



Number 173

WAS NEWS

Monthly Newsletter of the **Worthing Astronomical Society**

Official website: www.was.org.uk

Affiliated websites: www.observatory99.freemove.co.uk



March 2004

Almanac

All times U.T.

March LUNAR

March				
Full Moon	6 th	23.14	17.12	06.54
Last Quarter	13 th	21.01	01.44	09.02
New moon	20 th	22.41	06.20	17.42
First Quarter	28 th	23.48	08.56	02.11

EARTH

March

6 th	06.34	17.50
13 th	06.18	18.20
20 th	06.02	18.14
28 th	05.44	18.27

PHENOMENA

March

Day	Hour	
1 st	11	Saturn 5°S of moon
4 th	02	Mercury in superior conjunction
4 th	05	Jupiter at opposition
6 th	18	Jupiter 3°S of moon
7 th	17	Saturn at stationary point
22 nd	08	Mercury 3°N of moon

Minima of Algol

March 6th 05.42 9th 02.30 11th 23.18

Dave Wells

Editors Note

Now your chance to enjoy this month's newsletter in full Dolby[®] colour – why not subscribe to WASNews electronically? Be the envy of your fellow AA (amateur astronomer) members when you show them your colour copy!!! So don't delay, send an email to wasnews@tiscali.co.uk

Rob

You know it masks sense!!!!

Dates for your Diary

Cancelled Observer's Nights

Graham Boots

I am sorry but I will be away for the two Fridays the 2nd and the 9th (Good Friday) April 2004 so there will be no Observer's Nights on those evenings.

Reports

The Planets in March 2004

Glen Thomas - Planetary Section Director

Mercury is now past superior conjunction (on the far side of the Sun) and is particularly high in the sky near the end of the month. Look for it as the sky starts to darken (see the table below). A pair of binoculars can be useful for the initial spotting before the time given, but Mercury should soon thereafter be visible to the naked eye.

Date	Time	Alt°	Azimuth°
Mar-14	18:38	3.0	269
16	18:41	4.8	270
20	18:48	8.0	271
24	18:55	10.4	273
28	19:01	11.6	276
30	19:05	11.6	278
Apr-03	19:12	10.4	281
7	19:18	7.4	285
10	19:24	4.1	288
11	19:25	2.9	290

Venus is now very well placed at over 30° above the horizon at the end of civil twilight and 46° from the Sun on the 30th (Venus's maximum eastern elongation and the best aspect for eight years).

Mars transits the meridian during mid-afternoon and sets

before midnight. At nearly 2 AU it is five times further away than it was at its closest last and 4 magnitudes dimmer. Mars is, however, still visible high in the SW evening sky, and can be found 10° from Venus towards the end of the month.

Jupiter was at opposition on the 4th and is at its best, visible from dusk to dawn. Look out for a new cloud feature transiting Jupiter's central meridian 2½ hours before the Great Red Spot; a thin bluish strip covering some 40° of longitude between the South Equatorial Belt and the Equatorial Zone.

Saturn is already in the SW when the sky darkens, but is still very high and well worth observing.

Uranus, Neptune and Pluto are not visible as they are too close to the Sun.

Asteroid **7 Iris** passes north-westerly through southern Leo during March. It is 1°20' SW of **47 φ Leonis** on the 12th and nearly 3° W of the same star on the 20th. Iris is magnitude 9 and so should be easily visible in small telescopes.

Rosetta launched at last!

Nick Quinn

After a year's delay, Europe's 2nd space mission to a comet is underway. It was originally intended that Rosetta would visit comet 46P/Wirtanen, but that changed when the mission had to be aborted early in 2003. Problems with the Ariane 5 rocket that was to have sent the probe into space meant that it missed the 'launch window' and a new target had to be selected. No problems with Ariane this time: the probe lifted off early on March 2nd from ESA's spaceport in Kourou, French Guiana. Now the destination is 67P/Churyumov-Gerasimenko which it will reach in 2014. The ten year mission will utilise the gravitational fields of Earth and Mars to build up the velocity needed to get it there and at least one asteroid will also be visited en-route.

