



PERTH OBSERVATORY  
Department of Conservation and Land Management

## Perth Observatory Volunteer Newsletter September 1997 Editor: Nikola Angus

As predicted, the weather for September has seen some of the Night Tours cancelled and the planned Astronomy Field Nights rescheduled to December. Night Tour dates for October through to May next year have been allocated and volunteers should check the availability of the dates.

### Highlights for September

**Venus** is still prominent in the western evening sky and is moving from Virgo into Libra. Venus is accompanied in the western horizon by **Mars** which sets at around 10.30 PM. Mars is currently situated in Libra, by the end of the month it moves into Scarpis. **Jupiter** is located high in the northern sky in the early evening and can be seen all evening. **Saturn** is rising at about 10 PM in the eastern evening sky and can be seen most of the evening. **Mercury** has returned to the morning sky but is difficult to observe.

With the Total Lunar Eclipse on the morning of the 17th Jacquie Milner has once again kindly contributed the following:

### LUNAR ECLIPSE

*A lunar eclipse occurs when the Moon passes through the Earth's shadow. This shadow has two parts to it - the umbra, which is the true shadow, and the penumbra, which is the partial shadow. The Moon may pass through the whole umbra, known as a total lunar eclipse, or it may only partially enter the umbra for a partial lunar eclipse, or in the case of a penumbral eclipse, only enter the penumbra. A penumbral eclipse is often undetectable to the casual observer.*

*Lunar eclipses always occur at full Moon, as this is when the Moon is directly behind the Earth. They also occur either two weeks before or after a solar eclipse. When there is a total solar eclipse the associated lunar eclipse is only partial and when the lunar eclipse is total the associated solar eclipse is only partial. One notable case of this was the long solar eclipse of July 11, 1991, where there were two undetectable penumbral eclipses, one before and one after the main event. You can also have two partial solar eclipses either side of a total lunar eclipse. This is because of the time it takes the Moon to travel 180 degrees around the Earth it has moved away from the node where the eclipse occurred.*

*A node is the point where the Moon crosses the ecliptic (the path the Sun takes through the sky) and this brings us to the question of why we don't have a lunar eclipse every full Moon and a solar eclipse every new Moon. The Moon's orbit is slightly inclined to the ecliptic and wobbles around it by 5 degrees. So for an eclipse to occur the Moon must be on or very near a node, in line with the Sun because its orbit is inclined with respect to the ecliptic.*

*The next partial lunar eclipse visible in Perth will be on July 28th 1999 (paired with the total solar eclipse over Europe) and the next total lunar eclipse will be July 16th 2000 (with two partial solar eclipses either side). The next solar eclipse visible to us will also be in 1999 on February 16th. It will not be total, but annular, which means that when the Moon is on the disc of the Sun we can still see a ring of the Sun around the Moon. What is fortunate though is that the path will travel just south of Geraldton, directly over the town of Morawa.*

For further reading try:

**"The Making of a Prize Eclipse" by Owen Gingerich, Sky & Telescope, July 1991.**

*For Internet information try:*

*B Soulsby's Lunar Eclipse Observer through*

*<http://www-clients.spirit.net.au/~minnah.LEO.html>*

*For solar eclipse information and paths try NASA's solar eclipse pages at*

*<http://umbra.nascom.nas.gov/eclipse>*

### **Astronomy Field Nights**

Unlike the weather here Tom Smith was fortunate enough to encounter 6 nights of perfect weather in the Kimberleys in July. One night was spent showing the students from Kununurra District High the stars. Three nights were spent in the Purnululu National Park (Bungles Bungles) with fellow CALM colleagues (Park Rangers) with another night spent in the Bungle Bungles.

### **Observatory News**

- The new 16" telescope is operational in the 14" dome.
- 16 volunteers still active on the night tour list.
- A new advertisement calling for volunteers will be advertised in next Monday's (15th Sept) edition of the West Australian newspaper.
- Training for the new volunteers will commence in October. Two volunteers are required to give a five minute talk on what they get out of the Night Tours Volunteer Programme. Those interested please contact James Biggs.

