

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

13th November 2006

Stan Cocking Memorial Lecture:

**Dr Allan Chapman
(Wadham College, Oxford) –**

**'Sir Robert Ball FRS, Astronomer &
Populariser'**

This month promises to be a bumper month for observing – clouds permitting, with a good view of Mercury after its recent transit seen from down-under; another promise of a Leonid meteor storm, a tight grouping of Mercury, Mars and Jupiter, and an occultation of the Pleiades by the Moon. The bad news? They're all visible either in the early morning or in the middle of the night so you will have to set your alarms early. But it'll be worth it!

THE NIGHT SKY THIS MONTH

by **Bob Dryden**

We have a rather exciting session ahead of us this time. There is an occultation of the Pleiades, a very tight grouping of three planets, a possible minor outburst of the Leonid meteors to look out for, and there could still be a descent comet to watch.

Planets:

Without doubt, the featured planet this session is little **Mercury**. It will come into view in the morning sky around the middle of November and will remain on view until about the middle of December. This will be the best morning apparition of Mercury for 2006. Greatest western elongation is on 25th November when the planet will be 20 degrees from the Sun. Mercury will be crossing Libra and Scorpius so you will need to look low in the south east just before sunrise. Its brightness will be increasing throughout the apparition so by mid December it will be a bright -0.7 mag. This means that from late November onward Mercury should be easily visible in binoculars and often easy to the naked eye.

Perhaps the highlight of the show will be around December 9th, 10th and 11th when Mercury, **Jupiter** and **Mars** will all be very close together. This will be the tightest grouping of three planets since 1974 and there will not be another this close together before 2029 so it is well worth making the effort to see this event. The best morning will be the 10th when they will all fit within a one degree field of view and a low magnification eyepiece should get all three in it at the same time. As well as the planets there will be a bright star, beta Scorpius, in the view just for good measure. The observation will be quite

difficult however because as the Sun rises at 08.00 UT the planets will be just 10 degrees high so you will need a good clear south, south-eastern horizon. They rise about 07.00 UT and by 07.30 UT they are about 5 degrees high.

The other main planet on view will be **Saturn**. In Leo, and at a bright magnitude of +0.5, it rises earlier and earlier so that by mid December it is above the horizon by about 22.00 UT. The rings are slowly closing and they are now at an angle of -12.5 degrees but a small telescope will still easily show them. If you try to see the planet grouping on the morning of 10th December, you will have an extra treat as the Moon will be very close to Saturn on that morning.

This is your last chance to have a look for **Uranus** and **Neptune** this year as they are getting ever closer to the Sun. A pair of binoculars is all you need to see mag. +5.7 Uranus in Aquarius and mag. +7.8 Neptune in Capricornus.

Venus is too close to the Sun to be seen at the moment.

Meteors:

The **Taurid** shower is still active until 30th November although we have passed the point of maximum. While there has not been the enhanced number of bright meteors that we had last year, it is still very possible you will see the occasional bright one at any time.

Towards the end of this session, the **Geminid** meteor shower starts. Active from December 7th to 16th, with maximum being on the 14th, activity will be possible, but low to start with.

The main, and most interesting shower could be the **Leonids**. This year there could be two maxima instead of the usual one. Active from November 15th to 20th, the normal maximum is at about 23.00 UT on the 17th. There will probably be about 20 meteors per hour at best around maximum time. However, this year there could be a second maximum at about 04.45 UT on the morning of the 19th. During the early years of 2000, a group of scientists developed a way of predicting when the Leonids would have enhanced activity and they became quite successful at making these predictions. The high number of Leonid meteors we enjoyed through 1999 to 2003 are over now, but there is this one last prediction of higher activity on the 19th. While it is only a prediction, the past success makes it likely it will be worth getting out of bed for. The extra activity will be short lived, probably less than an hour, but provided it is clear, circumstances are excellent as there will be no bright Moon and the radiant will be high. How many meteors you will see is anyone's guess but some people are guessing 100/150 per hour. This is only a guess however, as the prediction models only give time and date, not numbers. You will have to go out and look to find out!!

