

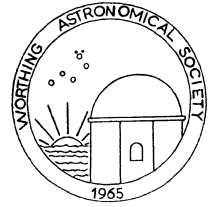


WAS NEWS

Monthly Newsletter of the Worthing Astronomical Society

Official website: www.was.org.uk

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



Number 161

February 2003

ALMANAC

All times U.T.

February./ March.

LUNAR

February	Date	Time	rise	set
New moon	1st	10.48	08.19	16.34
First Quarter	9th	11.11	10.27	00.56
Full Moon	16th	23.51	16.26	07.35
Last Quarter	23rd	16.46	01.05	09.51
March				
New moon	3rd	02.35	07.24	18.03
First Quarter	11th	07.15	09.44	02.13
Full Moon	18th	10.35	18.17	06.38
Last Quarter	25th	01.51	02.49	09.50

EARTH

February	Sunrise	Sunset
1st	07.39	16.49
9th	07.26	17.04
16th	07.13	17.16
23rd	06.59	17.29
March		
3rd	06.42	17.43
11th	06.25	17.57
18th	06.09	18.09
25th	05.53	18.21

PLANETS

(as at February 23rd.)

	Constellation	Rises	Sets	Mag.
Mercury	Capricornus	06.31	15.32	-0.2
Unfavourable				
Venus	Sagittarius	05.07	13.39	-4.1
Magnificent morning object visible in the South east				
Mars	Ophiuchus	03.27	11.21	+1.0
Morning object visible in the South east				
Jupiter	Cancer	15.01	06.24	-2.5
Morning object visible in the South				
Saturn	Taurus	11.12	03.21	-0.1
Visible in the south west				
Uranus	Aquarius	06.56	16.56	5.9
Unfavourable				
Neptune	Capricornus	06.13	15.20	8.0
Unfavourable				
Pluto	Serpens	02.16	12.02	13.9
Unfavourable				

PHENOMENA

Day	Hour	February
12th	02	Saturn 3° S. of moon
15th	20	Jupiter 4° S. of moon
17th	22	Uranus in conjunction
22nd	08	Saturn at stationary point

25th	04	Mars 2° N. of moon
27th	13	Venus 5° N. of moon
March		
1st	17	Mercury 3° N. of moon
11th	11	Saturn 3° S. of moon
15th	02	Jupiter 4° S. of moon
22nd	00	Mercury in superior conjunction
23rd	05	Pluto at stationary point

Minima of Algol

February	13th	03.30	16th	00.24	18th	21.12
March	5th	05.18	8th	02.06	10th	22.54
			13th	19.48		

Lunar Occultations

Times as at W.A.S. Observatory					
Date	U.T.	S.A.O.No	Mag	Phase	
Feb.	h. m. s.				
12th	20.24.23	78002	8.0	diss	
12th	21.08.57	78035	8.1	diss	
13th	00.22.15	78146	7.5	diss	
14th	01.23.42	79199	6.0	diss	
20th	05.13.26	139072	6.7	reapp	
23rd	03.54.10	159421	6.9	reapp	
23rd	04.28.55	159442	4.9	reapp	
March					
7th	18.46.45	92941	7.5	diss	
7th	18.52.35	92945	8.8	diss	
7th	19.37.11	92955	9.1	diss	
7th	20.37.06	92971	8.3	diss	
7th	20.56.03	92972	9.0	diss	
8th	18.59.10	93331	7.6	diss	
8th	19.30.35	93335	7.3	diss	
9th	19.37.36	76385	9.0	diss	
9th	19.46.45	76393	6.7	diss	
9th	19.47.48	76384	8.8	diss	
9th	19.54.50	76386	8.1	diss	
10th	19.41.50	76787	8.8	diss	
10th	20.02.33	76792	8.6	diss	
10th	20.52.55	76812	6.6	diss	
10th	21.09.32	76813	8.8	diss	
10th	21.20.26	76819	8.7	diss	
10th	22.28.57	76853	7.7	diss	
11th	19.02.41	77455	8.1	diss	
11th	19.24.30	77485	8.3	diss	
11th	19.50.49	77513	7.7	diss	
11th	20.29.57	77531	8.8	diss	
11th	20.36.43	77540	8.7	diss	
11th	22.57.34	77630	8.7	diss	

This is only about 22% of the predictions for the W.A.S. Observatory.

