

Newsletter

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**The Planets,
"A journey through
time and space"
DVD produced by
Haritina Mogosanu
and Frank Andrews
will feature on the
April talk.**

**Frank Andrews with
live commentary:**

**7:30pm Wednesday
7th of April 2010
Carter Observatory**

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04-2010





PRESIDENT'S REPORT FOR APRIL

The weather has still not been kind to us when it comes to our society observing at the Pauatahanui

Observatory. Although the day in question was nice and clear but it started clouding over at 5:00 PM and by the time it was dark it was totally cloudy.

Here is hoping for some clear weather for our next observing at Pauatahanui on April 17th starting at 7:30 PM.

The ST7 CCD Camera that WAS purchased recently is now at the KPO Observatory where it will be set up for Photometric Observing. Anyone wishing to be involved in learning about Photometric observing at the KPO should contact the President. Before we can do that we will need to invest in some Photometric Filters

We have found that the Pauatahanui Telescope will not be suitable as the ST7 camera when attached to the telescope should be left on the telescope set up. We are unable to do this at Pauatahanui because it is often used for visual observing and for Photography.

International Dark Sky Week is April 9-15 we will not be taking part as I feel we did our share of observing and talks last year. April 24th is Astronomy Day.

On Saturday 27th March Carter Observatory finally opened there doors to the public.

I arrived at 9:00 AM to assist with setting up and arranging power leads for the outdoors displays.

The Breeze Radio was on site live broadcasting. A mobile coffee stand was also on site although it nearly wasn't as the car towing the trailer was unable to climb up the steep road in front of the Scout den. It had to be towed with a four wheel drive. The car burned out its clutch trying to climb the hill. An outdoor stage was set up for a live band which was due to start when the Breeze Radio finished at 11:00 AM.

By 10:00 AM there was a queue forming to enter Carter which grew in length all day. The queue went up the hill past the Thomas King Observatory.

Inside Carter there were people everywhere. The queue to go up to the Cooke telescope went down stairs and around the main room. Everywhere was packed with people and it was like this all day and even at 5:00 PM when we were due to close there was still a cue there.

The Planetarium was fully booked out and you had to obtain a ticket from one of the Carter staff to get into the planetarium. By early afternoon the Planetarium was

booked out right up till 5:00 PM.

There was no entry fee to get into Carter or the Planetarium on this day.

At around 4:00 PM clouds were starting to roll in and by 4:30 PM we were clouded out which for the telescope operator was a bit of a blessing. Stewart Mawson was manning the Cooke refractor all day with some assistance from Ross Powell and I helped out as well.

John Field was Comet making up at the Thomas King Observatory and had crowds of people around him all day. We didn't open the Thomas King telescope.

Later in the day John set up a 6" Dobsonian with a White Light Solar filter to show people the sun and I also helped John with this telescope. The weather was fine and sunny although there was some high cloud at times until it closed in at about 4:00 PM.

The Carter shop did a brisk trade and is well stocked.

The day was very successful with 100's of people passing through Carter and the feedback from people was that they were amazed with what they saw.

We were unable to open the Boller & Chivens telescope as the dome has been frozen to the building and we are unable to move it.



Karu Po Observatory - if the wind had been coming from the South, we would have had problems. 21st February 2010



CARTER VOLUNTEERS

Remember we are now based at the New Carter Observatory and at this first meeting at Carter I will be calling for volunteers to assist in the running of the very famous Thomas Cooke Refractor at Carter on Saturday evenings. Carter will be open to the public every Saturday evening and the Wellington Astronomical Society will be assisting in running this telescope and maybe another as well. What I will be asking for is a contribution of time maybe once a month to man these telescopes. You will not be asked to run it every Saturday as it will be on a roster but two or three members will be on every Saturday with different members each time.

Remember we are getting the full use of these facilities for our meetings once a month for nothing.

When we were at the Royal Society Rooms we were paying up to \$1000 per year. So any contribution you make will be a huge saving for the society. So think of it as your contribution to help the society to save some money.

The May talk will be Astro Photography with John Field.

By the time you receive this newsletter the Carter Observatory will be open.

A big thank you to our Treasurer for the excellent work he has done in getting out annual report done and passed by the auditors.