Occultations:

The exciting occultation event this month concerns the Pleiades star cluster. The Moon will pass over the cluster on the morning of December 4th. The first bright star will be occulted at 02.50 UT, and the last one at 04.55 UT. In-between these times there will be several other occultations at various times. The whole event occurs while the Moon is in the western half of the sky. As it starts the Moon will be about 40 degrees above the horizon and by 05.00 UT it will be lower at about 20 degrees.

The Pleiades are not occulted very often so even so the timing is rather unsociable, I would urge you to make the effort to see it. Preferably, you should use at least a small telescope to see most of the action. Binoculars will probably show you some of the brighter stars occulted but the Moon will be very bright as it is nearly full phase so it will drown out many of the fainter stars in binoculars.

Comets:

Comet **M4/Swan** has put on a fantastic display so far and it will still be on view throughout the rest of November and December. However, as it crosses Hercules and Aquila, it will be fading quite rapidly. By mid December it is possible it will be down to 9th or 10th magnitude, but so far the comet has been brighter than predicted so we will have to wait and see what happens.

Comet 4P/Faye is still on view as well. This one will be around 9th and 10th mag. as it moves very slowly through Cetus (just below Aries). It will not rise until later in the night and you will definitely need a telescope for this one.

Asteroids:

Yet again, asteroid **7 Iris** is still easily visible in Aries. While it is fading now, it will still be easy to see in binoculars as it will only be down to mag. 7.5 by mid-December.

LAST MONTH'S TALK

Danielle Bewsher of the Rutherford Appleton Laboratory is a solar physicist. Her talk, entitled "Living with a Star" was about the monitoring of solar activity using satellite and ground-based observations. The most well-known satellite is SOHO, situated at the L1 point between the Earth and the Sun. [Ed: 'L' is for Lagrangian, after Lagrange, a French mathematician – the L1 point is one of a few stable points where the Earth's and Sun's gravity balance each other.]

Dr. Bewsher described the importance of the monitoring of solar activity, especially coronal and sunspot. The most dangerous are coronal mass ejections (CMEs). If directed at us they can cause severe disturbance in the Earth's atmosphere. That means satellite interference and electrical blackouts. ISS occupants have to lie low! The most violent CME recorded caused mass blackouts in Canada and was even detected by the two Voyager spacecraft at the limit of our solar system.

MOON PHASES:

Full: 5th Nov.; Last Qtr: 12th Nov.; New: 20th Nov.; First Qtr: 28th Nov.; Full: 5th Dec.

NASA Space Place

THE PLANET IN THE MACHINE

by Diane K Fisher & Tony Phillips

The story goes that a butterfly flapping its wings in Brazil can, over time, cause a tornado in Kansas. The "butterfly effect" is a common term to evoke the complexity of interdependent variables affecting weather around the globe. It alludes to the notion that small changes in initial conditions can cause wildly varying outcomes.

Now imagine millions of butterflies flapping their wings. And flies and crickets and birds. Now you understand why weather is so complex.

All kidding aside, insects are not in control. The real "butterfly effect" is driven by, for example, global winds and ocean currents, polar ice (melting *and* freezing), clouds and rain, and blowing desert dust. All these things interact with one another in bewilderingly complicated ways.

And then there's the human race. If a butterfly can cause a tornado, what can humans cause with their boundlessly reckless disturbances of initial conditions?



CloudSat is one of the Earth observing satellites collecting data that will help develop and refine atmospheric circulation models and other types of weather and climate models. CloudSat's unique radar system reads the vertical structure of clouds, including liquid water and ice content, and how clouds affect the distribution of the Sun's energy in the atmosphere. See animation of this data simulation at:

www.nasa.gov/mission_pages/calipso/multimedia/cloud_calip_mm.html

Understanding how it all fits together is a relatively new field called Earth system science. Earth system scientists work on building and fine-tuning mathematical models (computer programs) that describe the complex inter-relationships of Earth's carbon, water, energy, and trace gases as they are exchanged between the terrestrial biosphere and the atmosphere. Ultimately, they hope to understand Earth as an integrated system, and model changes in climate over the next 50-100 years. The better the models, the more accurate and detailed will be the image in the crystal ball.

