

# WAS NEWS

Monthly Newsletter of the Worthing Astronomical Society

Official website: [www.was.org.uk](http://www.was.org.uk)

Affiliated websites: [www.observatory99.freemove.co.uk](http://www.observatory99.freemove.co.uk)



Number 142

May 2001

## ALMANAC

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

### May./June.

#### LUNAR

May	Date	Time	rise	set
Full Moon	7th	13.53	19.29	04.42
Last Quarter	15th	10.11	01.44	10.50
New moon	23rd	02.46	04.26	20.29
First Quarter	29th	22.09	10.35	01.01

June	Date	Time	rise	set
Full Moon	6th	01.39	20.47	04.06
Last Quarter	14th	03.28	00.50	11.57
New moon	21st	11.58	03.36	20.35

#### EARTH

May	Sunrise	Sunset
7th	04.21	19.33
15th	04.09	19.46
23rd	03.58	19.57
29th	03.51	20.05
June	Sunrise	Sunset
6th	03.45	20.13
14th	03.43	20.19
21st	03.43	20.21

#### PLANETS

(as at May 29th.)

	Constellation	Rises	Sets	Mag.
<b>Mercury</b>	Taurus	05.07	21.47	+1.5
Favourable evening object in the W.N.W.				
<b>Venus</b>	Pisces	02.23	15.39	-4.4
Brilliant morning object				
<b>Mars</b>	Sagittarius	21.39	05.02	-2.0
Morning object getting brighter.				
<b>Jupiter</b>	Taurus	04.43	20.56	-1.9
Evening object lost in twilight				
<b>Saturn</b>	Taurus	04.01	19.32	+0.2
Unfavourable				
<b>Uranus</b>	Capricornus	00.32	10.16	+5.8
Becoming favourable				
<b>Neptune</b>	Capricornus	23.45	08.49	+7.9
Becoming favourable				
<b>Pluto</b>	Ophiuchus	19.24	05.35	+13.8
Favourable				

#### PHENOMENA

Day	Hour	May
10th	19	Mars 2° S. of moon
11th	01	Neptune at stationary point
11th	16	Mars at stationary point
16th	11	Jupiter 3° S. of Mercury
19th	13	Venus 4° N. of moon
22nd	05	Mercury at greatest elongation E. 22°

23rd	06	Saturn 1° N. of moon
24th	07	Jupiter 1° N. of moon
24th	20	Mercury 3° N. of moon
25th	13	Saturn in conjunction
29th	15	Uranus at stationary point
June		
4th	05	Mercury at stationary point
4th	12	Pluto at opposition
6th	20	Mars 4° S. of moon
8th	06	Venus at greatest elongation W.46°
13th	18	Mars at opposition
14th	13	Jupiter in conjunction
16th	13	Mercury in inferior conjunction
18th	00	Venus 2° N. of moon
18th	10	Jupiter 4° N. of Mercury
19th	22	Saturn 0.9° N of moon
21st	00	Mercury 3° S. of moon
21st	03	Jupiter 0.7° N. of moon
21st	12	Total eclipse of Sun (Africa)

#### Minima of Algol

May./June Unsuitably placed.

#### Lunar Occultation's

Times as at W.A.S. Observatory

Date	U.T.	Z.C.No	Mag	Phase
<b>May</b>	<b>h. m. s.</b>			
11th	02.34.28	2630	5.0	reapp
14th	03.25.56	3046	7.1	reapp
25th	10.18.37	976	2.9	diss
25th	11.16.37	976	2.9	reapp
25th	20.49.38	1033	6.8	diss
28th	22.23.22	1450	8.0	diss
30th	00.17.51	1578	6.9	diss
31st	21.41.50	1796	7.6	diss
<b>June</b>				
1st	22.54.32	1923	7.0	diss
10th	01.03.53	2991	6.1	reapp
17th	02.36.06	291	6.8	reapp
25th	22.14.45	1545	8.0	diss

This is only about 25% of the predictions for the W.A.S. observatory. If you are interested there are some Occultation's of Planets later in the year so get in some timing practise beforehand.

