

TAURANGA ASTRONOMICAL SOCIETY NEWSLETTER

Issue No. 21 July 2008 www.tauranga-astro.150m.com

In This Issue: [★April Monthly Meeting](#) [★May Monthly Meeting](#) [★June Monthly Meeting](#) [★Presidents Report 2008](#) [★Stardome Trip](#) [★Eyepieces for the TAS telescope](#) [★Constellation up close: Corvus](#) [★Back Page](#)

April Monthly Meeting

On Wednesday, April 24th we were lucky enough to have Craig Garner (pictured) deliver a presentation on the newly renovated "Stardome" facility of which he is the CEO. Prior to his move to Auckland Craig held the position of CEO of the Tauranga Chamber of Commerce.



Craig started his talk by telling us how one of the first tasks he was set when he took up his position in Auckland was to go out and raise two million dollars. Now that certainly sounds like a daunting task to me, but with a background in raising funds he was able to do so in short time. He was then directed to spend the money raised in upgrading the facilities at "Stardome".

Up until that time a Zeiss star projector had been used at the planetarium to project images of the night sky onto the dome roof. These were supplemented by other projectors which could show photos and video footage as well. This system had served the facility well for the last 10 years, but it was felt a new lease of life was required to carry stardome forward.

After quite literally searching the world, the Evans and Southerland Digistar 3 system, was selected. This uses computers to generate full dome 3D digital images. This is supported with a new sound system and a completely refurbished planetarium. Craig recounted how being ready for the opening in early April was a very close thing with the final seats being fitted on the day of the opening.

Stardome is situated in One Tree Hill Domain, Auckland and is an educational facility which shares space at the Auckland Observatory. Last year over 55,000 people visited the facility and the vast majority of those were school children with around 40% coming as part of the organised school tours run by stardome.

Craig has very gracefully arranged for a free presentation for members of the society and this trip is currently being arranged by members of the society's committee.

May Monthly Meeting

May's monthly meeting was in two parts. The first, being the Society's 2008 AGM. We elected the committee and heard the Presidents report from George. A copy of this report is included within the newsletter for the benefit of those members who were unable to attend on the night. It was pleasing to hear from our Treasurer Lew Lawson, the finances were in good shape. An update of the construction of the new building at Ferguson Park which would include the observatory as well as the purchase of the new Meade telescope was also covered.



Following the AGM we were fortunate enough to have Ted Harper give a great talk about a subject that he had been researching, Maya Astronomy. I would suspect that I am not the only one who was oblivious to the subject prior to Ted's talk. He described the people themselves and their civilisation which flourished for around two thousand years. The peak of their civilisation covered the period from AD300 - AD900.

A number of Mayan buildings were constructed so that the building or windows lined up with the sun at certain times of the year (such as solstices and equinox's). They were a people who excelled in observational Astronomy with only limited tools. I was really impressed

by a slide shown which compared Maya and modern figures for such things as the Lunar period, we calculate 29.53059 and the Maya calculated 29.53086. The periods for the year, Martian year and Venus's were also given and VERY close to the best calculations we make with 21st century tools.

Also covered were the Maya calendar which differed greatly from ours. As well as the importance of the December Solstice in the year 2012 when the Solstice sun lines up with the centre of the galaxy, an event that only happens once every 25,700 years. There was also speculation that the Maya may have known about sun spots, hundreds of years before Galileo made his discoveries on the topic in Europe around 1610.

Ted's talk was well received and appreciated by the members who attended. He also very kindly suggested that a copy of the slide show he used could also be attached to the newsletter. Due to the size of the file (2.6MB) this is a slight problem due to the down load times for those of us on dial up. If you would like a copy of the presentation email the editor at andrew32walker@yahoo.com with Maya Astronomy in the subject line and I will send you a copy.

June Monthly Meeting

Power crisis blacks out meeting

Some 21 hardy Tauranga souls, who turned up to hear and see our advertised monthly Astronomical program about Black Holes, were left quite literally "floundering in the dark".

Unbeknown to most, who arrived in a darkened and rather cold hall at the Otumoetai Soccer clubrooms, a large fire was slowly consuming Fergusson Park's Power Box, out on the road. Society Committee member Les Smith, a former Power Board electrician, did his very best to sort out the blackout, checking links at the building's back door. But it was obvious that only one of the building's 3 phases was intact and we weren't going to be able to get any energy out of the wall outlets to run our equipment or any heaters!