March Crossword answers

Across 1. HOUR,- unit of time; 3. ZODIAC,- also a small inflated rubber boat; 6. LMC,- could be mistaken for a cloud; 8. VENUS,- a very cloudy planet; 10. PELE,- volcano on Io; 11. CANOPUS,- Antab; 14. ECLIPSINGBINARY,- clip singer in bay (anagram); 17. VEGA,- alpha Lyr; 18. KIWI,- New Zealander; 19. ASTEROID,- road site (anagram); 21. ECLIPSE,- to block light from another object; 25. UFO,- flying saucer; 27. MESSIER,- a catalogue; 28. ION,- an arrested atom; 30. TAURUS,- You don't want this constellation in a China shop; 32. EARTH,- Tellus; 34. IO,- One of the Galilean satellites; 35. EQUINOX,- 23rd September; 36. SOHO,- satellite observatory studying the Sun; 37. NADIR,- opposite to zenith; 38. NORTH,- thorn (anagram); 40. HELIUM,- second most common element; 43. ANDROMEDA,- Largest galaxy in the Local Group; 46. BAR,- some spiral galaxies have one; 49. REDPLANET,- Mars; 50. ATOM,- smallest indivisible piece of a element; 52. BINARY,- a double star; 53. AZIMUTH,- horizontal angle around the sky;

Down 1. HALO,- angels and galaxies both have one; 2. RUTHCRISP,- Carter Observatory's public telescope; 4. DENEK,- alpha Cygnus; 5. LEO,- A lion circling the Earth; 6. LOKI,- volcano on Io; 7. CLUSTER,- An open or globular ...; 9. SCHMIDT,- type of telescope; 12. DINOSAURS,- an asteroid may have done them in; 13. REFLECTOR,- type of telescope; 15. NOON,- mid-day; 16. NEAREARTHOBJECT,- NEO (abbrev); 20. ECLIPTIC,- plane of Earth's orbit around the Sun; 22. SMC,- satellite galaxy to the Milky Way; 23. SHEPHERD,- astronaut; 24. DARWIN,- proposed theory of evolution; 26. FUSION,- process that powers stars; 29. LATITUDE,- allow some leeway; 31. SCORPIUS,- constellation with a sting; 33. LONGITUDE,- Latitude and ?; 39. SIDEREAL,- star time; 41. ICE,- frozen liquid; 42. MASS,- I weight 6 times less on the Moon, but still have the same ???; 44. VIRGO,- Constellation with Spica; 45. GAS,- solid, liquid or ...; 47. DAY,- 24 hours; 48. NOVA,- a new star; 51. HST,- an orbiting telescope;

World Wide Fund for Nature

This was not very successful from the societies view. We were to meet at the Thomas King Observatory at 8:00 PM on Saturday 27th the same day as the Carter opening. Only three members turned up and three members of the public as well.

I went along to the top of the Cable Car so I could see the city lights better and I was amazed that most of the high rise business were in darkness apart from the occasional floor with lights on.

Looking up towards the hospital was just a mass of orange lights. Most of the lighting we could see was from street lights and from security lights.

I could see quite easily bright white lights on the outside of TePapa. Unfortunately there was a rugby game on at the Stadium and lights from that lit up the whole of the waterfront area with that and the lights at the wharves it was impossible to see any lights we actually off.

The suburbs fared much better with many light turned off in the private houses.

I drove home at 9:00 PM to see what the light were like near my place and apart from the Porirua CBD the lights were dimmer than normal.

This is much the same as last year when only the private houses lights were switched off.

Remember daylight saving finishes on Sunday April 4th so we can start observing from 7:30 PM.



The Beehive during Earth Hour - picture source BBC



Meeting Room

The new home of the Wellington Astronomical Society



Meeting Room





Inside Carter Observatory in images



Wellington Astronomical Society is returning home after almost three years. Here is a preview of the new look of Carter Observatory. We looking forward to having you there for our meetings.

ASTRONOMY EVENTS 2010

April

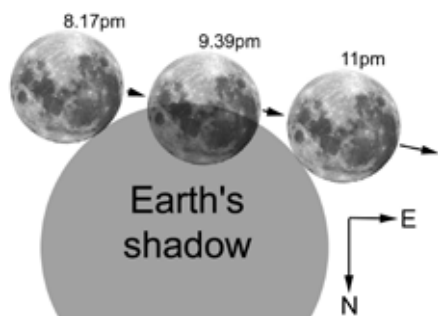
International Dark Sky Week is April 9-15
April 24th is Astronomy Day.

