MACARTHUR ASTRONOMICAL SOCIETY Inc.





PRIME FOCUS

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President's Report

Previously at MAS

Adjust your modulations and amplify your frequencies. If you did all that than I am sure you would have gained much insight into the world of the Radio Astronomer. Dr Enno Middleberg from the Australian National Telescope Facility was our guest speaker last month. His talk was fascinating. There is no doubting the contribution and magnitude that Radio Astronomy brings to unlocking the mysteries of the universe.

Don't forget to check out the sky cam images from the Parkes Radio Telescope. I found the easiest way to take a peek was by typing CSIRO into the search engine, then click on Australian National Telescope Facility, then click onto the image of the Parkes Radio Telescope, then follow your nose.

Dr Middleberg proved to be a very accomplished speaker and was most pleased to accept an invitation to return next year. He is well versed in many topics related to astronomy.

It Happens Tonight!

Glenn Dawes is guest speaker tonight. As you know Glenn is the part of "The Incredibles", that fantastic team that brings us the Astronomy Ephemeris each year. His topic tonight will be the development of the Astronomical Yearbook. Included in the talk will be the early days of the yearbook and how from humble beginnings it evolved into a national publication. Glenn also gave a similar presentation to another society earlier this year and it was very well received. Thanks again Glenn for coming along and visiting us good folks at MAS.

Next Month

Bishop Chris Toohey will be our end of year speaker, Chris is one of this country's foremost amateur astronomers. Chris also lectures about astronomy and is a writer and contributor for Sky and Space magazine. Should be a great night.

Is the year really moving that fast? Christmas is approaching at light speed. I am aware that we are doing some stargazing nights for some schools in November and I am sure John Rombi will bring us up to speed on that.

The Dates

29/10/05	The Forest
04/11/05	Rotary Observatory
05/11/05	The Oaks
21/11/05	Monthly Meeting
26/11/05	The Forest
03/12/05	The Oaks

Please apply a good dollop of common sense before heading out, last minute cancellations can take place, or maybe just no one turns up on account of storm and tempest! If in doubt call Johno or myself.

Special Note: To check the Star Night weather conditions call John Rombi on 0425249301 or Noel Sharpe on 0410445041.

The Observatory night that was to be held on October 7th was a complete washout. It was very obvious that the night would be cancelled. However, John and myself still went up and we had a nice chat to Dr Ragbir Bhathal. We are crossing our fingers for the Nov 4 night.

Event Emailing

We spoke at our last committee meeting about an idea to confirm and record the emails of the members who are regular attendees at The Oaks, The Forest and general public star nights. The idea is to bulk email everyone listed with details that could include last minute weather predictions, absences and apologies or cancellations.

Or we could know of several desperate members who will go regardless of weather. Another idea also is to bulk email with midweek events or off schedule field nights. e.g. the Moon sets around 11pm tonight and a bunch of us are going out to The Oaks. John will have a talk about this tonight.

Also I am looking at scheduling The Forest nights for January, February and March. In the past we have suspended these summer months but I think it maybe time to review this. What do you think?

The Fantastics.

I have heard that Martin and Bruce have held some astronomy talks with the public. That's fantastic! Also thanks to John for organising some great guest speakers for our club next year. That's fantastic! Remember to take a peek at our website www.macastro.org.au. It's looking great. Martin has put a lot of work into this and its well worth a look. That's fantastic.

Astronomy sure can be a frustrating hobby, cloud and rain, can't get polar aligned, damn I'm dewed again and I forgot my beanie. I do really look forward to our meetings, as at least they are indoors!

Regards as always

Noel Sharpe

Wot IC This Month October 17 – Nov 20, 2005

The Sky at 9 pm

To the northwest Aquila and the little horse Equuleus are swinging from east to west with Delphinus the Dolphin. Aquarius, Pisces and Pegasus are directly north followed by Andromeda, Aries and Cetus. Later in the night will come Taurus and Orion with Lepus and Columba the Dove.

Turning to the south Sagittarius sinks in the west followed by Pavo the Peacock, The Indian – Indus, the birds Grus, Tucana and Phoenix with bright Achernar in Eridanus creeping up from the southwest.

