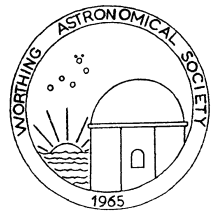


WAS NEWS

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



Number 210

July 2007



The Moon - Ed Sampson

April 10th 2005 19.00 UT 80mm Soml Apo @f6 – Philips Toucam pro 2

ALMANAC

All times U.T. B.S.T. add one hour

July/August/September

LUNAR

July	Date	Time	Rise	Set
New moon	14 th	12.04	03.11	20.47
First Quarter	22 nd	06.29	13.24	22.32
Apogee	22 nd	08.43	484,189km	
Full Moon	30 th	00.48	20.25	04.21
August				
Perigee	3 rd	23.58	368,858km	
Last Quarter	5 th	21.20	21.49	13.03
New moon	12 th	23.02	03.37	19.32
Apogee	19 th	03.31	404,655km	
First Quarter	20 th	23.54	13.35	21.13
Full Moon	28 th	10.35	18.59	04.49
Perigee	31 st	00.20	364,151km	
September				
Last Quarter	4 th	02.32	21.38	15.06
New moon	11 th	12.44	05.15	18.15
Apogee	15 th	21.13	405,671km	
First Quarter	19 th	16.48	14.42	21.05
Full Moon	26 th	19045	17.30	05.13
Perigee	28 th	02.01	359,409km	

EARTH

July	Sunrise	Sunset
14 th	03.59	20.13
22 nd	04.09	20.04
30 th	04.20	19.52
August		
5 th	04.29	19.42
12 th	04.40	19.29
20 th	04.53	19.14
28 th	05.06	18.56
September		
4 th	05.17	18.41
11 th	05.28	18.25
19 th	05.41	18.07
26 th	05.52	17.51

PLANETS (As at August 20th)

	Constellation	Rises	Sets	Mag.
Mercury	Leo	05.18	19.32	-1.4
Unsuitably placed				
Venus	Hydra	05.09	18.12	-4.0
Inferior conjunction on the 18 th				
Mars	Taurus	22.39	14.31	+0.4
Morning object in the East				
Jupiter	Ophiuchus	14.34	22.49	-2.3
Visible in the south-west				
Saturn	Leo	05.02	19.22	+0.6
Conjunction on the 21 st				
Uranus	Aquarius	19.46	07.00	+5.7
Opposition on September 9 th				
Neptune	Capricornus	18.51	04.28	+7.8
Opposition on the 13 th				
Pluto	Sagittarius	15.14	00.33	+13.9
Difficult				

PHENOMENA

Day	Hour	July
16 th	23	Saturn 0.00°N. of moon
17 th	12	Venus 2°S. of moon
20 th	15	Mercury at greatest elongation W.20°
25 th	16	Jupiter 6°N. of moon
27 th	17	Venus at stationary point
August		
7 th	02	Mars 6°S. of moon
7 th	02	Jupiter at stationary point
12 th	16	Mercury 0.2°S. of moon
12 th	21 on	Perseid meteor shower

13 th	13	Saturn 0.4°N. of moon
13 th	14	Venus 8°S. of moon
13 th	18	Neptune at opposition
13 th	19	Saturn 9°N. of Venus
15 th	20	Mercury in superior conjunction
17 th	05	Venus 10°S. of Mercury
18 th	04	Venus in inferior conjunction
18 th	14	Saturn 0.5°S. of Mercury
21 st	23	Saturn in conjunction
22 nd	01	Jupiter 6°N. of moon
28 th	11	Total eclipse of moon
September		
4 th	13	Mars 6°S. of moon
7 th	15	Pluto at stationary point
8 th	16	Venus at stationary point
9 th	00	Venus 9°S. of moon
9 th	19	Uranus at opposition
10 th	03	Saturn 0.7°N. of moon
13 th	11	Mercury 2°N. of moon
18 th	14	Jupiter 6°N. of moon
24 th	07	Venus at greatest brilliancy
29 th	16	Mercury at greatest elongation

Minima of Algol

July	25 th 01.42	27 th 22.30	30 th 19.18
August	14 th 03.18	17 th 00.06	19 th 21.00
September	3 rd 05.00	6 th 01.48	8 th 22.36 11 th 19.24

Lunar Occultation's

Times as at NEW W.A.S. Observatory site I've noticed a difference of up to ten seconds or so on some timings from the old site.