June

June 26th 2010 – Partial Lunar eclipse
Visible from all of Australia and NZ.

The Moon will pass through the southern part of the Earth's shadow; at maximum eclipse

(9.39pm AEST) over half the Moon's diameter will be covered.



July

July 2010 – Four planets after sunset

July sees a dance of the planets Mars, Venus and Saturn in the western sky. By the end of the month, they are joined by Mercury. The diagram at left shows them together on the 31st, when Mars is closest to Saturn.

Mercury passes Regulus on the 28th.



August

August 2010 – Triple conjunction with moon
The four planets are still visible mid August, and are joined by the Moon on the 13th. Planetary conjunctions:

8 August: Venus closest to Saturn

8 August: Venus closest to Mars.



October

International Space Week

October 4 – 10

Astronomy Day – 16 October –
Astronomy Week 11 – 17

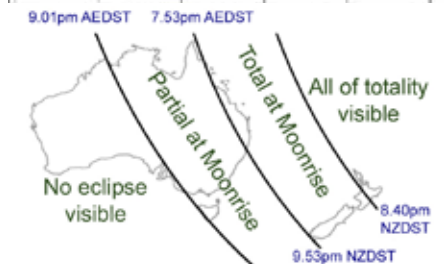
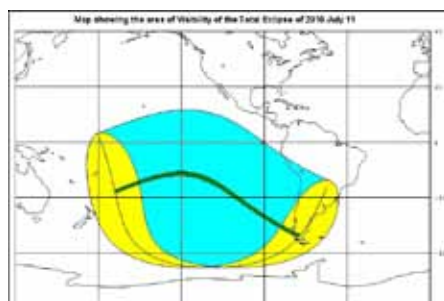
December

December 21st – Total Lunar Eclipse
– much of New Zealand

and the Queensland coast will see the Moon rise totally eclipsed.

Times of events:

| Phase | NZDST |
|-----------------|---------|
| Starts | 7.32pm |
| Totality starts | 8.40pm |
| Maximum | 9.18pm |
| Totality ends | 9.53pm |
| Ends | 11.01pm |



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OBSERVING AT PAUATAHANUI

The next observing at the Pauatahanui will be on April 17th after 7:30 PM.

If the weather is looking doubtful please contact **John Field** on his mobile 021-255-1904 to see if the session is going ahead.



Public Astronomy Symposium 22 January 2010 Auckland

This symposium was attended by approximately 400 and opened by the Hon. Dr Wayne Mapp who explained that he is an Amateur Astronomer. The first speaker was Prof. John Hearnshaw from Canterbury University whose presentation was titled "Search for Earth-like habitable planets". There are three ways of finding Earth-like planets:

(1) The Doppler method – periodic radial-velocity variation of a star, detected spectroscopically; (1) Transits of planets across a star disc – detected by photometry (2) Gravitational Microlensing – detected by photometry

A search for planets around Alpha Centauri A/B is currently underway using the McLellan 1-metre telescope and the Hercules High Efficiency and Resolution Canterbury University Large Echelle Spectrograph with an iodine vapour cell to provide reference lines [1]. This binary has a high inclination (79 deg.) and is circumpolar from New Zealand which make it an ideal target for the Mt. John Observatory. Roughly 30,000 spectra will need to be taken over a few years to find an Earth-mass planet orbiting at 1 Astronomical Unit, if present.

The next N.Z. speaker was Assoc. Prof. David Wiltshire from Canterbury University whose presentation was titled "Dark Energy and cosmic structure". If we take the photometric measurements of type Ia supernovae corrected for small differences in their intrinsic luminosity, together with their red-shifts and apply these results (at face value) to the nearly smooth Friedmann- Lemaitre- Robertson-Walker geometry we conclude that the Universe's expansion is accelerating. In the "Concordance" model 74% of the Universe is dark energy. However, as David reminded us, the Universe is far from smooth and his hypothesis is that the density gradients affect the cosmological modeling. [2] We reside in a gravitationally bound volume where clocks run slower than in the average void location. This gives rise to an apparent accelerating expansion starting at the time when the first complex large scale structures formed. If this model is correct, no dark energy is required to explain the observable Universe. [3]

Einstein's Strong Equivalence Principle needs to be changed to allow for variations in spacetime. A Cosmological Equivalence Principle [4] was proposed which defines a Cosmological Inertial Frame within a suitable neighbourhood.