Dave Wells

Editors Note

I'm sure all of you who share with me a love of all things Astronomical, will over the last fortnight have reflected on the tragic loss of the Space Shuttle Columbia with all its crew. This 'routine' flight was of course anything but routine and this incident will only serve to remind us all of the dangerous role undertaken by these brave individuals for the betterment of us all here on Earth.

Apologies to start on such a sombre note, I promise to return to a more lighthearted introduction next month.

In the meanwhile please read and (hopefully) enjoy a jam packed issue of this months WAS News

Rob

Dates for your Diary

Comet 2002 V1 NEAT.

Alex Vincent

Date	R.A.		Dec.		Mag.
2003	h	m	°	'	
Feb 13	22	03.0	-00	08	-3.5
Feb 15	21	50.5	-03	37	-6.2
Feb 17	21	41.9	-09	47	-9.2
Feb 19	21	53.2	-17	13	-7.2
Feb 21	22	16.0	-21	54	-4.1
Feb 23	22	39.7	-24	44	-1.9
Feb 25	23	02.4	-26	29	-0.3
Feb 27	23	23.6	-27	34	+1.0
Mar 1	23	43.2	-28	09	+2.0
Mar 3	00	01.3	-28	24	+2.9
Mar 5	00	17.9	-28	24	+3.7

The above co-ordinates are for Epoch 2000.0

As you can see from the above co-ordinates this comet will attain a magnitude of -9.2 on the night of February 17/18 2003, but will only be six degrees from the Sun. However it is possible that it will be a daylight object around this time and so it is well worth looking out for it either just before sunrise or just after sunset as it will be north of the Sun at its brightest. After February 21 the comet will be south of the Sun and therefore not observable from Britain. Good observing.

Reports

Solar Section Report - January, 2003

Section Director, Brian Halls

The year began with a sudden slow down in sunspot activity if compared over the last several months.

The reduction in sunspot activity had begun in the last few days of the old year and for the first few days of January appeared to be the same, however the number of sunspot groups once more began to increase as the weeks passed by.

By the end of the first week activity had once more increased to the same sort of levels seen over the last several months. The quality of sunspots groups was good – many groups of spots were C and D class active area. On 11th January there were even three E-class sunspot groups visible on the disk.

This pattern of behaviour persisted for most of the remaining month however in the last week the number of sunspot groups once more began to decrease though not to the same sort of levels seen at the end of December beginning January. There were seven small groups visible on the 31st.

What was of interest was the hemisphere bias in the sunspots – the southern solar hemisphere appeared to be the more active of the two.

Observations were received from the Observatory Curator, Graham Boots, Brian States and, the Director.

Despite the awful weather, the Sun was observed on 24 days in January and the **mean daily number of sunspot groups** was 5.92 – the **relative sunspot number** was 81.38.

The Planets in February 2003

Section Director, Glen Thomas

Mercury is now below 4° altitude in the east in the morning at the start of civil twilight, as the sky starts to brighten. The next chance to bag this tiny planet will mid-April, as it heads towards the May transit across the face of the Sun.

Venus is still dominant in the dawn sky, shrinking slightly from 20" apparent diameter to 15" over the next month.

Mars is still drawing away from Venus, but shining 100 times dimmer than the larger planet. Look for it before dawn as it precedes Venus in its daily motion by around 20° (35° to the west by early March). The Red Planet increases its angular size slightly as it heads for its closest approach around an August opposition, but is currently around 6" across.

Jupiter is as dominant during the night as Venus is around dawn. It is high enough to observe properly (30°+ altitude) between 20:00 and 04:30, long enough to see the entire planet's surface in one night (Jupiter rotates once in 9h 55m).

