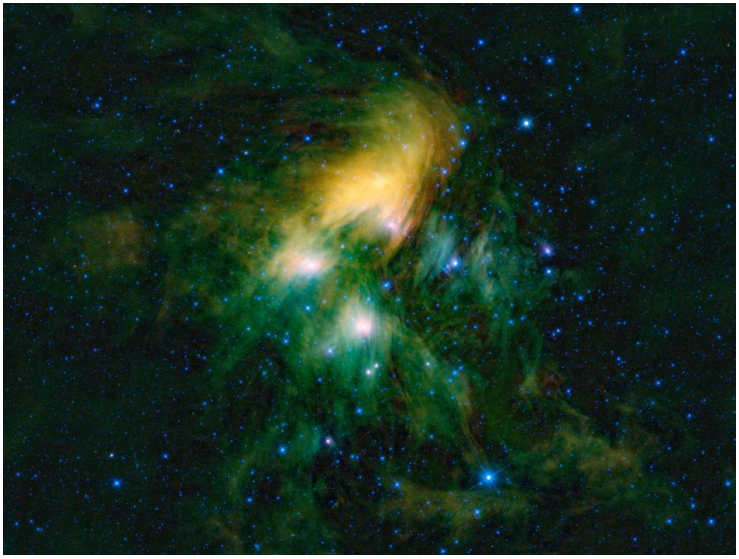
FOXTON BEACH
ASTRONOMICAL SOCIETY

www.fbas.org.nz



Matariki (the Pleiades) taken by NASA's Wide-field infrared Survey Explorer

NEWSLETTER
August
2010

FOXTON BEACH ASTRONOMICAL SOCIETY
LIST OF OFFICERS 2010 – 2011

President:	Stephen Chadwick	Ph 329-9458
Vice President:	Ian Cooper	Ph 329-7829
Secretary:	Tina Hills	Ph 368-6926
Treasurer:	Simon Hills	Ph 368-6926

SUBS ARE NOW DUE

$30 – Waged or $15 - Unwaged

Please pay Simon or send cheque to 6A York Street, Levin

We welcome contributions from any members - observing reports, photos, news, links to interesting websites, just about anything astronomical will be considered. Please have your contributions in by the 21st of the month. Address any newsletter contributions to Stephen Chadwick at stevechads@hotmail.com or post to 628 Himatangi Beach Road, RD11 Foxton. We cannot guarantee everything will be included, but we will do our best.

NEXT MEETING

General Meeting

THURSDAY August 5th 2010 at 7.30 pm

at the Foxton Beach School staff rooms, Carthew Terrace, Foxton Beach.

Tea, coffee and biscuits are now available at all meetings at a nominal charge of 50c

W a Registered Charity. All donations over $5.00 can be used to claim a Tax refund.

Bring Your Scopes

This is an invitation to all society members and visitors to bring along your telescopes to the next general meeting on August 5th.

If the weather is good we can set the scopes up next to the observatory and begin to get to know the telescopes that we have in the society. For those less confident it will be a good chance to expand your knowledge of your own instrument thus making use of it in the future less daunting.

Maybe your finder scope has been knocked out of position and so you are finding it difficult to use. Telescope doctors will be on hand to iron out any potential problems.

Remember, the school is now a much darker site! Thanks to the headmistress and caretaker of the Foxton Beach School, we are now able to hold our meetings with the spotlights off. At the last meeting we were amazed at how dark the sky actually was above the school – the Milky Way and the Magallenic Clouds could easily be seen.

To the Editor

Dear Editor,

I was fortunate to be visiting family in Nelson when world renowned British astronomers Heather Couper and Nigel Henbest arrived in Nelson in July, after heading a solar eclipse tour in Tahiti, to lecture on cosmic research to a packed hall at the Nelson Marlborough Institute of Technology.

Also at the lecture was their friend and well known NZ astronomer 90 year old Albert Jones of Nelson, known for his co-discovery of the brightest explosion seen by the naked eye in the night sky in three centuries. His observations were so accurate, he regularly fielded requests from more than 30 professional astronomers in 18 countries and has received honours from astronomical societies in NZ, the United States and Britain. Heather Couper, who is a trained scientist and the author of 30 books on cosmic research, has spent many years working in the media hosting television and radio shows in astronomy. Mr Henbest is a British astronomer and science writer. It was a real thrill to meet Heather and Nigel and hear their absorbing lecture – lucky me!

