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Journal



PRIME FOCUS

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PRESIDENT VICE PRESIDENT SECRETARY TREASURER EDITOR NOEL SHARPE JOHN ROMBI IAN COOK DICK EVERETT BOB BEE Ph 46474335 MAS : Postal Address PO Box 17 MINTO 2566 Phone 0415915771

President's Report

A Big Night!

Hello and welcome to all our members and guests. Tonight it gives me great pleasure to introduce to you Dr Stuart Ryder from the Anglo-Australian Observatory. Stuart will be our special guest speaker tonight. He will be talking about one of the most explosive events we can ever witness in the universe, namely the death of a star. In astronomical terms we call this a supernova.

Stuart is an accomplished speaker who kindly donates his time and expertise in outreaching to the amateur societies. He has recently arrived back from Germany and I am sure that everyone will make him feel most welcome tonight.

At time of writing I have issued an invitation to Rev Bob Evans to come along to listen to Stuart's talk. As you know Rev Evans is one of this country's most famous amateur astronomers. His discovery of a supernova in a galaxy which resides in the constellation of Grus in mid-December 2001 prompted Dr Ryder in researching his discovery.

Rev Evans has subsequently discovered another four supernovae last year. This brings his total to 39 discoveries. That's impressive!

Our speaker for next month will be Michael West from the Mars Society. As I have previously mentioned, Michael will be speaking about rocket propulsion, existing technologies and the latest developments. Maybe he could talk about the latest parachute systems and advise NASA. They could do with some help after their Genesis probe came thumping back to earth. Ouch!

A Little While Back

Our guest speaker last month was one of our own members, Mr Ned Pastor. Tektites, meteorites and the maldavites were the subject of Ned's talk to us. It was great chance to get our hands dirty with these flashy objects we see hurtling across the night sky. I thank Ned for sharing not only his expertise with us but also for displaying his excellent collection to us. Thanks again Ned.

Apologies Again

Another cancellation occurred with the Mount Carmel High School night. It was a last minute scheduling problem at the school and probably just as well, the weather was very poor with predictions of hail-stones. The sky took a rather nasty shade of black and purple, so it was best avoided in the end. Better luck next time.

Some Developments

Recently I have been having discussions with Campbelltown Rotary and Dr Ragbir Bhathal over the use of the Campbelltown Rotary Observatory. The early discussions have been promising and our society has been invited to assist in two open nights being Friday the 15th of October at 7pm to 9pm and the other on Friday 19th November.

It would be great to have as many telescopes operating in conjunction with the Observatory telescope on the night. I will keep you informed as developments come to hand.

Rev Bob Evans has kindly issued through me an invitation for our members to do some observing at the Linden Observatory in the Blue Mountains. The observatory is home to a whopping big 30" telescope and would not be an overly long drive from the Campbelltown area. This would be a fantastic opportunity for our members to observe many of our favourite objects in a way that we could barely imagine. I remember seeing the spiral galaxy in Sculptor through a 24" a while back and it was unbelievable. Please let me know if you are interested. My hand is already up. I will work on some dates and advise accordingly.

Lots of Dates

21/09/04	St Mary's Catholic School
09/10/04	The Oaks
15/10/04	Campbelltown Rotary Observatory
16/10/04	The Forest
18/10/04	Monthly Meeting
23/10/04	Public Night Dudley Chesham
	Sportsground
06/11/04	The Oaks
13/11/04	The Forest
15/11/04	Monthly Meeting
19/11/04	Campbelltown Rotary Observatory

Things can change quickly in a big city so please call to confirm before committing yourselves to the journey, either call John Rombi or myself on 0410 445 041

Signing off

Well I am getting ready to drive down to the forest, hoping for clear skies and good times. As always please drive carefully and take care.

Regards Noel Sharpe

President

What I See This Month September 20 – October 17, 2004

Overhead at 8.30 pm

Of all the seasons this is the one with fewest bright stars. Altair to northwest followed by the Great Square of Pegasus and the horns of Aries the Ram.

The south is dominated by Grus, Fomalhaut and Achernar with Canopus rising up from the south-east.

