

The Sideréal Times

The Journal of the Central West Astronomical Society Inc

Volume 1 Number 1

Winter (June – August), 2008

Edition 1

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Priceless

ASTRONOMICAL SOCIETY LAUNCHES JOURNAL

HISTORIC INAUGURAL
SOUVENIR EDITION



Harmoniendum Musica Orbium
In Harmony with the Music of the Spheres

Central West Astronomical Society Inc

Monthly Ordinary Meetings

Visitors are always welcome.

Where

Visitor's Centre, CSIRO Parkes Radio Observatory ("The Dish"), Newell Highway, 26 kilometres north of Parkes.

When

7.30 pm on the first Friday of each month (except January)

Meals are available at "The Dish Café" from 6.30pm

Monthly meetings typically include a talk by a notable guest speaker or an experienced member of the society (on a topic of interest in the fields of astronomy and space exploration, or a technical aspect of amateur astronomy).

Annual General Meeting

Commencing at 7.30 pm on the evening of, and immediately preceding our September Ordinary Monthly Meeting (see above).

Monthly Observing Evenings

From dusk on the Saturday evenings closest to each Third Quarter Moon and the New Moon. The Society's main dark sky observing site is situated near the village of Cookamidgera, 15 kilometres south-east of Parkes.

Visitors are welcome and location details are available at any monthly meeting (see above).

Postal Address

PO Box 819
Parkes NSW 2870

Website

www.cwas.org.au
(follow the email links)

President

Chris Toohey

Secretary

Eileen Newport

Vice President

Laurence Crowley

Treasurer

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Committee Members

Denis Crute, David George and John Trudgen

Editor

Alex Abbey

Public Officer

Bruce Carroll

Contributions to The Sidereal Times are welcomed and preferred as MS Word documents and low resolution jpeg files via website (see above).

Contributions do not necessarily reflect the opinions or policy of the CWAS Committee.

Deadline for contributions by second Friday of February, May, August and November.

Welcome from the Editor



The Editor and "The Beast"

Welcome to *The Sidereal Times*.

When the Central West Astronomical Society was launched at the beginning of 2002, the initial focus was on building a strong organisational structure.

The aim was to get the balance right by establishing a society with a friendly, welcoming yet professional atmosphere, whilst also having a formal and enduring structure so as not to rely on a handful of enthusiastic founders for its survival.

At the same time, the founding members wanted to attract a wide range of members from highly experienced and accomplished astronomers to absolute beginners and everyone in between.

After six and a half years of organising monthly meetings, countless leading guest speakers, public observing evenings, four AstroFests and David Malin Astrophotography Awards and national travelling exhibitions, the next logical step for the society was to establish its own newsletter.

The launch of its own newsletter is also an additional service to its members. Given that the society has members spread across the Central West of New South Wales (and even in Canada) it will provide an avenue for members to keep up-to-date with what is happening in their society, even when they cannot attend a meeting. It also provides a vehicle for non-members to learn more about the society.

Perhaps you were wondering about the origin of the name of our journal.

It's a little corny but it grows on you.

“Sidereal” relates to the stars (with sidereal time being measured by the movement of the stars, rather than the Sun, across the sky). The overall name (and the use of the Old English MT font in the main banner) hints at many an august, if more earthbound, newspaper. The Matura MT Script Capitals font, with its resemblance to Arabic characters, is a reminder that the Arabs were one of many cultures to make significant early contributions to the most ancient of the sciences – Astronomy. The use of Times New Roman was chosen for the remainder of the main banner as well as the text throughout the publication because it is, well.....clearer to read.

The insignia of the Central West Astronomical Society is also shown. The golden circle signifies a star (in particular, our own Sun), the dark blue background (rather than black) represents the colour of the background sky on a typical evening, and the initials of the society are arranged to allude to a radio telescope in acknowledgement of the society's first home at the Visitors Centre of the CSIRO's Radio Observatory at Parkes (occasionally referred to as “The Dish”). Finally, the society's motto is shown in the rich red of space's ever-present glowing hydrogen and the English translation again is in the dark blue of the night sky.

Our initial intention is to publish The Sidereal Times four times a year in March, June, September and December, coinciding with the seasons.

As it develops, we aim to find the balance between articles of significance that foster an interest in astronomy as well as increase the knowledge and skills of all our readers, whilst also providing humour and entertainment.

We hope you enjoy this inaugural edition.

