



WAS NEWS

Monthly Newsletter of the Worthing Astronomical Society
www.was.org.uk



Number 187

June 2005

ALMANAC All times U.T.

June/July LUNAR

June	Date	Time	Rise	Set
New moon	6 th	21.55	02.52	20.34
First Quarter	15 th	01.22	12.17	00.30
Full Moon	22 nd	04.14	21.41	03.04
Last Quarter	28 th	18.23	23.54	11.47

July	Date	Time	Rise	Set
New moon	6 th	12.02	02.58	21.08
First Quarter	14 th	15.20	12.31	23.07
Full Moon	21 st	11.00	20.54	03.12
Last Quarter	28 th	03.19	22.40	13.37

26 th	03	Saturn 1° S. of Venus
26 th	11	Saturn 1° S. of Mercury
27 th	19	Venus 0°01 N. of Mercury
29 th	02	Mars 2° S. of moon
July		
5 th	05	Earth at aphelion (152 million km.)
7 th	17	Saturn 5° S. of moon
8 th	21	Venus 3° S. of moon
8 th	22	Mercury 5° S. of moon
9 th	03	Mercury at greatest elongation E. 26°
9 th	10	Venus 2° N. of Mercury
13 th	18	Jupiter 0° 7 N. of moon

EARTH

June	Sunrise	Sunset
6 th	03.45	20.13
15 th	03.43	20.19
22 nd	03.43	20.21
28 th	03.46	20.21

July	Sunrise	Sunset
6 th	03.51	20.18
14 th	04.00	20.12
21 st	04.08	20.04
28 th	04.18	19.55

PLANETS

(As at June 22nd)

Planet	Constellation	Rises	Sets	Mag.
Mercury	Gemini	05.51	21.46	-0.4
Unfavourable				
Venus	Gemini	05.29	21.49	-3.9
Evening object in the west				
Mars	Cetus	00.24	12.35	0.0
Difficult morning object in the east south east				
Jupiter	Virgo	12.44	00.29	-2.0
Brilliant object in the South west				
Saturn	Gemini	06.00	21.50	+0.3
Unfavourable				
Uranus	Aquarius	23.24	10.12	+5.8
Difficult				
Neptune	Capricornus	22.33	08.01	+7.9
Difficult				
Pluto	Serpens cauda	18.41	04.18	+13.8
At opposition on the 14 th				

PHENOMENA

Day	Hour	Phenomenon
June		
10 th		Ophiuchid meteor shower
10 th	04	Saturn 5° S. of moon
14 th	03	Pluto at opposition
14 th	23	Uranus at stationary point
16 th	07	Jupiter 0°4 N. of moon

Minima of Algol

June Unfavourable		
July	21 st	00.48
	23 rd	21.36

Lunar Occultation's

Times as at Old W.A.S. Observatory

Date	U.T.	S.A.O. No	Mag	Phase
June				
11 th	21.48.03	98484	9.2	Diss
11 th	22.44.03	98518	9.0	Diss
12 th	21.32.07	98936	8.2	Diss
13 th	20.55.06	99301	9.1	Diss
13 th	21.08.52	99302	7.9	Diss
13 th	22.15.54	99312	8.6	Diss
17 th	21.21.55	158190	7.3	Diss
18 th	22.22.48	158760	8.5	Diss
19 th	22.25.51	183686	5.1	Diss
29 th	02.32.46	109427	7.8	Reapp
July				
2 nd	01.42.39	93304	7.0	Reapp
2 nd	02.46.22	93328	4.3	Reapp
11 th	21.04.52	118789	8.7	Diss
11 th	21.04.55	118791	8.6	Diss
11 th	21.54.19	118804	4.0	Diss
12 th	20.50.43	119176	8.0	Diss
14 th	21.13.12	157989	8.5	Diss

The list above is a selection of about 52% of the more easily observed events

Dave Wells

Editors Note

By God the Summer Solstice already!! Where oh where is the year going, barely have the Easter Eggs been finished, and already Mrs WAS Editor will be dipping into the Christmas Sherry.