Some important changes to Night Tour programme and volunteer duties are:

- Important to keep visitors in their groups of 12 at all times. This is good for safety reasons and adds to professionalism of the tours.
- All guides (full time and volunteers) must be assertive in their directions during tours - the visitors are looking to us for leadership, particularly since most visitors haven't been on site before.
- Staff are not permitted to bring guest on tour unless prior permission has been granted by the Government Astronomer.
- Refreshments for staff are: 20 cents tea or coffee and 60 cents cool drinks.
- Remember to read all updates and check notice board for any relevant changes.
- Re read information contained in August's Newsletter.

### **LANDSCOPE EXPEDITION**

The 'Under Desert Skies' expedition is to be held from the 19th to 28th of September, James Biggs and Greg Lowe and 2 other staff will be conducting the tour with 8 expeditioners. There will be 3 Astronomy Field nights in the Gibson Desert, 100km north west of Warburton. Then a visit to Surveyors General Corner, the intersection of Western Australia, South Australia and the Northern Territory and star viewing on inbound and outbound journeys.

### **Farewell**

The editorial position will now be filled by Jacquie Milner as I am commencing new employment but will see you all on Night Tours. Thanks for all the support.

# SETTING UP TELESCOPES

Most telescopes whether they are clock driven or computer controlled need some adjustment whilst tracking objects.

There are several reasons why errors can occur.

- Polar alignment is not accurate
- Errors in the clock drive systems
- Fluctuations in the power supplies used to drive the telescope
- Flexure in the telescope tube - due to changes in temperature, extra weight from lenses or cameras mounted on the telescope
- Atmospheric refraction - the amount of atmosphere which you are looking through

## POLAR ALIGNMENT

Astronomers in the Northern Hemisphere use the star **Polaris** to align their telescopes. In the Southern Hemisphere we must use a directional compass as an aid to point the telescope in the right direction.

- the telescope's tripod must be level
- the telescope itself must point at the South Pole - make sure that the **wedge** supporting the telescope is tilted appropriately for the latitude of the site eg: Perth -32 degrees south of the equator ie: RA (right ascension) axis of the telescope has to be **Parallel** to the earth's axis.

## SETTING THE CIRCLES

(These are found around the two pivot axis of the telescope)

- **RA - Right Ascension** - the coordinates which are like longitude on earth.
- **DEC -Declination** - is the distance from the equator to an object, usually expressed as an angle - like latitude on earth.

Setting up a telescope is a simple task.

Once all of the above steps are completed, and we know the coordinates of an object say like Sirius -- RA 06 hrs 45.2 min and DEC -16 deg 43 sec we set the telescope in motion by turning on the power.

While the telescope is tracking, undo both RA and DEC locks and point the telescope directly at Sirius (the brightest star in the sky) and then centre it in the main telescope. Lock both axis in place with the thumb screws located on both axis.

Locate the marker on the telescopes body and slide the movable RA setting circle until the marker and the RA time are in line. The DEC circle is fixed to the telescope tube and needs no adjustment.

Once all the steps are completed ie: level tripod , alignment with the S.C.P, latitude angle, power on, RA and DEC, the object chosen will usually be sighted in the view finder and the drive will track accurately on that object with only minimal corrections necessary.

SOME BRIGHT REFERENCE STARS:

		RA	DEC
SIRIUS	CANIS MAJOR	06 HRS 45.2	-16 43
CANOPUS	CARINA	06 HRS 23.9	-52 42
ARCTURUS	BOOTES	14 HRS 15.7	+19 11
ACHERNAR	ERIDANUS	01 HRS 37.7	-57 14
ANTARES	SCORPIO	16 HRS 29.4	-26 26

TEST YOUR SKILLS - FIND THESE WITHOUT USING THE 16"

OBJECTS:

NGC 6231	16 HRS 54.0	-41 48	OPEN CLUSTER	SCORPIO
NGC 6523	18 HRS 03.8	-24 23	LAGOON NEB	SAGIT
NGC 6618	18 HRS 20.8	-16 11	SWAN NEB	SAGIT
NGC 6656	18 HRS 36.4	-23 54	GLOB CLUSTER	SAGIT
NGC 7009	21 HRS 04.2	-11 22	SATURN NEB	AQUR
NGC 2070	05 HRS 38.2	-69 05	TARANTULA NEB	
NGC 253	00 HRS 47.6	-25 17	SPIRAL GAL	SCULP
NGC 5128	13 HRS 25.5	-43 01	CENTAURS A	CENT

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for the

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