Rosetta first returns to the Earth's neighbourhood in March 2005 where the gravity assist will boost the probe into an orbit that will take it to Mars in February 2007. From a distance of just 200 km Rosetta will conduct observations of the Red Planet before it returns to Earth once again where a further boost will fling the probe out as far as the asteroid belt. Finally, a third flyby of the Earth in November 2009 will send Rosetta on its final path towards the comet.

In August 2014, the probe will enter orbit around the comet's nucleus and release a 100kg lander, called Philae,

onto its surface. The comet should be dormant at this time but for the next year Rosetta will accompany the comet as it heads towards perihelion in October 2015. Studies of the comet and how it 'wakes up' in response to the Sun's warmth will greatly increase our knowledge of cometary science.

Comet 67P/Churyumov-Gerasimenko has a short period of 6.5 years. Currently it is 4.5 AU from the Sun and 3.8 AU from Earth heading out towards aphelion just beyond the orbit of Jupiter. In March 2009 the comet will reach perihelion 1.25 AU from the Sun before heading out to its next aphelion in 2012. When Rosetta gets to it, the comet will still be 3.7 AU from the Sun, but beginning to pick up speed as it races in to the inner Solar System.

Interestingly, this comet is greatly influenced by Jupiter and quite often its orbit is modified by the planet. In 1840 just such an encounter changed its perihelion distance to 3 AU from the 4 AU it was before that year. A further perturbation occurred in 1959 when the perihelion distance reduced again to 1.29 AU. Modelling using software packages such as 'Dance of the Planets', show the next Jovian encounter should occur in November 2018 when the perihelion will be further reduced to 1.21 AU before slowly increasing again.

February Meeting Reviewed

Report by Dave Storey

The speaker in February was Dr Robert Smith, on the subject of 'Solar Neutrinos'. This has become a legendary topic in astrophysics, only finally being solved in 2001.

Dr Smith started by reminding us of the various fundamental forces in nature. The neutrino is a particle associated with the weak nuclear force; having no electric charge, and an extremely low mass if any, it leads a rather ghostly existence, hardly interacting with ordinary matter at all. A neutrino moves at (or nearly at) the speed of light, and could travel through water for a year with only a fifty percent chance of any interaction! There are in fact three different types of neutrino namely the electron-neutrino, the muon-neutrino and the tau-neutrino.

Next solar models were discussed. By now astrophysicists have a good understanding of the mechanisms by which energy is generated in the Sun's core and then transported to the surface before radiating away. The Sun's energy originates in the nuclear fusion of hydrogen to helium, but this is a multi-stage process which can go via various different subprocesses. Several of these subprocesses involve the emission of neutrinos, which can have very different energies and fluxes, depending on exactly which subprocess they are generated in.

Now on to the experiments. Because of the very weak interaction of neutrinos with matter, vast amounts of detection material are required to capture just a handful of neutrino interactions. In the original Davis experiment of 1967, 85000 gallons of perchloroethylene (C₂Cl₄) were used, in a container 4850 ft deep in a gold mine in South Dakota. This unusual siting of the experiment was necessary to exclude other incoming particles such as cosmic rays; for the neutrinos though, a mile thickness of rock is hardly any obstacle at all! The neutrino interactions convert a chlorine atom to a radioactive argon atom. Every 3 months the argon atoms were swept out of the fluid into a small quantity of material, then it was a just a question of monitoring this to see how many argon decays are observed - there will be one per detected neutrino, typically only about 15 in total. The results are expressed in Solar Neutrino Units (SNU) and after various experimental correctins (e.g. for background events which are still present despite the one mile depth) the expected rate was about 7.6 SNU. Surprisingly, the observed rate was only about 2.56 SNU - this was the big puzzle! For a while the experimentalists and theoreticians each tried to work out why the other was wrong, but the answer had to wait for new experiments and new theoretical ideas.