As visitors started to arrive, they told us of the fire that was raging outside. Vice President Stuart Murray rang 111 and organized a Tauranga fire appliance to attend. We had all arrived early to pay both our annual subscriptions, as well as the fare for the bus, which was going to take us to Auckland in July to see Stardome's brand new digital Planetarium.

Treasurer Lew Lawson struggled in the dimly lit torch light to write the receipts, while Secretary Jim Barrowclough collected the cheques for the bus. A short time later our gathering was interrupted by the presence of a very large fire-fighter, who wanted to know what was going on. He explained that the Gyro Box supplying our power had gone up in a sheet of flames! Hence the flickering lights which later died completely.

Out on the street it was like the rising sun! The outer shell of the polythene gyro-box had melted into a hole in the ground, taking with it all the underground cables. Any metal parts would have become red hot.

Senior Station Officer Grant Taylor, the fire-fighter in charge of the call-out, generously offered us the use of their recreation hall at the Tauranga Fire Station, so that we could resume our meeting. But I felt it would be a bit of a mission to relocate all the gear and people and we all agreed to call the whole thing off.

It took three crews from power contractor Tenix all the following day to rebuild the lost Gyro box. We can only presume that the fuse links inside the box overheated, when the high intensity lights that are used for night soccer training caused a current surge. Let's hope the supply will be more reliable in the future, especially once the new observatory is up and running.

George Stewart

Presidents Report 2008

I have much pleasure in presenting this report, and in doing so, wish to acknowledge the support that I have received from a very dedicated committee. Without all of you this society could not have existed, nor could we have achieved some quite remarkable progress. Over the past 12 months, we have been most fortunate in being able to provide the members of the society, and our visitors, with some really first class programs. At last year's AGM, two members of the Hamilton Astronomical Society paid us a visit, explaining how they built their large 24 inch "Classical Cassegrain" telescope. In September, Gisborne Astro-photographer John Drummond "showed" us around his observatory, and explained how he was able to catch "Those Very Faint Photons" In October Dr Roger Feasey, from the Auckland Astronomical Society, presented a fascinating programme about "Our Universe of Galaxies" And just last month, the new CEO of Auckland's Stardome Observatory, Craig Garner gave us an insight into their new 2 million dollar planetarium. We intend paying him a visit later this year, if we can fill a bus!

My thanks also must go to our local members and my committee colleagues, for their excellent programmes and presentations during the year. And a huge vote of thanks goes to Editor Andrew Walker, for compiling and producing some very professional newsletters. Tauranga solicitors...Harris-Tate continue to sponsor our posted newsletters and for that we are most grateful. Another highlight has been our fund-raising efforts to pay for a new state-of-the-art telescope, which is to be installed in our future observatory. We made applications to both the Perry Foundation and Bay Trust and are delighted to announce that both applications were successful. Perry's have contributed just over \$4,000 with Bay Trust coming up with just under \$9,000. We have now ordered a 14 inch MEADE telescope, but we are unsure when it will arrive, as the factory in Mexico is only just getting production underway. More funding applications are in the pipeline to provide a video camera plus a few other vital accessories. Unfortunately, work on the building upgrade has been delayed, and it is unlikely that we will be in our new home in this calendar year. Looking ahead, I am confident of an exciting time for this society, its members, and for the people of Tauranga. I am hopeful that once we have the Observatory fully equipped, that we will be able to open it to the public, as well as for educational visits by school children. This will require a committed band of workers, who will need to be trained in not only in aspects of working the telescope, but in finding their way around the night sky! Finally, I would like to acknowledge the work of the Tauranga Moana committee of COGS the Community Organizational Grants Scheme, for again providing the Society with our operational funding. These funds allow us to continue our work in the community, especially in the field of education, which enables us to bring the ever growing science of Astronomy to young people and to members of the public.

George W Stewart

Stardome trip Sun 13 July 2008

On the morning of Sunday 13th July 45 keen astronomers met at the Tauranga Trust Hotel car park to be



bused to the Auckland Stardome. We were joined there by others who had driven private cars including members from the Whakatane Astronomical Society and members of the Auckland Astronomical Society. Precise timing by Jim Barrowclough and our driver Max had us delivered exactly on time for the start of the first show. The Stardome theatre was reserved especially for our group and we were met and welcomed by Stardome CEO Craig Garner.

Within the theatre Craig Garner gave us some technical background to the projection system and explained how the Auckland Astronomical Society had built their Stardome with money raised through their own efforts and without any government input. Recent upgrades have cost in excess of \$1 million and the theatre is currently among the most technically advanced planetariums in the world. The amazing digital projection system is based on a pair of Sony projectors and the hemispherical dome screen consists of very finely perforated aluminium allowing easy transmission of sound and ventilating air and the so the speakers for the all around sound system are placed behind the screen.