Best wishes,

Joan Bassett

Foxton Spring Fling

The annual Foxton Spring Fling will take place on Saturday September 4th. Once again FBAS will have a presence there. We need volunteers to man our 'patch'. Please bring your telescope. It is always a good opportunity to let the local public know that we are here.

If you are willing to help then please let one of the committee members know or say your intention on the FBAS discussion forum.

The Harry Williams Astrophotography Competition

The Harry Williams astrophotography competition is held annually by the Auckland Astronomical Society.

There are three categories:

Solar system
Deep sky
Miscellaneous (wide field views, star trails, star parties etc.)

One of our members was a runner up last year so let's see if FBAS can win something again.

The entry form and entry details are now online and can be downloaded from the Auckland Astronomical Society website:

www.astronomy.org.nz

Entries close September 19th, 2010.

Sculptor

The stars of **Sculptor** are not bright. In fact the brightest **deep sky** object, an **Open Cluster NGC1302**, at 4.5, equals the *brightes*t star. But there is a bright **Globular Cluster**, and the brilliant, beautiful **galaxies** in the "**Sculptor Group**", (which includes some just over the boundary in **Cetus)**, are unequalled for the backyard telescope.

Stellar Table and notes

Bayer	Mag	Spectra	Dist (ly)
□	**4.4**	B5	
□	**4.5**	B9	
□□	4.5	K0	76
□	4.6	A0	84
□	5.0	M0	233

The only simple way to find **Sculptor** quickly is to start from **Fomalhaut** and **Grus**, if the long, relatively bright string-body and wings of the Crane can be identified. Look East from the bright star and North from the Crane. The faint ladle shape should be evident.

Deep Sky Table and Notes

Object	Mag	Object type	Size	Dist(l y)
C0001302	4.5	Open Cluster	70"	778
NGC288	8.08	Globular Cluster	10'	
NGC253	**7.00**	**Spiral Galaxy (S)**	**25' by 5'**	**¼ on.**
NGC55	8.2	Irr. Barred Spiral?	33' by 6.5'	
NGC300	8.7	Spiral galaxy(Sc)	20' by 15'	6 million
NGC289	12.10	Spiral Galaxy(S)	3' by 2'	Binary pair interacting.
NGC613	10.77	Spiral Galaxy(S)	5' by 5'	

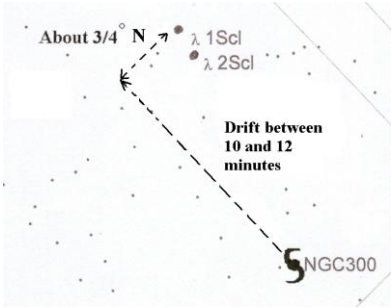
NGC253 (The Cigar Nebula) is one of the most amazing **spiral galaxies** in the sky. It is huge and bright, a must see! It has been less spoken of than many of its fainter, smaller Northern counterparts, because on their Northern horizon, it is as unimpressive as **M31** is from here! But **NGC253** in the **Zenith** presents the ideal picture of the **spiral galaxy**, with a bright **nucleus** and swirling, mottled dust lanes defining the **spiral arms**.

In contrast the bright edge–on spiral **NGC55** shows nothing you expect! Looking for the central bulge of a **nucleus**, you see that either there is not one or it is way off centre; the dust is as absent as in the **LMC** and the lack of defining **dust lanes** make this beautiful object look **irregular**.

