



WAS NEWS

Monthly Newsletter of the Worthing Astronomical Society

Official website: www.was.org.uk

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



Number 157

October 2002

ALMANAC

All times U.T. For B.S.T. add one hour
October./ November

		LUNAR		
October	Date	Time	rise	set
	New moon	6th	11.18	05.42 17.52
	First Quarter	13th	05.33	14.47 22.16
	Full Moon	21st	07.20	17.17 06.25
	Last Quarter	29th	05.28	22.50 14.30
		November		
	New moon	4th	20.34	06.06 16.31
	First Quarter	11th	20.52	13.53 22.24
	Full Moon	20th	01.34	16.19 07.46
	Last Quarter	27th	15.46	23.19 13.25

20th	14	Neptune at stationary point
26th	09	Saturn 3°S. of moon
30th	00	Jupiter 4°S. of moon
31st	12	Venus in inferior conjunction
November		
2nd	20	Mars 3°S. of moon
4th	06	Uranus at stationary point
4th	08	Venus 6°S. of Mercury
4th	10	Venus 8°S. of moon
4th	10	Mercury 2°S. of moon
14th	05	Mercury in superior conjunction

		EARTH	
October	Sunrise	Sunset	
6th	06.09	17.27	
13th	06.20	17.12	
21st	06.34	16.55	
29th	06.48	16.39	
		November	
4th	06.59	16.28	
11th	07.11	16.17	
20th	07.26	16.05	
27th	07.37	15.58	

Minima of Algol			
October	7th 02.54	9th 23.36	12th 20.24
	27th 04.24	30th 01.18	
November	1st 22.06	16th 06.06	19th 03.00

PLANETS				
(as at October 29th.)				
	Constellation	Rises	Sets	Mag.
Mercury	Virgo	05.47	16.30	-1.0
Too close to the Sun for observation				
Venus	Virgo	07.35	16.06	-4.0
Unsuitably placed				
Mars	Virgo	04.14	15.56	+1.8
Morning object visible in the East				
Jupiter	Cancer	23.15	14.15	-2.1
Morning object visible in the south-east				
Saturn	Orion	19.21	11.30	-0.1
Morning object				
Uranus	Capricornus	14.28	00.16	+5.8
Unfavourable				
Neptune	Capricornus	13.44	22.41	+7.9
Unfavourable				
Pluto	Ophiuchus	09.39	19.29	+13.9
Unfavourable				

PHENOMENA		
Day	Hour	October
10th	19	Venus at stationary point
11th	13	Saturn at stationary point
13th	07	Mercury at greatest elongation W. 18°

Lunar Occultations				
Times as at W.A.S. Observatory				
Date	U.T.	S.A.O.No	Mag	Phase
Oct.	h. m. s.			
11th	18.08.48	186092	8.4	diss
11th	18.56.42	186140	8.8	diss
11th	18.56.58	186147	9.0	diss
12th	15.19.20	187448	2.1	** diss
12th	16.05.40	187448	2.1	** reapp
18th	18.35.18	147042	4.6	diss
18th	21.04.54	128572	4.6	diss
18th	23.37.49	128599	8.9	diss
25th	21.23.32	77211	8.4	reapp
25th	21.58.44	77225	9.2	reapp
25th	23.47.31	77276	7.4	reapp
26th	00.00.27	77285	5.2	reapp
26th	00.35.13	77312	8.2	reapp
26th	00.37.37	77307	9.1	reapp
26th	01.03.03	77325	9.0	reapp
26th	01.27.18	77339	8.9	reapp
Nov				
9th	17.19.39	188332	8.8	diss
9th	17.50.53	188358	9.2	diss
11th	17.14.53	190349	6.0	diss
12th	19.23.11	164998	7.3	diss
13th	20.51.19	165504	7.6	diss

This is only about 14% of the predictions for the W.A.S. observatory.

Dave Wells

Editors Note

Hello all and welcome to the October issue of WAS News. Space (no pun intended) as always at a premium, so I'll keep this brief – the newsletter is jammed with interesting articles this month and I'm afraid some rather sad news.

