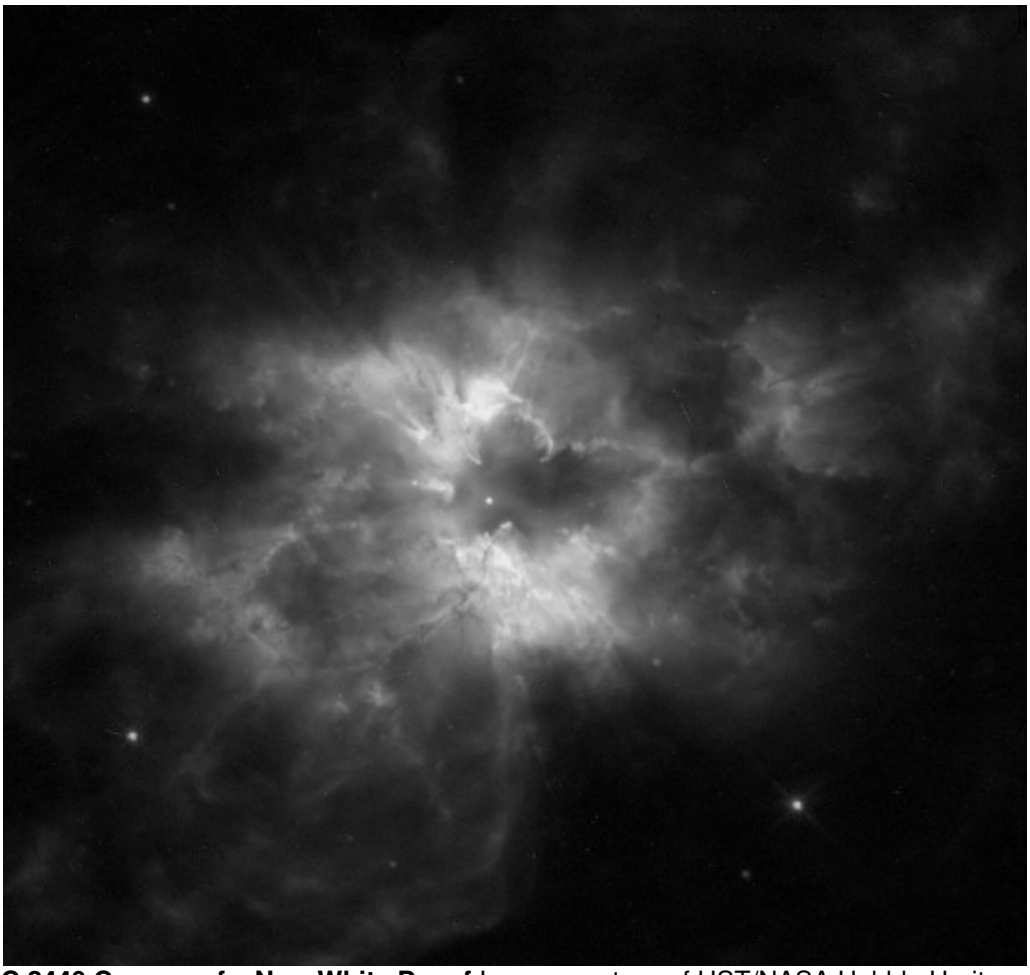
WELLINGTON ASTRONOMICAL SOCIETY



NGC 2440 Cocoon of a New White Dwarf Image courtesy of HST/NASA Hubble Heritage Collection

MONTHLY MEETING: The Cooling Processes in White Dwarf Stars by Denis J Sullivan,
Wednesday 6th August 7.30 PM
Science House,
Turnbull Street,
Thorndon

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The Cooling Processes in White Dwarf Stars by Denis J Sullivan,

About 98% of all stars end up as slowly cooling white dwarfs. This fate awaits our own Sun in the very distant future. A typical white dwarf has about 60% of the mass of the Sun compacted into a sphere that is the size of the Earth. The nuclear fusion processes that supply the energy flow responsible for halting the contraction of the `active' stars have ceased; complete gravitational collapse is prevented by the peculiar quantum behaviour of the electrons, as they cannot lose energy. However, the nuclei in the stellar plasma are slowly losing energy and it is this source that provides the photon luminosity that makes them visible. In addition, particle physics theory predicts that there is a significant loss of energy from a neutrino flux produced in the cores of the hotter white dwarfs. The speaker has been observing a particular hot pulsating white dwarf for a decade, and this talk will explain how these observations are expected to lead to a detection of this neutrino flux.