Moon Diary

17/10 Full Moon 25/10 Last Quarter 02/11 New Moon 09/11 First Quarter 16/11 Full Moon

On 4th November the thin crescent Moon will be in the west with Mercury and the bright star Antares. On the 12th it will partner up with Venus. On 16th the full Moon will be on the edge of Pleiades.

Evening Planets

Mercury climbs out of the sunset and into Libra and Scorpius this month. It will set by 8 pm but there will be good views while it is at greatest distance from the Sun on 4th November. Late November it will disappear into the Sun to return to the morning sky for Christmas.

Venus shines bright as darkness falls, moving into Sagittarius for all of November.

Sliding past the lid and handle of the Teapot it passes through Ophiuchus greeting M19 and several other clusters

Mars rises in Aries after 8 pm and has a close pass with the full Moon on the 19th. Preparing for its closest approach to Earth on the 30th October, it is brightening to -1.6 magnitude and swelling in size to 20 arc seconds which is larger than it will be at opposition. So now is the time if you want good views. This is as good as it gets for the next several years!

Neptune has been in retro-motion since May but now returns to its westward movement in Capricornus and Uranus resumes westward travel in Aquarius.

Morning Sky

Saturn rises at 2 am in Cancer and by mid-November will be rising at midnight.

Jupiter is in conjunction with the Sun so cannot be seen.

Meteor Showers

From the 1st October through to 25th November it is worth looking out for the **Northern and Southern Taurids**. The maximum is spread over a ten day period early November about 5 per hour, very bright and slow fireballs. When someone shouts "Wow! Look at that" you should have time to turn around for some of these.

PORTRAITS IN THE SKY

Hydrus - The Male Water Serpent

Introduced by the Dutch navigators Keyser and Houtman in 1590, Hydrus almost fills the gap between Achernar in Eridanus and the SCP. To avoid confusion with Hydra (near the Equator) it is specified as male. It's a stiff looking serpent but think of it as a cobra balanced on its tail near the pole and its head raised to strike at Achernar.

It is basically a large triangle $\alpha \beta \gamma$, with a twist of stars in the middle. α is a white star at 2.9 mag about 5° south of Achernar. β is a clear yellow star 21 ly away and about 15° south of α . It is the nearest bright star to the SCP but 12° away. γ is a red giant 230 ly distant.



I find Hydrus most useful in finding the SMC and Tuc 47 under suburban light polluted skies. Both are within 5° of β panning toward Achernar.

If you follow a line through β to γ and beyond you will come to the LMC

Double Stars in Hydrus

We begin with two binocular doubles to get you started.

Pi Hyi 1,2 are two unrelated red stars 9' apart visible in binoculars. Boost the magnification and one star is more brown than the other.

Eta 1,2 are also binocular wide unrelated stars with the brighter one orange and the other white.

Easily seen with 20-26mm are three wide telescope doubles all F class white stars, all 7^{th} magnitude and all on approx the same declination.

The first is 1° from Alpha Hyi. almost directly north just beyond a 6th mag star. This is **HIP 9377**, two equal white stars separation 35". The second is 1.5° to the left, **HIP 9902** again two white stars 52" apart.

The third is 2.4° southwest of Achernar in Eridanus on a line to, and almost halfway to **tau Tuc**. This is **HIP 6651** two equal whites 25" apart.

A brighter but closer double is *Herschel 3568* down near mu Hyi. This is a 5.6 mag star with a 9.4 companion which is also variable, 15" separation.

For our faint fuzzy hunters there is a lenticular galaxy 3° directly south of Beta Ret. It is only 12th mag but JH said it was fairly bright

THE SMC

The **Small Magellanic Cloud** a sister galaxy to the Milky Way is visible to the naked eye and yields many galaxies and swirling gas clouds to scopes of all sizes and binoculars. There is evidence that it is being torn apart by forces from the Milky Way and the LMC so get an eyeful now.



James Dunlop was one of the first people to put a telescope on the SMC in the 1820s, ten years before John Herschel went to South Africa. In fact Herschel numbered the SMC as one object in his catalogue. Then in the early 1900s Harlow Shapley (Lloyd's mate), deduced that they were separate galaxies not part of the Milky Way.