## *Planetary Report*

**Mercury.** Is at greatest elongation, E.  $22^\circ$  on May 22nd and at it's most favourable for the year, it fades considerably before disappearing into inferior conjunction on June 16th,

**Venus.** Brilliant morning object very low in the east, it's apparent diameter shrinks from 41 to 26 arc seconds and it's phase increases from 23 to 45 per cent illuminated during May. It's at greatest elongation W.  $46^\circ$  on the 8th June.

**Mars.** Morning object at stationary point on May 11th brightening as it moves, retrograde from Sagittarius back into Ophiuchus, and to opposition on the 13th of June

**Jupiter.** Evening object in the west disappearing into the twilight towards the end of May and in conjunction on June 14th

**Saturn.** In conjunction on May 25th and unsuitably placed throughout May and June

**Uranus and Neptune.** Are both becoming more favourable

**Pluto.** Is at opposition on June 3rd, good equipment and conditions needed.

## *Editors Note*

A bumper issue this month so I'll keep my comments brief, keep those articles rolling in, visit the official web site (if you can) and most importantly wish for clear skies!

Rob

## *Dates for your Diary*

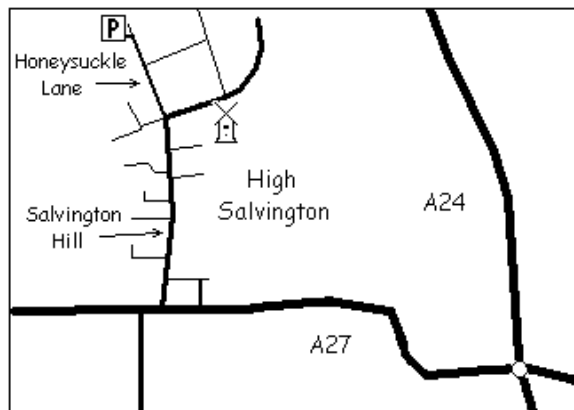
Glen Thomas ~ Planetary Section Director

### Mercury and Jupiter on May 15th and 24th at High Salvington

Mercury is favourable again this month, giving us two good photo-opportunities. Given this year's weather and my desire not to start off with a failure, I will be at High Salvington with a telescope for both events.

The first has Mercury less than 3 degrees from Jupiter. The plan is to meet at the Honeysuckle Lane car park after 20:00 UT (21:00 BST) on May 15th (16th if weather poor).

The second brings a two day old Moon in close, with the planets still only 7 degrees apart. Meet at the car park on May 24th from 20:15 UT (21:15 BST).



### Crescent Moon Watch

Nick Quinn

As Paul Carter pointed out in the March WASNews, this year is not particularly good for spotting the young crescent Moon. Our final opportunity this year comes on Wednesday 23rd May. At sunset, 19:58hrs GMT, the Moon will be just over 17 hours old, and only 3 degrees above the horizon. It will set just half-an-hour later at 20:29hrs GMT.

This will be extremely difficult to spot, even with a good telescope, but if you want to give it a try then you will find other WAS members at our usual observing site in the car park at the top of Honeysuckle Lane, High Salvington, (grid ref: TQ 119 069). Aim to arrive at about 8.30 pm British Summer Time! If you have a telescope or binocular, please bring it along.

Although we need a really clear sky this time, you will find some members present unless it is raining or completely overcast. Both Jupiter and Mercury will be more easily visible than the Moon, so we should see something.

### Mercury Watch

Nick Quinn

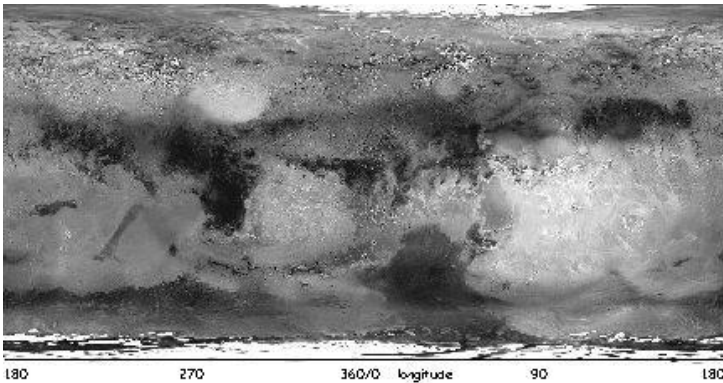
The day after our Crescent Moon watch provides another opportunity to spot Mercury. The Moon will be approaching two days old and not too far from the elusive planet. So, on Thursday 24th May aim to arrive at High Salvington around 9.00pm BST, weather permitting. See you there!