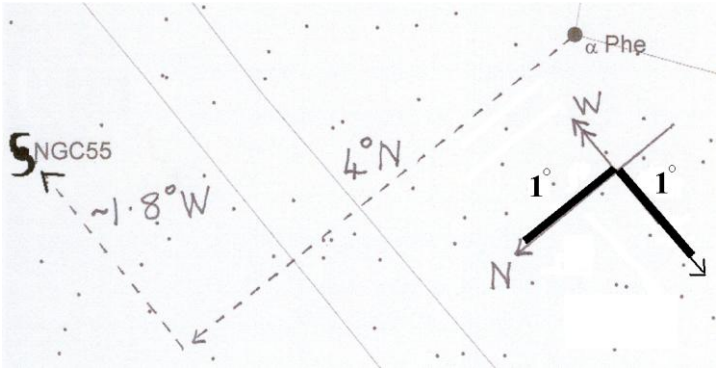
NGC55 can be found, starting from **Ankaa** (□-Phoenicis in nearby **Phoenix**) and moving the scope 4 degrees N. Then move the scope just less than 2 degrees west. As you complete this, possibly **hopping** past three well-placed **stars**, the distinctive shape of **'55** should amble into view. Remember the telescope *inverts the image*. The diagram shows my own sketch of the process.

NGC300 (The Southern Pinwheel) is found NE of □-Phoenicis, almost due E of the double □-Sculptoris. If the scope is first centred on □□, and then moved ¾ of a degree N, it will be due E of NGC300. The galaxy, in 10-12 minutes, will move, with the rest of the sky, due W, until NGC300 turns up in the field of view. It is wise to use a low power eyepiece, check the finder frequently, and be careful not to knock the scope! But this method, called "star drift", does work well.

And for a large RFT NGC300 is worth great efforts to see! As NGC253 is like M31, so NGC300 is like M33, with a brilliant nucleus and graceful, shapely spiral arms. A 10" f4.5 shows lots of detail, while a 17" RFT gives an image of a classic Sc spiral.



Two other galaxies are listed and their positions shown. One is easy to find and the other is intriguing if you can see it, but this is only the beginning of discovering Sculptor, a true realm of galaxies!



Cultural Perspectives

It is funny how time and place can make perfectly rational and correct descriptions absurdly misleading. **Patrick Moore's** contribution to the old favourites, the "Observer's" series of books was of course "**Astronomy**", and I still have a copy. As a child, I regarded that book as one of my treasures, and read from it constantly… I hope the author will forgive a quote on **Sculptor**, which he described as "extremely *barren*". Of course, to the amateurs of the day, an 12" was a "large" reflector, and **Sculptor** hardly rises above the hazy horizon in **Britain**. Nowadays, and in the **South**, amateurs look straight up at **Sculptor** and a 12" **reflector** is "*medium*"! There is that expression: "It's always the same sky…" (**Robert Burnham**?), but remember those two: time, and place.

Douglas Jackson

A Rare Occultation of the Pleiades

On the morning of Thursday, August 5th, 2010, we have our last chance to see an example of the rare astronomical event known as an occultation of the famous Pleiades star cluster by the Moon. The word occultation comes from the Latin word, 'occult,' which means, 'to hide.'

As the Moon orbits the Earth it appears to pass through the thirteen constellations of the zodiac. (Yes there are actually thirteen constellations that the sun passes through in a year. For two weeks in December the sun is in the constellation of Ophiuchus {Off-ee-oo-kuss}The Serpent Bearer, not that you will ever hear that from an astrologer!). The path that the sun *appears* to make across the sky is known as the ***ecliptic.*** The ecliptic line is actually the path of the Earth around the sun, but from our vantage point on the Earth it appears to be the other way round. The Moon however does not stick to the same path. Not only does the Moon appear noticeably bigger at ***perigee*** (peri=closest, gee=Earth), and smaller at ***apogee***(apo=furtherest, gee=Earth), but our Earth's natural satellite strays from the ecliptic line by 5 º north and south. It is for this reason that we don't have an eclipse of the sun or Moon every month.

Other Occultations of Note

Every day and night the Moon is passing in front of, occulting, background stars. All of those stars have to be inside that 10 º wide band that the Moon appears in. The brightest star in that zone is Antares in Scorpius. Occultations of Antares occur over several years before there is another lengthy gap of no Antares occultations.

