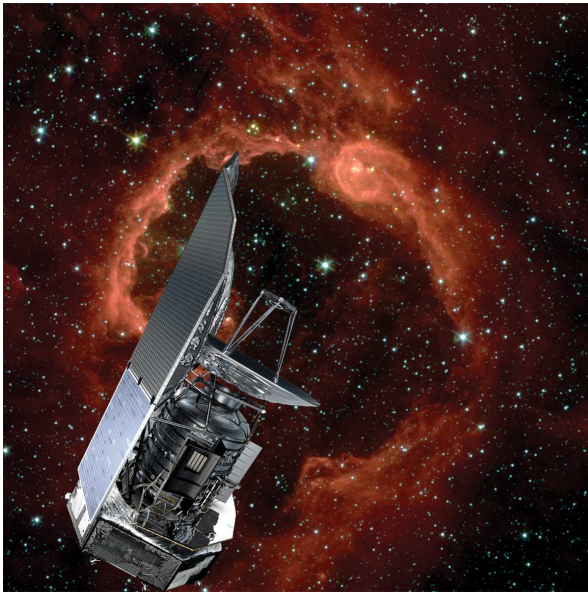
New: 15th Mar.; First Qtr: 23rd Mar.; Full: 30th Mar.; Last Qtr: 6th Apr.



FLIPPING THE LIGHTS ON COSMIC DARKNESS

Exploring the universe is a bit like groping around a dark room. Aside from the occasional pinprick of starlight, most objects lurk in pitch darkness. But with the recent launch of the largest-ever infrared space telescope, it's like someone walked into the room and flipped on the lights.

Suddenly, those dark spaces between stars don't appear quite so empty. Reflected in the Herschel Space Observatory's 3.5-meter primary mirror, astronomers can now see colder, darker celestial objects than ever before—from the faint outer arms of distant galaxies to the stealthy “dark asteroids” of our own solar system.



The Herschel Space Observatory has 3.5-meter primary mirror, allowing astronomers to see colder, darker celestial objects than ever before.

Many celestial objects are too cold to emit visible light, but they do shine at much longer infrared wavelengths. And Herschel can observe much longer infrared wavelengths than any space telescope before (up to 672 microns). Herschel also has 16 times the collecting area, and hence 16 times better resolution, than previous infrared space telescopes. That lets it resolve details with unprecedented clarity. Together, these abilities open a new window onto the universe.

“The sky looks much more crowded when you look in infrared wavelengths,” says George Helou, director of the NASA Herschel Science Center at Caltech. “We can't observe the infrared universe from the ground because our atmosphere blocks infrared light, and emits infrared itself. Once you get above the atmosphere, all of this goes away and suddenly you can look without obstruction.”

Herschel launched in May from the Guiana Space Centre in French Guiana aboard a European Space Agency Ariane 5 rocket. Since then, it has expanded the number of distant galaxies observed at far

infrared wavelengths from a few hundred to more than 28,000. And with the instrument testing and system check-out phases finally completed, the discoveries are only now beginning.

Beyond simply imaging these dark objects, Herschel can identify the presence of chemicals such as carbon monoxide and water based on their spectral fingerprints. “We will be able to decipher the chemistry of what's going on during the beginnings of star formation, in the discs of dust and gas that form planets, and in the lingering aftermath of stellar explosions,” Helou says.

And those are just the expected things. Who knows what *unexpected* discoveries may come from “flipping on the lights?” Helou says “we can't wait to find out.”

Herschel is a European Space Agency mission, with science instruments provided by a consortium of European-led institutes and with important participation by NASA. See the ESA Herschel site at sci.esa.int/science-e/www/area/index.cfm?fareaid=16. Also, see the NASA sites at herschel.jpl.nasa.gov, www.herschel.caltech.edu, and www.nasa.gov/mission_pages/herschel. Kids can learn about infrared light by browsing through the Infrared Photo Album at The Space Place: spaceplace.nasa.gov/en/kids/sirtf1/sirtf_action.shtml.