Rob

Reports

The Planets in October 2002

Glen Thomas

Mercury makes a very favourable appearance in the mornings in Virgo, along with **Mars**. Mercury is at its best on the morning of the 13th, reaching an altitude of 10° at 0700 BST (azimuth 13°), with Mars some 2.5 magnitudes dimmer just 4° above and to the right. Mercury may be seen from the 7th to the 25th if you have a clear eastern horizon. Look out for these planets at the start of morning civil twilight, around 45 minutes before sunrise at this time of the year.

Venus finally reaches inferior solar conjunction on the 31st, when it will be between Earth and the Sun. In fact, Venus will only share the same ecliptic longitude (the angle measured from the vernal equinox to a body, used as a coordinate system for the solar system), passing 5° to the south of the Sun (ecliptic latitude of -5°). Venus passes directly in front of the Sun, allowing it to be seen as a dark spot moving across the Sun's disc, only twice a century. The earliest chance to see this happen will be June, in 2004 and 2012, followed by December in 2117 and 2125.

Jupiter rises before midnight by the middle of the month but is a prominent object before dawn.

Saturn spends the month moving slowly in the most northerly reaches of the non-zodiacal constellation of Orion. It is high in the south in the small hours but is at a reasonable altitude for observing clearly before midnight by the middle of the month.

Uranus and **Neptune** are getting even lower in the south and southwest and may now be difficult to spot.

Pluto is now unfavourable, setting before the sky is dark enough to find the magnitude 14 planet.

Look for the largest asteroid, **1 Ceres** (mag 7.6), as it tracks westwards just one third of a degree above the stars 19 phi2 and 17 phi1 Ceti, from the 19th to the 27th. **18 Melpomene** (mag 8.0) is just 5° away to the south-west. Can you spot both in the same binocular field?

Solar Section Report - September 2002

By Section Director, Brian Halls

August closed with sunspot group 10095 (N07° L=059° size=0450 type=Fki on 31st) being the dominant group on the Sun. It remained very much so over most of its trip across the solar disk. It crossed the central meridian on 4th September and disappeared over the west limb on 11th. At the end of the last solar section report, in the September issue of WASNews. I speculated on the return of the large August sunspot group, region 10069. It did so on the 7th as region 10105.

It does not appear to have lost its complex magnetic configuration, though telescopically I think it appeared to have lost much of its large size since its last transit. Despite this it was responsible for activity that produced an auroral outbreak around the 10th. It maintained its naked-eye magnitude however as it began to approach the west limb it began the process of decay finally disappearing at the limb on the 20th.

Following the same sort of process as seen in the previous month, the sunspot bearing longitudes also disappeared and sunspot activity quietened down a little by the close of the month, though there was still plenty to see. Many sunspots were very small and short lived but kept sunspot numbers up during this time.

The southern solar hemisphere still maintained its dominance in the number of active area and sunspot numbers seen.

Members observed the Sun on -- days during September: Reports were received from Graham Boots, Nick Quinn and the Director.

MDF=

September Meeting Reviewed

Report by David Chilard, Assistant Secretary

Society business: Bob Turner hosted the meeting as Brian was in hospital.

- Michael Marshall presented the Treasury report for the Society's approval.
- Bob has become technical director for the five-day trip to see the solar eclipse in the Shetland Islands; although prices are not yet available, he has set up a mailing list for interested parties.
- This year's AGM will be held on the 9th of October; the position of Secretary is still vacant.

- Nick Quinn reported that John Dobson, inventor of the Dobsonian telescope, would be giving a speech on the 2nd of October.
- Dave Storey reported that Bob has donated a book called “More Small Astronomical Observations” to the Society’s library.
- Graham reports that maps and leaflets are available, as well as a new Astro Alert list compiled by Brian. He welcomed submissions for the exhibition to be held at Worthing Library, and reported that 8 of the 9 recommendations in the Observatory Health & Safety report have so far been implemented. There had been five successful Viewing Nights, as well as the night of the Perseids, and 39 people turned up at the Star-B-Q held at his house. Four guest speakers have so far been arranged for next year (2003-4).
- Six slides were presented, four of the Moon and Sun by Graham, and two comet photos by Alex.