Saturn is already high as the sky darkens and is as good a sight as it is possible to be: the rings are fully open and the planet is near perihelion (closest to the Sun in its orbit). Saturn will not be as close for three decades.

Uranus, Neptune and Pluto are too close to the Sun to observe.

Asteroid **20 Massalia**, at magnitude 10, continues to move eastwards between the horns of Taurus the bull towards Saturn. Perhaps visible in binoculars (7x50 or larger), sketch the field on different nights to identify the interloper.

Astronautics Section Report

Section Director Nick Quinn

The week after my talk at the WAS January meeting about Rosetta, ESA's Cometary mission, this press release was issued:

Rosetta launch postponed

Having considered the conclusions of the Review Board set up to advise on the launch of Rosetta, Arianespace and the European Space Agency have decided on a postponement.

The Review Board called for Arianespace and all its partners to make sure, in the framework of a programme for the resumption of Ariane 5 flights, that all Ariane 5 system qualification and review processes have been checked.

Arianespace and the European Space Agency, together with all interested parties, are now going to consult each other in order to determine arrangements for the soonest possible launch of Rosetta.

The preliminary inquiry into the failure of Europe's new 'heavy-lift' Ariane 5-ESCA, on its maiden flight in December, identified an engine fault as the main cause of the disaster. Doubts later emerged about other aspects of the rocket. Esa had little choice but to suspend Rosetta preparations. Arianespace will now carry out a full review of its Ariane 5 launch system. It will probably mean that another Esa mission, SMART-1, will also be delayed. As Glen reported the aim of this mission is primarily to test the use of solar electric primary propulsion to reach the Moon. Once in lunar orbit this spacecraft will carry out a complete programme of scientific observations including high-resolution imaging.

Rosetta will now be stored for a future mission. The launch window to Comet Wirtanen and the asteroids Siwa and Otawara has now closed and new targets will have to be identified for the spacecraft.

Society New Year Social January 8th 2003

Report by Vanessa Wegner

Brian Halls opened the evening by referring to the famous Rosetta Stone discovered in 1799. The stone was half written in Egyptian hieroglyphics & half in Greek, this gave historians the key to crack Egyptian hieroglyphics and is a good example of how man is always looking for devious ways to crack information. Brian's introduction was very appropriate for the first report of the evening:

Astronautics Section Report

The European Space Agency's Rosetta mission is scheduled for lift-off from Kourou, it has a launch window of 6 days from January 13th to January 31st. It's destination is Comet 46P/Wirtanen and to achieve its goal the probe will need to be gravity assisted from flybys of Mars (August 2005) & the Earth (November 2005 & November 2007). It will also make close range observations of two asteroid belts, 140 Siwa & 4979 Otawara.

This is the most ambitious Solar System mission ever launched by ESA, the launch window is short & the mission itself unusually long, the probe will not land on the comet until November 29th 2011, by then a number of astronomers involved will have retired! The comet will be dormant when the probe lands; it will stay a minimum of 60 hours but could spend two to three months on the comet. The mission will end in 2013.

The spacecraft will take panoramic & close-up photos of the crust; it will analyse gases, plasma, dust & learn as much as possible about the entire structure of the comet.

Nick concluded by giving a brief up-date on the International Space Station missions planned for 2003. A whole series of missions are scheduled, mostly to deliver & fit solar panels & batteries. Additional panels will of course make the ISS brighter from earth, which is good news for observers.

Alex Vincent

Alex showed some spectacular slides of Saturn in Orion, using a 15-second exposure. Another slide of Saturn with its rings fully open and also several images of a lunar eclipse for which he used a 500mm lens.

Graham Boots

Graham gave a run-down of some of the speakers planned for the year. In February Nik Szymanel & Ian King will be showing slides from their stay at La Palma, it is very unusual for amateur astronomers to be accepted & build up such a rapport with the professional astronomers on the island, they have produced some amazing images & the evening promises to be very interesting.