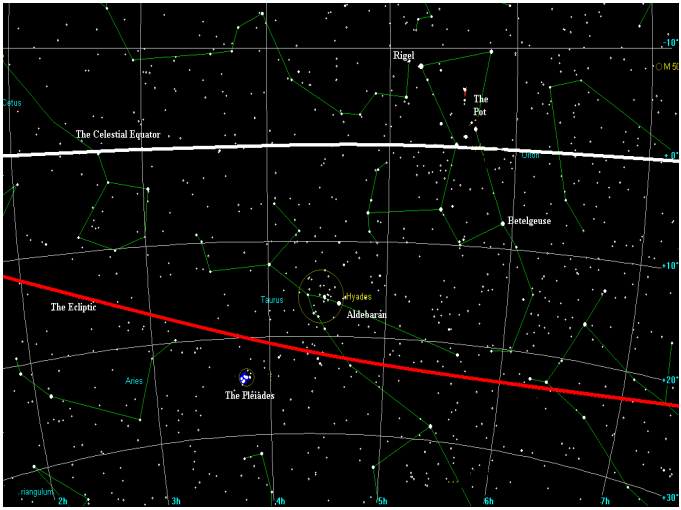
The Pleiades

The famous naked-eye open star cluster called the Pleiades (*PLYE-uh-dees)*, also known from the Greeks as the 'Seven Sisters,' just sits in the ten degree zone as well. The Pleiades cover an area of sky that is over twice that covered by the Moon. This means that the smaller Moon has a greater chance of occulting some, but not all, of the bright stars of the Pleiades at some stage.

The Stars of the Pleiades Star Cluster are;
Alcyone (Al – sye – o – nee)
Atlas (At-las)
Electra (I-LEK-tra)
Maia (MYE-a)
Merope (MERR-o-pee)
Taygeta (Tay-jet-a)

Pleione (PLYE-o-nee)
Celaeno (Sa-LEE-noh)
Sterope, Asterope (a – STERR-o-pee)

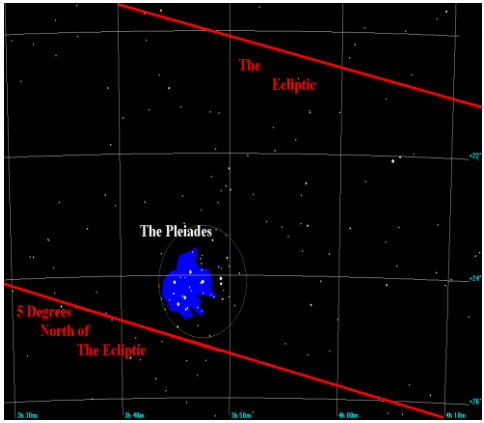
Above: The brightest stars of the Pleiades (image courtesy of The Sky Version 6).



ABOVE: The red line shows the ecliptic and how much it deviates from the celestial equator due to the tilt in the Earth's axis. The point of greatest deviation is where the ecliptic crosses the vertical line showing 6 hrs of R.A. (Right Ascension). This is where the sun is on our shortest day (the first day of winter in the southern hemisphere).

When the point of greatest deviation north approaches the Pleiades we then start to get our first series of Pleiades occultations. The Pleiades actually lie roughly 4 º to the north of the ecliptic. This means that the Moon will progressively move across the cluster from the top (south) as we see here in New Zealand over a period of about two years. Then there will be a period of about four years when the Moon in this part of the sky will be too far north and no occultations will be visible. As the Moon returns southward a new set of occultation opportunities will arise for another two year period. Once that series is over there is a gap of around 13 years before the next series starts.

For an observer at any one location on Earth one series may afford many fine chances to see a good example of a Pleiades occultation, while another series may include many near-misses due to the event happening before moonrise or after moonset!



Above: A close-up look at the Pleiades and their relationship to the ecliptic and the 5 degree band. The centre of the Moon can reach that 5 º line and therefore completely miss the Pleiades for several years.

