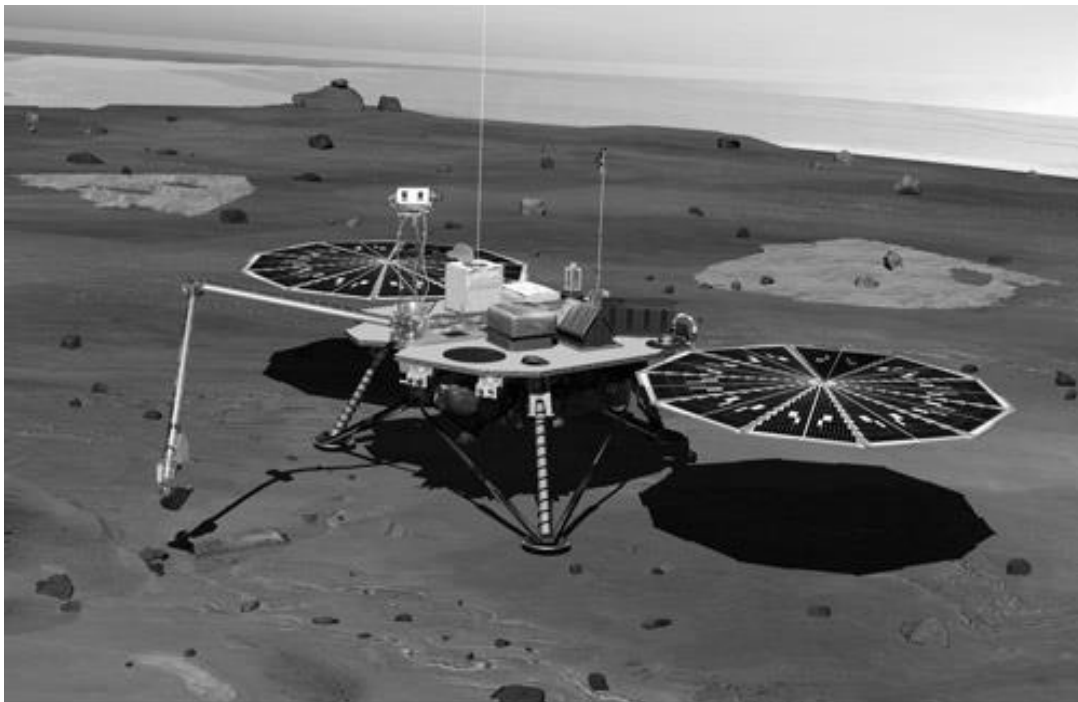


WELLINGTON ASTRONOMICAL SOCIETY



Artist's impression of the Phoenix Mars lander. Picture @ NASA

**MONTHLY MEETING
WEDNESDAY 8th August 2007
7.30 PM
SCIENCE HOUSE
TURNBULL STREET
THORNDON
WELLINGTON**

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Phoenix – Mission to the Martian Polar North by David Maclennan, President New Zealand Spaceflight Association

NASA's next Mars mission, due for launch on 3 August, will look beneath a frigid, arctic landscape for conditions favourable to past or present life.

Instead of roving to hills or craters, NASA's Phoenix Mars Lander will claw down into the icy soil of the Red Planet's northern plains. The robot will investigate whether frozen water near the Martian surface might periodically melt enough to sustain a liveable environment for microbes. To accomplish that and other key goals, Phoenix will carry a set of advanced research tools never before used on Mars.

A robotic arm will dig to the icy surface layer, which is expected to lie within a few inches of the surface. A camera and conductivity probe on the arm will examine soil and any ice there. The arm will lift samples to two instruments on the lander's deck. One will use heating to check for volatile substances, such as water and carbon-based chemicals that are essential building blocks for life. The other will analyse the chemistry of the soil.

The presentation will also summarise recent discoveries by the five spacecraft currently on or around Mars, as well as previewing future robotic missions.