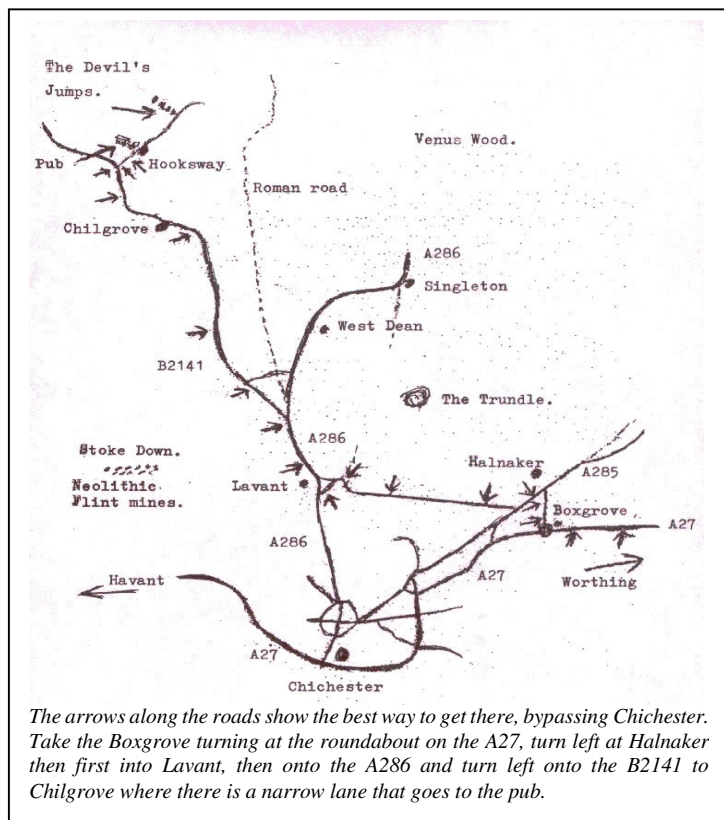
Rob

Dates for your Diary

Summer Solstice. Part One

Alex Vincent.

On June 21 some WAS members celebrate the longest day at The North Star Pub and some of us celebrate it at the Devil's Jumps, Hooksway near Chilgrove some ten miles north of Chichester. The Devil's Jumps are a group of Bronze Age round barrows (tumuli) and were built on the alignment of the setting sun on June 21. If it is clear then we shall see the sun setting in its full glory from the barrows.



We meet outside the WEA, Union Place, Worthing at 6.30 PM and then go from there. We park at The Royal Oak Pub, Hooksway and they do a nice selection of meals, which you must order before going to the barrows to see the sunset. It is a great evening out and is a good excuse for a party. The map helps you to get to the site from the A27 at Chichester.

Solstice Drink – Part Two

Linda / Dave Storey

The North Star, Littlehampton Road, Worthing is again the venue for this year's summer solstice drink. We meet any time after 8pm in the non-smoking section or possibly outside in the garden, if the weather is very good!

The North Star is on the north side of Littlehampton Road, about 300m east of the Durrington Lane roundabout and next door to the Esso garage. If anyone would like more detailed directions please ring Linda/Dave Storey on 01903 264136.

Hill Barn Observers Night

The monthly Observers Nights are temporarily on hold until completion of the new observatory. However there will be special nights for special events announced in advance in these very pages – Ed.

Reports

May Lecture Reviewed - Report by Janet Young

The Magellanic Clouds

Konrad Malin-Smith Croydon AS

Konrad started his talk saying that the two clouds are often overlooked because they are placed in the Southern Hemisphere. They are named after the Portuguese explorer Ferdinand Magellan, who on his last journey in the employ of the King of Spain, discovered the straits that are now named after him. The ship's log book relates to a journey to South America and the discovery of the Straits of Magellan and there is also a mention of the two clouds seen in the southern sky. During the journey, when landing at the Philippines, Magellan was killed and the clouds were named in his memory.

It was noted that these two clouds circled what is the southern pole in the absence of a polar star.