Dr. Lilian Hobbs will be telling the society in March all about CCD photography from inside the home. In June Jerry Workman will give a lecture on the planet mars, this is a very auspicious time as in August Mars will be the closest to the earth since the telescope was invented. White Dwarf stars will be the subject of the July meeting & this promises to be an exciting talk.

Glen Thomas

On the 7th May Mercury will make a rare transit across the face of the sun. This event will be special for UK observers because it will be the first transit visible wholly from the British Isles since 1973. The transit will start soon after sunrise.

We will finally be saying goodbye to the Galileo probe, which will be making a suicide dive into Jupiter in September 2003. Scientists have decided that the spacecraft must crash into the planet, not Europa, as there is a small chance there is hypothetical life under the hypothetical oceans of the moon!

Mars is the planet to visit during 2003. NASA are going to launch twin probes, the European contribution is the Mars Express. This is the smallest mobile explorer yet built & also one of the cheapest at a mere £100 million. It is an Open University invention & whilst not mobile itself it carries a robot "mole" that can crawl, dig & take samples.

In spite of the arctic conditions the evening was well turned out & the tea & coffee much appreciated! All the reports were well received & gave a tantalising idea of the exciting events in 2003.

Notices

Changes to the Constitution

Chairman – Brian Halls

As per item 15 of the constitution – **Alterations to the Constitution** – notice of an alteration is hereby given (changes shown in bold):

5.2 Executive Committee

The Society shall be administered by an Executive Committee of **six** persons elected from & by the voting membership and shall consist of

- 5.2.1 Chairman
- 5.2.2 Vice-Chairman
- 5.2.3 Secretary
- 5.2.4 Meetings Secretary**
- 5.2.5 Membership Secretary**
- 5.2.6 Treasurer

No person shall hold more than one Executive post at a time but Executive Officers may also hold positions of Section Director or Observatory Curator.

Voting for the changes to the constitution shall take place at the 12th March monthly meeting of the Society and shall, in the event of being adopted, be become effective at the Annual General Meeting, 8th October 2003.

WAS Members' E-Mail List

Glen Thomas

Nova alerts, new comets, space station and shuttle launch visibility, aurorae, solar flares, observing sessions and requests for help have all featured in e-mail exchanges between WAS members.

I have e-mailed all those currently on the list, as well as everyone who has supplied an e-mail address to WAS for the more *official* communications, so that I can update and reissue the list. The list is strictly confidential to those on it. With around twenty members and rather fewer *active senders* the traffic is fairly low, so it won't block your connection, but you do get the chance to receive or distribute information and updates between monthly meetings.

Anyone who wishes to join, or those who were on the list but whose details have changed, should e-mail me at glen.thomas@bigfoot.com, and I will add you to the list for its next issue.

Articles

The following article expresses the personal views of those interviewed and does not necessarily reflect the view held by Worthing Astronomical Society – Ed.

Meade Survey Results

Graham Boots

Author's note: The following survey has been conducted without prejudice.

Just over a year ago I purchased a MEADE telescope and immediately found I had a major electrical problem that was solve by exchanging it. About that time I met a number of people who had also purchased a MEADE telescope and who had also suffered electrical problems.

This made me conduct a survey of MEADE owners and I was able to contact and obtain replies from 17 owners. To my astonishment I found that out of 17 owners 15 had had, and in some cases continue to have, electrical problems of one sort or another.

In the table below I list the models of MEADE telescope and a short summary of the associated electrical problems.