Assoc. Prof. Kathy Campbell's, from Auckland University, presentation was titled "Extreme environments and the search for early life on Earth, and life elsewhere in the Solar System". Life may have taken hold on Earth over 3 Giga-anni ago [5]; the result of? (1) Terrestrial organic soup (2) Terrestrial hydrothermal vents (3) Extraterrestrial seeding by meteorites/comets

The most primitive organisms of the phylogenetic

tree of life are hydrothermal microbes. The present day early Earth-analogue "extreme environments" which contain microbial life are: hydrothermal vents, antarctic dry valleys, hypersaline lagoons, deep-rock subsurface, hydrocarbon seeps, anoxic sediments and terrestrial hot springs. Silica-rich deposits have been found on Mars by the Spirit Rover. Perhaps this is where we will find life elsewhere in the solar system?

The North Island, New Zealand has numerous areas for Earth analogue studies on extreme environments which feature terrestrial hot springs, fossil hydrocarbon seeps, undersea hot springs and offshore hydrocarbon seeps. "Back to Mars via Coromandel hot springs?"

Prof. Matt Visser's, from Victoria University Wellington, presentation was titled "Black stars versus black holes". General Relativity (GR) leads to black holes as exact solutions to the Einstein field equations. If quantum effects are added to GR then many classical theorems no longer apply [6]. Near a black hole virtual particle production causes Hawking Radiation and the particles emitted carry almost no information. This apparent loss of information violates a fundamental feature of quantum mechanics (QM) [7].

Another effect of QM is vacuum polarization which produces an energy deficit and a repulsive force around a mass. The vacuum polarization is negligible for free-falling matter, even when the matter gets dense enough to form an event horizon and become a black hole. However, if the matter's fall is slowed, vacuum polarization may grow, producing repulsion. The collapse may be delayed from ever forming an event horizon [8] [9]. Other objects suggested by researchers which perhaps form instead of a black hole include: gravastars, black hole complementary objects and fuzzballs.

Dr. Grant Christie's, from Stardome Observatory, Auckland presentation was titled "For love or money: research by amateurs". He noted that the internet can be used to find comets using for example the SOHO satellite [10]. Their position can be determined using the Astrometrica software [11]

Size and shape of asteroids can be determined with help from the GPS/Kiwi System [12] and Occult Watcher software [13]. Nova patrol is another area where NZ amateurs are making a contribution. Gravitational Microlensing search for exo-planets is well suited for amateurs using small telescopes. In the Southern Hemisphere good views are obtained of the galactic central bulge.

Dr. Phil York's, from Auckland University, presentation was titled "From Rutherford to Einstein". Both the amount of gravitational

light bending and alpha particle scattering are proportional to the inverse distance from the light ray to the centre of mass and from the particle to the atom centre respectively. Rutherford found the atomic nucleus from head-on collision of alpha particles and gold atoms; MOA group finds planets with well-aligned gravitational lenses with magnification > 100.

Some Student Contributions to Astronomy:

- Ian Bond: Monitored 100 million stars nightly for 10 years and discovered the first planet by gravitational lensing
- Koki Kamiya: discovered free floating planets roaming interstellar space
- Nick Rattenbury: measured the shape of a star at the galaxy centre
- Lydia Philpott: wrote code to analyse gravitational lenses of arbitrary complexity
- Christine Botzler: assisted discovery of a planet like Neptune orbiting a red dwarf star
- Yvette Perrott: Assisted discovery of a very small planet MB07192 and analysed MB07379 allowing for telescope locations and Earth spin.
- Dimitri Douchin & Petra Tang analysed Hubble Space Telescope images of MB07379
- Matthew Freeman analysed MB09319

Speakers from Overseas

Dr Marc Moniez, Laboratoire de l'Accelérateur Lineaire, France, "Dark matter"; Dr Javier Gorosabel, Instituto de Astrofísica de Andalucía, Granada Spain, "Solving the mystery of gamma-ray bursts"; Prof. David Bennett, University of Notre Dame, USA, "Discovering extra solar planets as blemishes in Einstein's telescope"; Prof. Scott Gaudi, Ohio State University Astronomy Dept, USA, "This is the way the world ends: The long-term fate of life in the Universe"

Overall a very enjoyable and challenging Symposium. Most presentations can be found on the Internet [14].