“The Moon, A Biography”: The evening’s feature presentation was a lecture by Dr. David Whitehouse, science correspondent for the BBC and a former NASA scientist. While researching his new book, he realised that although many textbooks covered the science of the Moon, the mythology had become lost in this age of electric lights.

He has thus set out to redress this balance, by reminding the world that the Moon was once cloaked in mystery and romance, believed to be important in fertility, and a companion to Man in the night. Furthermore, he has discovered that Galileo was not the first person to draw an image of the Moon, that accolade belonging to Cro-Magnon Man; he also was not the first to map the Moon’s surface through a telescope, as an Englishman named Sir Thomas Harriet did so, though he is famous for his other works. Even the first full map of the Moon in 1645 was a matter of contention between van Langran and Hevelius, but both were defeated by a Jesuit named Riccioli, who had been given the task by the Catholic Church of discrediting science.

Finally, in modern times, the Russians named a Mare on the far side of the Moon but were unable to launch a successful lunar mission owing to bureaucracy, while the Americans have given up on the satellite because it is considered to be “old news” compared to Mars. However, it is known that water is present in some polar craters, where the Sun has not shone since the Moon was formed, and that solar power can be generated at the southern pole, so a future Moon mission would be productive, and indeed an unmanned project would cost less than the Millennium Dome!

The Meeting was well turned-out and well received by all present.

Notices

Deirdre Gweneth Levers

1923 - 2002

Obituary by Wendy Dunkerley

Deirdre Gweneth Levers was born in Calcutta, India on February 13th 1923, where her father was an explosives expert. Returning to England to Blaekheath, she was privately educated and achieved success in dancing and elocution. Dee was taken on cruises as a teenager with her brother Derek, by her mother, who was keen on traveling, and found it cheaper to go cruising than stay at home. One particular trip to the Southern Hemisphere lasted 90 days and cost £90. Dee’s one regret was that she wasn’t interested in Astronomy then, so didn’t see the Southern constellations.

During the War, she served in the W.R.N.S in the Gunnery Division of the Fleet Air Arm in Cornwall, and her family lived in Helston. After the War, the family home was in Bognor Regis. She came to Worthing around 1960 and joined numerous organisations, including the W.E.A. Astronomy class, run by Mr.J.L.White(our late president) in 1963.

At this time, she was a doctor’s receptionist in Liverpool Gardens, and met Mrs Prince, our founder’s mother, who was a patient. Very soon, she learnt that Derek and friends were forming an Astronomy group, later called the Newtonian Observatory Astronomical Society, now Worthing Astronomical Society, at 5 Winton Place. Dee was member No. 5. From then until now she has been a very enthusiastic member of our Society, serving on the committee and being chairman. She went to everything she could, special favourites being the Winchester weekends, the Astrofests, and our exhibitions, which she helped run and supply with material.

Besides Astronomy, she was interested in many other things — Geology, church architecture, badges and medals etc., and was an avid collector of material related to her interests. She had a vast collection of postcards; church leaflets, theatre memorabilia, and of course books. Dee had a lifelong interest in the theatre and show business, and knew a number of celebrities with whom she corresponded.

Apart from W.A.S, Dee belonged to other organisations - the British Legion and the W.R.N.S Association being the most notable.

She was briefly married in the late 60’s to Derek Levers of Bognor; but lived with her friend Joan for many years.

One of the things Dee will be remembered for was her interest in helping those who showed an interest in Astronomy to become more enthusiastic, by talking to them, and giving them books etc., and showing them the sky through one of her telescopes.

Dee died on September 25th in Worthing Hospital. She will be greatly missed by W.A.S. and her vast number of friends in Worthing and elsewhere.

WAS Ad

Wanted Old Computers

Graham Boots

Over the last year members have donated three computers systems to the society, all of which have now been successfully lent to other members. The systems were old but still useful and may have just been thrown away. If you have any old computers or accessories such as monitors, keyboards, scanners, printers etc., we will be glad of them.