NASA's Earth System Science program provides real-world data for these models via a swarm of Earth-observing satellites. The satellites, which go by names like Terra and Aqua, keep an eye on Earth's land, biosphere, atmosphere, clouds, ice, and oceans. The data they collect are crucial to the modeling efforts.

Some models aim to predict short-term effects—in other words, weather. They may become part of severe weather warning systems and actually save lives. Other models aim to predict long-term effects—or climate. But, long-term predictions are much more difficult and much less likely to be believed by the general population, since only time can actually prove or disprove their validity. After all, small errors become large errors as the model is left to run into the future. However, as the models are further validated with near- and longer-term data, and as different models converge on a common scenario, they become more and more trustworthy to show us the future while we can still do something about it—we hope.

For a listing and more information on each of NASA's (and their partners') Earth data-gathering missions, visit science.hq.nasa.gov/missions/earth.html. Kids can get an easy introduction to Earth system science and play Earthy word games at: spaceplace.nasa.gov/en/kids/earth/wordfind.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

THE TRANSIT OF MERCURY

by former AAS member **Deborah Hambly**
in New Zealand

Last night [Ed. 8-9th Nov., NZ time] I brought three telescopes and a CCD occultation camera to Dargaville High School where I teach. I slept under the stars, being nervous about getting too far away from my computerised Meade SCT. It was its first night to 'sleep' outside and I was nervous about any rain, even though it had sheets and a variety of tarpaulins to cover it. I woke up at hourly intervals from 3pm to 5:30 (when the swim club arrived to train) and admired the incredible fortune I seemed to have with the weather - until about 6am!

My first public visitors arrived at 8am in gale force winds and I nearly brought the telescope in. I was just about to lose its alignment by bringing it in, when at 8:12 we had a beautiful break in the clouds. Frustratingly, the break wasn't long enough for me to get the three tarps off and get the solar filters weaved up and inside, but I was ready for the next gap and convinced to stick out the rain, hoping it wouldn't get into the scope.



Projecting the Sun's image onto a white screen – Mercury was seen as a small round dot moving slowly across the face of the Sun over a period of almost five hours.

The first class arrived at 9:00, and had to satisfy themselves with animations, pictures, and a brief explanation about the equatorial telescopes I had indoors. The next class arrived at 9:20 and miraculously the rain stopped, although the gale force winds didn't, and we got our first view. The Sun occasionally played hide and seek with us, but the next 230 students and another 20 staff and public got to see a 40cm solar projection of mercury, look through the 8" with a Thousand Oaks filter, and best of all - look for the prominence through the H-Alpha.

We have three disabled students at our school. A blind student came along and we demonstrated the event with the yellow balloons and a small table tennis ball. Another student who has no muscle control whatsoever was wheeled up to the projection screen for a close up view. Finally one of my albino student with only 10% vision was able to see colour in both scopes and make out the Sunspot in the projection. It was lovely that they weren't excluded.

Despite lots of preparation we were unsuccessful in videoing the egress as the first class of the day showed up for another try, and back came the rain and the clouds. I also found the Sun so bright that it was difficult to focus the camera on the TV set - despite that I had predetermined the precise focus. Having gale force wind didn't help, so I'm not sure if the images would have come out that well, but it would have been really nice to get

Mercury leaving the Sun - especially if there was any chance of picking it up against the chromosphere. All in all though, I can't complain at all. I had several female top students approach me to announce they wanted to become astronomers and they insisted on discussing then and there which subjects they needed to take at school to follow this career path!

The senior hospitality students who were catering for the event did a brilliant job enticing the morning visitors out to the venue in the pouring rain. One of the breakfast dishes was a Sunny side up egg, with a little currant to represent mercury. For lunch, one of the desert offerings was "Stargazer muffins" - vivid yellow lemon icing with chocolate chips.

It took nearly 3 hours to get my gear into two cars to come home as the skies closed in after the egress. On arrival home I was completely soaked getting from the car to the house. We are reporting gale force winds at the moment, and it doesn't seem any breezier than it was all day. I'm too tired to face unpacking back to the observatory, so that may have to wait until after I've caught up from having slept only a couple of hours last night. As I've seen both a transit of Mercury and Venus before, the highlight for me

was to be able to show it to so many people, and arouse so much interest in the event, and the gear.