Welcome to New Members

The committee wishes to welcome Bruce Christensen and welcome back Graeme Jonas. We look forward to contributing to your knowledge and interest in astronomy.

Pauatahanui Observing sessions

Observing sessions at Pauatahanui will be held on the first Saturday of the month, weather permitting. Located on "Willow Bank Farm" off Murphy's Road, Judgeford; on the left hand side of the road, about 1km from the intersection of State Highway 58 and Murphy's Road. The observatory holds a 12-inch Meade SCT on an equatorial wedge. The site has a number of flat areas at which members can place their own scope to observe. There is a toilet located in the shearing shed and car parking is in front of the shed. As the locale is a working farm it pays to wear sturdy footwear and dress warmly, bring along torch (hopefully with a red filter to protect your dark adaptation). Children are welcome but remember it will be cold, dark and mushy under foot!

This month's session will commence at 8:00pm on Saturday, August 2nd. If the weather is looking doubtful please contact John Field on his mobile 021-255-1904 to see if the session is going ahead.

Gifford Star Party Saturday August 9th

The Gifford star party will be held on Saturday August 9th. The contact person is Marilyn Head ph 389-0882 Mobile: 021 740 423.

Thomas King Observatory

Ross will be operating the TKO, usually on fine Saturdays, except when Gifford is happening. Hours will vary with the season. Contact Ross Powell Ph 389-9765, email rpowell@was.org.nz or Vicki Irons Ph 3838 710 email virons@was.org.nz for more details.

Editorial Disclaimer

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

From The Top by John Field

Being the middle of winter you would expect things to be quiet on the council; but even in winter the newsletter needs to be produced, speakers and the venue and equipment need to be arranged, invoices paid, membership subscriptions processed.

One job that is slowly moving along is updating and streamlining the WAS website. This site was created by Mike McGavin who is a computer whiz and has been maintained consecutively by Paul Moss, Edwin Rodley and lately helped by Bill Parkin. Updating websites means someone able to keep the information current but not so much that it becomes a challenge to find anything! Inserting images and links as well as making sure that they are still working can be a busy job, yet once again we depend on a member who has the knowledge and time do this; fortunately Edwin and Bill have been happy to fit it in. Marilyn Head and Roland Idaczyk have been busy organising the IYA 2009 website and Roland has decided to step down from the role. If anyone would like to take over this role please contact Marilyn Head Ph 389-0882 email marilyn@actrix.co.nz.

Star Party's at Schools.

We are planning to hold two Star Party's at schools this month one at Tawa College (Thursday August 28th & Friday August 29th) and the other at Hutt International Boys in Upper Hutt. If you want to come along and share your enthusiasm and skills with potential new astronomers and members, please contact John Field Ph 938-4526: email john.field@paradise.net.nz. The sessions will include observing and short presentations.

NZ IYA Website - Biographies Still Needed. Information taken from RASNZ email Newsletter Number 87, 25 November 2007

Marilyn Head, RASNZ Publicity officer, is still looking for notes of upcoming events and for local biographies.

She writes "The NZ International Year of Astronomy (IYA) site is up and running thanks to the sterling efforts of Roland Idaczyk at http://www.astronomy2009.org.nz. To make it as useful as possible we'd like it to be comprehensive so please let me know if you want any events - and that includes any from now until the end of 2009 - to be posted. A critical part is the section that deals with NZ astronomers - past, present and overseas. We would like to include as many active astronomers as we can - it should end up being the Who's Who of NZ astronomy. So we would like all individuals and societies to send me (not Roland) names and very short profiles with any relevant links to be posted." Marilyn's email address is www.writerfind.com/mhead.htm

What's in the Sky in August Information provided by Alan Gilmore Mt John Observatory

Jupiter appears high in the northeast sky in the early twilight, shining with a steady golden light. Binoculars will show the disk of Jupiter and perhaps one or two of its bright moons. A small telescope easily shows all four moons and the parallel stripes in Jupiter's clouds. There is an unreliable rule that "stars twinkle and planets don't". It certainly applies to Jupiter.