New experiments allowed the detection to be extended into different energy ranges, so that more of the different fusion steps could be observed. Also, and very importantly, some of the new detection methods were sensitive to all three neutrino types. The original Davis experiment had only been sensitive to electron-neutrinos. Some experiments allowed the detailed observation of particle tracks resulting from the neutrino interactions, which reassuringly confirmed the Sun as the direction of the neutrino source!

On the theoretical side, work in Grand Unified Theories (GUTs) suggested that the neutrinos, previously assumed to be massless, might in fact have small masses, too small to be observable by particle physics experiments to date. Furthermore, a rather technical argument in theoretical physics shows that if this is true, then it is possible for the three types of neutrino to mutate into each other as they propagate from the Sun to Earth. And so the solution became apparent: the solar process Davis was observing generated only electron-neutrinos; and the Davis detector was only sensitive to electron-neutrinos; BUT during their journey to Earth, neutrino mutation took place, resulting in a random mix of the three types, so that Davis's measurement was reduced by just the factor of three needed to explain the discrepancy!

With more results in from the newer experiments, it is now possible to say that the difference between the electron-neutrino mass and the muon-neutrino mass must be at least 0.007 electron volts. It is remarkable that astronomy has been able to make a contribution to particle physics in this way.

Dr Smith's presentation included much more detail than I have recorded here, but this was very carefully and clearly presented, making it easy to follow the different stages in the development of this fascinating episode in astronomy.

After the break, Graham warned us that he intended to step down as Curator of the Observatory. This will be after an epic 34 years of service for which the society will be forever indebted! He will be staying on until the end of the current session however, which should give us enough time to make arrangements for the future. Graham has written about his decision in last month's WASNEWS, noting some of the key moments in the observatory's history. He will also be presenting a talk on the history of the observatory at a future WAS meeting; this will be illustrated with slides, and should be a fascinating insight into the work that has been carried out there.

Solar Section Report - February, 2004

Section Director, Brian Halls

Over the last two years or so, we have seen a very active Sun – indeed, probably more active in this cycle than others in recent years.

Sunspot activity remains in decline as one would expect during the downward phase of the cycle, though the Sun still remains an interesting object to observe.

We saw quite a decline in the number of active sunspots close to the end of January with activity picking up as the month finished. This period of activity continued into the first week of February. By the start of the second week, the number of groups began to decline before increasing and again falling.

This trend continued for most of the month.

The types of groups were varied too; from the smallest class of group – a single mono pole spot (class Axx) of which there were several during the month to larger E class spots like region 0564 (N15°L=161° size/class 0780/Ekc) which reached a theoretical naked-eye visibility in the last few days of the month.

With the coming of Spring (and hopefully) sunnier early mornings and sunnier later sunsets, we are given a better chance to follow solar activity than we were during the short days of winter.

SAGAS

Nick Quin

The last meeting of the Southern Area Group of Astronomical Societies (SAGAS), took place on Saturday 28th February at the usual venue of Stockbridge Hall in Chichester. As has been the case recently, attendance was low: after the chairing society, Crawley,

the next society in terms of numbers was Brighton with four members present. Ironically the Brighton societies are in 'hibernation' for the year due to the lack of a committee! Linda Croft and Nick Quinn attended on behalf of Worthing.

After the usual reports and discussion about what each society has been up to, the science writer, Nigel Calder, gave a short talk about SuperWASP, the Wide Angle Search for Planets. SuperWASP aims to photometrically survey large numbers of stars in the magnitude range 7 to 13 to better than 1% precision over a wide area of sky. Well sampled lightcurves for all the stars in each field will be used to detect planetary transits, track Near-Earth Objects and record optical transients. Interestingly, funding was not forthcoming for the project when it was first proposed as a wide-field survey to monitor variable stars and novae. However, once the emphasis was shifted to extra-solar planets people began to get interested!