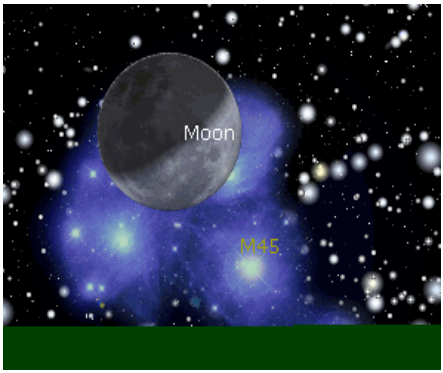
Our Current Series

The first occultation in this series was on July 3rd, 2005, at 6.00 a.m. I believe any occultation of the Pleiades between the last week of june and the middle to end of July has to be the most picturesque from here. A thin crescent Moon enables one to detect the stars with the naked-eye better and in bino's or a small telescope the whole spectacle is a fine sight indeed. Being the start of a new series the Moon clipped the southern (top) part of the cluster.

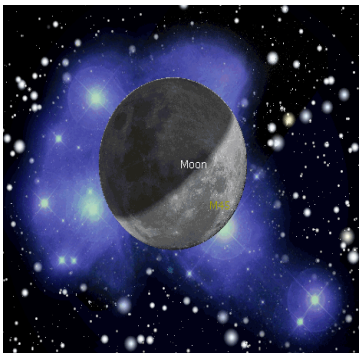
August 5th, 2010!

The Lucky Last perhaps. It will be another 13 years before we get another crack at observing one from here so here is hoping the weather cooperates. At around 2.45 a.m. the Moon will rise in the north east, slightly to the left of where the sun is currently rising. The occultation will already be underway.

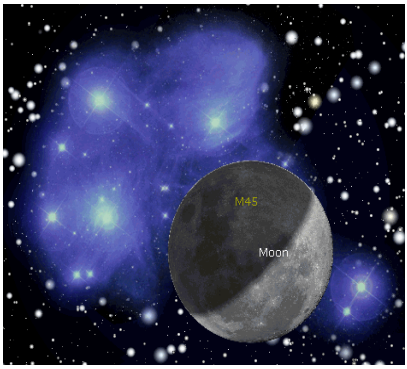
Obviously access to an unobstructed horizon will be needed to see the initial stages.



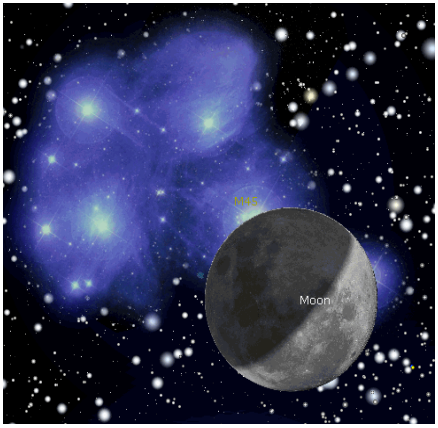
2010.08.05 at 2.45 a.m.



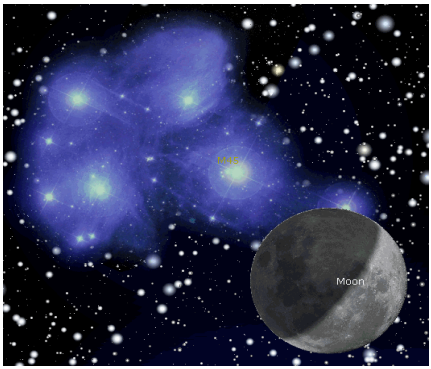
2010.08.05 at 3.18 a.m.
when Alcyone is hidden.



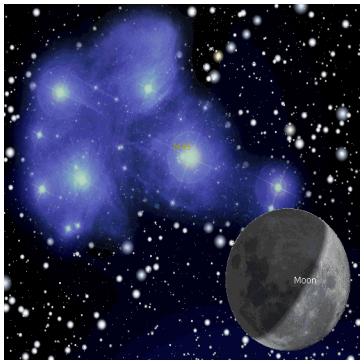
2010.08.05 4.00 a.m.



2010.08.05 4.25 a.m.
Alcyone reappears



2010.08.05 5.00 a.m.



2010.08.05 5.17 a.m.
occultation ends.

As stated earlier the dates from 1991 come into play again but this time the Moon has moved south. A close conjunction on the night of October 25-26th, and a daylight conjunction on December 19th where the Moon is a whole degree south of the Pleiades.