He then showed on the overhead projector a plan of the galaxy showing the distribution of Red and Blue stars or Population II type stars. These very same objects can be seen in both the Large and Small Magellanic clouds. Every type of stellar object can be found in them, double stars, planetary nebula, variable stars, supernova, the LMC and SMC are each a Celestial Zoo.

He then showed some slides starting off with one of them, taken during the 1950s, in Oxford Street playing golf and about to hit the ball down a man-hole cover! He explained he used this slide to focus on!

Articles

Messier Objects - Continued

Janet Young

This was followed by a slide of a trip he made to Australia with Alan Drummond of Crawley and Roy Easto of Croydon. Those that followed were of the two clouds, and then of Alan, Konrad and Roy in the outback on what is now a disused road. Then a slide of Konrad wearing wellies, not to protect his feet from muddy ground, but from the local residents such as scorpions and other creatures. Konrad made a point that his camera in the picture was one that takes film! This was followed with a slide taken by Konrad of a telephoto shot of the LMC that also included the Tarantula Nebula. The SMC also contains another well-known object, 47 Tucani that is a large Globular Cluster. The slide that followed was of the LMC by David Main and included 30 Doradis, The Tarantula.

He then showed a diagram of the Galaxy and positions of the LMC and SMC and the path they took around our own Galaxy. They take approximately 2.2 billions to circle us completely.

They were first photographed in the early twentieth century and although its only slight, movement can be detected with recently taken photos.

Henrietta Levitt of Harvard was a well known discovered of variable stars who specialized in Cepheid variables. She discovered huge amounts of variables all over the sky and in the LMC and SMC. She used a negative photograph and then superimposed a positive taken a month later for her discoveries.

He then showed a chart on the overhead of Cepheid variables in the SMC. Because the period of the Cepheid Variable is known with great accuracy, they enable her to work out an accurate distance of the LMC and SMC.

The famous mute astronomer John Goldbricked discovered Cepheid variables in 1784. Apparently Henrietta Leavitt was also deaf, something that is not generally so well known. Discovered S Cephei and made the Periodic Variation 5 days 8 hours and 48 minutes. Going back to slides he then showed a negative of the Globular Cluster Omega Centauri, then positive slide taken two weeks later and then both together and the variable stars certainly showed up well. Harlow Shapely continued Leavitt's work and continued to look for CV but was unaware that there were Population I and Population II type Cephids. Hubble then used Shapley's work for his expanding universe theories, again not realising that there were two types of CV. Baade eventually was the person who realised the two types of CV. This information doubled the then known size of the universe.

At the end of the talk Konrad answered a few questions.

The Messier Objects are so called because they were a list of fuzzy objects in the night sky compiled by Charles Messier (1730-1817) a French comet hunter. While hunting for comets he kept finding these faint and fuzzy objects, so decided to compile a catalogue of them to avoid them being mistaken for comets. He listed them as M or Messier followed by a number. Charles Messier did discover several comets, but it is for the Messier catalogue he is best remembered.

M12

Constellation: Ophiuchus

RA 16hrs 44m

Dec -01.52

Distance: 16,000 light years

Type: Globular Cluster

NGC 6218

Globular Cluster with a approximate magnitude of 10. Discovered by Charles Messier 30th May 1764.

M13

Constellation: Hercules

RA 16hrs 39m

Dec +36.33

Distance: 25,000 light years

Type: Globular Cluster

NGC 6205

One of the most well known globular clusters lies in the northern hemisphere. Magnitude of approx 6. Was originally seen by Edmund Halley in 1714 with the unaided eye. Is well placed in the early summer sky.

M14

Constellation: Ophiuchus

RA 17h 35m

Dec -3.13

Distance: 23,000 light years

Type: Globular Cluster

NGC 6402

Magnitude of 8. Lies in a rich area of the Milky Way and contains over 70 variable stars. Discovered by Messier in 1764.

M15
Constellation: Pegasus
RA 21h 27m
Dec +11.5
Distance: 40,000 light years
Type: Globular Cluster
NGC 7078

Has a total magnitude of 14. Contains a large number of RR Lyrae Variables

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What's on the Box

Saturday 11th June 2005



12.45 – 13.05: **The Sky at Night**

The Shocking Sun. Patrick Moore talks to astronomer John Brown about the solar mission Rhesi, which is observing sunspots and solar flares.