Acknowledgment

I would like to thank Roland Idaczyk for his helpful comments regarding this note.

References

- [1] "Facilities at Mt John University observatory", http://www.phys.canterbury.ac.nz/research/mt_jobm/facilities.shtml
- [2] D. L. Wiltshire, "Gravitational energy and cosmic acceleration", arXiv 0712.3982v1
- [3] D. L. Wiltshire, "Dark energy without dark energy", arXiv 0712.3984v1
- [4] D. L. Wiltshire, "Cosmological equivalence principle and the weak-field limit", arXiv 0809.1183v3
- [5] "Evolutionary history of life", http://en.wikipedia.org/wiki/Evolutionary_history_of_life
- [6] Carlos Barcelo, Stefano Liberati, Sebastiano Sonego & Matt Visser, "Black stars, not holes", *Scientific American*, October 2009
- [7] Matt Visser, "Black holes in general relativity", arXiv 0901.4365v3

Continued on page 8



The Evening Sky in March 2010

Sirius is the first star to appear at dusk, midway down the northwest sky. It is soon followed by Canopus, southwest of the zenith. Below Sirius are Rigel and Betelgeuse, the brightest stars in Orion. Between them is a line of three stars: Orion's belt. To southern hemisphere star watchers, the line of three makes the bottom of 'The Pot', now tipped on its side. Orion's belt points down and left to a V-shaped pattern of stars making the face of Taurus the Bull. Below and right of Sirius, are Procyon and Mars, making a line with Sirius down to the north. Mars is orange coloured, like Betelgeuse and Aldebaran. Saturn is in the northeast sky. In the southeast are the Pointers, Beta and Alpha Centauri, with Crux, the Southern Cross, above them.

Sirius, 'the Dog Star', marks the head of Canis Major the big dog. A group of stars above it make the dog's hindquarters and tail. Sirius is the brightest star in the sky both because it is relatively close, nine light years* away, and 23 times brighter than the sun.

Mars is fading as we leave it behind. It is low in the north sky at dusk and sets in the northwest about midnight. At mid month it is 170 million km away and small in a telescope.

Below and left of Mars are Pollux and Castor, the heads of Gemini the twins. Above and right of Mars, at the beginning of April, is the Praesepe cluster, marking the shell of Cancer the crab. Praesepe is also called the Beehive cluster, the reason obvious when it is viewed in binoculars. It is 500 light years away. Mars passes below Praesepe mid month and is right of the cluster thereafter.

Rigel, left of Orion's belt, is a bluish supergiant star, 40 000 times brighter than the sun and much hotter. It is 800 light years away. Orange Betelgeuse, right of the line of three, is a red-giant star, cooler than the sun but much bigger

and 9000 times brighter. It is 400 light years from us. The handle of "The Pot", or Orion's sword, has the Orion Nebula at its centre; a glowing gas cloud many light-years across and around 1300 light years away.

The V-shaped group making the face of Taurus the bull is called the Hyades cluster. It is 130 light years away. Orange Aldebaran, is not a member of the cluster but merely on the line of sight, half the cluster's distance.

Crux, the Southern Cross, is high in the southeast. Below it, and brighter, are Beta and Alpha Centauri, often called 'The Pointers'. Alpha Centauri is the closest naked-eye star, 4.3 light years away. Beta Centauri, like most of the stars in Crux, is a blue-giant star hundreds of light years away. Canopus is also a very luminous distant star; 13 000 times brighter than the sun and 300 light years away.

The Milky Way is brightest in the southeast above Crux. The Milky Way can be traced to nearly overhead where it fades. It becomes very faint in the northwest, right of Orion. The Milky Way is our edgewise view of the galaxy, the pancake of billions of stars of which the sun is just one. The centre of the galaxy is toward Sagittarius, below the Scorpion's sting, where the Milky Way is broad.