Date	U.T.	S.A.O. No	Mag	Phase
July	h. m. s.			
17 th	08.22.06	98967	1.4	Reapp
20 th	21.25.25	138905	7.3	Diss
21 st	21.08.28	157909	8.2	Diss
24 th	21.29.30	183797	6.9	Diss
25 th	18.54.42	184481	2.8	Reapp
August				
5 th	23.24.34	93062	5.7	Reapp
7 th	00.45.48	76131	3.7	Reapp
23 rd	20.18.06	186444	6.4	Diss
25 th	22.20.04	189001	8.1	Diss
26 th	20.44.09	189986	4.9	Diss
28 th	22.43.17	146362	3.7	Reapp
29 th	22.54.55	146885	7.3	Reapp
30 th	22.03.06	109304	8.8	Reapp
31 st	21.43.57	92460	8.3	Reapp
31 st	21.45.23	92456	8.5	Reapp
31 st	22.23.40	92468	9.0	Reapp
31 st	23.25.25	92419	9.6	Reapp
31 st	23.50.21	92500	7.9	Reapp
September				
1 st	22.55.29	0	9.5	Reapp
2 nd	23.22.29	75933	9.5	Reapp
4 th	23.34.34	77224	8.4	Reapp
19 th	19.34.30	185798	7.9	Diss
20 th	19.02.07	187225	8.1	Diss
20 th	20.21.06	187286	7.2	Diss
21 st	20.00.44	188471	9.0	Diss
21 st	22.20.29	188570	7.8	Diss
22 nd	19.01.28	189502	7.1	Diss
22 nd	23.31.21	189626	7.7	Diss
23 rd	20.56.37	164494	8.9	Diss
23 rd	21.26.48	164504	8.8	Diss

Dave Wells

Editors Note

Summer? Summer? Don't talk to me about summer; I've just spent last week (yes the week where it rained every day) at Sandy Balls holiday camp in a tent! I even packed the telescope to wow fellow campers....a 15 second 1/4 gap in clouds on Tuesday revealed Venus laughing at me and the poor telescope stayed in its box. I thought I handled it rather well, but Mrs WAS News editor may tell a different story....

On a more positive note, please savour this edition of the News letter as that's it until September, I suggest reading odd pages this month and saving the evens to August.

Very best

Rob

Dates for your Diary

Barbeque.

Janet Young

The WAS summer barbeque will be held at the home of Paul Jefferies in Findon Valley from 7.30pm on Saturday 18th August 2007. As is usual, members attending are asked to bring a bottle and seating and anyone who is willing to bring extra food is welcome to do so.

For those of you who are vegetarians, can you please inform a member of the committee in advance. Tickets will be on sale from the treasurer at £4.00 each from the June meeting. Further details of the venue will be provided with the tickets. May I take this opportunity to thank Mr. Jefferies for offering his home to us on that evening.

Reports

June 2007 meeting review by Richard Godley

The Cassini Mission To Saturn: The Latest

Professor Carl Murray
Queen Mary University of London

Professor Murray has worked on the Cassini project for 17 years. The plan for the mission was to study Saturn and its system for four years, from when it went into orbit around Saturn at the end of June 2004 until June 2008, but Professor Murray said that it was hoped that the

project would be extended to June 2010 and, perhaps, even beyond that.

The craft is actually the Cassini-Huygens spacecraft, and is about 7 metres in height. Cassini is the main orbiter and Huygens is the smaller orbiter that was used to land on Titan. The responsibility for the Cassini part of the mission is with NASA, while the European Space Agency (ESA) is responsible for Huygens.