Alex Abbey
Editor

President's Welcome



CWAS President, Bishop Chris Toohey

Our Central West Astronomical Society has entered a new phase of its history with this, our first journal. We have become part of the scene locally and even nationally. We even have an international profile these days. Our annual AstroFest and the David Malin Astrophotography Awards have been growing in stature and prestige.

A society produces a journal when its identity is established and it knows why it exists and where it fits in the scheme of things. It is another way of saying who we are. It also keeps members, who are unable to be at meetings, in touch with what we are doing.

A journal needs articles and ours will benefit from contributions from we who are members of the CWAS.

Thanks must go to Alex Abbey for generously accepting the decision to appoint him as our journal's first editor.

I hope you enjoy the first (historic) edition of “The Sidereal Times”.

Chris Toohey
President

Highlights from the Year So Far.....

January



Vice President Laurie Crowley and Treasurer John Sarkissian proudly accept one of the \$1,000 Parkes Shire Cultural Awards on Australia Day, 2008 in Parkes, for the CWAS David Malin Astrophotography Awards. The award was sponsored by the Central West Credit Union which, back in 2004, also provided a \$2,000 community grant to establish the inaugural CWAS AstroFest.

April



Some CWAS members after our April meeting. The guest speaker was Rick Twardy (CWAS member and former Manager of the Visitor Centre at “The Dish”). Rick, standing at centre in sleeveless vest, gave a fascinating talk titled, “True.....but not quite!” in which he challenged the audience to think about some apparently basic astronomical phenomena that we take for granted – and perhaps shouldn’t.

February



Scenes from a Photoshop workshop conducted by astrophotographer and CWAS member Steve Quirk at Parkes East Public School, February 2-3, 2008

May



Top: Vice President Laurie Crowley (right) thanks member Col Bembrick (left) at the May meeting for his account of both the 23rd NACAA (see page 9) and Dr Fred Watson’s recent tour of ancient South American astronomical sites.

Bottom: Some of Col’s audience at the May meeting



The 2008 CWAS AstroFest

by John Sarkissian, CWAS AstroFest Organising Committee

The Central West of NSW boasts some of the darkest skies in Australia, and as such is a wonderful place to appreciate the wonders of the night sky. In an effort to foster, encourage and promote astronomy in the region, the Central West Astronomical Society is holding its annual festival of astronomy, or *AstroFest*, this July.

The festival endeavours to bring to the people of the Central West world renowned astronomers, both professional and amateur, so they may share their enthusiasm and love of the heavens.

The festival incorporates a two day conference and a programme of associated events.

The conference will be held in The Coventry Room of the Parkes Shire Library and Cultural Centre and at the CSIRO Parkes Observatory's Visitors Centre from 5 to 6 July 2008. In a series of lectures, local and international guest speakers will provide fascinating insights into various aspects of modern astronomy. The theme of this year's conference is "Looking to the Future".

Prof. Harvey Butcher, the Director of Mount Stromlo Observatory, will be giving the keynote address, the prestigious "John Bolton Lecture".

The other guest speakers include Prof. Anne Green of Sydney University and Prof. Michael Kramer of Manchester University. This is truly a star-studded gathering – one not to be missed.

On Saturday night, 5 July, the conference dinner will be held at the Comfort Inn Parkes International Hotel. Dr Fred Watson will be giving the after dinner address titled: "*The Life and Times of Harry Bloggett*". This will be a fun night out, so bring along your friends and let's

enjoy the evening together.

For all CWAS members, the conference registration is \$30 per person plus \$35 for the Conference Dinner (*Optional*). The associated events will run over the entire month of July and will be held at various venues in the district.

- The "*David Malin Awards*" (DMAs) will be announced and presented at a special ceremony during the conference. Last year's DMA touring exhibition attracted 110,000 people and already this year's exhibition has exceeded this number. A great result!
- A public viewing night will be held on Saturday, 12 July, on Bushman's Hill, Parkes. The public are invited to view the Moon, Jupiter, Saturn and the splendours of the southern night sky. Admission is free.
- The Great AstroFest Raffle is supported by myAstroShop. The raffle prize is a SkyWatcher SW880 254mm Dobsonian telescope valued at \$770. The raffle will be drawn on Sunday, 6 July, at the Parkes Observatory Visitors Centre at 1:30PM. Tickets are now available.

This is OUR AstroFest, so come along and share the experience and help make it another great year. For more information see: http://www.parkes.atnf.csiro.au/news_events/asrofest/

True.....But Not Quite by Rick Twardy

DOES THE SUN RISE AND SET EVERY DAY?