The galaxy is packed with clusters of stars and globulars and if you want a head start on the brand new "MAS Globular Cluster 100 Hunt", then now's the time.

We begin with an old favourite to the upper right of the SMC is the best Globular Cluster for small scopes. **47 Tuc.** an awe inspiring sight, more centrally condensed and more able to be resolved than Omega Cent. Originally thought to be a star, hence its name, but now known to contain more than 500,000 stars.



47 Tucanae

Just 30' north of 47 is **NGC 121** a slightly elongated cluster 1.5' across and mag. 10.9. It will look like a star at first but with 9mm you should be able to resolve some outer stars.

NGC 339 is 40' northeast of Lamda Hydrus. At 2' diameter it is bright and in 15 mm will appear medium large. There is no bright core and it does fade toward the edges.

NGC 411 and **419** are similar GCs, large and bright, relative to the two described above. However you will need the map of the SMC printed in the September 2004 issue of *Sky and Space* to locate these, or ask me about them.



NGC362

On the northern edge of the SMC you will find **NGC362** a bright GC visible in binoculars at 7.0 mag. A very pleasing sight NGC362 is really not in the SMC at all but part of our own Milky Way.

Pisces - The Fishes

Pisces is an ancient constellation depicting certain events in the legend of Typhon, a massive Greek monster. This has nothing to do with typhoons or hurricanes.

Typhon was the deadliest and the largest monster ever conceived by Gaia (Mother Earth) and Tartarus. Its thighs were gigantic coiled serpents; its arms could spread across the heavens, and its donkey-shaped head touched the stars. In flight, its wings blotted out the sun, and burning boulders came out of its mouth.

When Typhon attacked the mountain home of the Olympian gods, each god took the disguise of an animal and ran away to Egypt, rather than stay to fight. Zeus transformed himself into a ram, Dionysus a goat, and Aphrodite and Eros both disguised themselves as fish and swam up the Nile to escape the monster.

After a long battle, which spread all round the Mediterranean, Typhon was eventually defeated when Zeus ended his rampage by hurling Mount Aetna at him, finally burying him deep in the earth. But under the earth, the monster still spews up fire and boulders every so often.

Origins of the legend are based on ancient Hittite culture, as well as popular explanations for the volcanic eruptions along the Aegean archipelago. As for Pisces the fishes, they are Aphrodite and Eros, who were placed in the heavens to remember the time when Typhon nearly overran Olympus. Later cultures connect the two fish with the Biblical miracle of the loaves and fishes.

Pisces is two fish connected by their tails at the star **alpha Piscium** which passes the meridian on 22nd October. Alpha's name, "Al Rischa", means "the cord". The Sun passes through the southeast corner of Pisces; and the vernal equinox is also there.

The constellation is rather faint; Pisces' stars are generally 4th magnitude. There are a few fine double stars, and one Messier face-on spiral, which is quite faint and a challenge for smaller telescopes.



Double Stars:

The following doubles are all nicely separated and bright and quite easy with 100 mm or more.

Zeta Piscium is a fine binary with A class and F class stars 5.6, 6.5 and 23" separation. **Psi^t** (ψ^{I}) **Piscium** are two white stars 5.3, 5.5; easily separated with 20 mm at 30" separation.

35 *Piscium* are a cream and white double 6.0, 7.5, which will probably require 12-15 mm to see the 12" arc second separation.

Struve 61 (65 Piscium) is a splendid binary of equal stars: 6.3, 6.3; at 4.4" separation. This binary is found just on the border with Andromeda. Start from zeta Andromedae, move north 3° and east 0.5°.

Deep Sky Objects:

M74

M74 (NGC 628) is a spiral galaxy seen face on, about 22 million light years away, and one of the faintest Messiers. hunter. One mentioned by Hartung is NGC 524 a round galaxy located halfway along a direct line from 86 Psi to 106 Psi. Supposedly bright and visible in 100 mm, give

it a try!





That's all for this month. Next month we will have some Christmas highlights to keep you busy over the New Year

Good seeing IC

Borrowing MacDob

The Society's own telescope, a 6" Dobsonian, is available for loan to members. It is easy to transport, set up and use. If you would like to borrow MacDob for a month, speak to Bob Bee who is its custodian (at meeting or 46474335).