Subscriptions due soon

Subscriptions for the year ending 31st August will be due soon. The rates are Family \$70, Individual \$50, Student/Beneficiary \$30. The student rate is designed for full-time students.

Stargazers Getaway - September 7-10. Information taken from Royal Astronomical Society of New Zealand . Email Newsletter Number 82, 23 July 2007

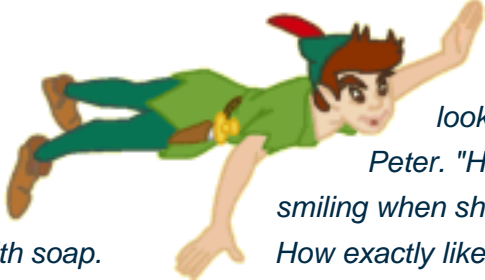
Phil Barker advises that the Stargazers Getaway is arranged for September 7-10. As usual it will be at Camp Iona near at Herbert, 20 kilometres south of Oamaru.

It is a superb deep sky site and the accommodation is very reasonable for the price. Cost is \$25 for 3 nights \$10 for one night and \$20 for two nights. We provide some light refreshment tea coffee, etc, with this. There has been plenty of interest already but at least 30 people are needed to make the event a success. Last year we got around 40 and in previous times over 60 have attended. It's a good time to catch up with the goings on, astronomically speaking, of the lower half of the South Island. It is customary for a few talks to be given. Anyone wanting to give a talk should contact Phil at phil.sonja@xtra.co.nz or Ross Dickie at radickie@xtra.co.nz

Editorial Disclaimer

Views expressed in this newsletter are not necessarily those of the Society as a whole

Galactic Circle feature



When Wendy saw the shadow on the floor, looking so draggled, she was frightfully sorry for Peter. "How awful!" she said, but she could not help smiling when she saw that he had been trying to stick it on with soap. How exactly like a boy!

Fortunately she knew at once what to do. "It must be sewn on," she said, just a little patronisingly.

"What's sewn?" he asked.

"You're dreadfully ignorant."

"No, I'm not."

But she was exulting in his ignorance. "I shall sew it on for you, my little man," she said, though he was tall as herself, and she got out her housewife, and sewed the shadow on to Peter's foot. - J. M. Barrie, Peter Pan

1. When is a shadow formed?
 - a) When the light is turned off
 - b) When the path of light is blocked by an object
 - c) When an object falls to the floor
2. When a shadow is formed the shape is...
 - a) Similar in shape to the object
 - b) A dark blob
 - c) Round
3. When an object moves closer to a light source, its shadow
 - a) gets bigger
 - b) gets smaller
 - c) stays the same
4. Which will give the best shadow?
 - a) A glass window
 - b) Bubble wrap
 - c) A wooden chopping board
5. Materials that light can pass through are called
 - a) Transparent
 - b) Translucent
 - c) Opaque
6. Which one of the above can light not pass through? Materials that are....
7. Why do shadows made by the sun move over the course of a day?
 - a) Because the weather changes
 - b) Because the objects keep moving
 - c) Because the sun appears to move across the sky each day.

8. Shadows are longest at noon in
- Winter
 - Summer
 - Spring
 - Autumn
9. When the sun is behind you, your shadow is
- behind you
 - in front of you
 - above you
10. An analemma is...
- A newly discovered moon of Saturn
 - The figure of eight path showing the Sun's position at the same time daily throughout the year
 - Another word for an eclipse

Bonus question: Why are some shadows fuzzy, while others have very crisp lines?

Answers at the Galactic Circle Meeting on the third Wednesday -August 15th - between 4.30 and 6.30pm 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.

Upcoming Star Parties

We often post up-to-date information about upcoming star parties on the society's announcements' email group. If you'd like to join, send a blank email to: announce-subscribe@was.org.nz.

The Pauatahanui Star Party will be held on Saturday August 4th. Observing will commence after dark. The Phone number at Pauatahanui is 021-102-6056

The Gifford Observatory star party is on Saturday August 11th from 8-10pm. For more details contact Duncan Hall at cell phone 021-615-905

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

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.