The Clouds of Magellan, LMC and SMC are midway down the southwest sky, easily seen by eye on a dark moonless night. They are two small galaxies about 160 000 and 200 000 light years away.

Saturn is in the northeast at dusk. It is a little brighter than Spica the brightest star in Virgo, on Saturn's right. Saturn's rings are nearly edge-on to us this year. In a telescope they look like a thick line through the planet. Saturn is 1280 million km away in mid March.

Brilliant Venus sets in the northwest an

hour after sunset. It will set progressively later as it swings out from the far side of the sun, catching up with Earth. It is around 230 million km away in April.

Jupiter, bright and gold-coloured, rises due east about 4 a.m. It is 870 million km away.

**A light year (ly.) is the distance that light travels in one year: nearly 10 million million km or 10¹³ km. Sunlight takes eight minutes to get here; moonlight about one second. Sunlight reaches Neptune, the outermost major planet, in four hours. It takes four years to reach the nearest star, Alpha Centauri.*

Alan Gilmore

Continued from page 7

[8] Matt Visser, Carlos Barcelo, Stefano Liberati & Sebastiano Sonego, "Small, dark, and heavy: But is it a black hole?", arXiv 0902.0346v2

[9] Carlos Barcelo, Stefano Liberati, Sebastiano Sonego & Matt Visser, "Revisiting the semidassical gravity scenario for gravitational collapse", arXiv 0909.4157

[10] Official Solar and Heliospheric Observatory (SOHO) site, <http://sbohowww.nascom.nasa.gov/>

[11] Astrometrica, <http://www.astrometrica.at/>

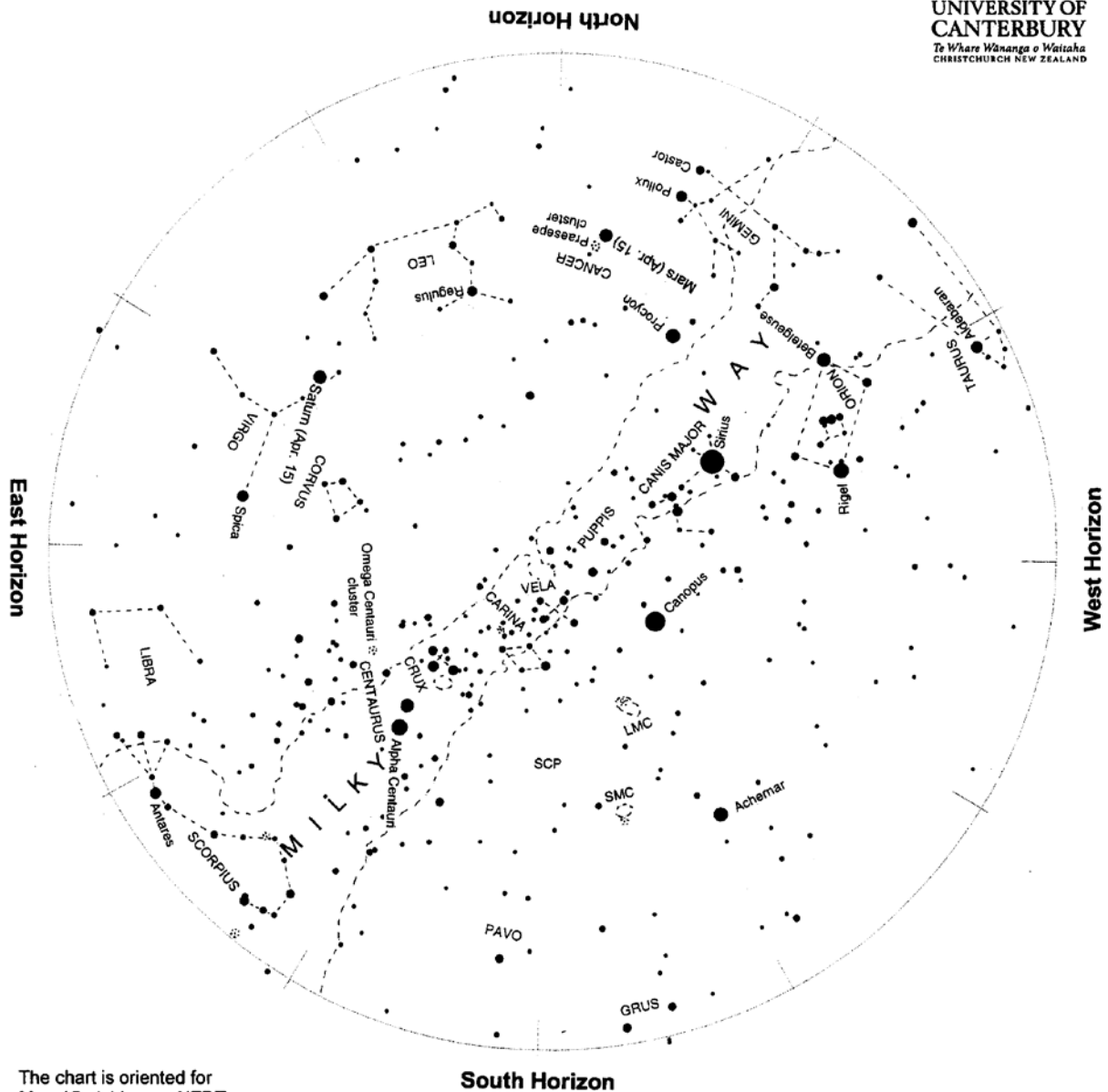
[12] Loader video Occultation System, <http://ocsec.wellington.net.nz/videoime/loadervideo.htm>