The Next Series

The whole process starts again for New Zealanders on September 6th, 2023 with a daylight graze of Merope at 8.30 a.m If conditions are right telescopic viewers may get this one. In succession we have a near Full Moon on Halloween morning. Another bright moon on Christmas eve 2023. A fine daylight event with a crescent Moon on March 15th, 2024 at 4.00 p.m. suitable for telescopes. There is a gap after this until 2028 but none of the events available to New Zealanders in the 2028-29 series are very-good at all!

So folks this is your best chance for several decades to get a near perfect view of an occultation of the Pleiades. Best of luck with the weather.

(Ian Cooper).

Ancient Chinese Astronomy

The ancients of our world knew about Astronomy. Nigel Henbest in *The History of Astronomy* says "China has the world's longest-running observations of the sky: though based in astrology, they are of unique importance to astronomy today. In 210 BC, the great First Emperor of China was buried near Xi'an with his famous Terracotta Army of full-sized clay warriors. According a contemporary account, his own tomb – yet to be excavated – was even more lavish, containing a fabulous double map: "Below was a map of the Earth.

The hundred rivers of the Empire were modeled in mercury: cleverly designed machines made the rivers flow. Above everything was the starry vault." This map reflected the crucial role that the sky played in ancient Chinese thought. The heavens weren't remote from everyday life. The sky was a mirror of the Earth. Every time that something unexpected occurred in the sky, it showed a disruption on the Earth – which, in effect, meant somewhere in China.

To pinpoint exactly where, the Chinese split the stars into 283 small constellations, representing different parts of the Empire. On 7 December, AD 185, for instance, Chinese astronomers spotted a brilliant new star and reported: "A guest star appeared within the Southern Gate. It was as large as half a mat; it showed the five colours and it scintillated." The Astronomer Royal alerted the Emperor, and decisive action was taken against the region corresponding to the Southern Gate. "The governor of the metropolitan region Yuan Shao punished and eliminated the middle officials and several thousand people were killed."

Chinese astronomers kept watch from a raised platform, where four observers faced north, south, east and west; while a fifth lay on his back and looked straight upwards surely the best job! The next morning they reported to the Astronomical Bureau, which kept records from 206 BC to AD 1912 – the longest-lived bureaucracy the world has ever seen. Today, astronomers can mine this ancient archive for unique information on astronomical events.

New insights from old information

British astronomer Richard Stephenson, who taught himself ancient Chinese and is now a leading expert on the astronomy of the Far East, has looked into the "guest star" of AD 185. He identifies the Southern Gate as the two bright stars Alpha Centauri and Beta Centauri. And he concludes that the guest star was so brilliant that it had to be a nearby supernova – the most violent kind of stellar explosion.

Led by the Chinese results, Stephenson has pinpointed where the explosion occurred. And here astronomers studying X-rays from the Cosmos with the orbiting Chandra Observatory have located the incandescent fireball still expanding from the 2000-year-old explosion. “One of the key things is that you have a definite date,” Stephenson explains, “so you know precisely how long the remnant has been evolving.”

The Chinese observations can also indicate how bright the supernova was. “In the case of a supernova seen in AD 1006,” Stephenson continues, “the Chinese said it was so bright that you could see things on the ground by its light.” These ancient observations really come into their own with the supernova spotted in July AD 1054. A star exploded in the constellation we know as Taurus, shining so brilliantly it was visible in daylight for 23 days.

Today, in this location we find the twisted wreck of the long-dead star: the Crab Nebula. It’s powered by a collapsed core of the old star, which lurks at the centre of the nebula as a pulsar – a super-dense ball of neutrons only 25 km across, spinning around 30 times a second. Astronomers and physicists are short in understanding how neutron stars change as they grow older. With the Crab Pulsar, the Chinese observations provide a unique piece of information: the pulsar’s age. We know that it was born exactly 953 years ago. The Chandra Observatory has also pinpointed pulsars within supernova remnants that - according to Stephenson - are the fireballs from stars the Chinese saw explode in AD 386 and 1181.

