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President's Report:

John Rombi

Welcome to 2011...and a "happening" year for The MAS.

2010 managed to throw some curly situation towards us, but I'm happy to say that we came through with flying colours (I will elaborate in my yearly report in April)

I would like to thank our Patron, Prof. Bryan Gaensler for being our speaker in November.

He brought us up to speed on The SKA (Square Kilometre Array). The decision on the placement of this huge project will be decided by the end of next year (2012)

To give you an idea of the importance of this project for Australia....The Snowy River Scheme, an engineering marvel, then and now, will pale in to insignificance.

The SKA will place Australia on the scientific and political map of the world.

It will bring top scientists from all over the planet, and the ensuing media coverage, to our little corner..

MAS has put its resources behind the public face of The SKA, we will take any opportunity to bring this project to the general populace. I hope we will be able to hold an observing night at The Domes and a presentation by Dr Lisa Harvey-Smith (SKA Project Scientist), sometime in June.

Stargard + The Forest

Finally had clear skies!!! Our first SG on Jan 1st had a record turnout of 25 members!!

(Continued on page 2)

MAS Committee

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John Rombi

Vice President

Trevor Rhodes

Secretary

Roger Powell

Treasurer

Tony Law

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Stewart Grainger

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Chris Malikoff

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Stuart Grainger
Carol McVeigh

Patrons

Professor Bryan Gaensler (Syd Uni)
Doctor Ragbir Bhathal (UWS)

MAS Postal Address

P.O. Box 17
MINTO NSW 2566

Web: www.macastro.org.au

Prime Focus Editor

Geoff Young
editor@macastro.org.au

MAS Dates 2011

February	26	Stargard	July	2	The Forest
				23	Stargard
March	5	The Forest		30	The Forest
	12	Public Night, The Oaks			
	26	Stargard	August	27	The Forest
April	2	The Forest	September	3	Stargard
	9	Stargard		24	The Forest
	30	The Forest			
			October	22	The Forest
May	7	Stargard		29	Stargard
	28	Stargard			
			November	19	Stargard
Jun	4	The Forest		26	The Forest
	25	Stargard			
			December	17	Stargard
				24	The Forest



President's Report:

John Rombi

With the next SG at the end of the month, attracting another huge crowd.

Unfortunately The Forest has suffered from unusually overcast skies over the last few months.

I am very happy to report that quite a few of our new members have taken advantage of our great sites and are enjoying the dark skies with the more seasoned observers.

Our Room

Has been generously supplied by UWS for 2011, apart from June & November we will be in Bldg 22, room 5 for the remainder of 2011. I apologise to everyone in advance for having to navigate the two flights of stairs. After many discussions with UWS, this is the room that was on offer.

Speakers

We are very fortunate to have a full calendar for 2011 of some of the finest minds in Astronomy and related fields, so don't miss out!!

As I mentioned at our January meeting, the new committee, after discussion with the members, may revise the breakdown of our Macarthur Astronomy Forums.

More information will be provided after the A.G.M.

Public Outreach

We have had a few requests for The MAS to visit various organisations throughout 2011.

I am in the process of organising the dates...as on previous occasions, the call for volunteers will be put out.

OUR A.G.M.

Will be held on Monday April 18th, I would like to take this opportunity to encourage you to consider a position on the committee. Like any society, there needs to be a collective to manage the daily affairs. You will work with an innovative, friendly group, striving to make The MAS the very best that it can be.

As always, if there is any matter concerning MAS in any way that you would like discussed (either in private or by the committee) please don't hesitate to contact me.

Macarthur Astronomy Forum

We have repackaged the way we promote our monthly meetings, with the hope that it may attract a greater interest in Astronomy.

With this in mind, I would like to welcome our first "Forum" speaker for the year, Prof. Fred Watson (AAO) his presentation will be on "The Poles"

Until next month, Clear Skies and keep looking up!!

John Rombi.