[13] Occultation Software, <http://ocsec.wellington.net.nz/software/software.htm>

[14] Department of Physics, Faculty of Science, The University of Auckland, Public Astronomy Symposium, General References and Presentations

OBSERVING AT THOMAS KING

All public observing evenings will be held at the Thomas King Observatory run by our Observatory Director Ross Powell. from 7:30. There are public observing evenings at the Thomas King nearly **once a week** starting as soon as it gets dark depending on the weather. **Ring Ross on 389 9765.**



The chart is oriented for
 Mar. 15 at 11 p.m. NZDT
 April 1 at 10 p.m. "
 April 15 at 8 p.m. NZST
 May 1 at 7 p.m. "

Evening sky in April 2010

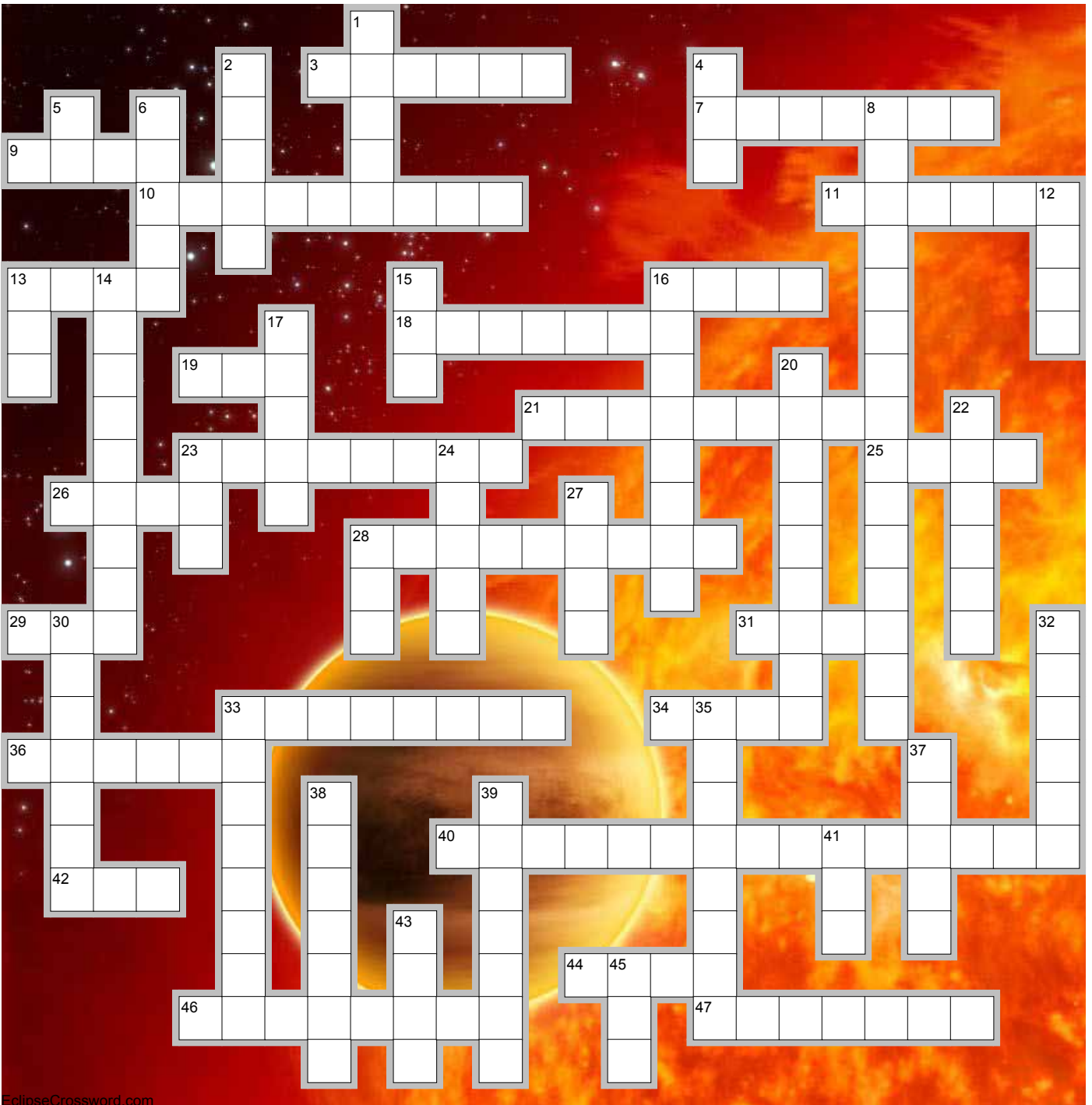
To use the chart, hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge. As the earth turns the sky appears to rotate clockwise around the south celestial pole, SCP on the chart. Stars rise in the east and set in the west, just like the sun. The sky makes a small extra westward or clockwise shift each night as we orbit the sun.