I think you can see what's coming here so let's cut to the chase: there are places and dates on Earth where the sun neither rises nor sets ...it is, in fact, either continuously present or continuously absent: yes beyond the ant/arctic circles. Recall the definitions of the ant/arctic zones: that locus beyond which there is at least one day of no rise/no set during the year.

Chewing Point: What Does The Moon "Do" At Those Locations?

CWAS Member Analyses Nearby Minor Planet

By Col Bembrick

Recently, four dedicated amateur astronomers from Australia and New Zealand observed minor planet 6411 Tamaga over a time span of 11 days to determine its spin period. Using CCD cameras and the technique of unfiltered differential photometry, they derived a value of 8.352 hours with a probable error of less than 30 seconds.

The reason for all this activity was that Tamaga at that time was in Canis Majoris at a Declination of -20, well placed for southern observers. Tamaga was discovered by Rob NcNaught from Siding Spring on 8th October, 1993 and was given the provisional designation 1993 TA. As Rob is a subscriber to “The Astronomer” magazine from the UK he subsequently proposed the name TAMAGA, which was accepted in 1997.

Tamaga turns out to be an interesting minor planet in many ways – it is a Mars crosser, meaning it comes inside the orbit of Mars and can thus approach relatively close to Earth. In this instance we observed the asteroid, whose diameter is around 16.6 km, at a distance of 0.8 AU from Earth at a magnitude of 15.0. The light curve shown below is typical of many minor planets, having two maxima and two minima during one rotation. The peak-to-trough

amplitude is 0.34 from which we can deduce that the two longest axes of the asteroid (perpendicular to the rotation axis, c) have a ratio $a/b = 1.37$ – ie the a axis is some 40% longer than the b axis.

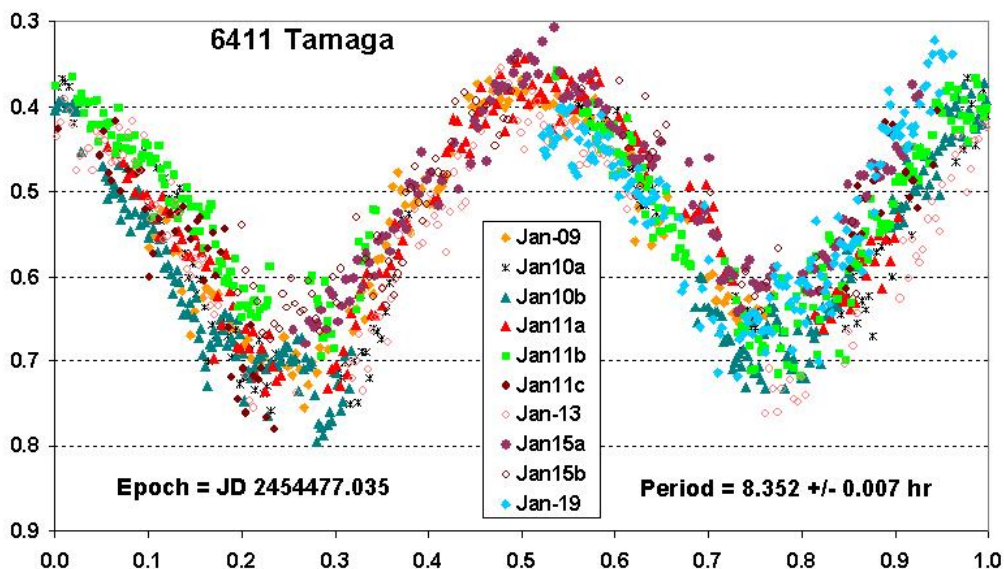
This observing effort was undertaken by Col Bembrick (Bathurst), Tom Richards (Melbourne), Bill Allen (Blenheim, New Zealand) and Greg Bolt (Perth). The results have been written up and accepted for publication in the Minor Planet Bulletin, to be published at the end of June, 2008.

Whether it be the challenge of locating a faint deep sky object or the “Wow” factor from admiring a beautiful image of Saturn or the Moon, amateur astronomers, as often as not, are in the “business” of simply enjoying and marveling at the night sky (and even the day sky, with a solar filter).

Whilst this is perfectly valid, distinguished amateur astronomer and CWAS member Col Bembrick from Bathurst also encourages amateur astronomers to make real scientific contributions that assist the professionals. Indeed, he was awarded the prestigious Berenice Page Medal in 2004 for his work in the area described above (see page 9).

Incidentally, an AU (astronomical unit) is the average distance between the Sun and Earth.