The Moon Diary

22/9 First Quarter 28/9 Full Moon 6/10 Last Quarter 14/10 New Moon

A partial eclipse of the Sun will occur for Asia and America at 13.45 on the 14th October but not for here. The Moon will be 1° away from the Sun. I don't know if we can see anything with a solar filter?

Earth is at vernal (spring) equinox on 23rd September. Short nights and the dreaded daylight saving are coming!

Evening Sky Planets

The only evening planets this month are **Neptune** rising in the daylight and visible all night in Capricornus; and **Uranus** which will rise at 4 pm in Aquarius and also be visible all night. Both these planets are just past opposition so will be at their brightest.

Morning Sky

Saturn rises between 2.45am and 1 am in Gemini near Castor and Pollux. On 8th October, a waxing crescent moon will pass by to the north of the planet. Venus will rise round 3.45am in Cancer during September and then in Leo during October. In early October it will move to within 5° of Regulus the brightest star in Leo.

Next will come **Mercury** in the morning twilight and **Mars** too close to the Sun to be seen.

Jupiter will start the month in Virgo too close to the Sun for viewing, but rise earlier each day to chase after Venus.

Comets

Linear K4 may be visible in Corvus as a morning object 7th mag. in late October.

Meteors

The **Orionids** meteor shower is visible from early October through to 7th November. They are associated with Halley's comet and we can expect from 15-30 per hour with a maximum on 21st October. Best seen after midnight they are fast, bright and some leave smoky trails.

Portraits in the Sky

On the far north horizon this month we find:

Cygnus - The Swan

One of the more obvious asterisms in our winter skies it is sometimes called the Northern Cross. The constellation is quite bright, with the stars being generally third and fourth magnitude.

Swans occur throughout Greek myths; often one of the gods transforms himself into a swan, usually to seduce some attractive nymph or woman. The swan commemorated here, isn't precisely known. It may be linked with Cycnus, son of Poseidon. Cycnus had been left out on the seashore at birth to die. However, a swan took pity and flew down to care for the newborn child. Later he became the king of Colonae, but he wasn't a particularly good king. He defended Troy against Achilles' attack and in their oneto-one struggle Achilles choked Cycnus to death.

Poseidon grieved for his son and placed him in the sky as a swan.

Despite the myth, this constellation was known simply as "Ornis" (Bird) to the Greeks. It was the Romans who named it *Cygnus* after the Greek myth to explain its name.

The Arabs have seen the constellation as a hen, so most of the Arab star names relate to parts of a chook. The Arab word for 'hen' is 'Da ja jah. So you could say that "methinks this um Jar Jar Binks ina sky big".



The tail of the swan is marked by **Alpha Cygni, or Deneb**, (meaning the Hen's Tail). Passing overhead on 1st August this is a

supergiant, more than a hundred times the size of the Sun, with a very high luminosity. Since it is so far away (3,200 light years) its real brilliance is lost in space.

Gamma Cygni is "Sadr", "The Hen's Breast". Between beta and gamma Cygni is the Cygnus Star Cloud, a vast region of exceptional beauty.

Epsilon Cygni is "Gienah", meaning "The Wing".

The constellation has several superb visual binaries as well as several faint deep sky objects, but surprisingly, while the constellation lies in the heart of the Milky Way, it has no truly outstanding clusters, nebulae, or galaxies.

Double Stars

Beta Cygni is called *Albireo*. This is a mistake for "ab ireo" as it was called by Ptolemy. The meaning for "ab ireo" is not known but the Arabs called it the Hen's Beak - "Al Minhar al Dajajah".



This is a well known magnificently coloured double star. **Beta¹ and beta²** form a binary of extraordinary colour. AB: 3.1, 5.1; separation 34.3", are gold and blue (or perhaps yellow and blue-green). The

components are quite wide, making it a popular object for binoculars.

Delta Cygni is a visual binary 2.9, 6.3; 2.5".with an orbit of 828 years.

Mu Cygni is another visual binary (4.8, 6.1, sep 1.85") with a long orbit of 789 years. For the next fifty years the separation will decrease (as seen from the earth). *Tau Cygni* is a visual binary with a 49.9 year orbit: 3.9, 6.8, separation 0.8". Good collimation needed here!