Secretary's Column:

Roger Powell

It's been three months since the last issue of Prime Focus, which was in November. It was decided to give Geoff a break. During this extended seasonal period, members have at last had some better luck with observing nights after a barren few months. We also celebrated the fifteenth anniversary of the inaugural meeting of MAS in a double garage at Ingleburn on 15th January 1996.

Despite the break, the committee has continued to meet monthly, with a number of issues on the agenda. The most important of them will be mentioned below.

The most critical recent issue facing the management committee has been that of our room booking, of which John has already alerted you. It seems that with changes to key personnel; with new administrative procedures; and with changed teaching arrangements, UWS has forgotten our past relationships and collaborations. Our free meeting room will not be sustained by UWS beyond this year. This means that MAS will be charged commercial rates from next year if we choose to remain at the University, where we have held all our meetings since February 1996. We have made further representations to the Office of the Vice-Chancellor but have so far not achieved any recognition that MAS - as the only science based community organisation in the Region - deserves support in the promotion of astronomy and scientific excellence within the Macarthur community,

which it has done regularly in conjunction with UWS for fifteen years.

Whilst the committee will continue over the next few months to continue a dialogue with UWS, it has been forced to consider the options for next year. We do not want to put membership fees up to cover the new UWS charges, neither do we want to see our monthly meetings come to an end because of this decision by UWS. So it has been decided that MAS should explore the possibility of sponsorship of our monthly meetings to pay for the new cost of holding it from next year. This is the reason why the meetings are being promoted externally as the Macarthur Astronomy Forum, because it might give us something we can market. As far as we members are concerned, the 'creation' of the Forum this month will make little difference to the way each meeting is conducted but hopefully it may pave the way to a future sponsorship that will enable us to continue to provide great guest speakers without charging admission fees.

Several other methods of raising funding to keep our meetings going are also under consideration such as barbecues and a paid advertising slot on the website. A meeting was held with Cr. Russell Matheson MP (Macarthur) to explore the possibility of a government grant. We are also about to compile a list of suitable

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Secretary's Column:

Roger Powell

alternative locations to meet. As always, suggestions from members in this regard are welcome.

Our proposed constitutional changes have been on display on the website since early January and we have received a number of pertinent comments from members. These were considered by the management committee on 9th February and where appropriate they have been included in a new draft document, which is now available on the website. The committee feels that the document is considerably improved by these changes and we hope that you will bear with us over the next two months as we continue to work our way towards a vote on it at the AGM. We will remain open for comments until 1st March and any further comments received by then will be reviewed by the committee on 2nd March. At this point, we will be posting up the final draft on the website and it will be displayed until the AGM, whilst the committee formulates the procedures for putting the proposal to the members.

The committee also decided recently to post the management committee minutes on the website for mem-

bers to peruse and we will also include a financial summary in Prime Focus magazine. The committee is also looking at a possible new observing site which may give us a third site to use and more details of that will follow.

Following the website's "Image of the Week", it was decided to introduce an "Image of the Year" to be judged by Chris and John from images that are in the Members Gallery by 1st April.

The end of this month also marks the end of the MAS financial year and the start of a new one. That of course means membership fees are due, so please see Tony at the next meeting (or mail a cheque to PO Box 17, Minto, NSW 2566). Happily for all of us, the fees will remain unchanged from last year's level.

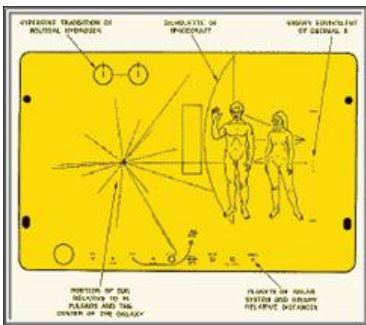
With a new financial year, the AGM also starts to loom on the horizon. Accordingly, I give notice that the AGM will be held on Monday 18th April 2011 and that nominations for the election of office bearers will close two weeks earlier on 4th April.

Best regards.

Deep Space Pioneers:

Davy Jones

Where were you on the 2nd March 1972 (some refs state 3rd of March) – the day Pioneer 10 (AKA Pioneer F) was launched into space on its epic journey to Jupiter and its search for alien life?