Editor



Getting the Most Out of Your Telescope – Eyepieces and Exit Pupils

by Chris Toohey

The following article is based on a talk given by Chris Toohey, current President of the Central West Astronomical Society, at the society's March, 2008 meeting. It reflects some of the author's extensive technical knowledge of observational astronomy.

When I'm using an optical telescope visually, I find it helps to have a "feel" for how it is working. By that I mean a sense of the relationship between the aperture, the focal length and magnification, and the combination of these things that is operative at the time of my observation.

Knowing the interplay between these things helps me in choosing the right eyepiece and especially if I'm thinking of buying another eyepiece or two.

For me the EXIT PUPIL embodies all the things I have mentioned. It refers to the diameter of that little beam of light that leaves the eyepiece to enter your eye. It is usually measured in millimetres. It will tell you a great deal about the dynamics of your telescope objective/eyepiece combination.

To find the exit pupil diameter, divide the magnification into the objective diameter in millimetres.

e.g. 100X in a 200mm scope will deliver a 2 mm exit pupil. Squaring the exit pupil will give you the light factor. In a pair of 7 x 50 binoculars the exit pupil will be about 7mm across, the light factor is 49. From this you can see that a 2mm exit pupil will deliver an image of an extended object 4 times brighter than a 1 mm exit pupil. You can also see that a relatively small change in eyepiece focal length will result in very different light factors.

It is because the exit pupil embodies the relationship between the objective, the magnification and therefore also the F/ratio of

the telescope, it is so very useful.

For example, we know that for an adult, dark adapted eye, the pupil expands to about 5mm or 6mm for a younger adult. A telescope exit pupil larger than this will not be fully accommodated by the eye. The light will literally miss its mark. To find the required eyepiece to achieve a 5mm exit pupil, simply multiply that figure by the F/ratio at the telescope. Therefore in a F8 scope a 40mm eyepiece will give a 5 mm exit pupil.

Generally speaking a 0.5mm exit pupil is regarded as the smallest useful in most telescopes. Therefore in our F8 scope a 4mm eyepiece would achieve this.

Medium size exit pupils hover around 1mm which will result from a magnification equivalent to the objective diameter in millimetres. Under most circumstances these will be the magnifications you will use on bright extended objects such as the planets. Fainter objects such as nebulae and galaxies usually require larger exit pupils somewhere around 2mm. The result will be an image 4 times brighter than with a 1mm exit pupil. Of course the magnification will be halved and the field of view doubled (assuming identical apparent field in both eyepieces).

All of this is helpful in choosing a telescope and, as well, expectations can be kept at realistic levels.

For example, it is a fact that under average circumstances the atmosphere will at best support magnification around 250X. If I am into planetary observing I will expect to use a 1mm exit pupil most of the time. Therefore ideally I will choose an objective around 250mm in diameter. Of course a smaller scope will also deliver 250X with the appropriate eyepiece but the image will be dimmer and contrast is reduced rendering fine planetary detail harder to see.

Continued Page 8

Eyepieces and Exit Pupils (continued)

From Page 7

There are some other variables influenced by whether or not I choose an obstructed (reflector) telescope or an unobstructed (refractor) scope.

That discussion is for another time, but I have found that purely in terms of contrast a 5" refractor approximates an 8" reflector, so refractors can tolerate smaller exit pupils than their reflector cousins. (Such is the influence of the central obstruction of a secondary mirror.)

On the very best nights the atmosphere will

support 400X or even a bit more. So again, if I am a planet nut then a 400mm scope (16") will be a good choice for a scope to best exploit the best nights while operating with a 1mm exit pupil.

As for image brightness of fainter extended objects, there is no substitute for large exit pupils and therefore large apertures. This results in a condition known as aperture fever for which there is no known cure!

Basic Calculations – Exit Pupils

F/ratio = ratio of diameter of objective to its focal length
= focal length / aperture

Magnification = focal length of objective / focal length of eyepiece
or
= aperture / exit pupil

Exit pupil = diameter of light beam exiting the eyepiece
= focal length of eyepiece in mm / f/ratio
or
= diameter of objective in mm (aperture) / magnification

To calculate the focal length of an eyepiece needed for a given exit pupil:

Required eyepiece = given exit pupil × f/ratio of telescope (in mm)

Largest useful exit pupil in reflectors = 5 mm

Exit pupil at which diffraction pattern becomes visible = 1.6 mm (reflectors)
= 1.2 mm (refractors)

Smallest useful exit pupil = 0.5 mm

Highest useful magnification = aperture in mm × 2

Lowest useful magnification = aperture in mm / 5

True.....But Not Quite by Rick Twardy

DOES THE MOON RISE AND SET EVERY DAY?