The craft was named after Giovanni (a.k.a. Jean-Dominique) Cassini and Christiaan Huygens. Cassini discovered four of Saturn's moons and was the first to observe the division between the rings that was named after him. He also set up the Paris Observatory at the behest of King Louis XIV of France. Huygens was Dutch, a contemporary of Cassini, and was the discoverer of Titan. He also did work on pendulums and developed the wave-based theory of light around the same time that Newton had proposed the particle-based theory.

Professor Murray applied for a job on the Cassini imaging team when the project was announced in 1989. The teams were formed in 1990. The job of the imaging team was not to build the instruments, but to design the filters and the science. There were three areas of interest for them.

1. Atmospheres
2. The rings
3. Surfaces

The UK was well represented on the mission, having responsibility for 6 out of the 12 instruments on Cassini and 2 out of the 6 on Huygens. The Cassini-Huygens craft was launched in October 1997, taking a tortuous near 7-year route to Saturn, including a fly-by of the Earth in August 1999 and of Jupiter in December 2000.

Professor Murray showed an artist's impression of the craft's arrival into Saturn's orbit (Saturn Orbital Insertion or SOI). This was on July 1, 2004, although it was still June 30th in California, where a large party took place in Pasadena. With friends and family of the scientists also invited, they watched the images come in. The engines cut out one second earlier than planned, but this occurred because of the efficiency of the engines that could monitor themselves and shut themselves down at exactly the right time. During the next six months the craft carried out long orbits of Saturn, before the two parts of the craft separated and Huygens landed on Titan in January 2005. There were communications problems between the two craft during this period.

Titan's atmosphere is interesting. For example, its atmosphere is mainly nitrogen, as is the case with the

Earth. Methane is the second most abundant gas in Titan's atmosphere. Surface pressure is about 50% greater than the Earth's, while, obviously, temperatures are lower. Methane rain and clouds have been detected. Titan's atmosphere is a chemical smog. What interests astronomers is that the building blocks of life are found within this atmosphere, which is similar to that of the Earth in the time before life emerged here. Titan's surface was imaged, and, although hazy, surface features were visible.

Professor Murray showed a video reconstructing the descent phase. The craft passed through layers of methane cloud. A feature like a coastline could be seen, with a visible drainage pattern of methane rain and a dried-up methane lake. The rain on Titan may be a mixture of methane and ethane, rather than purely methane. At the landing site there appeared to be some boulders, but given the size of the craft itself, these were really just pebbles. A radar image also showed what looks like a coastline. Titan has been used to change the craft's orbits of Saturn.

The moons Tethys and Dione both show evidence of material coming from their surfaces, which are thought to consist of water-ice. Dione appears to have ice cliffs. Giovanni Cassini discovered both of these moons.

Another moon of great interest is Hyperion. This moon has the distinction of being the largest non-spherical moon in the Solar System. It is 'under-dense' in that its density is about 0.6 grams per cubic centimetre rather than the more normal 'expected' figure of about 1.0. Hyperion tumbles chaotically so that its non-circular orbit gives the moon a day length that is constantly changing.

Iapetus is another of the moons discovered by Giovanni Cassini. One half of Iapetus is much darker than the other half. In terms of its orbital motion, it is the leading face that is dark - so dark that the moon disappears when this face is towards us - while the trailing face is bright. This variation is believed to be caused by the moon's leading face sweeping up dark dust, probably left behind by Phoebe, as it orbits Saturn. Cassini will make a much closer approach to Iapetus on September 10th, 2007.

Enceladus, which was discovered by Herschel, who also discovered Mimas, is an icy moon. Data retrieved from the Voyager craft in the early 1980s suggested it is an unusual moon. It is associated with Saturn's diffuse E-ring. Enceladus has resonance with Dione in the same way that Io does with Europa in the Jupiter system.

The surface of Enceladus has some smooth areas and some cratered areas. A smooth surface indicates a young surface. In July 2005 Cassini had a close look at the south

pole of Enceladus, at a distance of less than 200 kilometres. After studying the images and data sent back by Cassini the conclusion is that ice volcanoes exist here.