Thirty-seven years – is a lifetime away. Imagine the crudity of the 'ancient technology'! Big – clunky – cutting edge in the broadest sense of the word! Then consider the mathematical beauty of the successes achieved – and how it was so painstakingly achieved. As has been said many times – today, in 2011, we have more computing power in a home PC than was available to such complex cosmic endeavours.

Launched atop an Atlas/Centaur/TE364-4 three-stage launch vehicle; Pioneer 10 carried only eleven instruments – as follows: 1. Plasma Analyser (P/L) 2. Charged Particle Instrument 3. Cosmic Ray Telescope 4. Geiger Tube Telescope 5. Trapped Radiation Detector (P/L) 6. Meteoroid Detector (ENC) (F) 7. Asteroid-Meteoroid Experiment (ENC)(F) 8. Ultraviolet Photometer 9. Imaging Photopolarimeter (ENC) (P/L) 10. Infrared Radiometer (F) and 11. A Helium Vector Magnetometer.

This very limited and specific collection of instruments sent back more useful information in its working lifetime

than could of ever been hoped for; leading the way for all future deep space exploration.

For the record – the third stage booster was required to gain a speed of 51,810kph to enable the unit to complete its flight to Jupiter. At the time, this made Pioneer 10 the fastest manmade body to leave Earth – at a speed that would take it past the Moon in just eleven hours; traversing 80 million kilometres of space and crossing the orbit of Mars in only twelve weeks.

Measuring just 2.9 metres in length, and 2.7 metres at its widest point, Pioneer 10 weighed in at just 258kgs. Electrical power was supplied by four radioisotope thermoelectric generators (RTGs), each providing just 155 watts of power at launch – decaying to 140w in transit to Jupiter. The spacecraft required just 100w to power all systems.

An RTG is a nuclear electrical generator that draws its power from the process of radioactive decay! Heat released by the decay process is converted into electricity via the **Seebeck effect** (an explanation of which would take us down the murky road to the magic world of semi-conductors). Put simply, an RTG is a form of battery; a power source long associated with space probes, satellites and even terrestrial unmanned scientific facilities. The most obvious drawback to their use is the requirement to safely contain the radioisotopes long after the useful 'battery life' has been expended.

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Deep Space Pioneers:

Davy Jones (cont)

By July 15th 1972, Pioneer 10 entered the *Asteroid Belt* – an area 280 million km wide and 80 million km thick – located approximately between the orbits of Mars and Jupiter. The thinly spaced objects within the Asteroid Belt travel at speeds estimated to be 20 km/sec and the objects within, vary in size from mere dust particles to rocks the size of the state of Queensland! Whilst other spacecraft have since negotiated this area of space, at the time scientist were unsure if Pioneer 10 would be able to safely navigate its way across this possibly terminal minefield.

By the 4th of December, 1973, Pioneer 10 made its first fly-by of the gas giant, Jupiter, achieving a dream first approved in February 1969. The earliest mission objectives had been outlined as follows: *explore the interplanetary medium beyond the orbit of Mars – investigate the environment within the Asteroid Belt and assess the belt's potential hazards to future outer planet missions – explore the locality around Jupiter – and make a close approach Jupiter to gather information on the possible effects of Jovian radiation on spacecraft instrumentation.*

In just twenty-one months the textbook mission had been completed beyond all expectations – but the story continued for the tiny probe well beyond this point as for many years a weak signal continued to be traced by the Deep Space Network. Right up to 1997 and onward, the probe was employed to train flight controllers on how to obtain radio signals from space! The final successful telemetry – *the technology that allows remote measurement and reporting* – from Pioneer 10, was on April 27th 2002.

Amazingly, on the 23rd of January 2003, what is recognised as the very last extremely weak signal was received from the still operating probe. At that time Pioneer 10 was estimated to be 12 billion kilometres from Earth (80 au). A further contact effort was made on February 7th 2003 – but this attempt was unsuccessful.