You can read more about SuperWASP at <http://www.superwasp.org>.

The next meeting of SAGAS will take place in July and will be hosted by Hampshire Astronomical Group. No 'business' takes place at the summer meetings, instead there will be talks taking place in the Clanfield Memorial Hall, and visits to HAG's nearby observatory complex. If you haven't been to Clanfield, then you really should go and see one of the most impressive amateur observatories to be found in the UK. Watch WASNews for further details or check out the SAGAS website at <http://www.nightlife.demon.co.uk/SAGAS.htm>.

There is more: on Thursday September 16th, legendary American observer Stephen J. O'Meara will be giving a talk at Chichester High School for Boys, and in the summer of 2005, 'Nightlife' will be hosting another of their very successful conventions, in Portsmouth.

So, SAGAS is not just about boring society business, astronomy is also very much on the agenda! See you at the next meeting?

Notices

Observatory Transfer - Sub-Committee

Graham Boots

Volunteers are urgently needed to serve on the newly appointed sub committee which was set up by the committee recently. The tasks involved are likely to be vetting possible sites, providing ideas, negotiating with land owners and general discussion. Occasional meetings of the sub-committee would be held when considered necessary.

If you can help please contact Graham Boots on 01903 505346 or Alex Vincent on 07753282714.

Donation of Slides to WAS

Graham Boots

Member, Linda Storey has donated the following 39 colour slides of astronomical subjects to our society for which I express our thanks. The list below shows the five categories of astronomical subjects covered by these slides. At the observatory we now have four collections of many slides which have been donated to us over the years that are available for loan to members. A complete list is available from the curator of the observatory.

CONSTELLATIONS 20 COLOURED SLIDES

PLANETARY GROUPINGS 2 COLOURED SLIDES

TOTAL LUNAR ECLIPSE 4 COLOURED SLIDES

MOON OCCULTATION OF SATURN - CRESCENT & GIBBOUS MOON 9 COLOURED SLIDES

SUN SHOWING SUN SPOTS 4 COLOURED SLIDES

The above photographs we taken using 50 and 135 mm lens, they are short undriven exposures. They are undated and the amateur astrophotographer is unknown.

Was Ad

Why not look the smartest astronomer in your neighbourhood!!!

Brian Halls

WAS polo shirts and sweat shirts available. In dark blue with silver-white WAS logo. In male and female sizes. Sweatshirts and Polo shirt sizes XS men (to fit chest 34) or ladies (to fit chest 32) to XL male (to fit chest 44/46) or female (to fit chest 40).



Polo shirts £12 each; Sweatshirts £15 each.

What's on the Box

Saturday 13th March 2004



12.45 ~ 13.10 **The Sky at Night**

Cosmic Vision - The world of astronomy. David Southwood talks to Patrick Moore about the European Space Agency's current and future missions. Also the latest news from Mars.

WAS News News

Hubble picture of space phenomenon imitates art

Space Telescope Science Institute News Release

"**S**tarry Night," Vincent van Gogh's famous painting, is renowned for its bold whorls of light sweeping across a raging night sky. Although this image of the heavens came only from the artist's restless imagination, a new picture from NASA's Hubble Space Telescope bears remarkable similarities to the van Gogh work, complete with never-before-seen spirals of dust swirling across trillions of miles of interstellar space.