Sometimes, the imperial astronomers were treated not to a guest star, but to a “broom star” – a fuzzy object that crawled across the sky, sweeping the sky with its tail. In 240 BC, they set down the world’s first record of the celestial visitor we now know as Halley’s Comet. In AD 530, the Chinese recorded Halley’s Comet with more precision: “On 1 September, it was one degree to the northwest of Xiatai [a star in Ursa Major].” These early fixes on the comet’s orbit meant that European mission controllers could predict its 1986 apparition with greater accuracy, enabling them to send the Giotto spacecraft through the comet’s heart with unerring precision.

Ancient Chinese Eclipse Predictions

The Chinese were also careful to record eclipses of the Sun – a portent of doom that would directly affect the Emperor or his family. “There was a total eclipse in 181 BC,” says Stephenson, “and the Emperor’s dowager was really alarmed by it: she died two years later.”

An eclipse features in the earliest astronomical record in the world, from the Chinese city of Anyang. Around 3000 years ago, a diviner inscribed a question

on an oracle bone – a polished shard of animal bone: “Diviner Ge asks if the following day will be sunny or not.” He pushed in a red-hot needle, and interpreted the ensuing cracks. Twenty-four hours later, the diviner inscribed the actual answer to the question. In this case, something rudely interrupted the sunshine: “Three flames ate the Sun, and big stars were seen.”

This is clearly an account of a total solar eclipse. The “flames” were the Sun’s outer atmosphere, the corona, with the brighter stars and planets becoming visible during the darkness of totality. To astronomers’ eternal gratitude, Diviner Ge recorded that the eclipse fell on the 52nd day of the 60-day lunar month. In 1989, NASA researchers calculated when a total solar eclipse would have been seen in China on the 52nd day of any month. The only date that fits is 5 June 1302 BC – making this eclipse the most ancient exactly dated astronomical event.

This eclipse isn’t important only as a record-breaker. It reveals new information about the Earth’s rotation. Astronomers know that our day is gradually getting longer, due to the influence of the Moon’s gravity – that’s why we have to occasionally insert “leap seconds” to our clocks. But the rate of slowing isn’t constant.

By studying exactly where eclipses have been seen over the past millennia, Stephenson has tracked the variation in the Earth’s rotation rate. As well as the Moon’s influence, he has to invoke minute changes in the Earth’s shape as the surface bounces back from the weight of ice sheets that burdened northern lands during the last Ice Age: “especially in the area around the Gulf of Bothnia, the land’s still rising at quite a rate.” These results are showing in a way the ancient Chinese could never have predicted – that their scrutiny of the heavens has indeed been mirrored in the planet under their feet!

From *The History of Astronomy* by Heather Couper and Nigel Henbest (submitted by Allen Little)

The View from the Sand Dune Observatory

The Cat's Paw Nebula (NGC6334)

I don't have to explain why this one is called the Cat's Paw nebula. It is an emission nebula in Scorpius, located near the tip of the scorpion's tail. It is a huge stellar nursery, the birthplace of hundreds of massive stars, many having been born within the past few million years.

Particularly striking is the red, intricate bubble that makes up the 'left toe'. This is most likely either a star expelling large amount of matter at high speed as it nears the end of its life or the remnant of a star that already has exploded.

The nebula covers an area of the sky slightly larger the full moon.

(Image by Stephen Chadwick)

Calendar of Events

Here is a provisional list of upcoming events:

August 5th: Monthly Meeting
"Buiding the Sand Dune Observatory" Steve Chadwick

September 2nd: Monthly Meeting
TBA

September 4th: Foxton Spring Fling

Classified

Meade 8" Starfinder Dobsonian Telescope

includes:

Telrad Reflex Sight
12 & 25mm Plossl Eyepieces

Price $1500

Contact Pat Keating on 063680570 or 0210657021

If undelivered return to:

Foxton Beach Astronomical Society
c/o 6A York Street, Levin 5510

Nelson Bartlett Observatory *(Photo by W Marshall)*

THE FOXTON BEACH ASTRONOMICAL SOCIETY
NELSON BARTLETT OBSERVATORY
FOXTON BEACH SCHOOL STAFF ROOMS
CARTHEW TERRACE
FOXTON BEACH