Venus, brilliant and silvery, sets in the northwest half an hour after the sun at the beginning of the month. It moves to a more westerly location and sets later through the month. **Mercury** also begins an evening sky appearance during August, moving up toward Venus. **Saturn** moves down the sky, setting earlier through the month. The three planets form a close bunch around the middle of August, changing places from night to night. Venus is the brightest by far. Mercury is a little brighter than Saturn.

On the 13th and 14th Venus and Saturn will be close together with Mercury well below them. On the 16th, Mercury will be just above Saturn and below and to the left of Venus. Mercury catches up with Venus on the 20th, when the two will be almost level. For the rest of August, Mercury will be a little above and left of Venus. During this time Mercury and Venus move upward, night to night while **Mars** sinks downward. By the end of the month Mars will be not far above Mercury and Venus.

Canopus, the second brightest star, is near the south skyline at dusk. It swings upward into the southeast sky through the morning hours. Canopus is a truly bright star: 13 000 times the sun's brightness and 300 light years* away. On the opposite horizon is **Vega**, one of the brightest northern stars. It is due north in mid-evening and sets around midnight.

Midway up the southwest sky are 'The Pointers ', Beta and **Alpha Centauri**. They point down to **Crux** the Southern Cross. Alpha Centauri is the third brightest star. It is also the closest of the naked eye stars, 4.3 light years away. And it is a binary star: two sun-like stars orbiting each other in 80 years. A telescope magnifying 50x will easily split the pair. Beta Centauri, like most of the stars in Crux, is a blue-giant star hundreds of light years away.

Arcturus, in the northwest at dusk, is the fourth brightest star and the brightest in the northern hemisphere. It is 120 times the sun's brightness and 37 light years away. When low in the sky Arcturus twinkles red and green as the air splits up its orange light. It sets in the northwest around 10 pm.

Just north of overhead the orange star **Antares** marks the heart of the Scorpion. The Scorpion's tail hooks around the zenith like a back-to-front question mark. Antares and the tail make the 'fish-hook of Maui' in Maori star lore. Antares is a red giant star: 600 light years away and 19 000 times brighter than the sun. Red giants are dying stars, wringing the last of the thermo-nuclear energy out of their cores. Big ones like Antares end in massive supernova explosions. Between **Scorpius** and Jupiter is 'the teapot' made by the brightest stars of **Sagittarius**. It is upside down in our southern hemisphere view.

The **Milky Way** is brightest and broadest overhead in Scorpius and Sagittarius. In a dark sky it can be traced down past the Pointers and Crux into the southwest. To the northeast it passes Jupiter and Altair, meeting the skyline right of Vega. The Milky Way is our edgewise view of the galaxy, the pancake of billions of stars of which the sun is just one. The thick hub of the galaxy, 30 000 light years away, is in Sagittarius. The actual centre is hidden by dust clouds in space. The nearer clouds appear as gaps and slots in the Milky Way. A scan along the Milky Way with binoculars shows many clusters of stars and some glowing gas clouds, particularly in the **Carina** region below Crux, and in Scorpius and Sagittarius.

The Large and Small Clouds of Magellan, **LMC** and **SMC**, look like two misty patches of light low in the south. They are easily seen by eye on a dark moonless night. They are galaxies like our Milky Way but much smaller. The Large Cloud is about 5% the mass of our Galaxy; the smaller about 3%, but that's still billions of stars in each. The LMC is about 160 000 light years away, SMC about 210,000 L.y. distant.

*A **light year** (**l.y**.) is the distance that light travels in one year: nearly 10 million million km or 10^{13} 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.