30 Cygni and 31 Cygni [omicron¹] form a wonderful triple, suitable for binoculars: AB: 4.0, 5.0; sep 338" (orange and turquoise). C: 7.0 mag. sep 107" (blue).

61 Cygni is another fine binary of two orange stars: 5.2, 6.0, separation 30.3". 61 Cygni was the first star ever to have its parallax measured, in 1838 by Friedrich Wilhelm Bessel.



Deep Sky Objects :

Cygnus contains two Messier objects and some faint and difficult nebulae:

M29 (NGC 6913) is an open cluster of about half a dozen eighth magnitude stars shaped like a square. The cluster is easily found 1.5° south of Gamma Cygni and a couple of arc minutes to the east.



M29

M39 (NGC 7092) is a large and scattered group of faint (seventh magnitude) stars forming a rough triangle. It is 9° ENE of Alpha Cygni, but is curiously difficult to find due to its large size



NCC 7000 -"The North American Nebula" because of its shape, is a bright slightly greenish emission nebula. Found between alpha Cygni and xi Cygni, you'll find it is extremely faint, and is best seen in binoculars or photographs

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NGC7000

The Veil Nebula West and East (NGC 6960 and NGC 6992/95) are fine filaments seemingly suspended in the cosmos. A large scope and perfect conditions with plenty of patience are needed to appreciate the delicate lines. 2.5 to 3 degrees south of epsilon Cygni, the star 52 Cygni is in the same field as the western segment and is the best starting point to search for it. 52 Cygni is three degrees due south of *epsilon Cygni* (also a binary, *Struve* 2726: 4,9; 6.6").

Cygnus A is the second brightest radio source in the sky. This pecularly-shaped galaxy is considered to be a billion light years distant, and is an object of intense investigation. Two lobes of radio emission are fed by jets of energetic particles from the galaxy core. *Cygnus A* is found in a highly nebulous region of the constellation, about three and a half degrees west of *Gamma Cyg*.

Now leaving Cygnus in the northern sky, raise you eyes straight over your head and

slightly to the east to come to a bright star which is **Fomalhaut**, the main star in **Piscis Austrinus – The Southern Fish** also known as Piscis Australis, a fish lying on its back, drinking in the waters pouring from the jars of Aquarius.

The constellation was known in ancient times, and is said to be the original "Pisces". The constellation may refer to the Assyrian fish god Dagon and the Babylonian god Oannes. Even the Arabs called the constellation The Large Southern Fish.



There are several fine binaries here, as well as a red dwarf. Most stars are fourth or fifth magnitude, except for :-

Alpha PsA - Fomalhaut meaning "The Fish's Mouth". Also known as 'The First Frog", this is a first magnitutde A class white star, 16 times brighter than the Sun, and 25 light years away.

Some northern observers call Fomalhaut 'The Lonely Star" because of its isolation just above the horizon in their autumn sky. It is surrounded by a disk of icy particles four times the size of our solar system with a hole in the middle. No planets have been detected, but one explanation for holes like this is planet formation.

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Double stars:

Beta PsA is a yellow and white double 4.5, 7.5; at 30.4"sep. *Delta PsA* is a faint binary: 4.5, 10; sep. 5", while

Gamma PsA: is about the same 4.5, 8.5; sep. 4.3". Eta PsA: is getting into the expert observer class at 5.5, 6.5; sep. 1.6".

Deep Sky Objects:

NGC 7172 is a 11.8 mag. spiral galaxy seen almost edge on. A dark equatorial band can be seen with larger scopes. The galaxy is 2° NW of **mu PsA**. Near the limit for my 20cm mirror in the same field, just to the south, lie three faint galaxies: 7173, 7174, and 7176 about 12th mag.



NGC7172

Lacaille 9352 is a red dwarf 11.6 light years away, with a visual magnitude of 7.44. It is found 1° SE of *pi PsA.*

NGC7314 is 1.5° NE of Epsilon PsA. At 70 million ly distance it is thought to be an outlier of the Grus Cloud of Galaxies which also contains the Grus Quartet. The next trip to Belanglo should give good views of these, like last time.