The images of this area of Enceladus show long cracks, which have become known as 'tiger stripes'. These areas of Enceladus are warmer than surrounding areas. It was thought that there would be geysers on the surface of Enceladus from which plumes of ice would be erupting. In order to prove the existence of the ice plumes photographs of the south polar region were taken with the Sun hidden behind Enceladus. The craft was rotated as the photographs were taken in order to prove that the ice plumes were real and not reflections or distortions. The ice plumes indicate possible liquid water under the surface, or they could be due to tidal stress (like friction) at the 'tiger stripes'.

Professor Murray showed a number of photographs of Saturn, including a 12-hour exposure with the Sun behind it. Until 2009 the Sun will light up Saturn from below and therefore the shadow of the rings currently falls onto the northern hemisphere of the planet.

4 new moons have been discovered by the Cassini probe. Credit for the discovery of these moons officially goes to the Cassini Imaging Team collectively. One of the moons discovered during the mission is Polydeuces, first identified in October 2004. Professor Murray noticed the movement of the moon in the photos. The name 'Polydeuces' follows a naming convention that names of Saturn's moons come from mythology. In this case it was suggested by Professor Murray's son that the name should relate to the fact that the moon was near Dione and its neighbour Helene (named after Helen of Troy). It was therefore decided that the moon should be named after Polydeuces, the half-brother of Helen of Troy.

Daphnis is another moon discovered by the Cassini Imaging Team and we saw a photograph of this moon in the Keeler Gap. It has a gravitational effect on the rings. Professor Murray also had a role in the naming of Daphnis.

Professor Murray now showed a movie of the ring-plane being crossed. In the movie various moons could be seen orbiting the planet. Two new objects were seen just before Saturn Orbital Insertion. An animation of one of these, S2004/S3 was shown. It was not known whether the object, orbiting close to the F-ring, was a moon or not.

The F-ring is changing all the time due to the effect that the moon Prometheus has on it. As the orbit of Prometheus brings it close to the F-ring it pulls particles out of the rings. As these particles are brought slightly

closer to Saturn they become subject to a 'shearing effect' and this leads to streamers of material stretching away from the rings as was shown in the animation.

Professor Murray showed a mosaic of the whole ring. Following Kepler's law objects inside the ring are rotating one way, those outside the ring the other way. The jets shown in the image are thought to be S2004/S6, another object discovered by the Cassini probe.

Finally, at the end of his highly enjoyable and informative talk Professor Murray showed a photograph Cassini had taken showing the distant Earth between Saturn's E-ring and G-ring.

Notices

WAS Competition

Ed Sampson

Subject

The competition is on an Image/ Photography based theme.

The entrants are to capture or photograph anything in the sky

With an astronomical theme.

Categories

There are 2 categories

1 Camera and SLRs

This will include film and digital SLRs compact digital and film cameras

And just about any sort of manual use camera.

2 CCD and Webcams

The second category is for Deep space CCDs or webcams.

The Prize

There are 2 first prizes one for each category.

You will each get your photo on the front page of the WAS news

You will each receive a £10 WH Smith prize

You will also receive an additional prize based on your choice of

Photography.

The Rules

1 The competition is **not** open to committee members.

2 The Photo/Image must be on an astronomical theme and taken during the competition time.

3 Details must be provided of the equipment used to capture your subject.

4 The winners will be announced on the January social and the covers will follow.

5 Only 1 image per person

6 A minimum of 5 entrants is required for the competition to go ahead.

Images

You can submit your images in any form

Photo, Print out, Slide, Digital image or even a Sketch

Submit all images to Ed Sampson or e-mail them to star.man1@ntlworld.com

The committee will decide on the best entrants

The details will also be printed in the next few additions of WAS news

Astronomical Publications

Graham Boots

The society annually subscribes to the following four organizations and receives their publications which are circulated free to members. Please let me know if you would like to go on any of the circulations lists letting me know which journals you would like. My telephone number is 01903 505346. They are *Astronomy Now*, *Sky & Telescope*, *Society of Popular Astronomy* including news letters and journal of the British Astronomical Association.