WAS News News

Voyager spacecraft ventures into mysterious realm

Stephen Clark Spaceflight Now

NASA's intrepid Voyager 1 space probe has begun its journey to the stars and is now exploring the farthest reaches of the Sun's influence where the solar wind strangely interacts with interstellar space, agency officials formally announced on Tuesday.

At the 2005 Joint Assembly Meeting of the American Geophysical Union in New Orleans, scientists revealed new findings that confirm the passage of the Voyager 1 spacecraft into an uncharted region of the far outer solar

system, where the magnetic field intensifies and the solar wind is drastically slowed and becomes super-heated.

"Voyager has entered the final lap in its race to interstellar space as it begins exploring the solar system's final frontier," said Voyager project scientist Dr. Edward Stone of the California Institute of Technology.

Voyager 1 and its twin Voyager 2 were both launched aboard Titan rockets from Cape Canaveral, Florida, in 1977 to embark on a "grand tour" to visit the outer planets. Both are now approaching their 28th birthday and continue on extended missions to beam data back to Earth as it leaves the solar system headed for interstellar space.

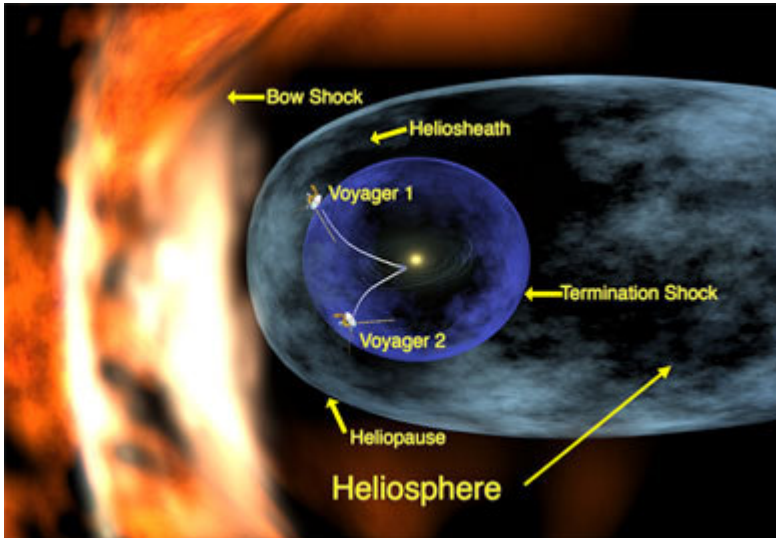
Officials say Voyager 1 crossed what is known as the termination shock around December 16 of last year to enter the heliosheath- a place unlike any ever visited in the solar system. The boundary crossed in December marks a point where charged particles constantly emitted from the Sun called the solar wind slow down from hundreds of miles per second to subsonic speeds. This is due to pressure from the interstellar wind, or the gas blowing between stars likely resulting from ancient nearby supernovae.

Evidence of the transition was not received until the next day because the large Deep Space Network antennas were not scheduled to be in contact with Voyager 1 on December 16. Also a factor was the length of time it takes communications to travel one-way to and from the probe- now over 13 hours. However, all indications say the passage likely occurred December 16.

This shock also causes the temperature of the solar wind to significantly increase from about 200,000 degrees to over a million degrees due to the increased density of the particles once inside the heliosheath, which extends out to the heliopause and bow shock - the last official boundaries encountered before entering interstellar space. Dr. Stone likened the shocks to the waves generated ahead of the bow of a moving ship as the water is pushed forward and compacted.

Affects from the solar wind are felt across the vast expanse of the solar system known as the heliosphere, which scientists hypothesize is shaped much like a comet with a long tail due to the Sun's path through the Milky Way galaxy.