NGC7134

Good seeing

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Uranus and the Lamingtons

We held a hastily arranged observing night at The Oaks on Saturday the 21st August. A small number of us ventured out and grabbed some great views of the planet Uranus through Ned's mighty refractor. A definite small greenish disk could be seen under high power, superb! John tried his best to find something called the Saturn Nebula, no relation to the ringed planet. Despite John's best efforts it proved to be elusive quarry. i.e. he could not find it.

With the assistance of Ian Cook I hunted down the Helix Nebula and later on I located the Ring Nebula and the spiral galaxy in Sculptor, namely NGC 253. I was expecting some rather fine views through my 10" reflector. However, this was not the case as there was a ton of moisture about and the views were definitely soft and not contrasty.

Bruce was very busy in taking some photos and trying out his new mount. All in all it was a great night to be had.

We did manage to attend a previously scheduled night, no cancellation this time.

This was the Girl Guides Association night on 28th August at Silverdale. The day was warm and clear but as I headed out the clouds rolled in and covered the sky in a thick blanket of grey. Well, at least no rain or hail this time.

When I arrived I was overwhelmed. It's a huge property and I could not locate my fellow members. A large bonfire was blazing away in the distance, maybe the guys organised this as a signal so I could find my way - how thoughtful. Upon reaching the bonfire I was greeted by 140 girl guides who were chanting away the storm clouds by enthusiastically belting out all the classics like "Little green frog" and "Koombi ya my Lord".

Still I could not find my compatriots. Then my mobile phone rang, it was the vice president of MAS. In the distance I could see the back lit keypad of John's mobile waving around like a lantern guiding my poor lost soul homeward. United at last we spoke about the clouds and what a shame it was that we could not hold court under a starry sky.



NGC253

But wait! Why not set up some scopes and have the girls settle around and be enthralled by tales of past deeds of this intrepid band of astronomers. As appealing as this sounded some of our troop decided to head off for greener pastures, i.e. go home.

It was unbelievable. For some reason the moon was brilliantly appearing through the dark and light patches of cloud. The telescopes were able to pull some fantastic detail off the lunar surface, the clouds were acting as a gigantic filter.

I had in my old kit bag a hand held slide projector and a bunch of my favourite slides. The guides gathered around in a circle and I led them through the fascinating world of astronomy. The transit of Venus, Orion Nebula, and Eta Carinae. It was the best fun you could have without a laptop, the girls have never seen such a retro device before and it worked a treat.

The questions flowed, in particular I would like to share one such line of questioning - do the stars have names? I went through the obvious ones and then I replied, what's the name of our own Sun?

No one knew so I informed them that our Sun's name is Sol. Immediately one girl put up her hand and said, "I see, that's why they call it the Solar System". I have done many such nights as these and it never ceases to amaze me as to the fantastic things we hear from children who display such eagerness to understand.

After concluding the night's viewing we where invited into the inner sanctum and behold, there was a feast of cheesecake biscuits and lamingtons to be had, as well as copious amounts of tea and coffee. This intrepid band of astronomers was well rewarded for their innovation and assistance in making for a great night for the girl guides. My thanks to lan, John and Tony who stayed for the festivities, also thanks to Dick, Lloyd and Ned for making the trip out. We ate all the lamingtons so for the guys that missed out, better luck next time!

Regards Willy Wonker

Snippets from Lloyd Wright

What Does Binary Mean?

'Binary' just means having two parts, and you will find it used in many places. (whenever there are two of anything) and not just in connection with stars. The English astronomer William Herschel coined the term 'binary star' after an investigation in the 1970s of stars that appear close together in the sky. He showed that many were indeed pairs of stars travelling together.

Binary stars are very important in astronomy because a lot of things which are hard to discover when stars are on their own can be easily measured when two are together. When two things are close together, they affect each other in many ways and we can learn a lot from these effects.

For example, two stars close together exert a gravitational pull on each other changing the way they move. By measuring their movements very carefully, we can often figure out how much material is in each star and how 'heavy' it is.