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LAST MEETING'S TALK

by Gwyneth Hueter

If you were Galileo, a two inch telescope would have been an extremely large telescope (ELT), but, as Dr Fraser Clarke from Oxford University explained, things have moved on a bit since then...

Technology dictates, and the earliest telescopes were refractors, then as mirror technology took off with aluminisation, reflectors got bigger and bigger with the Mount Wilson and Mount Palomar 100 and 200 inches respectively (everyone has forgotten about the 6-metre alt-azimuth Russian flop). The Palomar telescope is still involved in front line science but single mirror telescopes had reached their limits. The glass blocks needed to create them were too heavy, bent under their own weight and took ages for their temperatures to settle in readiness for a night's observing.

In 1993 the two 8-metre Keck telescopes saw first light, as did the next technological step – segmented mirrors. The Keck mirrors consist of 36 1.8m hexagonal segments, and are kept aligned via adaptive optics technology. And there you have the basic concept of ELTs.

(In between all this, came the drive to put telescopes in space. Hubble has continued to stun us with its amazing views of the universe, but its 2.4m main mirror is puny in comparison with what adaptive optics can do. Remember, doubling an aperture size makes it 16 times more sensitive. [Ed. Ask Gwyneth for the maths on this...])

The adaptive optics help to counteract the effects of the atmosphere but you need a beam-splitter and a guide-star. Not much good if you are dealing with a very small area of sky, so an artificial star is used, namely a sodium laser which can reach up to 90km into the atmosphere (and hopefully not be visible from Faringdon).

This next generation of ELTs is hopefully due for first light in around 2018, the GMT ('Giant Magellan Telescope') at 25m, the TMT at 30m (hence, 'Thirty Metre Telescope') and the E-ELT at 42m ('European Large Telescope').

Dr Clarke gave us a description of the E-ELT, whose main mirror (focal ratio = f/1) will have 984 segments of 1.4m each, and every day, two of these segments will be removed for recoating. The secondary mirror will be 5.7m and there will be three other mirrors dealing with the adaptive optics and folding the light into the sensors. Its location is not yet finalised, but will be either on La Palma (Canaries) or in Chile. Dr Clarke then finished off by giving us tasters of all the exciting discoveries we hope to make when these telescopes start operating. RAL and Oxford University will be involved in producing OPTIMOS which will conduct spectroscopy and galaxy surveys.

FURTHER DISCUSSION

If you are not already on our internet mailing list, then why not log on to YahooGroups. The list is called 'abingdonas'. Members use the list to alert each other about celestial events and to chat about amateur astronomy. The list is quite active, with several messages most weeks. To read through previous messages click on:

<http://groups.yahoo.com/group/abingdonas/> .

To join the abastro list, please go to <http://www.yahogroups.com> . You can also unsubscribe from the list here.

To post messages to the list, please send them to abingdonas@yahogroups.com . Please note that you will need to sign up with a YahooID if you do not already have one. You can do this on the above page.

Further information about the mailing list can be found on the abingdonas webpage at : <http://groups.yahoo.com/group/abingdonas/> .

Further discussion on astronomy and many other topics takes place at the Spread Eagle pub in Northcourt Road after the meeting. You are most welcome to join us.

AAS IS NOW ON TWITTER

A new way of using Twitter for AAS messages and alerts

A couple of weeks ago we set up a Twitter account for Abingdon AS with the intentions that it could be used for updates about AAS meetings and observing sessions and also for members to alert each other about ongoing aurorae, meteor showers, etc. Unfortunately, while the Twitter account - as originally set up - could fulfil the first intention, there was no easy way for it to allow members to alert each other.

This deficiency has now been rectified by using Twitter in conjunction with a similar 'microblogging' service called Identi.ca. Whether you will need to sign up with Identi.ca depends on how, individually, you want to use this facility. Various types of usage are listed below together with what the user will need to do. Numbers in brackets refer to footnotes with further details at the end of this article.