What's in the Sky in July: Information provided by Carter Observatory

Planets

August is a poor month for viewing the planets. Jupiter and Mars will be visible for all of August. Venus will be visible in the evening sky at the start and in the morning sky at the end of the month. Saturn will be visible in the evening sky for the first few days of August and Mercury will just be visible in the evening at the very end of the month.

Venus will be visible in the Western evening sky for the first few days of August. As the days progress, it will rapidly sink lower in the evening sky until about the middle of the month it will set as the Sun sets and towards the end of the month it will reappear in the morning sky. At the start of the month it sets at 19 36 and by August 12 at 18 36,(an hour after Sunset). By August 24 it rises at 05 59 (an hour before Sunrise) and at 05 24 by month's end. Venus starts the month in the constellation of Sextans, moving into Hydra on August 18, into Leo on August 25 for a very short stay, and finally into Cancer on August 26. It starts and ends the month at a brilliant magnitude of -4.3 , fading to -4.0 in the middle of the month.

Saturn will be visible in the early evening for the first part of August. At the start of the month it sets at 18 50 and by August 7 at 18 30 (an hour after Sunset). Saturn is in the constellation of Leo, in which it remains until September 2009. Its magnitude is a constant 0.6 during the month.

Jupiter will be visible for the first two thirds of the night. At the start of the month it sets at 03 43 and at 01 49 by month's end. Jupiter is in the constellation of Ophiuchus, in which it remains until 2007 December. Its magnitude slightly fades from -2.4 to -2.2 by the end of August.

Mars will be visible for the last quarter of the night. At the start of August it rises at 02 23 and at 01 59 by month's end. Mars is in the constellation of Taurus. Its magnitude slightly brightens from 0.5 to 0.3 during the month.

Mercury may just be visible in the evening sky at the very end of August. By the end of the month it sets at 19 03, which is 68 minutes after Sunset. Mercury starts the month in the constellation of Gemini, moving into Cancer on August 5 and finally into Leo on August 14. It has a magnitude of -0.6 by month's end.

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

Phases of the Moon

Last Quarter – August 6 at 09 20. New Moon – August 13 at 11 03.
First Quarter – August 21 at 11 54. Full Moon – August 28 at 22 35.

Lunar Eclipse on August 28

On August 28 there is a total eclipse of the Moon. This is when the Earth's shadow falls across the Moon. As the Earth has an atmosphere, the shadow that is cast on the Moon does not have a clear cut edge so the shading will be gradual. The eclipse starts at 19 52 when the Moon enters the penumbra (partial shadow), but little change will be seen until the Moon enters the umbra (full shadow) at 20 51. The total eclipse starts at 21 52 and ends at 23 23, with maximum at 22 37. The Moon leaves the umbra at 00 24 and leaves the penumbra at 01 22. The Moon should go a reddish colour because of the dust in our atmosphere; the more dust the redder the Moon will appear. (A violent massive volcanic eruption somewhere in the world (preferably not NZ) in early August would make this eclipse spectacular!!!!).

Below are the times of the eclipse.

	Time
Moon Enters Penumbra	19 52
Moon Enters Umbra	20 51
Total Eclipse Starts	21 52
Maximum Eclipse	22 37
Total Eclipse Ends	23 23
Moon Leaves Umbra	00 24
Moon Leaves Penumbra	01 22

Comets

No bright **comets** are predicted to be visible during August.

Meteor Showers

August is a rich month for meteor showers. Four different showers are active, but three of these reach their maximum activity at the very end of July.

The alpha Capricornids shower is active between July 03 and August 25, with maximum activity on July 30 when up to 8 meteors an hour are expected. The mean magnitude of the meteors is 2.5, and the radiant is at R.A. 20h 28m and Dec -10° . The radiant is in the constellation of Capricorni, near to alpha Capricorni (Al Giedi – The Goat), which is visible for the majority of the night.