First feature was the movie "Dawn of the Space Age" which is an amazing digitally produced history of man's journey into space including intimate detailed views of the historic Russian and American space craft from launch to orbit and beyond, and much of the equipment used in space and on the moon. With sights and sounds all around the experience is almost like being there. We were under the launch vehicles as the rocket engines fired, floating in space with the first space walkers and bouncing across the face of the moon with the American moon buggy. The realism and the immersive experience were so complete that it was often hard to realize that we were seeing computer generated animation.

The main feature was followed by a spectacular 15 minute demo of the range of capabilities of the planetarium data base and projection system during which we were whizzed all over the cosmos to view space objects from distant and unfamiliar vantage points. Plans are in place to further upgrade the data base in the near future to display many thousands more astronomical objects.



From the theatre we were directed to the Sun Room for ample coffee, tea and biscuits provided by our hosts, and given time to eat our picnic lunches before moving on to the Space Room for a 40 minute talk by Dr. Grant Christie. He told us of the research that is being done from the Auckland One Tree Hill observatory and by other Auckland and NZ astronomers and in particular the work relating to the search for extra solar planets using the principles of gravitational microlensing. Microlensing events occur when from our vantage point on earth distant stars pass in front of even more distant stars.

The All Sky Automated Survey (ASAS) project surveys millions of stars every night to find stars of varying magnitude and as potential microlensing events are identified astronomers around the world have the information to watch the most exciting candidates. ASAS finds 600 to 700 events each year. These events can take from 10 to 100 days to unfold and a few are very bright and exciting to study. ASAS is a Polish project using telescopes in Chile and operated from the Carnegie Institute of Washington

During microlensing events the light from a distant star is bent inwards toward a nearer star as it passes through the space affected by the gravitational field of the nearer star. This causes the light to converge and concentrate into an "area" through which the earth may pass. The nearer star could be 1200 light years away and the distant star 2000 light years away but because the light of the distant object is being concentrated its brightness may increase 20 to 30 times and sometimes a lot more as we pass through this focal area. The nearer star does not have to pass directly in front of the distant star to affect the light of the distant star. As the stars approach alignment the brightness of the distant star increases and is precisely measured and

graphed against time.

This graph reveals one or more peaks that in the hands of extremely competent mathematicians can be interpreted to provide definitive information about the alignment and details of the stars involved. The shape of the curve reveals how closely aligned the 2 stars became. In events where the near star is headed for very close alignment the graph becomes very steep as the brightness increases sharply. These are the rarer and more exciting events where other information may be gleaned. If the nearer star should have one or more planets around it the gravity of these planets will also affect the way the light of the distant star is bent and amplified. The brightness versus time graph can now have super imposed smaller peaks and once again the mathematicians with extensive brain and computing power can make some deductions such as the masses of the bodies involved and the sizes of the planetary orbits around their star.

As these events near their peak the frequency of the measurements is critical and so astronomers around the world collaborate to watch the event continuously and in one case a single measurement provided the evidence for a small peak in the graph which was interpreted as the signature of a planet in orbit around the near star. Not all microlensing events reveal planets but this too is useful information.

As various differing planetary systems are identified including some that are somewhat similar to our own and some very different, theories of the genesis of planets can be refined and so with relatively small telescopes in low cost facilities local astronomers are accomplishing exciting leading edge research.

After Dr Christie's talk we had a short time to explore the Planetarium complex and examine the 500mm Cassegrain Zeiss telescope and the 400mm Meade before our bus ride home.

The weather was sunny and perfect for an enjoyable outing. Jim and his helpers did a fine job of organizing. Our driver Max was helpful and efficient and also enjoyed the Stardome. Our hosts and hostesses at the Planetarium were extremely generous and hospitable. We were all impressed with the facility and will be enthusiastic ambassadors for the Auckland Stardome.

Robert Taylor.

Eyepieces for the TAS telescope

A few months back George asked if I could recommend accessories necessary for the new telescope that had been ordered for the society. I advised that the first thing we would need would be a set of quality eyepieces. He asked if I could write an outline of what I thought we would need and why as the people reading our application for funding were unlikely to have a background in astronomy. I have included what I wrote for George in the newsletter as it may be of interest to other members and gives some of the reasons for the items chosen.