Sunspots

Sunspots are dark marks on the photosphere of the sun. Often, groups of small spots will merge to form large spots, which can be as large as 50,000 km across (four times the diameter of the earth) and last for months. The inner, dark part of a sunspot is called the umbra. Around this is the penumbra. The inner, dark part of a sunspot is called an active region.

Observations of sunspots can be used to find the rotation period of the Sun. The Sun does not have a single rotation period, but instead rotates at different speeds depending on the solar latitude. Near the equator, the rotation period is about 25 days. Near the poles, it is longer, about 36 days. Sunspots are dark because the umbra is about 2,000°k cooler than the rest of the photosphere.



Sunspots are not actually dim, however. A sunspot against the night sky would appear about 10 times as bright as the full moon. Sunspots only seem dim because the rest of the Sun is so bright. Sunspots are region of strong magnetic fields. These particles can't

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cross the magnetic field lines, and so they can't move out of the way to allow new hot material to bubble up. The particles cool off, and therefore darken, but remain in place.

The magnetic field comes out of the Sun at one location, and goes back into the Sun at another. This means that sunspots always come in pairs. One spot will have north polarity like the north pole of a bar magnet, and the other will have south polarity.

SETI by DNA

According to Australian researcher Paul Davies, we won't find evidence of aliens by searching the skies - we'll find it in our own DNA. He says this coded message will only be discovered once we have the technology to read and understand it. It's a waste of time to search for radio waves coming from another planet, as SETI does. It's more likely that extra-terrestrials would leave an artifact on Earth for us to find - but only when we know enough to recognize it when we see it. But if ETs came here millions of years ago, what could they leave that would survive? The solution would be to leave a message in human DNA, where it would be copied and saved over large periods of time.

Scientists have recently discovered large amounts of "junk" DNA that contains no genes and seems to have no use in the human body. Davies says, "If ET has put a message into terrestrial organisms, this is surely where to look. We can tell if this junk DNA is manufactured by using a computer to find obvious pattern sequences." If these are found, "the presumption of tampering would be inescapable... Trying to second-guess alien communication strategies is fraught with uncertainty, so we should try everything we can afford."

The truth may be out there somewhere. Or it could be a lot closer to home. "Did the ancient Egyptians know as much (or more) about modern science and technology than we do?" William Henry thinks so. Find out (from the internet) what he learned on his recent trip to Egypt - this is information you won't find in your typical travel guide!

A BRIEF ANALYSIS OF MATTER By Frank Kish, 2004.

INTRODUCTION

Preface: It has been said "There are three categories of events in real space and time; events that are reproducible, events that are unpredictable, and events that are singular.

a) An event that is reproducible is the data of science.

b) Events that are *unpredictable* lend themselves to *statistical* enquiries.

c) Events that are *singular* lend themselves to philosophical enquiries."

And the question of whether there was and what was the origin of matter, i.e. the Universe, is singular, one-time event. For this reason alone, we can never expect a certainty of evidence on the above subject from science. This preamble indicates the difficulty of the task this paper is facing in trying to connect such singular events with the physical reality.

The Purpose of this paper is to search for the simplest and essential ideas relating to *matter*, through the labyrinth of Science in general and Physics in particular, which is the

basis of science. It is hard to form a comprehensive and yet, a simplified idea of the subject, for the following reasons:

First, the basic information that is available from expert publications is widely *scattered*, *complex* and they often represent *conflicting* theories.

Second, both, Science and Physics underwent a major *transformation* in the past few decades, affecting the *concept* itself, and the *finite* or *infinite* nature of *energy* and *matter*, space and *time*.

These changes are due mainly to three scientific developments:

a) Theory of Relativity, (by Einstein), of space, time and motion;

b) Theory of the Nature of Matter, (combined effort by several Scientists), and the "Forces of Nature" that act upon *it*;

c) Quantum Mechanics, (by Bohr and Planck), with its "Uncertainty Principle", (by Heisenberg), with other implications, that flow from it.

Of all the recent theories Quantum Physics is the one that shatters most our commonsense view and values of the physical reality by the introduction of *uncertainty* in Modern Physics:

(i) The Uncertainty Principle states that heat and light (i.e. electrons) behave like waves, and could also behave as particles, (i.e. photon-quanta of energy) at other time.