## Return of the Red Planet

Glen Thomas ~ Planetary Section Director

Two years after its last apparition, Mars is approaching opposition again in June. The good news is that Mars will be closer than it has been for sixteen years; it only reached 16 arc seconds across in 1998, but will exceed that this year from mid-May through to early August! There is the chance of making out a number of surface features even in small telescopes as it grows in apparent size throughout May, reaching 20.8 arc seconds on June 21. Mars is still a small planet though, and will only appear as a point in binoculars.

The bad news is that Mars is low down in Ophiuchus so it will never get very high in the sky. Observations will always be through a large thickness of atmosphere, unless you manage to travel to the Southern hemisphere, although patience will help you to see details on the surface. Take your time at the eyepiece, maybe sketching your observations, and any brief moments of good seeing will allow you to see more than you would with quick looks.



The Martian equinox is on June 17, so while you will not get a clear view of either polar ice cap, you may glimpse both! You could also catch the indistinct darker or lighter surface features (the albedo features) that are shown on the map. To find which face of the red planet is visible refer to the table of the longitude of the central meridian - the longitude of Mars that will run down the centre of the disc. The table shows figures for midnight (UT) on several nights over the next two months.

Table: Longitude of the Central Meridian at midnight

<u>date</u>	<u>May</u>	<u>June 2001</u>
1/2	199	278
7/8	144	225
14/15	80	163
21/22	16	101

To find the approximate longitude of the central meridian for other nights and times, subtract 9 degrees per whole day later and add 15 degrees for every hour after midnight (subtract for hours before midnight). Since Mars' day is just 40 minutes longer than Earth's, if you observe Mars at about the same time on consecutive nights you will see Mars appear to rotate slowly the 'wrong' way. Similarly, if you observe 40 minutes later each consecutive night Mars will be showing the same face to you.

### Wanted: Armchair Astronomers!

Nick Quinn

During late May, we will witness a rare flyby of Asteroid 1999 KW4. It is a member of the 'Aten' class of asteroids and revolves around the Sun in only 188 days.

Only Mercury has a shorter year (88 days). Around 25th May this body will attain a brightness of 11th magnitude, faint, but visible in the society's telescopes, as it whizzes past the Earth at a distance of only 4.8 million kilometres. The June issue of Sky and Telescope magazine contains a short article about the close approach, and a call for observations to try and pin down its rotation period.

This is where I need your help. I aim to obtain a series of CCD images from which it should be possible to measure its brightness and any variation due to rotation, thereof. Potentially I could end up with a hundred images or more, each of which has to be measured. If you have a PC and an Internet connection then here is your chance to do some 'real science'! In essence, I will take the images overnight and either send them to you by e-mail, or post them to a web site for you to download.

The next day, using suitable photometric software (for example Astrometrica), you will measure the brightness of the asteroid on each frame and plot the results on a graph. There are several possible nights so it is important that the analysis is done quickly so that I can change the frequency of imaging to match the period of rotation.

There are at least two other CCD imagers in the Society who may also be inspired to join in this observing campaign. Please contact me to volunteer your services and for further details email: [nick@nquinn.demon.co.uk](mailto:nick@nquinn.demon.co.uk).

## **Reports**

### **Solar Section Report ~ April 2001**

Brian Halls ~ Solar Section Director

The energetic activity of March continued into April. The month began with three large groups that were present at the close of the previous month.

Sunspot region 9393 at N16<sup>0</sup> L= 154<sup>0</sup> remained naked eye comprising an area size of 1700<sup>6</sup> – making this the largest sunspot visible during solar cycle 23. This massive area rapidly deteriorated in size prior to disappearing over the western solar limb on the 5<sup>th</sup>, but not before being responsible for flare activity, one of which was the biggest event observed on the Sun for 10 years.

Other groups took its place for activity and size. One such region – 9415 at S21<sup>0</sup> L=358<sup>0</sup> (size= 680 class = Dko) as also a very active spot group and of naked eye size. It produced activity that was responsible for aurora activity observed on Earth – this group was of interest to astronomers due to its magnetic make up.