Model	Electrical Problem
MEADE ETX 90	Replaced twice as altitude control would not rise beyond 45°; third model was okay. Unable to update Autostar with appropriately purchased software.
MEADE ETV70	Could not update Autostar despite being exchanged several times; MEADE ETX 70 refractor was purchased instead which also would not accept Autostar updates, but owner accepted this situation & kept the refractor.
35.5 cm MEADE	Major electrical problem occurred days after 12 month guarantee expired and cost £1,000 to rectify.
25 cm MEADE LX 200	Repeated Declination motor failures and 1RA motor failure; motors repeatedly replaced.
25 cm MEADE LX 200	No electrical faults.
MEADE	Accidentally reversed polarity using 12V dry cell accumulator causing major

ETX125EC	electrical damage; appears telescope costing £1,000 was not diode protected; telescope replaced.
Unknown MEADE	When changing from DC to AC current, Autostar default settings have to be reset each time.
25cm MEADE LX 200	Declination motor not slewing far enough; after being dismantled, cleaned & re-assembled, problem cleared. No major problems, just reboots to clear them when they happen.
MEADE ETX125 EC	Electronic control sticks on 1 of the 4 slewing speeds and cannot select any of the other 3 speeds; Not rectified – remains an intermittent fault.
20cm MEADE LX 10	Needed to adjust clock drive speed.
25cm MEADE LX 200	Owned for 8 years; replaced 1 Declination & 1 R A., electric motors.
25cm MEADE LX 200	Owned for 3 years; 4 electrical breakdowns, declination motor runaway at top speed & RA motor failure intermittent.
20cm MEADE	Creep after beep with Autostar; advised to train RA & Dec. motors repeatedly; after 3 efforts, fault almost cleared; after further 2 efforts problem cleared.
MEADE DS127	Creep after beep & numerous other faults; found useless with Autostar. Refused to drive properly. Refused to find objects. Exchanged and replacement found to be even worse. Currently the RA and Dec motors have been returned for replacement.
25cm MEADE	No electrical faults.
MEADE ETX125 EC	Creep after beep; model exchanged several times.
20cm MEADE	Various faults; model exchanged several times.

One owner said to me that if he has to replace his MEADE he would seriously consider Celestron. Another owner said 'MEADE ought to be ashamed of putting their name to such a piece of rubbish' and another said he walks to his observatory with his fingers crossed. For my part I am very sorry to find so much disappointment and therefore cannot recommend this telescope manufacturer.

Members may recall a 'cry for help' that was printed in last months WAS News concerning the sighting of a mysterious object; following are two letters that explain all – Ed.

(Another) Mysterious Object

John Hopkins

The "Mysterious object" described in the January 2003 news letter reminds me very much of the fireball associated with the Barwell meteorite which I witnessed on 24th of December 1967 if my memory is correct.

The event started in the western sky at an elevation of about 40 degrees above the horizon as a red dot that grew brighter and then became a fireball, the name being a good description of the visual effect. The motion "seemed" very much slower than a shooting star and I believe it was, but that may be a subjective effect of the longer duration of the event? The fireball continued all the way down to the northern horizon. Thanks to all the witness reports, material from the meteorite was recovered at Barwell in leicestershire.

The description of the mysterious object would seem to indicate that it was a meteorite that skipped back out of the atmosphere which is something I have read happens from time to time, or, and I do not know if this is possible, slowed down so much it ceased to be heated so violently?

Mysterious Object (Explained)

Neil Bone - Director, British Astronomical Association
Meteor Section

The event you saw was a fireball, technically a very bright meteor (the definition is usually a meteor brighter than the planet Venus, which was a prominent 'Morning Star' in the eastern pre-dawn sky in December, and remains so now). Such events are associated with the atmospheric entry of larger pieces of debris than the millimetre-sized dust-balls which give rise to more common, fainter 'shooting stars' at times when the annual meteor showers like August's Perseids or November's Leonids are active.

Quite often, the objects involved in producing the very brightest fireballs - like the December 19 event - are substantial pieces of rocky material from the asteroid belt between Mars and Jupiter, thrown into Earth-crossing trajectories following past collisions, and eventually swept up by Earth as it orbits the Sun. These fragments may have dimensions comparable to a football, for example. Very rarely, the fragments may be large enough to survive atmospheric friction, and land to be collected on the ground as meteorites. Most often - and this was

probably the fate of the December 19 event - all the material is ablated away by the heat of entry, leaving nothing more than a smoke trail in the high atmosphere.