Sirius, the brightest star, is midway down the western sky. Below it is Orion with bright stars Rigel and Betelgeuse. Orion's belt and sword, aka 'The Pot', appears between them. Canopus, the second brightest star, is southwest of overhead. Mars is low in the north. Saturn is in the northeast with fainter Spica to its right. Crux, the Southern Cross, and The Pointers are high in the southeast sky. The Scorpion, on its back, is rising in the southeast. The Milky Way spans the sky from SE to NW.

Chart produced by Guide 8 software; www.projectpluto.com. Labels and text added by Alan Gilmore, Mt John Observatory of the University of Canterbury www.canterbury.ac.nz



Cross Word with Murray Forbes



EclipseCrossword.com

Across

3. You don't want this constellation in a China shop; 7. 23rd September; 9. volcano on Io; 10. Carter Observatory's public telescope; 11. proposed theory of evolution; 13. angels and galaxies both have one; 16. satellite observatory studying the Sun; 18. horizontal angle around the sky; 19. flying saucer; 21. Mars; 23. allow some leeway; 25. unit of time; 26. smallest indivisible piece of a element; 28. an asteroid may have done them in; 29. frozen liquid; 31. volcano on Io; 33. star time; 34. alpha Lyr; 36. also a small inflated rubber boat; 40. clip singer in bay (anagram); 42. satellite galaxy to the Milky Way; 44. New Zealander; 46. road site (anagram); 47. An open or globular ...;

Down

1. opposite to zenith; 2. Tellus; 4. A lion circling the Earth; 5. One of the Galilean satellites; 6. Constellation with Spica; 8. NEO (abbrev); 12. a new star; 13. an orbiting telescope; 14. Latitude and ?; 15. solid, liquid or ...; 16. astronaut; 17. thorn (anagram); 20. Largest galaxy in the Local Group; 22. process that powers stars; 23. could be mistaken for a cloud; 24. alpha Cygnus; 27. I weight 6 times less on the Moon, but still have the same ???; 28. 24 hours; 30. Antabi; 32. a double star; 33. constellation with a sting; 35. plane of Earth's orbit around the Sun; 37. a very cloudy planet; 38. a catalogue; 39. type of telescope; 41. some spiral galaxies have one; 43. mid-day; 45. an arrested atom;