In the southern hemisphere, leader sunspots in a group have a negative polarity, with the following spots in the group having a positive polarity, however region 9415 bucked this trend and had the magnetic polarity of a northern group with the leading spot being positive and the following spots being negative! It is likely that the flare activity in this group was in part likely caused by the strains in the magnetic fields brought about by this strange configuration.

This very interesting group reached maximum size – 880<sup>6</sup> by the 8<sup>th</sup> and began to diminish in size as it too vanished over the west limb.

On the whole, sunspot activity which had been quite during the latter part of 2000 and the early part of this year, has continued to increase over the last two months, proving that the Sun which is now reckoned to be a year past its sunspot maximum can still throw up a few surprises.

## **Stellar & Deep Sky Summer 2001**

Graham L. Boots ~ Stellar & Deep Sky Section Director.

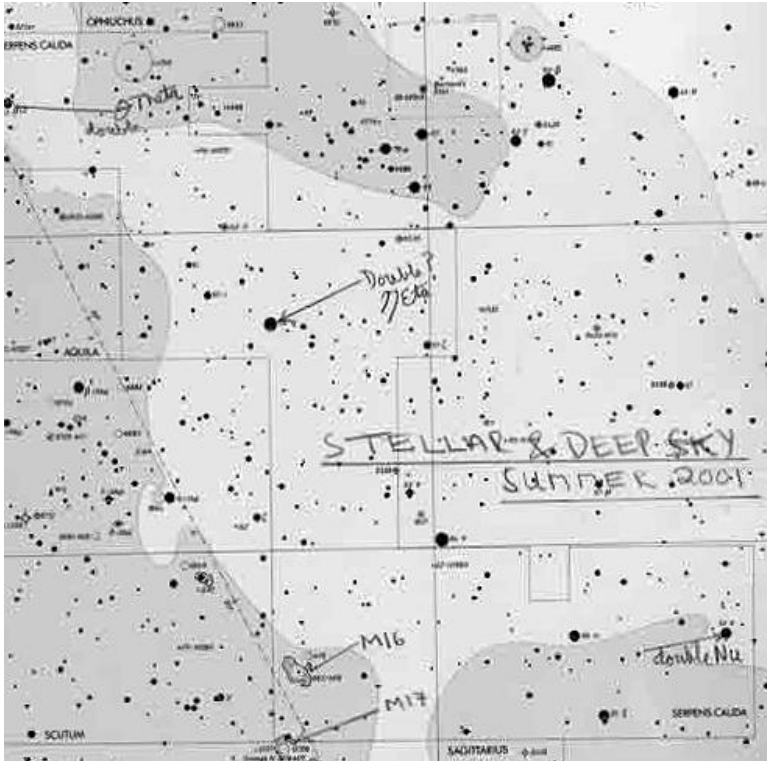
My last article for the Stellar and Deep Sky section appeared last autumn and dealt with four objects in the constellation of Vulpecula. On Friday the 3<sup>rd</sup> November the Observer's Night was blessed with clear skies with a limiting magnitude of 5. A nearby street light had recently been changed to full cut off, this light shone directly upon the observatory and the change has made a remarkable difference. A limiting magnitude of 5 for an urban site is very good. Five members plus two guests attended and we were able to observe all four celestial objects that I had written about in my last article.

Using the finder scope upon the 20cms Cassegrain / Schmidt, which has a 5° field of view, we were able to view the whole of the asterism called the 'Coat hanger'. We then observed the Dumbbell planetary nebula M27. For this object we used the 29.2cms Newtonian fitted with the Lumicon Ultra High Contrast filter and found the image was better when viewed with the 16mm rather than the higher magnification of the 9.5mm eyepiece on this occasion. Again using the Newtonian we inspected the optical double star alpha Vulpeculae. This time we used a 40mm eyepiece, which gives a wide field of view and a low magnification of 41X with this telescope, this was necessary as this double has a large separation of 7 arc minutes. The observers present agreed the colours of red and blue as stated in the Visual Atlas of Double Stars by Mike Ropelewski published by The Webb Society. The nearby loose star cluster of about 30 10<sup>th</sup> magnitude stars was also observed which completed the viewing of the chosen objects in Vulpecular.