These events occur quite high up - they are luminous above about 25-30 kilometres altitude - which makes it no surprise that it was so widely visible. Indeed, I have also had sightings from the Midlands, Cornwall, Devon, Essex, Middlesex, Hampshire, Sussex, Kent and beyond. From observers' descriptions of the track, it looks to have been heading east-west parallel to the South Coast, ending somewhere over Cornwall. Any resulting material probably ended up in the Atlantic (a common outcome for fireballs seen around the British Isles)! Fireballs are not especially rare - we receive reports of perhaps a couple every month, sometimes more (fireballs seem to be more common in February and March, during the third week of June, and in the first week of December for no particularly obvious reason). Often these come as solitary accounts, the single witness in many cases being someone out walking their dog late a night! The December 19 event was more widely seen because it occurred on a clear morning, at a time when many people were on their way to work.

What's on the Box

Thursday 13th February 2003



21.00 – 21.30 ~ **Leading Edge**

The science magazine looks at the growing problem of light pollution and the movement to restore darkness to the sky at night.

Thursday 20th February 2003



16.30 – 17.00 ~ **The Material World**

Simon Singh looks at the problem of space debris. Pieces of derelict spacecraft, fragments of launch vehicles and even tiny flecks of paint can cause huge damage to orbiting craft.

Saturday 22nd February 2003



20.00 – 21.00 ~ **The Archive Hour**

(The Big Ear) Leo Enright chronicles the history of the Jodrell Bank radio telescope, a story of financial scandals, political intrigue, Russian Sputniks and the odd game of cricket.

WAS News News

'Hail Columbia'

William Harwood - Story Written for CBS News



Former astronaut Robert Crippen, pilot of the shuttle Columbia for its maiden voyage in 1981, remembered NASA's oldest orbiter today in a moving tribute before a throng of workers gathered on the broad shuttle runway at the Kennedy Space Center.

It was at that same runway that technicians, engineers, family members and journalists gathered last Saturday to welcome Columbia and its seven-member crew back to Earth after a successful 16-day science mission. But they waited in vain. Columbia was destroyed just 16 minutes before its anticipated arrival when it veered out of control in the thin air 200,000 feet above Texas.

Crippen, who helped oversee NASA's initial response to the 1986 Challenger disaster, first flew in space aboard Columbia on April 12, 1981, when he and commander John Young rocketed away from pad 39A. More than two decades later, he delivered Columbia's eulogy, struggling to keep his emotions in check as he remembered the shuttle and its fallen crew.

"We're gathered here this morning to honor and salute the Columbia crew and mission STS-107," he said. "The grief in the hearts of the crew's families and the entire NASA family, which includes all of our contractor community which supports the agency, is very heavy. Still, this crew lived lives that deserve our celebration. Yes, they were cut short. But these brave men and women lived their lives to the fullest doing much more in their time here on Earth than many can imagine.

"Words at a time like this seem weak. They don't fully communicate the depth of our feelings. The NASA family speaks much clearer with actions. The action that is being taken to find the cause of the accident, correct it and continue the crew's journey of discovery in space is the grandest tribute that we can pay to them. I'm certain that is what they would have wanted.

"It is fitting we are gathered here on the shuttle runway for this event," Crippen said. "It was here last Saturday that family and friends waited anxiously to celebrate with the crew their successful mission and safe return to Earth. It never happened. I'm sure that Columbia, which had traveled millions of miles and made that fiery re-entry 27 times before, struggled mightily in those last moments to bring her crew home safely once again. She wasn't successful.

"Columbia was a fine ship. She was named after Robert Gray's exploration ship, which sailed out of Boston Harbor in the 18th century. Columbia and the other orbiters were all named after great explorer ships, because that is their mission, to explore the unknown.

"Columbia was hardly a thing of beauty, except to those of us who loved and cared for her," Crippen said. "She was often bad mouthed for being a little heavy in the rear end. But many of us can relate to that. Many said she was old and past her prime. Still, she had only lived barely a quarter of her design life; in years, she was only 22. Columbia had a great many missions ahead of her. She, along with the crew, had her life snuffed out in her prime.