Articles

The Huyghens Eyepiece

Michael A Marshall

The seventeenth century Dutchman Christian Huyghens ('Higenz' or 'Hoigenz') was a mathematician, a physicist and an astronomer. He is known for inventing the pendulum clock (1656) and developing the wave theory of light (1678). He improved the telescope eyepiece and discovered the Orion Nebula, Saturn's ring system and Saturn's satellite Titan.

Huyghens would have known the following about telescope eyepieces.

- (1) The field lens has the job of doubling the field of view obtainable with the single lens Kepler ocular, by generally converging the image forming light toward the optical axis where it can after passing through the ocular or eye lens be accommodated by the eye all at once. The penalty is a reduction of eye relief.
- (2) Chromatic and spherical aberration of a lens are minimized by using a high ratio of focal length to aperture diameter, a practice more applicable to objectives.
- (3) The mathematical condition for achromatism, using a field lens and eye lens made from the same glass, is that the separation of the lenses be equal to the average of their focal lengths.
- (4) The eyepiece of the time was still troubled by spherical aberration.

Huyghens sought to diminish the spherical aberration by an appropriate choice of focal length ratios and positions of the two lenses. Since spherical aberration increases rapidly with light deviation at a refracting surface, the condition for minimum aberration for a lens is the equalization of the deviations at the front and back surfaces. This is adequately achieved by a plano—convex lens with the convex side facing the objective. (To turn the lens the other way is to increase the aberration by four to five times.)

With that in mind, he worked out the condition whereby the two lenses themselves deviate the light equally, assuming the light to be initially parallel to the optical axis. This condition is that the separation of the lenses be equal to the difference in their focal lengths, the focal length of the field lens being the longer. To satisfy the condition of achromatism at the same time, Huyghens made the ratio of focal lengths three to one; so in units of the eye lens focal length, the separation is two units, which is equal to half the sum of one unit and three units.

The focal length of an equivalent Kepler ocular works out at one and-a half units, and its position would be one unit behind the Huyghens eye lens, toward the eye position. This means that, disregarding the effect of the field lens; the objective has to focus half a unit in front of the position of the Huyghens eye lens. The effect of the field lens is to bring this focus one unit in front, at the eyepiece focus, thus shortening the focal length of the objective/field lens combination. Thus an eye lens of 20 mm and a field lens of 60 mm are placed 40 mm apart and form an eyepiece of 30 mm focal length.

If cross wires or a scale were to be placed one unit behind the eyepiece, where a field stop would be placed and be seen at infinity, then it would be viewed through the eye lens alone with its attendant and troublesome chromatic aberration. Furthermore, as the distant object is viewed through both lenses, its image and the cross wires image or scale image would be disproportionate in size. Thus the Huyghens with its internal focal position is not suitable for cross wires or a scale.

The Huyghens has an angular field of .30 to 50 degrees, is free from distortion, has an eye relief of .3 mm or more, has little chromatic difference of magnification, and has no objectionable internal reflection. Its errors decrease with focal length and so is more favoured for higher powers, particularly with microscopes.

This is the historic Huyghens eyepiece. Present-day Huyghens commonly have a focal length ratio of field lens and eye lens of two, and a lens separation of one and a half units of eye lens focal length to maintain achromatism. The eyepiece focal length is then one and a

third units. Thus an eye lens of 20 mm and a field lens of 40 mm are placed 30 mm apart and form an eyepiece of 26.7 mm focal length.

The Huyghens eyepiece, a double Kepler in effect, can compare favourably with the more complex forms of modern eyepieces provided the Objective has a focal ratio of $f/15$, whereas a focal ratio of $f/9$ increases the spherical aberration three times. The working limit is about $f/12$. A small focal ratio additionally brings out chromatic aberration, coma and distortion. The Huyghens is relatively simple and cheap to make.

According to Sir George Airy, the spherical aberration can be further reduced by making the plane side of the field lens slightly concave (275 times the radius of the front surface) and the plane side of the eye lens slightly convex (6 times the radius of the front surface). The improvement is small but allows a small reduction of acceptable focal ratio of the objective.