The delta Aquarids S[outh] shower is active between July 08 and August 19, with maximum activity on July 29 when up to 20 meteors an hour are expected. The mean magnitude of the meteors is 3.2, and the radiant is at R.A. 22h 36m and Dec -16° . The radiant is to the North of Fomalhaut (alpha Piscis Austrini) near to delta Aquarii (Skat), which is visible for all of the night.

The Piscis Austrinids shower is active between July 09 and August 17, with maximum activity on July 29 when up to 8 meteors an hour are expected. The mean magnitude of the meteors is 3.2, and the radiant is R.A. 22h 44m and Dec -30° . The radiant is near to Fomalhaut (alpha Piscis Austrini), which is visible for all of the night.

The delta Aquarids N[orth] shower is active between July 15 and August 25, with maximum activity on August 12 when up to 5 meteors an hour are expected. The mean magnitude of the meteors is 3.4, and the radiant is at R.A. 22h 28m and Dec -05° . The radiant is to the North of Fomalhaut (alpha Piscis Austrini) and to the East of beta Aquarii (Sadal or Sund), which is visible for most of the night.

Diary of Astronomical Phenomena: Information provided courtesy Carter Observatory

- Aug 3 Venus 6° S of Regulus in evening.
- 4 Moon at perigee (closest to the Earth) at 12 00. (Distance = 0.0024659 AU = 368,890 km).
- 7 Jupiter stationary against the background stars at 18 00, as its motion changes from a Westerly to an Easterly direction.
- 13 New Moon at 11 03.
- 16 Mercury in Superior conjunction (on the far side of the Sun) at 08 00.
- 18 Venus in Inferior conjunction (between the Earth and Sun) at 16 00.
- 19 Moon at apogee (furthest from the Earth) at 15:00 (Distance = 0.0027047 AU = 404,620 km).
- 22 Saturn in conjunction with Sun (on the far side of the Sun) at 11 00.
- 24 Mars close to Aldebaran in the morning sky.
- 28 Full Moon at 22 35 and Lunar Eclipse (see details above).
- 31 Moon at perigee (closest to the Earth) at 12 00. (Distance = 0.0024344 AU = 364,180 km).

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.

Rise	Set	Trans	Alt	Az
H M	H M	H M	$^{\circ}$	$^{\circ}$
07 24	17 30	12 27	32	68
07 15	17 37	12 26	34	70
07 06	17 44	12 25	36	73
06 55	17 51	12 23	39	77

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 Wellington, and other places 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
Aug	H M	°	H M	Aug	H M	°	H M	Aug	H M	°	H M
1	19 53	101	08 40	12	06 55	61	16 36	23	11 49	129	03 13
2	21 07	92	09 04	13	07 24	68	17 46	24	12 45	129	04 09
3	22 21	83	09 27	14	07 48	75	18 53	25	13 51	126	04 57
4	23 35	74	09 50	15	08 09	83	19 57	26	15 02	121	05 38
5	-- --	69	10 16	16	08 29	91	20 59	27	16 17	114	06 12
6	00 52	65	10 46	17	08 48	98	22 01	28	17 32	105	06 40
7	02 09	58	11 23	18	09 07	106	23 02	29	18 48	96	07 06
8	03 24	53	12 09	19	09 29	113	-- --	30	20 04	86	07 29
9	04 32	51	13 06	20	09 55	119	00 05	31	21 21	77	07 53
10	05 31	52	14 12	21	10 25	124	01 08				
11	06 18	56	15 23	22	11 02	128	02 12				

More accurate Sunrise/set and Moonrise/set times for any location, in New Zealand or overseas plus data, such as the position in the sky of the Sun and Moon (or planets) at a particular time, twilight times, illumination from the Sun or Moon, can also be supplied by Carter Observatory. There may be a charge for this information

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

Iapetus Retains Its Youthful Figure. Article taken from the Royal Astronomical Society of New Zealand . Email Newsletter Number 82, 23 July 2007