(ii) This *uncertainty* undermines also our *material* way of thinking, by revealing that *matter* has far less *material* substance than we once believed.

The content of this paper covers only the *principle issues* associated with *matter*, in order to provide a global view, through a synthesis of physics, *cosmology* and *philosophy*, as each discipline *is* being its rightful domain.

The Information contained herein was based on mostly scientific *publications* of notes and books produced by authors acknowledged in their field. These are:

In the field of Modern Physics:

Frank H. Shu, Prof. Of Astronomy, Berkeley Uni. of Cal.(The Physical Universe) P.W. Atkins, (The Second Law of Thermodynamics). W. Heisenberg, and H. Pagels.

In the field of Physical Cosmology:

Frank H. Shu, J.V. Narlikar, Sir Martin Rees, J. Gribbin, Paul Davies, S. Weinberg, and H. Genz.

In the field of Philosophical Cosmology:

P.J.Glenn, (Aristotalian Philosophy), J. Maritain, B. van Frassen, Prof. of Philosophy, Princeton Uni. and Lawrence Sklar, Prof. of Philosophy, Uni. of Michigan.

OUTLINE

The following items comprise this paper:

1) What is Matter?

- 2) Origins of Finite and Infinite Matter.
- 3) Infinity and Causality.
- 4) Origin of Matter by Chance.
- 5) Evolution and Properties of Matter.
- 6) The Ultimate End-state of Matter.

To be continued ...

[This is the first installment of an extensive paper by longstanding MAS member Frank Kish.]

A Future on Mars?

People could land on Mars in the next 20 to 30 years provided scientists can find water on the red planet, according to the head of NASA's surface exploration mission.

Two partially solar-powered "robot geologists" -- Mars Exploration Rovers, or MERs -- have been trundling across 5km of the planet and into craters since January, beaming back data about the makeup of what scientists believe is Earth's sister planet.

Asked how long it could be before astronauts land on Mars, Arthur Thompson, mission manager for MER surface operations, said "My best guess is 20 to 30 years, if that becomes our primary priority." The two MER robots, dubbed Spirit and Opportunity, have found ancient evidence that water was once plentiful -- important for scientists hoping to know if there was once, or could still be, life on Mars. Without water, the dream of sending astronauts to the often dusty planet, which has rust-coloured rocks and where the sky is red and sunsets are blue, could unravel.

"If we cannot find water in situ ... it really makes it difficult to send humans. Water is the key," said Thompson. Such a mission would take 11 to 12 months to get to Mars and it would be impossible to carry enough water for the astronauts, plus the water needed to make rocket fuel for the return journey, to cool the spacecraft and to generate energy. "We'll find water. It's there, we'll get it," he said.

Thompson said scientists had found a canyon on Mars "that makes the Grand Canyon look like a small canyon", where water could still be present. "There are indications that there is actually water that seeps out the side of the canyon, and going down the side it evaporates. We believe it's an ongoing process."

Three satellites now orbiting Mars are constantly gathering information, and, according to Thompson, if there is water, the chances of finding life are greatly increased. US President George W Bush wants a permanent presence on the Moon and to land people on Mars in the future. NASA's buildup includes sending at least one nuclearpowered robot to Mars in 2009, the Mars Science Laboratory, or MSL, program.

NASA has competing strains on its resources. Its chief Sean O'Keefe recently it could take at least \$A3 billion to get space shuttles back in flight after Columbia broke up in February 2003, killing all seven astronauts aboard. "NASA has a finite budget ... (but) they have pretty much assured us that they want MSL, that Mars exploration is very high on the agency's agenda," Thompson said. "My understanding is that Mars program office is pretty much assured funding for the next few years."

MER cost \$A1.14 billion. The cost of MSL was not clear. Thompson said the MER robots, which had been expected to die last April, were healthy and may go on for another year. That made his the best job on the planet.

"How bad is it to have to get up every day to go to work to drive on Mars?"

Does anyone want to borrow MacDob, MAS's 6" Dobsonion telescope? If so...

Contact Bob Bee on 46474335

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