The principal sources of the foregoing information are as follows.

Lights for Students by Edwin Edser, Macmillan and Co. Ltd, 1902 edition.

Technical Optics by L C Martin, Sir Isaac Pitman and Sons Ltd, 1950 edition.

Handbook for Telescope Making by N F Howard, Faber and Faber Ltd. 1969 edition.

Advanced Level Physics by M Nelkon and P Parker, 1970 edition.

Amateur Astronomer's Handbook by I B Sidgwick, Faber and Faber Ltd. 19~1 edition.

The Oxford Illustrated Dictionary, Clarendon Press. 1975 edition.

What's on the Box

Monday 14th October 2002



00:35 - 01:00 ~ The Sky at Night
(Picture Perfect) The world of astronomy with Patrick Moore. Two amateur astro-photographers talk about the skills and equipment needed to capture astronomical events in the night sky

Saturday 12th October 2002



17:40 - 17:54 ~ Letters from Space. Part 1 of 2
Former astronaut Jerry Linenger reads a selection of letters written to his 14-month-old son during his six months spent working aboard the Mir space station

Sunday 13th October 2002



17:40 - 17:54 ~ Letters from Space. Part 2 of 2
Former astronaut Jerry Linenger reads a selection of letters written to his 14-month-old son during his six months spent working aboard the Mir space station

WAS News News

Amateurs to help discover extra-solar planets

NASA News Release

Astronomers at NASA and the University of California at Santa Cruz have launched a Web-based project that has amateur astronomers lining up to have a chance to discover extra-solar planets that 'transit' or pass in front of their parent stars.

Of the more than 100 known extra-solar planets discovered so far, only one (called HD 209458 b) is known to pass in front of its star, as seen from Earth. The small dimming of a star during such a transit will allow amateur astronomers to perform valuable measurements that can aid scientists by determining the planet's size, and potentially reveal the planet's atmospheric composition and the presence of rings or moons in orbit around it.

During the nights of Oct. 5 and Oct. 30, backyard sky-watchers will get their chance. On those dates, a planet twice as big as Jupiter, orbiting the star HD 68988, has an 8 percent chance of passing in front of its star, giving amateur astronomers the chance to confirm the existence of a Jupiter-sized planet outside our solar system. The star, located near the Big Dipper in the northern sky, is too faint to see without a telescope.

The basic search technique used by the amateurs scanning the autumn skies this month will involve taking a night-long series of electronic images of the star HD 68988 and surrounding stars. The astronomers will use these images and specialized software to look for small changes in brightness characterizing a planet's transit, a technique called 'transit photometry.'

Requirements for astronomers who want to sign up for an observing shift are a computer-controlled telescope, a charge coupled device (CCD) camera and personal computer, and software to record and analyze the small changes in stellar brightness that will be produced by a planet. Previous experience measuring the brightness of variable stars or success in observing the known transit of HD 209458 with a CCD camera also are highly recommended, the researchers say.

Interested participants should visit: www.transitsearch.org for exact transit time predictions and further details

Diary

October 9 *A.G.M.*
November 2-16 Exhibition at Worthing Central Library from Saturday 2nd November to Saturday 16th November 2002 Member's contributions welcome.
November 13 *Getting Started with CCD Astronomy* by Alan Smith (Christ's Hospital Observatory and Horsham Astronomical Group)
December 11 *North American Star Parties.*-Owen Brazell editor of "The Deep-Sky Observer" published by the Webb Society.
January 8 *Society New Year Social*
February 12 *Astronomical Imaging from La Palma* - Nik Szymanek & Ian King
March 12 *Indoor Astronomy (observatory-remote operating)* - Dr. Lilian Hobbs of Southampton AS
April 9 *TBA*
May 14 *TBA*
June 11 *The Planet Mars* - Jerry Workman Bsc., F.R.A.S.

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 www.was.org.uk or Email: worthing_astronomical_society@hotmail.com

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

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