The next constellation I have chosen which is for the summer months is Serpens Cauda (the snake's tail) which is due south at the end of July around 11.00 p.m. This is only half a constellation, the other half being Serpens Caput (the snake's head) These two halves are divide by the constellation of the serpent bearer, Ophiuchus.

I will as usual include some double stars beginning with Theta Serpentis. This double has a separation of 22". 3 seconds of arc, fairly wide, magnitudes 4.5 and 5.4 and are described as silvery white. Eta Serpentis is listed as a double star in the Norton's 2000 Star Atlas 18<sup>th</sup> edition and on the Sky Map Pro V4 CD but is not shown as a double in Wil Tirion Sky Atlas 2000, Visual Atlas of Double stars nor the 15<sup>th</sup> edition of Norton's.

Eta is a 3<sup>rd</sup> magnitude star but I do not know the magnitude of the secondary star nor the separation. Can any one tell me more about it ? Perhaps we will observe it anyway. Nu Serpentis are a pure white pair set against a rich stellar background, again I do not know the separation or the magnitude of each component star, the combined magnitude is given as 4. Can anyone help out on this one too ?.



In Serpens Cauda there are two very famous deep sky objects, M17= NGC 6618 the Omega Nebula and M16=NGC 6611 the Eagle Nebula. The Omega Nebula, also called the Swan or Horseshoe & Swan Nebula was discovered in 1746. Sir John Herschel observed it from the Cape in 1833 as described as “very remarkable, consisting of two loops like a capital Greek ‘omega’, the one bright and the other exceedingly faint” The Omega Nebula is 4,800 light years away and 27 light years in diameter. It contains 4000 solar masses of excited gas and is therefore an emission nebula but it also contains a mixture of cold dust, warm dust, cold gas and stars as well as the excited hot gas.<sup>ref 1</sup>

If we cannot see the gas from our Observatory site we will certainly see the open star cluster associated with the nebula. M17 is an object making new stars. It is more in the constellation of Sagittarius than Serpens Cauda but as it is so close to M16, which is in Serpens Cauda, I chose to include it.

I expect we have all seen the splendid photograph by the Hubble Space Telescope of Eagle Nebula showing early star formation and columns of dark dust. Like

M17, M16 is another HII region where similar ingredients are making new stars. M16 is 6500 light years away. Bright O and B stars create ionising radiation that causes the some of the nebula’s gases to glow so for the most part this object is an emission nebula opposed to reflection nebulae which shine when cold gas reflects starlight. When objects like M17 and M16 are viewed in infra red emissions the numerous stars embedded within the gas are revealed.

What are HII regions? They are clouds of ionised hydrogen gas. While some hydrogen atoms are being knocked apart by ultraviolet photons, other hydrogen atoms are reassembled as free protons and electrons manage to get back together. During this recombination of hydrogen atoms, the captured electrons cascade downwards through the atom’s energy levels towards the ground state. These downward quantum jumps release numerous photons causing the nebula to glow.<sup>ref 2</sup> Because emission nebulae radiate mainly in this way these objects are referred to as HII regions.

The Eta Carina, Lagoon, Trifid and Orion nebulas are also HII regions and all are within our own galaxy. In each case the nebulas are associated with star clusters which can be referred to as loose, open or galactic. They contain relatively very young stars.

Before we view these objects in Serpens Cauda this summer I would suggest that you read a little about them as this will aid discussion on the Observer’s Nights.

References :-

- (1) Catalogue of the Universe Paul Murdin & David Allen 1979 page 114
- (2) Universe 4<sup>th</sup> edition William J Kaufmann III 1994 page 372 20-4

*April Lecture Reviewed - Report by Vanessa Wegner*

### Globular Clusters - Bob Turner

Bob explained that he had always been interested in Globular Clusters ever since he had first owned a telescope quite simply because they are so beautiful. If amateur astronomers are asked what were the first things they saw in the sky they usually say Saturn, comets & globular clusters, part of their appeal is that they are very easy to see & very photographic. Bob started his lecture by immediately stimulating the audience’s interest with slides of M13 taken with a 12 inch telescope using a 3 minute exposure, M13 is the

largest globular cluster which can be seen from the northern hemisphere. Bob then showed an image of M15 which has an even more dense centre. Globular clusters typically have one star per cubic light year, this is much closer than you would normally see in star formations. As Bob pointed out anyone can see something like this irrespective of knowledge or professional equipment & sit back & say “god that is beautiful” & the image is so fantastic you can carry it with you for the rest of your life.