Though there is no hiring fee, members are invited to make a donation of their choice which will go towards the upkeep and upgrade of MacDob

Good finder stars help a great deal here. The galaxy is found ENE 1.5° from *Eta Piscium*. You will need dark skies and some gentle wobbling of the scope for this one.

There are several faint galaxies below 12th magnitude if you are a fanatic faint fuzzy

Prime Focus Vol 10 Issue 9 October 2005



THE ANTHROPOCENTRIC UNIVERSE ffk. Jan. 2005. Part 3

[This is the continuation and conclusion of Frank's article]

3. ANTHROPOLOGICAL NUMBERS AND EVENTS

3.1 The Large Numbers;

Extract from: "Big Numbers of Dirac" by N.Kosinov: In opposition to the Strong Anthropic Principle, the theory of Multiverse was proposed. The weakness in this theory is (among many other things), that it cannot find answers to the so called Large Numbers. which were published for the first time by P. Dirac. There are about nine apparently unconnected cases in our Universe, where the large numbers of cca. 1040 appear consistently. The mysterious occurrences of these large numbers have not been solved vet. A recent scientific and mathematical value analysis of superconstants and these large numbers was carried out on the basis of an updated and highly accurate one single big number of $D_0 = 4.16650385(15) \times 10^{42}$. All large numbers are compound and include the number Do.

The following are the *five groups* of universal superconstants:

- The fundamental quantum of action;
- The fundamental quantum length;
- The fundamental quantum of time;
- The fine structure constant: and
- The number pi.

The following are the **six cases** and their quantities, in which the mysterious *large numbers* of cca.10⁴⁰ appear with relation to our Universe; (The following quantities are based on the above *Big Number* of D_0):

- Ratio of photon-baryon density = D^{1/2}
- Ratio of typical star lifetime to Planck time = D^{3/2}
- Ratio of characteristic nuclear time to Planck time = D^{1/2}
- Ratio of Metagalaxy action to elementary action = D³
- Ratio of a square of a gravitational charge of the Universe to hc = D³
- Quantity of the charged particles in the Universe = D²

Dirac's three big numbers:

- Ratio of electrical and gravitational forces in the hydrogen atom = 10³⁹
- The age of Metagalaxy in nuclear time units = 10³⁹
- Ratio of Metagalaxy mass to proton mass = 10³⁹

3.2 The Physical Constants

Certain physical constants are universal, meaning they are assumed the same throughout the Universe and unchanged through all time.

There are many *constants* in physics, which apparently may have no reference to anything else, until one considers just how a small change in any one of these constants would make a huge difference either to our Universe itself or to life on Earth.

There are several groupings for the Physical Constants in general; the important ones are the following:

 a) Fundamental Physical Constants: (http://physics.nist.gov/cgi/cuu/Category ?view.)

In this schedule "All Constants" are included, a Total of **304 No. off;** Excluding the Astronomical and the Mathematical Constants.

Prime Focus Vol 10 Issue 9 October 2005

b) Universal Constants: (Included in a) above). These are:

Speed of Light, Avogadro constant, Boltzmann const., Gas const., Ideal gas volume, Electronic charge, Rest mass of electron, Planck const., Gravitational const., Permittivity of free space, Radiation const., Vacuum permeability.

c) Mathematical Constants:

(http://mathcad.com/library/Constants/) Pythagoras' constant, Golden mean, Nat'l log. Base, Archimedes' const., Euler const., Apery's const., Catalan's const., Feigenbaum • const., Madelung's const., Glaisher-Klinkelin const.,Brun's const.,Wirtinger-Sobolev isoperimetric const., Wilbraham-Gibbs const.,Laplace limit const., Gauss' lemniscate const., Geometric probability const.

d) Astronomical Constants: (The

Physical Universe; by: Frank Shu) Astronomical Unit, (AU), Parsec, Year, Solar mass, Solar radius, Solar luminosity, Mass of Earth, Radius of Earth.