To receive meeting updates and alerts from fellow members via SMS text message:

If you do not have one already, set up a Twitter username(1) and arrange for it to follow the Twitter user abingdonastro(2). Then provide your Twitter account with your mobile phone details (3) so that you can be sent text messages. You will only be able to do this

if your mobile phone is connected to the Vodafone, O2, Orange or 3 networks. As yet T-Mobile and Virgin Mobile do not have arrangements to receive Twitter texts.

To send alerts to other members from your mobile phone:

Set up an Identi.ca username (4) and use it to join the abastro Identi.ca group (5). Then download an Identi.ca 'client' program (6) and install it on your phone. Once you have set it up to access your Identi.ca account you can use it to send messages to the group members by including !abastro in the message. Group messages will be automatically forwarded to the Twitter account.

To receive meeting updates and alerts from fellow members on your phone but not by SMS:

Set up an Identi.ca username (4) and use it to join the abastro Identi.ca group (5). Then download an Identi.ca 'client' program (6) and install it on your phone. You will then be able to receive messages from other abastro Identi.ca group members and also to send them (see above).

To send and receive messages from your PC/Mac without using the Identi.ca website:

Set up an Identi.ca username (4) and use it to join the abastro Identi.ca group (5). Then download an Identi.ca 'client' program (7) and install it on your computer. You will then be able to receive messages from other abastro Identi.ca group members, and also to send them group members by including !abastro in the message.

To send and receive messages using the Identi.ca website:

Set up an Identi.ca username (4) and use it to join the abastro Identi.ca group (5). Use your browser to go to the abastro group page on the Identi.ca website (8). You will then be able to receive messages from other abastro Identi.ca group members, and - if you log in - also to send them group members by including !abastro in the message.

Footnotes

1. Set up a Twitter username and account: at <http://www.twitter.com> .
2. At <http://twitter.com/abingdonastro> and click the 'Follow' button.
3. Log in to your Twitter account at [http://twitter.com/\[your new username\]](http://twitter.com/[your new username]), then click the 'Settings' link and, on the 'settings' page click the 'Mobile' link and follow the instructions on the 'Use Twitter with Text Messaging' page.
4. Set up an Identi.ca username and account at: <http://identi.ca/>
5. Having logged in to your new Identi.ca account at [http://identi.ca/\[your new username\]](http://identi.ca/[your new username]), direct your browser to <http://identi.ca/group/abastro> and click the 'Join' link to join the 'abastro' Identi.ca group set up for AAS.
6. Examples include: Mobidentica from <http://www.substanceofcode.com/software/mobidentica/> for Java compatible phones; Gravity from: <http://mobileways.de/products/gravity/gravity/> for phones with the Symbian operating system; Yatca for RIM BlackBerry phones via <http://yatca.wordpress.com/>; iDent for the iPhone, which can be downloaded through iTunes.
7. There are many - see: <http://status.net/wiki/Apps?source=laconica> for a list covering various computer operating systems, including Windows, Linux, Mac OS. I use Spaz on my Windows XP PC and on my Linux PC. It uses some Adobe freeware, which has to be installed first, and works fine.
8. <http://identi.ca/group/abastro>

DATES FOR YOUR DIARY

15th – 17th Mar. (First clear night) 8pm Observing evening at Frilford Heath. Ring Ian on 07817 687627 on the night to confirm if we are meeting.

