WELLINGTON ASTRONOMICAL SOCIETY

Two 6 inch dobbies Photo © Gordon Hudson

MONTHLY MEETING
WEDNESDAY 13th JUNE 2007
7.30 PM
SCIENCE HOUSE
TURNBULL STREET
THORNDON
WELLINGTON

CONTENTS

Caring for telescopes-Part 2- by Gordon Hudson.

This month Gordon will present part 2 of "Telescopes" and teach some ways of collimating your telescope for optimum clarity and also share a few nifty ways of doing this essential task that he has discovered to be timesaving, easy, and yet still precise. He will also be showing a dvd that demonstrates the fully automated operation of the Kotipu Place Observatory including the photometry of variable stars.

Thomas King Observatory

Although Carter Observatory is closed Ross Powell will be at the TKO every night suitable for observing between Wednesday and Saturday each week. Contact Ross Powell Ph 389-9765, email rpowell@was.org.nz or Vicki Irons Ph 970-5215 email virons@was.org.nz for more details.

Galactic Circle Feature

Galactic Circle will be on the third Wednesday in June between 4.30 and 6.30pm and will be held at the Kelburn Scout Hall due to the closure of Carter Observatory for redevelopment. The group is coordinated by Marilyn Head ph 389-0882 email marilyn@actric.gen.nz. We look forward to seeing you all there.

Black Holes

Black holes are objects so dense that not even light can escape their gravity, and since nothing can travel faster than light, nothing can escape from inside a black hole.
Black holes can be said to "come in all sizes", meaning that they have a wide range of masses. There are at least two different types of black holes - "stellar-size black holes" which form from the death of a very massive single star in a supernova explosion, and "supermassive black holes" in the centres of galaxies which have the mass of a few billion to hundreds of billions of solar masses. Black holes are fascinating objects where space and time become so warped that time practically stops in the vicinity of a black hole.

Inevitable Mathematics

Scientists believe that if an object reaches a particular distance from a black hole (the event horizon), it will inevitably be drawn into it. In mathematics, a similar situation can occur. Some mathematical expressions and operations will result in a numerical 'black hole' no matter where you start!

A. Follow the procedure below starting with a positive integer (number). We show you the results for the beginning values of 5 and 7.

Start with a Number	5	7
Multiply it by 6	30	42
Add 12 to the result	42	54
Divide by 3	14	18
Subtract twice the original number	**4**	**4**

Why does this always give the answer 4? Let us examine the steps.

Go through the procedure again with the starting value of "B".

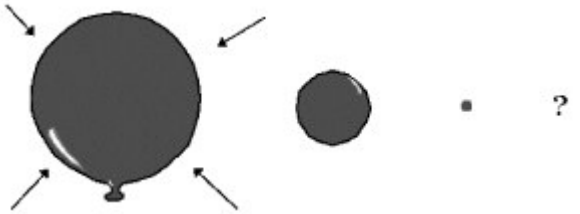
Start with a Number	B
Multiply it by 6	6B
Add 12 to the result	6B + 12
Divide by 3	(6B + 12) / 3 or 2B +4
Subtract twice the original number	2B +4 - 2B or 4

Notice that the final result is 4, regardless of the initial value. That is, all beginning numbers fall into the 'black hole' 4.

Now it is your turn. Can you create a numerical 'black hole' whose value is always 10?

Aluminum Foil, Balloons, and Black Holes

Model what happens when a star collapses into a black hole.



Materials:

- Round balloons
- Aluminium foil
- Kitchen scales (best if can measure to at least 0.1 grams)
- Cloth (or flexible plastic) tape measure
- Student worksheet

1. You are going to determine what radius, mass, and density it takes to make this aluminium foil balloon (that will represent a star) into a black hole.
2. Blow up the balloon until the diameter is about 15 cm, no larger. Tie off the end and measure its circumference. (Make sure you record all your measurements) This is the core of the star.
3. Cover the balloon with several sheets of aluminium foil. These layers of foil represent the outer layers of your "Model Star". Be generous with the foil and cover the balloon thoroughly at least twice. Use the kitchen scales to weigh your 'star'.

You are now ready to simulate the enormous mass of the star collapsing inward toward the core. Use your hands as the "Giant Hands of Gravity" and squeeze the balloon down until it pops. You will need to *gently* shape the aluminium foil back into a "sphere". Don't squash it too hard and record your measurements of the circumference and weight again.

No matter how small you see it you should see that the mass of the star stays the same. When a star explodes as a supernova or a super massive black hole gobbles up stars that have strayed too close, they don't just disappear – though they do end up in a black hole!

RASNZ Conference 2007, Auckland. Information taken from RASNZ email newsletter number 81, 21 May 2007.