3.3 The Anthropological Coincidences: a)

(http://userweb.nashville.com/~al.schroeder/a nthro1.htm)

Collated from the works of cosmologists and physicists, like Sir Martin Rees, J. Gribbin, S. Hawking, J. Barrow and F. Tipler. These events are also known as the *Cosmological Coincidences*. These **15** *coincidences* have the most complex nature and were in existence well *before* life could develop on Earth, which being one of the arguments for the Strong Anthropic Principle. The full list and explanations of the individual events may • be found on the above *Webpage* and in its Links.

b)

(http://rgrace.org/1/38cosmocoincidences.htm I)

This Webpage lists 8 events, which are mainly centered on the magic number of 10⁴⁰, with explanations of their implications given by P. Davies.

c) (http://sparc.airtime.co.uk/users/station /cosmic.htm)

The following 9 *items* of physical constants are considered being *fine-tuned* individually and in concert with one another; for full explanations see the above *Webpage*. These items are:

The force of gravity, Properties of water, The carbon cycle, The properties of neutrinos in supernovae, The strong nuclear force, The density of the Universe, The proton-neutron mass ratio, The matter-antimatter ratio, The three-dimensionality of the Universe.

CONCLUSION

This brief yet complex analysis began with the different views of our Universe, through a variety of interpretations and theories of the Anthropic Principle. Multiverse, as a theory of the many worlds was explored, which was shown to be causally interconnected with our Universe, thus forming an infinite and complex cosmic entity. The quantum uncertainty of Multiverse appears to have many physical and philosophical problems, which would have to be resolved if Multiverse, as a scientific theory, is to replace the Anthropic Principle.

The Anthropic Principle, however, may never be a scientifically viable theory, because it uses ontological argument by inference to a *purpose* of the physically fine-tuned events in our Universe. Therefore, on the basis that both theories are using unscientific *assumptions* one way or another, in order to prove or interpret a *onceonly event* in our Universe, from a scientific point of view, they may be considered as *incomplete* propositions.

Frank Kish

Astro Snippets

The following are from: New Scientist – July 2005.

Astronomers' Theory Rocked

The Cassini spacecraft's closest fly-by yet of Saturn's moon escaladus, on 14th July 2005, has revealed strange surface features seen nowhere else in the solar system. Its icy surface appears to be strewn with boulders up to 20 metres wide. Astronomers, who had expected a smooth cratered surface, are at a loss to explain this anomaly.

Lights, Camera, Focus

Before NASA's Deep Impact spacecraft smashed into comet Tempel 1 on 4th July, scientists had been placing bets on just how big a crater would form on the comet's nucleus. Now, it looks like all bets are off.

NASA says it cannot see the crater because its computers cannot fix the fuzzy pictures taken by the High Resolution Instrument, a camera on the fly-by spacecraft. NASA first discovered that the HRI was not focussing properly in March and blamed fuzzy images on moisture settling on the camera. The agency was confident that some nifty image processing on Earth would reveal more detail. Unfortunately, the computer technique only works on high-contrast images. When the impact probe struck the comet, it raised so much dust that surface features became too faint for computers to do their stuff. Deep Impact's principal investigator says his team is still in contact with the fly-by spacecraft, recalibrating the HRI and will have another go

 at the carter images using the new calibration data. "We still hope to see the crater", he says.

Cosmic Cosmetics

Meteoroid impacts can give facelifts to asteroids, apparently knocking hundreds of millions of years off their actual age.

Peter Thomas of Cornell University (in Ithaca, New York) and his colleagues studied the asteroid Eros and noticed that 40% of the asteroid's surface had far fewer craters than the rest of it. He thinks a collision with a meteoroid caused an 'asteroid-quake' and the seismic waves set Eros shaking so hard that small craters in a wide area around the crash site were smoothed out. "One impact has completely reset a surface" he said.

Because craters are used to determine an asteroid's age – the more craters, the older the asteroid – Thomas urges care when using crater counts. "You could be fooled into thinking it is a factor of 10 younger than it is."

[This could start a whole new process for plastic surgeons to the rich and famous. Ed.]

Prime Focus Vol 10 Issue 9 October 2005

Xena Would be Over Her Moon, But Poor Pluto Might be Having Pups.

The following article was published in the New York Times on October 7, 2005.

No planet's status is safe as astronomers struggle with a cosmic conundrum, writes Dennis Overbye.

For the past 18 months, a committee of the International Astronomical Union has been pondering if the word "planet" means anything any more.