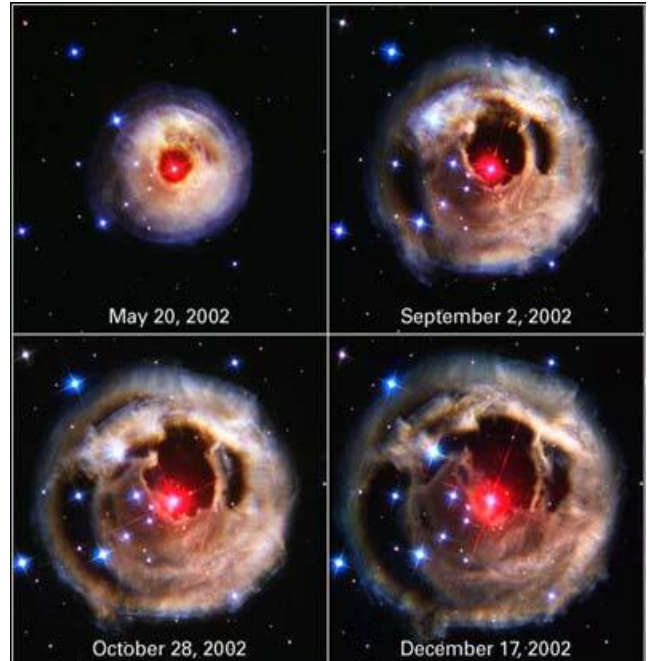
This image, obtained with the Advanced Camera for Surveys on February 8, 2004, is Hubble's latest view of an expanding halo of light around a distant star, named V838 Monocerotis (V838 Mon). The illumination of interstellar dust comes from the red supergiant star at the middle of the image, which gave off a flashbulb-like pulse of light two years ago. V838 Mon is located about 20,000 light-years away from Earth in the direction of the constellation Monoceros, placing the star at the outer edge of our Milky Way galaxy.

Called a light echo, the expanding illumination of a dusty cloud around the star has been revealing remarkable structures ever since the star suddenly brightened for several

weeks in early 2002. Though Hubble has followed the light echo in several snapshots, this new image shows swirls or eddies in the dusty cloud for the first time.

These eddies are probably caused by turbulence in the dust and gas around the star as they slowly expand away. The dust and gas were likely ejected from the star in a previous explosion, similar to the 2002 event, which occurred some tens of thousands of years ago.

The surrounding dust remained invisible and unsuspected until suddenly illuminated by the brilliant explosion of the central star two years ago.



The Hubble telescope has imaged V838 Mon and its light echo several times since the star's outburst in January 2002, in order to follow the constantly changing appearance of the dust as the pulse of illumination continues to expand away from the star at the speed of light. During the outburst event, the normally faint star suddenly brightened, becoming 600,000 times more luminous than our Sun. It was thus one of the brightest stars in the entire Milky Way, until it faded away again in April 2002.

The star has some similarities to a class of objects called "novae," which suddenly increase in brightness due to thermonuclear explosions at their surfaces; however, the detailed behavior of V838 Mon, in particular its extremely red color, has been completely different from any previously known nova.

Nature's own piece of performance art, this structure will continue to change its appearance in coming years as the light from the stellar outburst continues to propagate outward and bounce off more distant black clouds of dust. Astronomers expect the echoes to remain visible for at least the rest of the current decade.

Diary

10th March 2004 Transit of Venus, Robin Gorman
– Hampshire Astronomical Group

14th April 2004 Isidis Planitia – Beagle 2 Landing
Site on Mars Dee Levers Memorial Lecture. Dr
David Rothery – Open University Dept. of Earth
Sciences.

12th May 2004 Member's Contributions. Various
short talks and slides / video display. Members show
and describe their current activities.

9th June 2004 History of the WAS Observatory
Graham Boots - Curator of the Observatory

All Meetings (**bold**) are held on the second Wednesday of every
month unless otherwise stated, at Heene Church Rooms,
Worthing at 7.30 p.m. Meetings include the latest astronomical
work, reports and, photographs by members. For further
information please call 01903 521205, on the Internet at
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Note to Contributors

Contributions & Correspondence for the **April** issue of
WAS NEWS should be with the Editor by **April 1st**. All
material for inclusion should be sent to the Editor.

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a b c d e f g h i j k l m O n o p q r s t u v w x y z