The 2007 RASNZ conference will be held from Friday 29 June to Sunday 1July. It is being hosted by the Auckland Astronomical Society. The venue will be the Quality Inn, 477 Great South Road, Manukau. This is 15 km to the south of Auckland City and within a few kilometres of Auckland Airport. The guest speaker for the conference will be Dr David Dunham, long-term president of IOTA, the International Occultation Timing Association. This

year's Fellows' Lecture will be given by Dr Denis Sullivan. His topic is Astroseismology - the Science of Stellar Pulsation. Full details of the Conference programme and papers are posted on the RASNZ's website http://www.rasnz.org.nz/

What's in the Sky in June: Information provided courtesy Carter Observatory

Planets

June is an excellent month for viewing the planets. Venus, Mars, Jupiter and Saturn will be visible for all of the month. Mercury will be visible for all but the very end of the month.

Mercury will be visible in the Western evening sky for all but the end of June. At the start of the month it sets at 18 26, by June 7 at 18 29 and at 17 08 by month's end. Mercury is in the constellation of Gemini. During June it very rapidly fades from 0.4 to 5.0.

Venus will be visible in the Western evening sky. At the start of the month it sets at 20 09 and at 20 34 by month's end. Venus starts the month in the constellation of Gemini, moving into Cancer on June 4 and finally into Leo on June 27. Its brilliant magnitude slightly increases from –4.3 to –4.4 during June.

Saturn will be visible for the first quarter of the night. At the start of the month it sets at 22 17 and at 20 37 by month's end. Saturn is in the constellation of Leo, in which it remains until September 2009. Its magnitude slightly fades from 0.5 to 0.6 during the month.

Jupiter will be visible for all of the night, except at the end of the night towards the end of June. At the start of the month it sets after Sunrise and at 05 59 by month's end. Jupiter is in the constellation of Ophiuchus, in which it remains until 2007 December. Its magnitude slightly fades from –2.6 its brightest for the year, to –2.5 by month's end.

Mars will be visible for the last quarter of the night. At the start of June it rises at 02 42 and at 02 36 by month's end. Mars start the month in the constellation of Pisces, moving into Aries on June 28. Its magnitude slightly brightens from 0.8 to 0.7 during the month.

All times are for Wellington unless otherwise stated. Other centres may vary by a few minutes.

Phases of the Moon

Full Moon – June 1 at 13 04, Last Quarter – June 8 at 23 43.New Moon – June 15 at 15 13. First Quarter – June 23 at 01 15.

Winter Solstice

The Southern hemisphere Winter Solstice is at 06 06 on June 22. This is when the Sun is at its most Northerly point in the sky and therefore at its lowest altitude at the middle of the day in the Southern hemisphere. Mathematically this means that the longest night is June 21/22 and the shortest day is June 22. We say "mathematically", as the nights and days are longer or shorter than the adjacent nights and days by only a few seconds, whereas actual Sunrise and Sunset times can vary by up to 3 or 4 minutes due to atmospheric conditions. This large variation means that any of the nights or days around the Solstice could actually be the longest or shortest.

Occultation of Antares by the Moon on June 28

The bright star Antares will be occulted by the Moon in the evening of June 28. The following table gives the time of the disappearance (D) and of the reappearance (R), in New Zealand Standard Time (NZST). These times are given to the nearest minute.

The Moon is 2 days before Full Moon, which will make Antares difficult to see.

Disappear (D) h m	Reappear (R) h m
18 05	19 14

Comets and Meteor Showers
No bright **comets** or significant meteor showers are predicted to be visible during June.

Upcoming Star Parties

The Gifford Observatory star party is being held on Saturday June 16th. The contact person is Duncan Hall. His contact number is 021 615 905021 450-882
Pauatahanui Star Party will be held on Saturday June 23rd. Observing will commence after dark. The Phone number at Pauatahanui is 021-102-6056.

Please note that mobile charges may apply when you phone some of these numbers

Diary of Astronomical Phenomena: Information provided courtesy Carter Observatory

June 1 Full Moon at 13 04.
2 Jupiter 6°N of Moon at 00 00.
2 Mercury at greatest Easterly elongation from the Sun (23°) at 22 00.
6 Jupiter at opposition (on the opposite side of the Earth to the Sun) at 11 00.
9 Venus at greatest Easterly elongation from the Sun (45°) at 15 00.
13 Moon at perigee (closest to the Earth) at 05 00. (Distance = 0.0024317 AU = 363,780 km).
15 New Moon at 15 13.
16 Mercury stationary against the background stars at 04 00, as its motion changes from an Easterly to a Westerly direction. - Matariki Celebration begins
19 Saturn 0.4° S of Moon at 20 00.
22 Winter solstice at 06 06.
25 Moon at apogee (furthest from the Earth) at 02:00 (Distance = 0.0027042 AU = 404,540 km).
28 Occultation of Antares but the Moon at ~18 00. (See above).
28 Jupiter 6°N of Moon at 02 00.
29 Mercury in inferior conjunction (between the Earth and Sun) at 07 00.