Saturn's distinctive moon Iapetus (eye-APP-eh-tuss) is cryogenically frozen in the equivalent of its teenage years. Unlike any other moon in the solar system, Iapetus is the same shape today as it was when it was just a few hundred million years old; a well-preserved relic from the time when the solar system was young. "Iapetus spun fast, froze young, and left behind a body with lasting curves," said Julie Castillo, Cassini scientist at NASA's Jet Propulsion Laboratory, Pasadena, California. Cassini flew by Iapetus in early 2005 and discovered the moon had a walnut shape, bulging at its midsection. On top of that it has a chain of mountains located exactly along its equator. Scientists now think the moon's bulging midriff and slow spin rate point to heating from long-extinct radioactive elements present when the solar system was born. "We've modelled how Iapetus formed its big, spin-generated bulge and why its rotation slowed down to its present nearly 80-day period. As an unexpected bonus, Iapetus also told us how old it was," said Dennis Matson, Cassini project scientist at JPL. "You would expect a very fast-spinning moon to have this bulge, but not a slow-spinning moon, because the bulge would have been much flatter." Scientists calculate Iapetus originally rotated much faster: at least five hours, but less than 16 hours per revolution. The fast spin gave the moon an oblate shape that increased the surface area. By the time the rotation slowed down to 16 hours, the outer shell of the moon had frozen. Furthermore, the surface area of the cold moon was now smaller. The excess surface material was too rigid to go back into the moon.

Instead, it piled up in a chain of mountains at the equator. "Iapetus's development literally stopped in its tracks," said Castillo. "In order for tidal forces to slow Iapetus to its current spin rate, its interior had to be much warmer, close to the melting point for water ice." The challenge in developing a model of how Iapetus came to be "frozen in time" has been in deducing how it ever became warm enough to form a bulge in the first place, and figuring out what caused the heat source to turn off, leaving Iapetus to freeze.

The heat source had to have a limited life span, to allow the moon's crust to rapidly become cold and retain its immature shape. After looking at several models, scientists concluded that the heat came from its rocks, which contain short-lived radioactive isotopes aluminum-26 and iron-60 (which decay very rapidly on a geologic timescale). Since these elements decay at a known rate, this allowed scientists to "carbon date" Iapetus by using aluminum-26 instead of carbon. Scientists calculate the age of Iapetus to be roughly 4.564 billion years old.

Evidence for these same isotopes (aluminum-26 and iron-60) has been found in meteorites formed in the inner solar system. Therefore, there is a possibility of comparing the early chronology of the outer solar system with other objects in the inner solar system, such as Earth, Earth's moon and asteroids." This is the first direct evidence of the early spin history for a satellite in the outer solar system. It teaches us more about how the speed of a body's rotation influenced its evolution, and broadens our knowledge of the early history of outer planet satellites," said Matson. These results appear in the online version of the journal *Icarus*. More information on the Cassini mission is available at: <http://saturn.jpl.nasa.gov> and <http://www.nasa.gov/cassin>

Launch of AstronomyRatings.com website. Article taken from the Royal Astronomical Society of New Zealand . Email Newsletter Number 82, 23 July 2007

We are pleased to announce the launch of a free, new informational site - www.AstronomyRatings.com - for amateur astronomers of all levels of interest and experience. At this site, you can: * Rate products and write your own reviews for thousands of astronomy telescopes and accessories* Read and rate other's reviews * Link to hundreds of astronomy product reviews and discussions on sites like Cloudy Nights, Astromart, etc. from one location * Earn discounts and win prizes for posting your opinions

In the near future - with help from astronomy-savvy members like yourself - we expect AstronomyRatings.com to become the de facto starting point for researching astronomy products. Membership is FREE! At this time, you can surf the entire site and use all its features without registering. In the near future, access to certain areas of the site will be restricted to registered users only (but will still be free). We look forward to your membership and contributions to AstronomyRatings.com for the benefit of the entire amateur astronomy community.