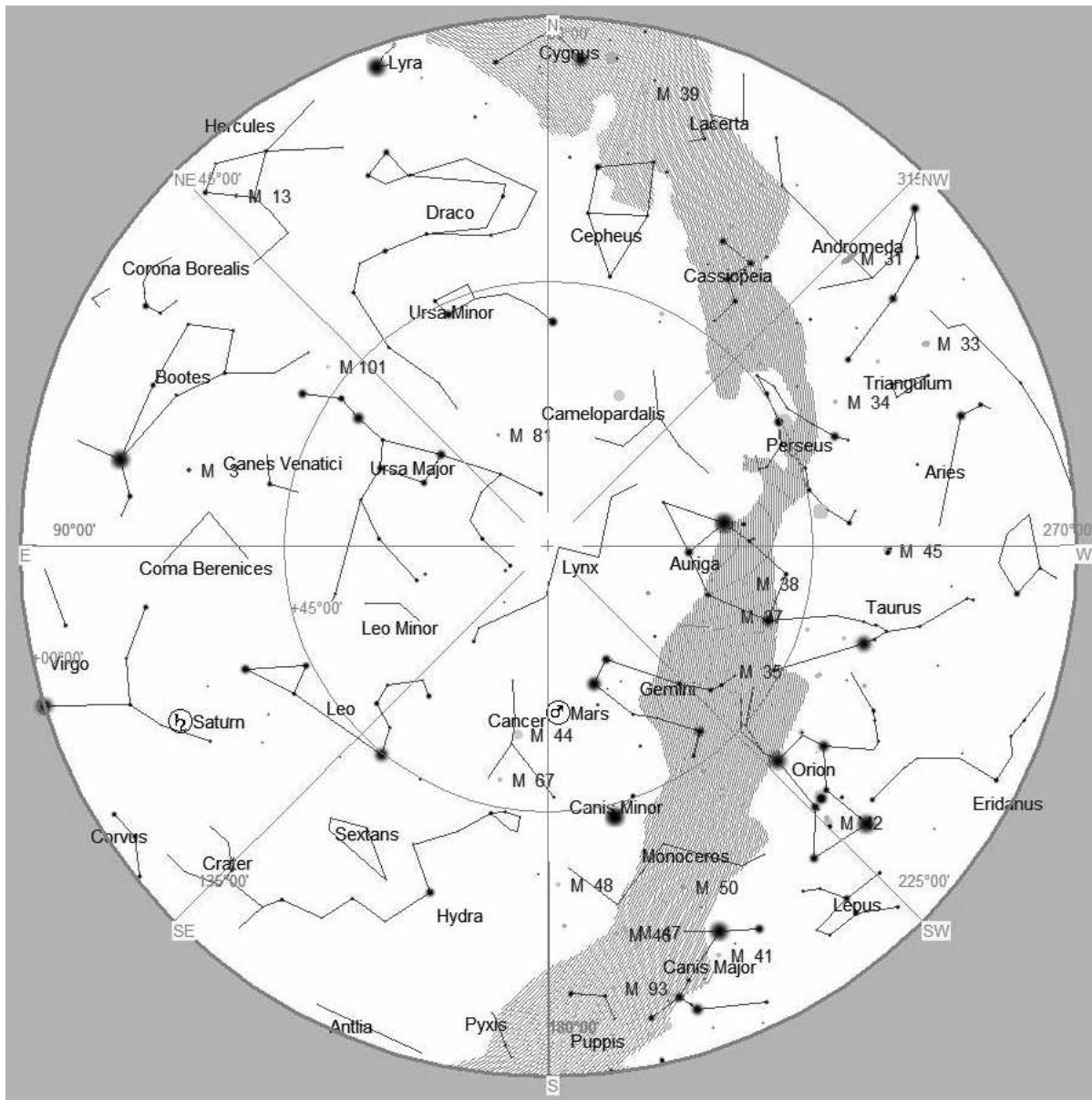
22nd Mar. 8pm Beginners' Meeting in the Perry Room.

12th Apr. 8pm Speaker meeting: Robert C Smith (University of Sussex), "Stars that go bang in the night"

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

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

STAR CHART



The Night Sky at 21:00pm (GMT) next Saturday (13th March)

Mars is due south at the moment and quite high in the sky. This more than makes up for the fact that it is further away and therefore smaller than it was two years ago. But if you haven't seen Mars this time around, make sure you do soon before it gets too close to the Sun – we are charging on ahead and leaving Mars behind in its slower moving orbit so it is getting smaller by the day. Further west is Saturn which reaches opposition this month – that means it will be due south at midnight.