Sunrise/Sunset

Alongside are Sunrise and Sunset times for each Monday of the month for Wellington. The table also gives the time of Transit (Trans), the maximum Altitude (Alt) and the Azimuth (Az). The time of transit is when the Sun crosses the local North-South meridian from East to West. At the time of transit, shadows will point South. The transit time is also the time at which the Sun is at its maximum altitude (Alt). Assuming your horizon is at sea level, the Azimuth is the position on the horizon where the Sun rises or sets. The angle is measured from true North (not magnetic North), towards the East for Sunrise and towards the West for Sunset.

An azimuth of 90°, for Sunrise, means the Sun rises exactly in the East and for Sunset the Sun sets exactly in the West.For azimuths less than 90°, the Sun rises to the North of East and sets to the North of West (Winter months). For azimuths greater than 90°, the Sun rises to the South of East and sets to the South of West (Summer months). Other New Zealand centres may differ slightly from Wellington below.

Date	Rise	Set	Trans	Alt
Jun	H M	H M	H M	°
4	07 39	16 59	12 19	26
11	07 43	16 58	12 20	26
18	07 46	16 58	12 22	25
25	07 48	16 59	12 23	25

Moonrise/Moonset

The table on the next page gives the Moonrise and Moonset times for Wellington for the month. The times for other New Zealand centres may deviate by up to 30 minutes, and this difference will vary during the month. (Unfortunately it is not possible to estimate this difference by consulting the Sunrise and Sunset tables above as the Sun differences between Auckland, Wellington, Christchurch and Dunedin bear little resemblance to the Moon differences because of the Moon's declination).

In the table, we include the Azimuth (Az) that the Moon rises and sets on the horizon. It assumes your horizon is sea level. Azimuth is measured in degrees from True North (not

Magnetic North) either towards East or West depending on whether it is for Moonrise or Moonset. So for an Azimuth of 90°, the Moon will rise exactly in the East and set exactly in the West. For Azimuths less than 90°, the Moon will rise to the North of East and set to the North of West. Similarly, for Azimuths greater than 90°, the Moon will rise to the South of East and set to the South of West.

Date	Rise	Az	Set	Date	Rise	Az	Set	Date	Rise	Az	Set
Jun	H M	°	H M	Jun	H M	°	H M	Jun	H M	°	H M
1	16 36	128	07 47	**11**	02 42	77	13 43	**21**	11 43	81	23 22
2	17 25	130	08 48	**12**	03 59	68	14 12	**22**	12 03	89	-- --
3	18 23	129	09 43	**13**	05 18	61	14 48	**23**	12 21	97	00 23
4	19 28	126	10 30	**14**	06 38	55	15 33	**24**	12 41	104	01 24
5	20 38	120	11 09	**15**	07 54	52	16 30	**25**	13 02	111	02 25
6	21 50	113	11 41	**16**	08 57	52	17 37	**26**	13 26	118	03 27
7	23 02	105	12 08	**17**	09 48	55	18 49	**27**	13 56	123	04 31
8	-- --	99	12 32	**18**	10 27	60	20 02	**28**	14 32	127	05 36
9	00 14	96	12 55	**19**	10 58	67	21 13	**29**	15 18	129	06 38
10	01 27	86	13 18	**20**	11 22	74	22 19	**30**	16 14	129	07 36

More acurate astronomical information for specific locations both in New Zealand and overseas is available from Carter Observatory but there may be a charge for this information.

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How to receive your WAS newsletter by email