Constitution Amendment to Society Handbook

Janet Young

This is just to notify members that the following amendment to the Constitution is required and a vote will take place at the July meeting. (*Not June as previously reported – Ed.*)

10.2 will now read:

"Not less than one month before the AGM, the executive committee shall put forward a proposal for subscriptions for the year. Such a proposal shall be adopted if passed in accordance with sections 8 & 9 of the constitution."

Committee Vacancies

Graham Boots

Due to a mixture of work and personal reasons the following vacancies and opportunities have arisen to serve on our committee with effect from our AGM on the 15th October 2007.

Chair
Vice Chair
Business Secretary
Treasurer

Also vacant is the position of Instrument section director, curator of the observatory & librarian

If you would like to know more about these opportunities please contact Graham Boots

Articles

Out Into Space

Colin Knappitt

That was the title of the set of cards given away in packets of Brooke Bond Tea (Choicest, Edglets and P.G. Tips Tea) around 1957. It was, I believe the first of the many tea card series issued, including British birds, British mammals and African mammals. I collected them avidly for years but only the Out Into Space introduced me to a life-long interest. Foolishly, in a moment of madness years ago, I gave away all the carefully completed albums; but there is another copy of Out Into Space still in the family, albeit a little battered and missing a few cards. Apart from anything else, it is an interesting historical item, produced at or just before the start of the Space Age.

The set comprises fifty cards in a blue covered album that cost 6d (2 ½p). The series was approved by Dr A. Hunter, then Secretary of the Royal Astronomical Society, and was offered, as Brooke Bond said, “in the interests of education”. In addition to the brightly coloured cards, each with its hundred or so words of explanation, spaces in the album cover other items of interest with monochrome diagrams. The first twenty cards deal with the Solar System; the next twenty-six with constellations; and the final four with miscellaneous matters. I want to pick out a number of the cards that caught my imagination or interest.

Card 5: SEASONS

I was always fascinated by this card, which depicts the Earth at its solstice and equinox positions, appropriately illuminated by the Sun. The latitude and longitude lines on the little globes make them look like pumpkin lamps.

Card 15: JUPITER and Card 18: NEPTUNE

The statement that “An aeroplane travelling at 500 M.P.H. would take 90 years to reach Jupiter” has stuck in my mind for fifty years. The Neptune card shows the jet and gives a surprisingly precise journey time to that planet of 6164 years. Jet propulsion would not, of course, get the aeroplane more than a few miles above the Earth’s surface but that is a minor detail! I note that the New Horizons probe to Pluto is now travelling at some 51,000 M.P.H. following its swing around Jupiter. Just as well we are not relying on that 500 M.P.H. jet to reveal Pluto’s secrets.

Card 20: METEORITE

The card depicts the 50 ton rock that fell at Groetfontein in South-West Africa. The terms meteor and meteorite are used interchangeably in the description.

Card 46: MILKY WAY

On this card, the Milky Way is sweeping up magnificently above the spires and chimneys of a town in silhouette. There is not a hint of light pollution.

Card 48: RADIO TELESCOPE

Two dishes feature on this card, with diameters of about forty feet. The nearer one is painted orange and the further one is white. It is not clear if this was more than an artist’s impression. The description talks of “a giant one being erected in Cheshire to transmit and receive ultra-short-waves”.

Card 50: ASTROLABE

The astrolabe shown is a magnificent 3-D affair on a stand, with inscribed metal circles and like the one owned by Tycho Brahe. The transporter in the film “Contact” (from the Carl Sagan novel), with its revolving intersecting metal rings, has more than a passing resemblance to this astrolabe.

So, a big “thank you” to Brooke Bond for its inspirational series. That satisfied my hunger until about 1962, when I acquired a copy of the newly published “Observer’s Book Of Astronomy” by Patrick Moore.