Well, OK, it does nearly every day ...but every so often it rises just before midnight one day and next rises just after midnight on the second day following! So there you have it: some days it never rises.

Of course, by the same reasoning, some days it never sets. But it would be a funny ol' sky if there was a day where the moon neither rose nor set!

Penrith Hosts Highly Successful 23rd NACAA

By Colin Bembrick

The 23rd National Australian Convention of Amateur Astronomers (NACAA) was held last Easter at Penrith Panthers, with over 100 people attending from all Australian states and territories, plus a small contingent from New Zealand. NACAA is held every two years in a different state capital or regional centre. The next NACAA will be held in Canberra in 2010.

The main conference was over the Saturday and Sunday, but well-attended workshops were held on both the Friday and the Monday. A convention dinner was held at the venue on the Saturday evening, with after dinner speaker Prof Ray Norris of the Australia Telescope National Facility (ATNF) giving an enlightening address on Aboriginal Astronomy and its probable antiquity. Also at the dinner the 17th Berenice Page Medal was awarded (*in absentia*) to John Broughton of Queensland. John claimed the award by virtue of his many asteroid discoveries and his notable successes in asteroid occultation observations, using his very own drift scan method.

(The Berenice Page Medal is awarded, at most, every two years for excellence in amateur astronomy in Australia and its territories. Candidates are judged on the basis of scientific contributions which have served to advance astronomy – Editor)

The conference proper got under way on the Saturday morning with the Keynote Address given by Prof Matthew Colless, Director of the Anglo-Australian Observatory (AAO) on the Future of Optical Astronomy in Australia. This was followed over the weekend by more than 30 presentations on a wide variety of topics by amateurs from both Australia and New Zealand. There were so many speakers that parallel sessions were run for most of the weekend, making it very difficult to decide which of the sessions to attend. The topics ranged from variable stars, minor planet research, telescope

restoration, double star observing, eclipsing binary interpretation, meteor showers, lunar eclipses, narrow band imaging, planetariums and astronomy education.

Sessions on Sunday afternoon included the opening papers of the 2nd Trans-Tasman Symposium on Occultations, which continued as a workshop for the whole of Monday. Speakers here included Dave Gault, Steve Kerr, Steve Russell and David Herald of “Team Occultation”. Other things of interest included a number of excellent poster papers – Jupiter images by Tom Richards & company from the Astronomical Society of Victoria (ASV), Solar Flares by Harry Roberts of the Astronomical Society of New South Wales (ASNSW) and Binary Asteroids by Dave Higgins of the Canberra Astronomical Society (CAS). The Convention was also fortunate in having Arne Henden, Director of the American Association of Variable Star Observers (AAVSO), on hand to give several interesting presentations, including a precision CCD photometry workshop.

The official convention programme wound up with a well-attended BBQ at the University of Western Sydney Observatory on the (cloudy) Sunday night, where several prizes and awards were handed out. The Astral Award for best paper presentation went to Serge Wadhwa for his paper on Eclipsing Binaries. The NACAA shield was handed over to the Canberra AS for the 2010 NACAA. It was generally agreed that this NACAA was one of the very best – well organised and at a great venue with an abundance of good speakers. See you in Canberra in 2010!

Col Bembrick is an accomplished amateur astronomer, member of the CWAS, and himself the 2004 recipient of the Berenice Page Medal for the type of work outlined on page 6 of this edition - Editor

THE DISH

The dish stands alone on its tower of stone, With wheels that rumble and gears that groan.
For many a year they've turned its ear
To space, for stars to come by.
Out in the hills it scans alone,
For space and stars to come by.

Up comes John with his hard-hat on,
Frown on his face as he looks out yon,
For the crash and the din of the wind coming in should stop that dish from a'pointing.
The clouds in the sky are shrieking by
And still the Dish is a'pointing.

"Oh Boss be told, these hours we stole
But what be the winds that blow from the pole?
We've all read that the wind is dread,
But downtime – we avoid it.
Though the Dish as a whole has the shape of a bowl, the big wind's threat – we ignored it".

Says John, "I don't see why the likes of thee Should plainly risk so schemishly Our metal and skin
and walls within, So hand the big dish over.
Though your time is free, Dish belongs to me So hand the ol' dear over."