So what are we observing when looking at a ball of stars containing several million stars? Although separate from the Milky Way Globular Clusters have settled many questions about our galaxy. Herschel in the 1830`s noticed many Globular Clusters in the area of Sagittarius & from this he was able to construct a model of the Milky Way showing that we are not in the centre but Sagittarius is. In 1918 Harlow Shapley started observing Cepheid variables, stars which vary in brightness over a period of time & he was able to predict where they are in the galaxy & therefore the size of the galaxy. In the 1940`s & 1950`s there were lots of questions asked about Globular Clusters, how old are they, how did they form & how many are there. Many of the answers to these questions has to wait until physics had caught up & recent observations by the Hubble have caused even more questions to be asked.

In the early 1900`s two astronomers Hertzsprung & Russell started to plot the brightness & surface temperatures of stars. The scale they used, O, B, A, F, G, K, M, R, N & S ran in order of decreasing surface temperatures, this sequence can be remembered by the mnemonic “Oh Be A Fine Girl Kiss Me Right Now Sweetie” although there are variations! So using the scale O stars are very bright (hottest) & M stars very faint (coolest). In order to end up with a useful model the absolute magnitude had to be measured not the apparent magnitude. When stars are plotted against one another a pattern starts to emerge, from dwarf stars, giants to super giants, we can then begin to understand the life cycle of stars. Its interesting that as even more stars are added even more groups appear, e.g. there is no real difference between a gas giant & a star, if Jupiter had been bigger it would have been a star. Very small mass stars will not progress as they don`t burn enough energy but a star 15 to 20 times the mass of our sun will have a place at the top of the chart, such a star would be very bright & burn energy extremely quickly therefore its life span would be comparatively short, our own sun sits in the middle of the diagram.

When a star is very young it burns mainly hydrogen, it will start to rotate & condense in the centre. When the pressure is high enough the atomic process starts, this

requires protons, positrons, neutrons & neutrinos. When the star gets a bit bigger other reactions start to happen, higher elements such as lithium are produced & eventually carbon & then iron, so there are lots of stages a star can go through. A Hertzsprung-Russell diagram of Globular Clusters is interesting as all the energetic young stars are missing, so it seems Globular Clusters must be very old, indeed some are 10 billion years old. The questions therefore has to be asked why aren`t Globular Clusters being formed now? Or are they?

In the 1970`s it was realised that there are Globular Clusters all around galaxies but they vary enormously in number. We also now know there are differences between the Globular Clusters themselves, some are metal rich & some are relatively metal poor. The Hubble has shown us that the further out in the universe the more irregular the galaxies are, this implies that something happened in the early universe which is not happening now. Also far out in the Universe are Pre-galactic blobs, we don`t know what these are but they could have formed the early galaxies, they also perhaps have a role to play in the formation of metal rich Globular Clusters.

So are existing Globular Clusters survivors from a previous age when there were many more & also what happens when they fall apart? A clue to this is that there are now only high mass Globular Clusters, perhaps there were once low mass Globular Clusters which have dissipated.

When did Globular Clusters form? There are three possible answers, they formed before galaxies, at the same time or after galaxies. If they formed before galaxies we would indeed only expect dense Globular Clusters to have survived, however they don`t contain much dark matter therefore they don`t have the same characteristics as early formed objects. The second option is an appealing idea but when galaxies formed they were not evenly spaced, there are huge gaps of absolutely nothing between them therefore this is not a likely answer. There is some evidence to support the idea they formed after galaxies, when galaxies interact there is a lot of star formation, this could be ideal conditions for Globular Clusters to form.

The Hubble has shown us images of interacting galaxies & there are some strange objects when this occurs, they look like comets but we know this is not the case, we suspect these are high density areas, perhaps the conditions are suitable for Globular Clusters to form.