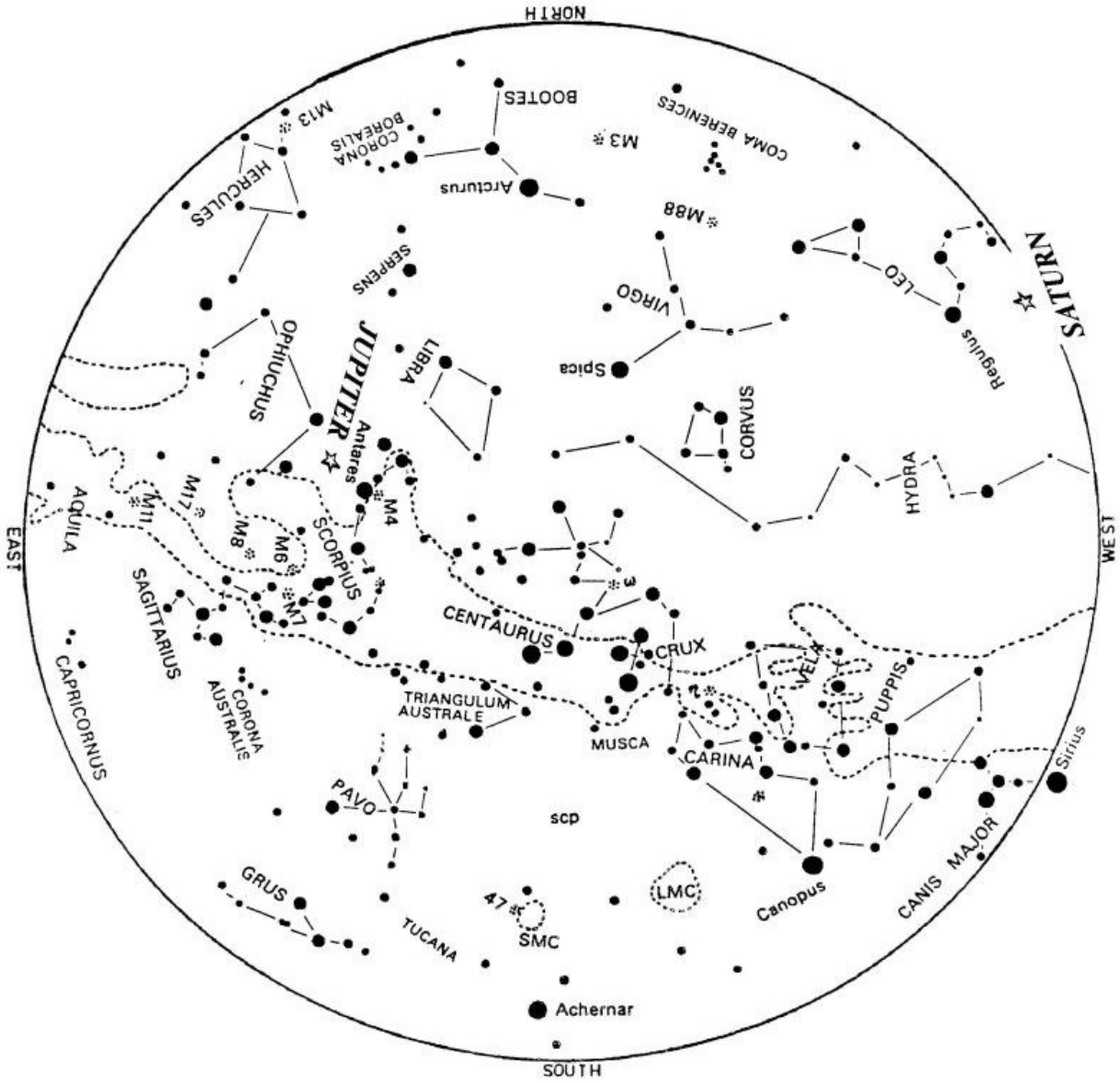
At our last AGM, the incoming council was asked to set up a system where WAS members could receive their newsletter over the internet (rather than by post).if you wish to receive your newsletters this way, then please send an email to ;newsletter-subscribe@was.org.nz with your full name in the body of the email (a subject line is not required).I need your name in the email as it is not clear from some email addresses who the email is actually coming from.

You should then receive an automatic reply, asking you to confirm you want to subscribe (and to check your email address is okay). I (as moderator) will then get a request to subscribe you. After I okay your subscription you should get another message telling you it's been done. When each newsletter becomes available, I will email a short message to all subscribers to that effect and provide a link to the newsletter. In this way you can download the newsletter at your own convenience. The newsletters will be in pdf format, and are typically 1 - 2MB in size.

Note that this is only intended for current WAS members, which is why I have to okay each subscription request. The only exceptions will be for companies that advertise in the newsletter or other astronomical societies that swap newsletters with us. Further note that for the first few months you will also continue to receive your newsletter in the post. Once we're confident the system is working well, you will only receive the newsletter via email.

SKY MAP PROVIDED BY CARTER OBSERVATORY

This chart shows the sky as it appears at about 21:00 for ~June 15.



How To Use the Sky Charts

To use the sky chart hold it up to the sky so that the direction in which you are looking is at the lower edge of the map. For example, if you are looking at the western horizon then the map should be held so that the "WEST" label is at the lower edge. The altitude and direction of the stars and planets will then be correctly shown. The centre of the chart will be directly overhead. The above chart is for 21:00 NZST, but other month's charts, from previous WAS *Newsletters*, can be used at other times of the night. The table below indicates which month's chart, from back copies, can be used at other times during this month.

For this time of the night:	17:00	19:00	23:00	01:00	03:00	05:00	07:00
Use this month's charts:	Apr.	May.	Jul.	Aug.	Sep.	Oct.	Nov.

Note that although the stars will be correctly positioned, the planets will not be correct as they move against the background stars from month to month

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