Notes by Alan Gilmore (with planet conjunction notes adapted from those by Brian Loader; see www.rasnz.org.nz), University of Canterbury's Mt John Observatory, P.O. Box 56, Lake Tekapo 7945, New Zealand. www.canterbury.ac.nz
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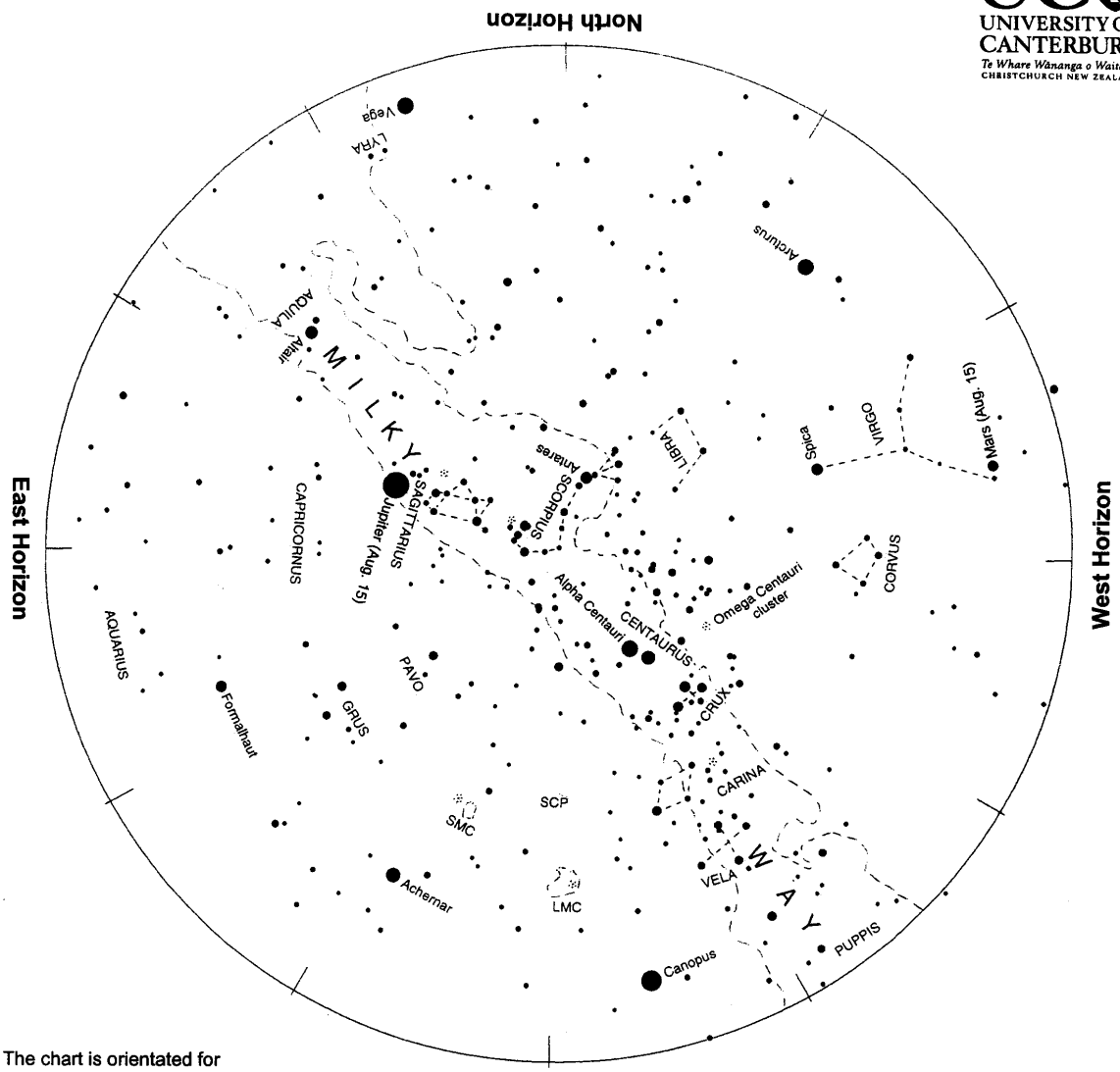
August Sky Map created by Alan Gilmore



The chart is orientated for
July 15 at 10 p.m. NZST
Aug. 1 at 9 p.m. "
Aug. 15 at 8 p.m. "
Sep. 1 at 7 p.m. "

Evening sky in August 2008

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 clockwise rotation each night as we orbit the sun.

Jupiter is the brightest star-like object in the evening sky, northeast of the zenith at dusk; gold coloured. Arcturus, in the northwest, is a bright orange star often twinkling red and green. The Pointers and Crux, the Southern Cross, are midway down the southwest sky. Canopus is low in the south; later swinging up into the southeast sky. The Milky Way spans the sky from northeast to southwest with its broad centre overhead. The Scorpion's tail curls around the zenith. Vega crosses the northern sky, staying low. Venus and fainter planets set early in the west.