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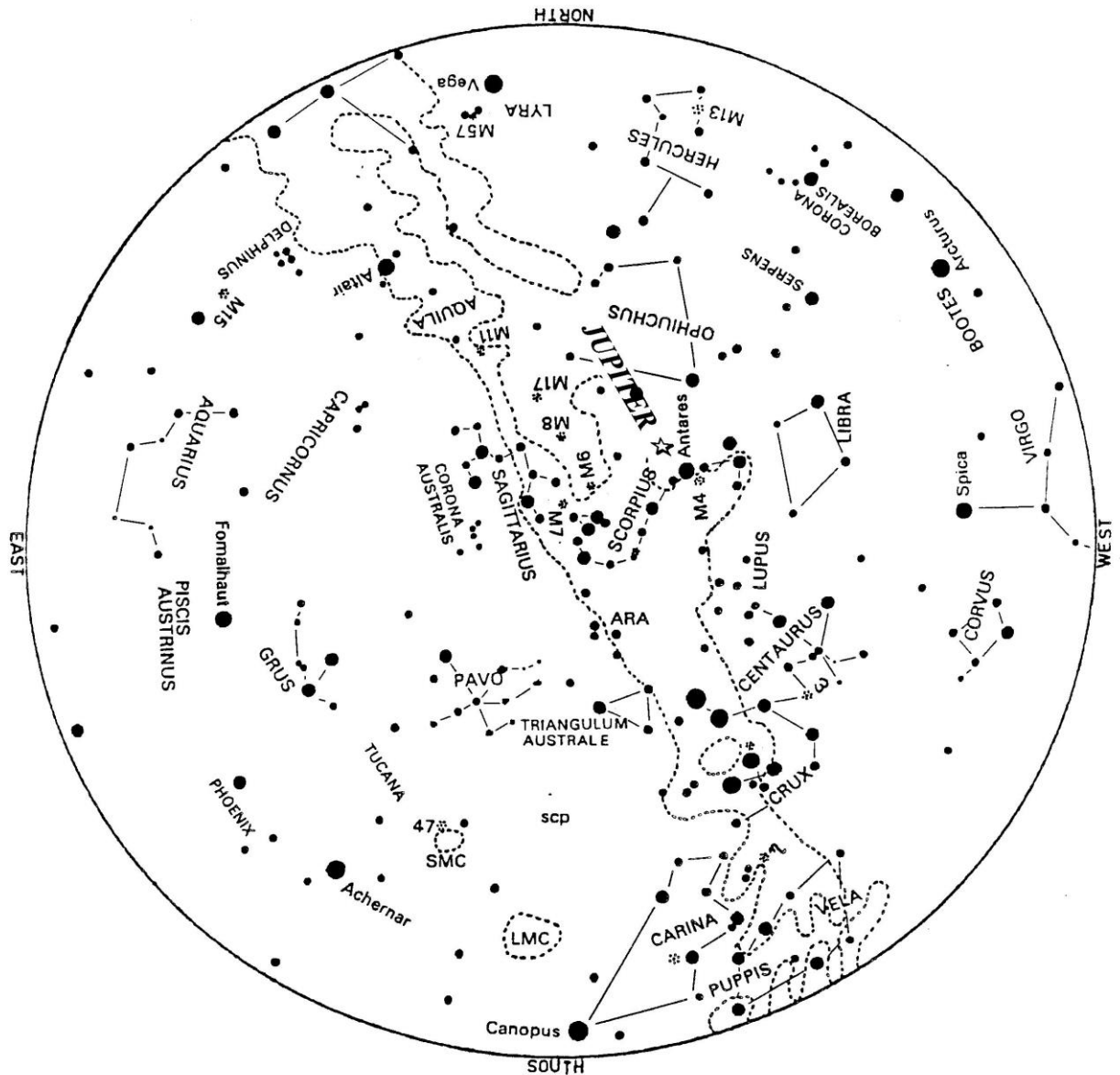
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SKY MAP provided by Carter Observatory

This chart shows the sky as it appears at about 21:00 for ~August 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:	19:00	23:00	01:00	03:00	05:00
Use this month's charts:	Jul.	Sep.	Oct.	Nov.	Dec.

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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