The Meade 14inch LX200 Telescope that has been ordered by the Tauranga Astronomical Society (TAS) comes with one eyepiece, a Meade 26mm Plossl. In order to provide a more useful instrument, a selection of eyepieces will be necessary. This telescope will primarily be used for visual astronomy and just as in Photography one lens can't do everything.

It is important to note that the focal length of the eyepiece alone sets the magnification which is employed. The telescopes focal length is fixed at 3556mm and the magnification is this number divided by the focal length of the eyepiece. A 26mm eyepiece will yield 136x ($3556/26$) a 10mm eyepiece will yield 355x ($3556/10$).

There are many different objects in the heavens to behold study and enjoy. Some are relatively large such as Nebulae and open star clusters and require the lowest Magnification and Widest field of view to enjoy while

others are small and respond well to high magnification such as some planetary nebula, others fall somewhere in between. The moon is a high contrast (bright grey's and whites against pitch black) object that can often withstand as much magnification as the optics and atmosphere will allow whereas the planets are often best enjoyed using medium magnifications (150x-220x).

Field of view is also another consideration. This is the area of sky being viewed in degrees. As a yardstick the full moon is half a degree or 30 minutes of arc. Each eyepiece has what's called an apparent field of view. This is the field of view from edge to edge of the field stop (the black edge of the circle which encompasses the image) expressed in degrees. To get a field of view larger than about 50 degrees in an eyepiece, complicated lens design and special glass types are required. This equates to a lot of work for the manufacturer and a high price for a wide, well corrected image. Currently the crème of the crop is the 13mm Ethos eyepiece by the American company Tele Vue, sporting a 100 degree apparent field of view this optical wonder will set you back just under \$1000 purchased new.

To find out the area of sky being viewed simply divide the apparent field of view by the magnification. For example our telescope fitted with a 41mm Panoptic with its 68 degree field of view would give us 87x Magnification ($3556/41$) and 0.78 degree field of view ($68/87$) or roughly one and a half times the area of the full moon. This is the widest area that can be taken in with this telescope due to the design of the scope and the constraints of the 2 inch eyepiece format.

Another consideration is what is called eye relief. This is the distance from the eyepiece to where the image is formed. Eyepieces with very little eye relief require the observer to place their eye close to the lens to see the image. This is not a problem for those of us who do not require glasses but as a number of our members and the public do require them I have felt it only prudent to recommend those that have at least 18mm eye relief (15mm is considered the minimum for this purpose and 20 is ideal).

When tasked to recommend eyepieces for the telescope I have decided to recommend what I would choose based on 10 years observing if cost was not a primary consideration. As the saying goes "Quality remains long after the price is forgotten". The two leading eyepiece manufacturers in the "Premium" category seem to be Tele Vue in America and Pentax in Japan. Personally I have only owned Tele Vue and can say I have found them to be excellent as a whole. But eyepieces are an extremely personal thing and people's mileage may differ.

Eyepieces recommended:

41mm Panoptic

27mm Panoptic

17mm Type 4 Nagler

12mm Radian

8mm Radian

This gives us magnifications ranging from 87x – 445x. This will allow plenty of flexibility when viewing different objects or trying to see different details within the object under observation. All have sufficient eye relief and sport apparent fields of view as follows: 82 degrees for the Nagler, 68 degrees for the Panoptics, 60 degrees for the radians.

Note: It appears that our request for funding the purchase of these eyepieces through a grant is almost certain to be approved. This will equip the society with a very high quality set of eyepieces to grace the forthcoming

Meade 14 inch Cassegrain telescope. Now all we need is the observatory and a willing band of astronomers to put such first rate kit to good use!

Andrew Walker

Constellation up close: Corvus

Corvus "the Crow" is a bright and striking constellation which rides high in the Northern sky at this time of the year. It is prominent and easily found South West of the brightest star in Virgo, Spica (Alpha Virginas).

This small constellation has some interesting deep sky objects within its confines and another on the border with Virgo which I will include in this article. The object on the border is the Messier galaxy M104 (NGC4594) otherwise known as the sombrero galaxy and the subject of some famous photos by observatories including the Hubble Space Telescope. To find this object follow a line between Delta Corvi (North Western most star in the keystone pattern) and Spica. Roughly $\frac{1}{4}$ of the way towards Spica move your scope slightly to the West, through the finder look for a tight L shaped asterism. This appears as a kind of finger in the eyepiece which points to the near by M104. In the eyepiece of my 10 inch scope the galaxy appears as an elliptical smudge of light bisected through the middle by a dark band. In photographs this band is clearly a ring of dust around the edge of the galaxy that we are viewing. To my eye this is almost as prominent as the division through NGC5128 (Centaurus A or Hamburger Galaxy). While it can sometimes be difficult to pick out if you are looking for it for the first time it is an object that can be viewed in telescopes of small aperture. Through my old 6 inch Newtonian I could pick this object out through the light polluted skies of suburban Auckland. From a dark sky I would imagine that this object would not pose a difficulty through a 4 inch scope. Like all galaxies this is a very distant object. It is believed to lie at a distance of 50 million light years from us.