"The solar wind creates a bubble (the heliosphere) around the Sun, and near the edges of the bubble is a place where the solar wind piles up as it encounters the interstellar wind," Dr. Stone explained



This artist's concept shows the locations of Voyagers 1 and 2. Voyager 1 is traveling a lot and has crossed into the heliosheath, the region where interstellar gas and solar wind start to mix. Credit: NASA/Walt Feimer

The entire heliosphere is impacted by the 11-year solar cycle, and Dr. Stone said Voyager team members believe the boundaries marking the edge of the solar system actually expand and contract as the Sun's activity level changes. The crossing of the termination shock could have actually been more due to the shrinking of the heliosphere than the outward motion of Voyager 1, he said.

Voyager 1 made the historic passage into the heliosheath at a distance 94 times that which lies between the Earth and Sun, or about 8.7 billion miles away. Scientists point to tell-tale signs such as magnetic field changes and changes in the strength of particle energies measured since December as evidence the entrance into the heliosheath has occurred.

Two magnetometers aboard the Voyager 1 probe have been used throughout the mission as it flew past Jupiter and Saturn and as it continued its journey into the unknown. Measurements from the instruments indicate the magnetic field has been compressed and has increased by a factor of about two-and-a-half.

Particle energies recorded by the plasma wave instrument aboard Voyager 1 noted the strength of the particle beams was much more uniform than before, giving the ground team even more reason to believe the spacecraft is now in the heliosheath. A large burst of plasma wave noise was also observed and downlinked in telemetry data.

Officials had observed other substantial changes in science data throughout 2002 and 2003 as the intensity of charged particles within the solar wind spiked to high levels, but there was no increase in the strength of the

magnetic field that would occur when the solar wind dramatically slows, marking the entrance into the heliosheath.

"The missing element that is there this time is the compression of the magnetic field," Dr. Stone explained. It is believed that sistership Voyager 2 will cross the termination shock within the next three to five years, allowing scientists to once again be glued to incoming telemetry to try and learn more about this last leg of the trip out of the solar system. Voyager 2 is currently at a distance from the Sun of about 76 astronomical units, or around 6.5 billion miles.

"Voyager's observations over the past few years show that the termination shock is far more complicated than anyone thought," said Dr. Eric Christian, a discipline scientist with NASA's Sun-Solar System research initiative.

Before reaching the heliopause and passing into interstellar space, the Voyagers must complete a trip through the turbulent heliosheath that is projected to last about ten years. "The thickness (of the heliosheath) is unknown, and that is one of the things we intend to discover," Dr. Stone said. "We have a new region to explore."

The Voyager spacecraft are still in relatively good health with many of their instruments soldiering on in this new harsh environment almost 28 years after launch. Electrical power for the probes are produced by three radioisotope thermoelectric generators on each craft, which are projected to last until about 2020.

NASA is considering putting the \$4.5 million per year Voyager project on the chopping block in the coming year in a cost-cutting move to prepare for the retirement of the space shuttle and the development of the next-generation Crew Exploration Vehicle, part of the agency's presidentially-mandated Vision for Space Exploration. The Planetary Society reported Tuesday that a review of the project has been moved up from next year to November to help facilitate attempts to make sure the Voyager program is put into the NASA budget over the coming years.

"This is a wonderful opportunity to reach interstellar space, and we hope we can keep the spacecraft operating through the year 2020," Dr. Stone concluded.

Diary

8th June 2005 Jets, the exhaust of the most efficient engines in The Universe - Dr Christian Kaiser Southampton University

13th July 2005 'Wish You Were Here Astronomy' - Dr Lilian Hobbs Southampton Astronomical Society

14th September 2005 40th Anniversary Lecture September 1965 – 2005. Black Holes & White Rabbits (physics & magic) - Professor John C. Brown Astronomer Royal for Scotland Dept., of Physics & Astronomy Glasgow University

12th October 2005 Member's Contributions Inc The Super String Theory - David Storey.

9th November 2005 Universe in 4D- Cosmic Light Show - Dr. Christopher Baddiley Infrared Physicist Worcester

14th December 2005 Adventures with a Small Telescope - Neil Bone Meteor Section Director of the British Astronomical Association

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 find us on the Internet at www.was.org.uk or email: chairman@was.org.uk

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

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