Recently another question has been asked. Is it possible that the centre of a Globular cluster could collapse & form a black hole? Nine months ago researchers thought this was possible but now we are not so sure, although the centre of a Globular Cluster is very dense would it be dense enough for this to occur?

Bob finished the talk by posing the question, will Globular Clusters ultimately tell us how the universe was formed? But whilst debating all these questions & waiting for the answers in the mean time we can look & appreciate how very beautiful Globular clusters really are & the audience certainly agreed with Bob's sentiment of his last slide Omega Centauri, "they will blow your mind".

## *Notices*

### Newbury Amateur Society 20<sup>th</sup> Anniversary Celebration (1981-2001)

*8<sup>th</sup> September 2001*

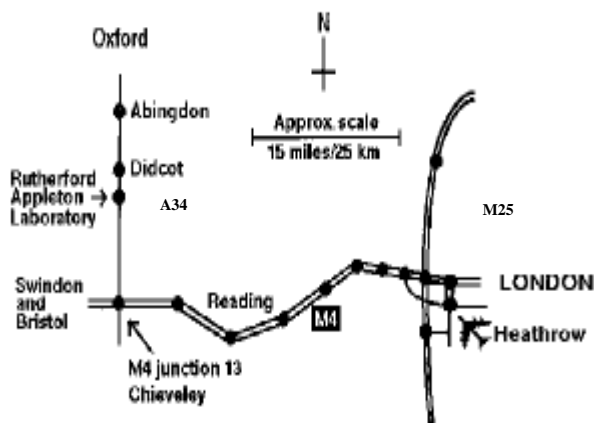
- **B**asking in the Sunshine ~ Richard Harrison (Rutherford Appleton Laboratory)
- Changes in popular Astronomy publications ~ Pam Spence
- Our growing understanding of the Martian and Jovian Atmospheres ~ Pat Irwin (Oxford University)
- CCD Astronomy ~ Nik Szymanek
- Observational Highlights of the last 20 years ~ Neil Bone
- Astronomy, Religion, History and the Realm of ideas ~ Allan Chapman (Oxford University)

Rutherford Appleton Laboratory  
Chilton, Didcot, Oxfordshire

Doors Open 9.00–Meeting Begins 10.00–Finishes 17.00

Pay at Door - Entry £5.00 / person - inc tea/ coffee

Lunch available Trade stands: Earth & Sky,  
Venturescope, etc.



## SAGAS Meeting Saturday June 2nd 2001

**E**ESAS are to host the SAGAS Summer meeting this June 2nd 2001 details below

The meeting will take place at Bexhill High School, Down Road, Bexhill On Sea, East Sussex on Saturday June 2nd, 2001, from 10:30 am to 5:30 pm.

The school has excellent facilities, which includes PA system, back/front projection screens, ISDN links, seating for 300 people, extra rooms for exhibitors and trade stands.

Entrance will be by ticket only to both events (Available in advance from ESAS)

£1.50 for entrance which Includes all talks.

£1.50 for entrance to Herstmonceux (Bar-B-Q extra on day)

A limit of 100 has been given by Herstmonceux so please order your tickets well in advance to avoid disappointment .

Ample car parking available at both sites.

- |   |  |
|---|--|
| I.R. Poyser (Confirmed)                             | • Andromeda Books (Confirmed)              |
| Speedibrews (Confirmed)                             | • Ventura Scopes (Confirmed)               |
| Martin Lunn Second Hand Astronomy Books (Confirmed) |  |
| Astronomy World (Confirmed )                        | • Green Witch Astronomy Centre (Confirmed) |
| Earth & Sky (Confirmed)                             | • House of Optics (Confirmed)              |

ESAS will have computers showing off software packages: SKY MAP PRO - REDSHIFT 4

Solar Observing will be available throughout the day: In collaboration with the SOHO Website a special presentation will take place over the Web

Other live astronomical web links will be showing throughout the day.