Located within Corvus is the planetary Nebula NGC4361 (pictured at left). This is a large diffuse planetary which can be found by sweeping your scope from Delta Corvi up towards Epsilon Corvi (South Eastern most star). The nebula can be found roughly two and a half degrees along this line. This object appears as a large, ill defined smoke ring to my eye. It does not appear to have the sharp edges of some others of its ilk. Hubble Space Telescope images of this nebula show a bright core with a dimmer annulus surrounding it. Two opposing arms stretch from the inner to the outer shell giving an appearance similar to a barred spiral galaxy. The object is listed as Magnitude 10 making it a relatively easy object for backyard instruments. In his book "Hidden Treasures", part of the Deep-Sky companion series, Stephen James O'Meara lists this object as Hidden treasure number 61 and notes "here is the aged core of a red-giant star that has blown off its outer atmospheric layers across two light years of space".

The previously mentioned star Delta Corvi is also worth some attention in its own right, and not just as a sign post to NGC4361. This star, like most in our galaxy, is actually a binary or double star. What makes this double well worth a look is the stark colour contrast between the two components. One is yellow in appearance and probably how our sun may look to any observers in other systems looking back our way. Its companion is a vivid crimson-red and the pair are quite striking in the eyepiece.

Another object which has been imaged in fantastic detail by the HST is NGC4038 and NGC4039 also known as the Antenna or Ringtail Galaxy. These are a pair of interacting galaxies with tails that give the appearance of an insects Antennae (hence the name). Through the telescope they are reasonably faint though the nature of the object can be seen through the 10 inch without too much trouble. Interacting galaxies do make fascinating objects for imagers and serve to remind us that the universe is active and dynamic with collisions and mergers playing a major part in its history. This is also a way of looking at a possible future for our galaxy as it speeds towards a future collision with the Andromeda Galaxy. No need to worry just yet as we still have around 3 billion years to go before this is expected to occur.

BACK PAGE

The Tauranga Astronomical Society holds a monthly meeting on the fourth Wednesday of each month at the Otumoetai Soccer Club rooms, Fergusson Park, Tilby Dr, Matua. The meeting begins at 7.30pm and all are welcome.

New comers are invited to attend two meetings free of charge, however, after this a charge of \$5.00 per meeting will apply if membership of the society is not taken up.

Current membership fees are below and may be paid to the treasurer on any club night.

Full Time Student \$15 Ordinary Membership \$20 Family \$30

Meetings consist of a presentation of roughly one hour either by a society member or an invited guest on an astronomical subject. After light refreshments this is followed by viewing through one of the society's telescopes, weather permitting, or the screening of an Astronomical DVD.

The Tauranga Astronomical Society Newsletter is published quarterly each January, April, July and October. The editor welcomes contributions from members provided they are on an Astronomy related subject and are original. Articles for the newsletter may be submitted electronically by email too:

andrew32walker@yahoo.com

T.R.O.G (Tauranga Roving Observers Group)

TROG is a list of persons interested in observing from a dark sky site. We have been currently meeting approximately once a month at the editor's home in rural Te Puke. Another location previously used is Bell Road Papamoa and other sites are welcomed.

If interested in observing contact either Ursula Macfarlane 5767283 or Andrew Walker 5738550. The group is informal and no previous experience is required. Just bring along a telescope or binoculars if you have them, any star charts you might need and your enthusiasm.

Your Committee is:

George Stewart: President 576-6170 geo_dorothy@wave.co.nz

Stuart Murray Vice President 576-1943 stual@clear.net.nz

Jim Barrowclough: Secretary 576-5389 jimbar@clear.net.nz

Lew Lawson: Treasurer 574-9800 lindy.lew@xtra.co.nz

Andrew Walker Editor 573-8550 andrew32walker@yahoo.com

Les Smith 576-4368 lesmith@xtra.co.nz

Shaun Belcher 576-3773 sabelcher@value.net.nz

Ursula Macfarlane 576-7283 ursa.minor@clear.net.nz