WAS Ad

Sussex Astronomy Centre

For all your astronomy needs
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Large range of accessories, software, books etc
16 Mulberry Lane
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Telephone 01903-247317
Email worthingastronomy@tiscali.co.uk
Web Site. www.sussex-astronomy-centre.co.uk
Ask for Paul Farmer (Club Member)

WASNews News

Cassini scientists wring out details on spongy Hyperion

Ciclops News Release

Scientists on NASA's Cassini mission to Saturn now have a better understanding of why the odd moon Hyperion has such an unusual appearance.

The crucial factor in creating the strange, sponge-like appearance of Hyperion appears to be its extremely low density, say Cassini scientists in a research paper being published in the July 5 issue of the journal *Nature*. The researchers examined Cassini spacecraft images and other data on the moon's mass acquired during encounters with Hyperion over the past three years.



Credit: NASA/JPL/Space Science Institute. Download larger image version [here](#)

Hyperion is covered by a large number of medium-sized, well-preserved craters. "Careful mapping of features showed that its bizarre appearance probably results from a convergence of rather routine effects," said Dr. Peter Thomas, a Cassini Imaging Team member working at Cornell University in Ithaca, New York.

Cassini's closest encounter with Hyperion, in September 2005, allowed accurate measurement of the moon's mass and size, which showed it is only slightly more than half as dense as water.

"The close flyby produced a tiny but measurable deflection of Cassini's orbit. Therefore, the orbit determination, carried out by our Italian colleagues, allowed us to estimate the mass with fairly good accuracy," said Cassini radio science deputy team leader Nicole Rappaport of the Jet Propulsion Laboratory in Pasadena, Calif. "Combined with the determination of Hyperion's volume from imaging data, this provided an accurate computation of its density."

Initial conjectures about the origin of Hyperion's strange surface invoked dark materials accumulating on crater floors that subsequently got warmed by sunlight and melted deeper into the surface. However, the new analyses have shown that the moon's low density, and therefore low surface gravity, may cause craters to form differently from those on other, denser bodies that have been explored in the Solar System.

According to the researchers, impactors smacking into Hyperion's porous outer layers form craters more by compressing the surface than by blasting out material, as they do on denser bodies. Additionally, the moon's low gravity means that any material ejected from craters on Hyperion has a good chance of escaping completely and not re-impacting the surface, making Hyperion's craters look sharper and less blanketed by debris than on other bodies.

These new results about Hyperion's craters accompany another paper in the same journal issue which details the moon's composition. Both are important to understanding this unique moon's history and evolution.

"With time, we are coming to understand the various planetary processes that shape the bodies in our solar system," said imaging team leader Carolyn Porco. "And this latest work on Hyperion is a beautiful demonstration of that."

Diary

16th July 2007 Search for Extraterrestrial Unintelligence" - Professor Jonathan Tennyson F.R.A.S. Department of Physics & Astronomy University College London

13th August 2007 At the Observatory from twilight onwards Perseids Meteor Shower

17th September 2007 Cosmology & WMAP - Professor Malcolm MacCullum F.R.A.S., Department of Mathematics Queen Mary University of London

15th October 2007 Member's Contributions & AGM

19th November 2007 Observing Mars - Neil Bone. Mars will be at opposition on 24th December 2007. Neil is Section Director of the Meteor section of the British Astronomical Association & Author of 'Mars Observing Guide'.

14th December 2007 At the Observatory from twilight onwards Geminids Meteor Shower

17th December 2007 Nuclear Fusion: The Sun's Power on Earth – Jim Swift Crawley Astronomical Society.

21st January 2008 New Year Social & Member's contributions.

18th February 2008 TBA

17th March 2008 Stars: Origin and Evolution – Dr Serena Viti Department of Physics and Astronomy University College London

All meeting (bold) are held on the 3rd Monday of every month (except August when we normally have a bar-b-que at a member's home) at Emmanuel United Reform Church Hall on the corner of Heene Road and St., Michael's Road, Worthing beginning 7.30 p.m. Meetings include the latest astronomical work, reports and images by members. For further details contact us by Internet at www.was.org.uk or email chairman@was.org.uk

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Note to Contributors

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

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