"In a couple of mins", says leader and grins, "We'll be done, then fix its pins.
We've come a long way to see what may,
We've a mind to spy on – heed now!
We're tired of observing your safety whims, We've friends high up – so flee now".

But just as they thought their data were caught They found their plans were truly fraught.
Before they could mind John slipped behind To wires, so many, that informed them.
"A shrewd yank here should make them fear And be the way to thwart them".

But some men moan when weight is thrown, – such mean reports they post from home.
But their hot blust his career won't bust – the safety rules defend it.
When it comes to a gust then stow you must – on the head of the scope depend it.

Now John takes his stroll to prevent a toll Each time aloft a storm does roll.
And we're still here after many a year
For research skill be done by.
Under skies of coal a cosmic goal
Of space and stars to come by.

*...by Rick Twardy 2005 08 20
(with apologies to JRR Tolkien)*

Astrophotography Gallery

Given that the Central West Astronomical Society (CWAS) hosts the David Malin Astrophotography Awards each year, it is hardly surprising that many CWAS members are enthusiastic photographers of the night sky.....and few members are more enthusiastic than **Tony Trelford** from Canowindra, who provided these beautiful images for the inaugural edition of our journal.



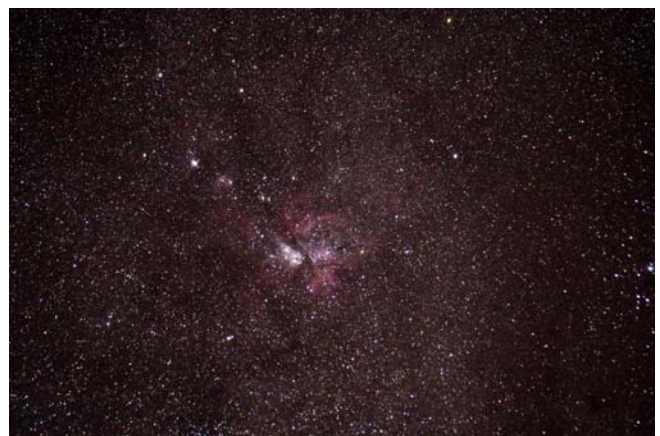
The challenging **Horsehead Nebula** in Orion. This is a case of persistence paying off for Tony. Imaged with a Canon 350D camera through an ED 80mm refractor on 29 October, 2006. Tracked and guided for 345 seconds.



The colours are natural though exaggerated. However, what is most intriguing about this detailed image of our **Moon** is that it was taken with a 1.3 mega-pixel mobile phone camera (through an ED 80mm refractor, 2x Barlow, neutral density filter and 13 mm eyepiece for 1/21 second on 11 May, 2008). Processed with Photoshop CS3.



Large Magellanic Cloud. Taken with 350D camera and Sigma zoom lens. ISO 800 for 205 seconds. Piggybacked on ED 80mm refractor and tracked on EQ5 mount.



Eta Carinae. Taken with 350D camera and Sigma Sigma zoom lens. ISO 800 for 158 seconds. Piggybacked on ED 80mm refractor and tracked on EQ5 mount.

The 10 Commandments of Amateur Astronomy

By Michael Grimshaw

1. Thou shalt consult thy great oracle *Star Atlas 2000*, before reporting thy rogue comet, lest it be an *NGC*
2. Thou shalt cast from thy mind the temptations of *Astro-Physics* or *Takahashi*, unless thine harvests are truly bountiful
3. Thou shalt not lust for the *Dob* of *Goliath*, for thee shall be consumed by aperture-fever, and thence cast down into thy pit of bankruptcy
4. Thou shalt not tempt the wrath of other followers by desecrating the sacred dark-sky site with insidious white light
5. Thou shalt not love thy telescope more than thy spouse or thy children; as much as, maybe, but not more
6. Thou shalt not reveal to thy spouse the true value of thy telescope collection; only the individual components, and that shalt be done with great infrequency
7. Thou shalt not store thy telescope within those places considered sacred by thine spouse; these being the living room, dining room and bedroom, lest thee be condemned to the house of the dog for all eternity
8. Thou shalt not tempt the wrath of the one true god, by worshipping the lesser gods of *Nagler*, *Apo* and *Alaksutov*; lest thee be punished with eternal cloud cover wherever thou shalt roam
9. Thou shalt not read *Astronomy* or *Sky & Telescope* on company time, for thine employer has the power to make thy hobby full time
10. Thou shalt become familiar with the most common sights of the night sky, lest thee be ribbed for an incorrect identification; for embarrassment is a heavier load to bear than even the greatest of counterweights

So it is written