FURTHER DISCUSSION

The Society's web site is 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.

DATES FOR YOUR DIARY

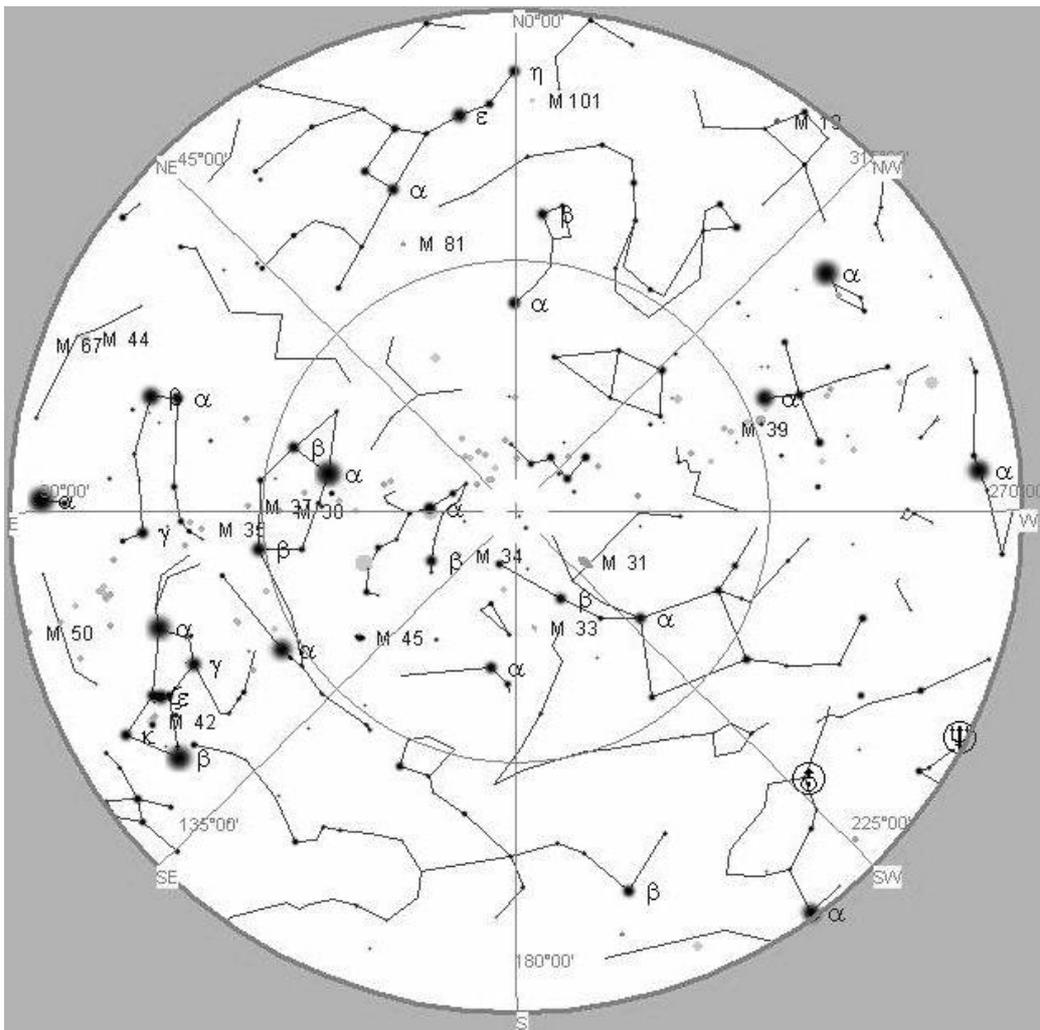
20th - 22nd Nov 8pm. Observing evening at Britwell Salome.

4th Nov. 8pm. Beginners' Meeting in the Perry Room.

11th Dec. 8pm. Speaker Meeting: Guy Hurst (Editor, "The Astronomer"): "Guest Stars, Ancient and Modern".

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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STAR CHART



The Night Sky at 10pm next Saturday (18th Nov.)