Chart produced by Guide 8 software; www.projectpluto.com. Labels and text added by Alan Gilmore, Mt John Observatory of the University of Canterbury, P.O. Box 56, Lake Tekapo 7945, New Zealand. www.canterbury.ac.nz

How to Build Your Newtonian Physics Machine **taken from the NASA Space Place website and © to Colleen Barboza.**

Take note: You may want a little help from an adult for some parts of this project.

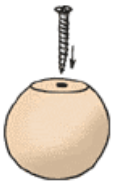
What you need:

Construction set with interlocking pieces, such as Lego, Mega blocks

5 large (at least 1-inch diameter) spherical beads, knobs (found in hardware stores and made as drawer pulls), or hard balls (like golf balls)

- Whatever you use should be made of hard and dense material, like hard wood, glass, or ceramic. You need to be able to attach a thread. For beads, you can poke the thread through the hole in the centre. For knobs (with a hole in one side only) or balls, you can drive a screw eye, screw, or nail into it for tying the thread to. Hint: You can get 1-1/2-inch diameter wooden knobs in the doll-making supplies area of craft stores or as drawer pulls in hardware stores.

- 5 small screw eyes, screw hooks, wood screws,
- or nails with heads (if using knobs or balls, instead of beads)
- Sturdy cardboard, about 5 inches x 8 inches
- Thread or nylon fishing line, tape, scissors, ruler, pencil

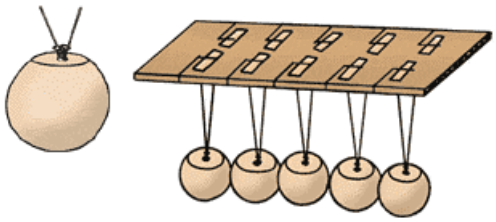


What to do:

1. Build yourself a sturdy frame out of your construction set. A good, workable size is about 10 to 12 inches high, 8 to 12 inches wide, and 5 or 6 inches deep. Other sizes can work too, but you might want to try this one to start. Sides and top should be open. When done, it should wobble very little.
2. If you are using knobs or balls (instead of beads), insert a screw, screw eye, screw hook, or nail ***straight*** into one side of each.

Hint: If you are using screws or screw eyes, it may help if you get an adult to drill "starter holes" first.

3. Using the ruler, along one long side of the cardboard make five pencil marks that are the same distance apart as the diameter of the beads (or balls or knobs). The marks on the ends should be an equal distance from the ends of the cardboard. Make similar marks on the other long side of the cardboard, using the ruler to make sure the marks are straight across from each other.
4. Now, measure the width across the inside of the top of your structure. Measure the same distance across the width of the cardboard and draw two lines this same distance apart, centered across the width of the cardboard.
5. With the scissors, cut five slits along each side of the cardboard, at exactly the marks from Step 3, and cutting in only as far as the lines you drew in Step 4.
6. Cut five pieces of thread about 20 inches long.
7. If you are using beads, stick a thread through each bead.

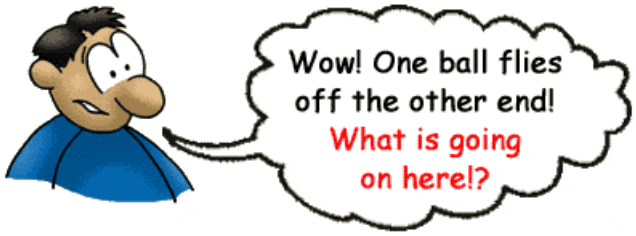


If you are using knobs or balls, stick a thread through each screw eye or else tie (in the center of the length of thread) a thread around the screw or nail in each knob.

(If you are using hooks, go ahead and do the next step, then hang the balls on the threads.)

8. Slide the ends of the thread into the slits in the cardboard.
9. Place the cardboard on top of your structure, with the beads or balls hanging down in the centre.
10. Adjust the lengths of the threads so that the balls are all hanging freely, at **exactly** the same level and **exactly** centred.
11. When all is as **nearly perfect** as you can make it, tape the threads down to the top of the cardboard so they don't slip.
12. Decorate your contraption any way you like, as long as nothing gets in the way of the swinging balls. You may use other parts of your construction kit, models, things made of construction paper, or whatever. Get creative!

Now, pull one of the end balls out from the rest and let it go. What happens?



To find the answer to this visit the Spaceplace website http://spaceplace.nasa.gov/en/kids/

Council Contact details

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