Last month *Nature* magazine reported that the committee was ready to propose dumping the term "planet" in favour of terms such as "terrestrial planets" and "trans-Neptunian planets" and so forth.

But that was a false alarm. Although a majority favoured the redefinition, many other ideas were blooming and contending so fractiously that reaching agreement was not easy.

The solar system is more complicated now than in 1930, when Clyde Tombaugh added Pluto to the inventory of wandering lights circling the sun. In addition to Earth, Mars, Venus, Jupiter, Saturn, Mercury, Neptune, Uranus and Pluto, there are comets and asteroids bumping about in the night. AdvertisementAdvertisement

There are also the Oort cloud, a hypothesised halo of cometary bits hibernating in deep, deep space; and the Kuiper Belt, a ring of icy bodies beyond Neptune's orbit. Not to mention the dozens of moons circling the planets. Pluto is the big problem. Is it a planet or not? Some argue that its small size, less than onefifth the diameter of Earth, and a weird tilted orbit that takes it inside Neptune every couple of hundred years make Pluto more like a Kuiper Belt body than a fully fledged planet. A furore arose five years ago, when some experts demoted Pluto, calling it a "Kuiper Belt object".

The controversy became more desperate this year, when astronomers discovered an object larger than Pluto orbiting in the Kuiper Belt, 14.5 billion kilometres from the sun. If Pluto is a planet, should this new object, nicknamed Xena, be the 10th planet? Xena has a tiny moon, making it seem even more planet-like.

Some say planets should be larger than 2000 kilometres in diameter (Pluto is about 2400 kilometres across). Others say the need to assign adjectives to "planet" might mean it is time to retire the term and perhaps use words such as "terrestrials", for balls of dirt and rock, like Earth; "Jovians", for giant gaseous planets, like Jupiter and Saturn; and comets.

The new object, now known poetically as 2003 UB313, is destined to languish nameless until the astronomical union decides which part of the astronomical bureaucracy is responsible for major planets or minor planets and will have to approve a new name.

S. Alan Stern, the lead investigator of a coming NASA mission to Pluto and the Kuiper Belt, suggests that the criterion of planethood should be roundness - a body big enough for gravity to have conquered geological and mechanical forces. That would include in the roll call of planets not only Pluto, but dozens of undiscovered objects out in the Kuiper Belt.

A new proposal, defining anything with a radius of more than 1000 kilometres (roughly that of Pluto) as a planet, has been put forward.

I cannot argue with logic and the desire for clarity. But, by precedent, Pluto is a planet. If we agree on that, then we can look forward to many more planets.

There is something ennobling and hopeful about living at a time when a 10th planet is added to the solar system, and maybe an 11th and 12th as planned surveys of the trans-Neptunian void are carried out. It is like living in an expanding universe.

(The New York Times)

Some Humble Observations

I wasn't able to get to the Forest with the other keen eyes-on members on 1st October, but I was able to grab some time in my backyard. But objects that would have been a breeze at the Forest required some star hopping from home.



I had a modest viewing program starting with M30 in Capricornus. Though I couldn't see it directly, once I used the guide stars zeta and 36 Cap. and moved across to find 41 Cap.,

in the eyepiece (not the finder scope), M30 could be seen. It had a concentrated centre with 'fingers' of stars radiating out. Pretty!

Then I switched to Aquarius and M72. This I also found (eventually) by star hopping. See the sketch (not exactly to scale) below:



First I located ε and μ Aqu. Theoretically, M72 was about 3.5° from them, but it was easier to hop to the small triangle of fainter stars, then up to another pair above them. M72 then could be found as the 3rd point of another triangle. It was faint, small in size, and hard to resolve individual stars (due to neighbours back light?).

I then hunted for M73 – very frustrating. I knew from images what it should look like, but let's face it – what was Messier smoking that night? 4 lousy stars?



I was certain I had star hopped to the correct location but couldn't be sure *which* 4 stars were M73.

So I gave it up as a bad joke.

I had more success with the Saturn Nebula ... but that's another story. Good Observing... RB





analysis of Globular Clusters sets the age of the Universe at 13.7 Gy, and Galaxy formation at 200 mill. yr. after the Big Bang.

10.0

2