"I was here at the shuttle runway in March of 1978 when Columbia first arrived at the Kennedy Space Center. She came in on the back of a 747 escorted by Deke Slayton in a T-38. She certainly wasn't very pretty at that time. A large number of her tiles had not been installed and many that had were not adhering very well. KSC management made a fairly unpopular statement at the time, that it was going to take several years to get her ready to fly. They were right.

"Readied for launch by the loving care of the Kennedy team, the same care they've given to all 28 of her flights, she was finally ready to fly in April 1981. John Young and I were privileged to take her on that maiden flight. She performed magnificently, the world's greatest electric flying machine was what John described her as.

"Because she was a little heavy, she didn't get some of the more glamorous missions. But she was our leader in doing science on orbit. Just as she was doing with this crew in Spacehab on mission STS-107, microgravity scientific exploration was her bag. She carried Spacelab numerous times, studying materials processing, life sciences, all of which were focused on giving us a better life here on Earth.

"Columbia also helped us better understand about the heavens and understand the origins of the universe with several missions, including Astro, also deploying the most advanced X-ray observatory ever built, the Chandra X-ray Telescope, and by her very recent Hubble Space Telescope servicing mission. Just as the crew has, Columbia has left us quite a legacy.

"There's heavy grief in our hearts, which will diminish in time, but it will never go away and we will never forget," Crippen said. "Hail Rick, Willie, KC, Mike, Laurel, Dave and Ilan. Hail Columbia."

Diary

February 12 *Astronomical Imaging from La Palma - Nik Szymanek & Ian King*

February 15 Observer's Workshop 1, The Institute of Astronomy, Cambridge. *Imaging Comets, Why Observe Variable Stars, Measuring Double Stars, Visual Observation of Jupiter, Astrometry of Minor Planets, Observing Variable Nebulae* – are subjects being covered in this series of free talks; 1100hrs – 1600hrs. Entrance is free of charge.

February 22 SAGAS, Stockbridge Hall, Stockbridge Road, Chichester, 14.15hrs. Charing society, Hampshire Astro-Group.

March 12 *Indoor Astronomy (observatory-remote operating) - Dr. Lilian Hobbs Southampton AS*

April 9 TBA

May 14 TBA

June 11 *The Planet Mars - Jerry Workman Bsc., F.R.A.S.*

July 9 *White Dwarf Stars - Konrad Maylin-Smith Croydan AS*

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

Executive Committee

Chairman: Brian Halls

7 Ryecroft Court
Penhill Road
Lancing
West Sussex, BN15 8HJ
Tel: 01903 521205
Email: worthing_astronomical_society@hotmail.com

Vice-Chairman: Bob Turner

21 Beachwood Ave
Worthing
West Sussex
BN13 2HR
Tel: 01903 692522
Email: rfturner@compuserve.com

Secretary: Post Vacant

All Correspondence to The Chairman, Brian Halls at:

7 Ryecroft Court
Penhill Road
Lancing
West Sussex, BN15 8HJ
Tel: 01903 521205
Email: worthing_astronomical_society@hotmail.com

Assistant Secretary: David Chilard

40 Ferring Street
Ferring
Worthing,
West Sussex
BN12 5HJ
Tel: 01903 501819
Email: dave-ros@tinyworld.co.uk

Treasurer: Michael Marshall

84 Bramley Road,
Worthing,
West Sussex.
BN14 9DT
Tel: 01903 823576

Curator of the Observatory: Graham Boots

101 Ardingly Drive,
Worthing,
West Sussex
BN12 4TW.
Tel / Fax: 01903 505346
Email: gboots@observatory99.freemove.co.uk
Web Site: www.observatory99.freemove.co.uk

Note to Contributors

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

Rob Davis
61 Stirling Court Road,
Burgess Hill
West Sussex
RH15 0PS
Tel: (01444) 239205
Email: robertdavis@lineone.net

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