At least four Lectures will take place during the day between 11 am & 5 pm

Dr Paul L. Money – Up to date information on Mars (Confirmed)

Peter Gill – Solar Observing (Confirmed)

Norman Walker — Observations Ancient and Modern (Confirmed)

Nik Szymanek - CCD Imaging (getting the right results) (Confirmed)  
Dr Martin Lunn— (Confirmed)

Refreshments will be available throughout the day

From 6:30 Activities will start at Herstmonceux Science Centre

Welcome From Steve Pizzey (Science Projects)  
Bar B Q Outside under cover if weather inclement  
Tour of the observatories viewing through the 26 " telescope

Observing with ESAS telescopes If weather permits :

10" Meade, ETX 125 with AS, ETX 90 with AS, 9.25" Dob, 8" & 6"

Newtonian, 6" & 3.5" refractors, and various binoculars.

Other societies are welcome to bring their own telescopes

## ***WAS Ad***

### **Wanted**

I wish to obtain an ANGLE FINDER which will fit the view finder of the older type of single reflex cameras SLR. The makes of cameras we have are Cosina, Exa. Yashica and Prackticas. I expect a close fit can be modified. When the sky area being photographed is in the zenith it is impossible to get beneath the camera in order to a line the field of view and guess work has to be used with often disappointing results. A right angle finder would mean the observer just needs to look horizontal.

Also, does anyone have any low power Huyghenian eyepieces spare? I am thinking of the Japanese 0.96" diameter push fit type such as H20mm and H12.5mm. The Society has several 60mm refractors to loan out but we are very short of suitable eyepieces for them. We need several of each. Anything would be considered, we are desperate.

If you can help please telephone Graham Boots on Worthing 01903 505346

## ***What's on the Box***

*Friday 11<sup>th</sup> May*

**BBC TWO**

01.00 ~ Final Frontier

The world of astronomy and space exploration with the latest developments, discoveries and events in the night sky. In this programme, exploring the Kuiper Belt, and a look at whether the ancient site of Knowth in Southern Ireland could contain Moon Maps. Plus a Beagle 2 update and the Greenwich Observatory planetarium show.

## ***WAS News News***

### **Pioneer 10 probe lives on**

**Stephen Clarke ~Spaceflight Now**

In a possibly last-ditch attempt to try to contact Pioneer 10, ground controllers successfully received the deep-space probe's faint radio signal Saturday, washing away fears that the craft had been forever lost. The signal was received at a tracking station in Madrid, Spain, at 1727:30 GMT (1:27:30 p.m. EDT).

Pioneer 10 was last heard from in real time last July, while the last radio signal of any kind came in August. Officials were able to obtain five one-way communications sessions and three more opportunities of the two-way variety in early March.

Saturday's contact came during a two-way session, where controllers uplink commands to the spacecraft to lock on with a stable downlink signal. Engineers concluded that Pioneer 10 is currently in a mode where it will only communicate with ground controllers if a message is sent to the probe.

Pioneer's chief flight controller Ric Campo summed up the problem: "In order [for Pioneer 10] to talk to us, we need to talk to it."

This means that for controllers to communicate with Pioneer 10 in the future, they must reserve extra capabilities with the Deep Space Network (DSN). The DSN also supports more important missions such as Galileo, Cassini and Ulysses, making future communications more difficult to obtain and limiting the tracking capabilities for Pioneer 10.

The DSN is a collection of large dish-like antennas with installations in Goldstone, California, Canberra, Australia, and Madrid, Spain.

Currently, Pioneer 10 is 7.29 billion miles from Earth and its round-trip light time is 21 hours, 45 minutes. Its speed relative to the Sun is 27,380 miles per hour.

Pioneer 10 was officially retired March 31, 1997. The craft now serves as a training tool for ground controllers and its faint signal provides a radio beacon used by DSN and other facilities to confirm station tracking and receiver performance.

### *Diary*

**May 9 – WAS Monthly Meeting – “Observing Planetary Nebulae” by Owen Brazell.**

May 19 – Webb Society AGM – 10.30; Rutherford Appelton Laboratory, Nr Oxford.

June 2 – SAGAS Meeting – Chaired by East Sussex Astronomical Society; Bexhill High School, and Herstmonceaux Science Centre in evening. (See article).

**June 13 – WAS Monthly Meeting – The Sloan Digital Sky Survey by Dr Jon Loveday. (University of Sussex)**

June 21 – First total solar eclipse of the millennium.

*All monthly meetings (bold) are held at the Heene Church Rooms, Heene Rd, Worthing @ 7:30pm*

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

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