On March 4th, 2006 – the last time the probe's antenna would be acceptably aligned with Earth – yet one last attempt at contact was made. No response from Pioneer 10 was forthcoming. It is thought that sheer distance and lack of power were the reasons for the eventual loss of contact, rather than the destruction of the probe. It should also be noted that the probe must first be contacted by NASA before it will respond and send back data.

When its last position was recorded, Pioneer 10 was headed in the general direction of Aldebaran, in the constellation of Taurus. At an estimated speed of 2.6 au per year – assuming Aldebaran has relative zero speed – Pioneer 10 should reach this distant destination in approximately 2 million years.

Pioneer 10 and its twin, Pioneer 11 (AKA Pioneer G), may yet possibly achieve one last duty if they are ever intercepted by 'alien life'. Both vehicles carry the famous gold anodized aluminium plaques - suitably shielded from erosion and cosmic dust - which depict the human race in all its naked glory. Further information – should the extra-terrestrials be adventurous or interested enough – and have technology well in advance of that presented to them in the shape of the defunct Pioneer probes – provides the exact location of our '*Blue Island*' world.

A very Happy New Year to ALL our readers.

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Cool River:

Bob Bee

It's amazing the trivia one can pick up by reading the definitive book on the Large Hadron Collider, namely "The Large Hadron Collider: A Marvel of Technology", edited by Lyndon Evans. All braced to learn about the most technically complex instrument designed and built by mankind, I came across the following fact. It appealed to my sense of irony.

As we all know, the preferred temperature scale for scientists, particularly for extreme low temperature applications (such as out in deep space and in cryogenic systems), is the Kelvin. Both the Celsius and Kelvin scales share the same sized gradation, but the freezing point of ice, which is 0°C at sea level, equals 273°K. Absolute zero, the temperature below which no material can be cooled, is 0°K or -273°C. There is no negative Kelvin temperature. (For the purists, the actual value is 273.15, not just 273, but I'm keeping it simple here.)

So, where did the Kelvin scale get its name? Yes, it's no secret it's named after one Lord Kelvin (1824 – 1907), a

pioneer in the science of thermodynamics. But where did the learned lord get his title Kelvin from? It wasn't his name.

Born in Belfast, William Thompson was researching in Glasgow University. For his work on transatlantic telegraphy, he was 'ennobled'. That is he became a baron, deserving the title of Lord. But Lord what? He was able to choose. It so happens that Glasgow University was set on the banks of a beautiful river, the Kelvin River in fact. William pondered what to call his title looked out his window and saw the river. Aha! He decided to become Lord Kelvin, or 1st Baron Kelvin.

Yes, the most famous temperature scale in science is named after a Scottish river! I don't know about you, but that tickles my funny bone.

Whence Cometh Camelopardalis?

Bob Bee

We don't get to see the fairly obscure constellation Camelopardalis from 'Down Under' so pay it little attention. But I've often wondered why a constellation representing a giraffe would have a reference to a camel in its name, not to mention the 'leopard' bit.

Well, all became light while I was watching Stephen Fry's *QI* on TV in early January. (Excellent show by the way, worth watching. You pick up all types of interesting trivia.) The question was asked (very tongue in cheek, obviously): What type of animal do you get when you cross a camel with a leopard?

The answer was that the ancient Greeks firmly believed

it was a Giraffe. That is, when their creating gods finished making the animals, some camel and leopard parts were left over, so they used them to make a giraffe. Obvious!

The upshot of this is that the official species name for a giraffe is, believe it or not, 'camelopardalis'. Hence the strange constellation name.

From a quick survey, it would appear that while long in neck, the stellar giraffe is not long in astronomical interest, at least for amateur telescopes. Still, next time you are in the northern hemisphere, check it out.

MAS MONTHLY FINANCIAL REPORT

Tony Law, Treasurer

Term deposit:	\$7,000.00
Cash account:	\$3,175.53
PayPal account:	\$267.35
Refreshment float:	\$40.00
Merchandise float:	\$100.00
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TOTAL CASH ASSETS:	\$10,582.88
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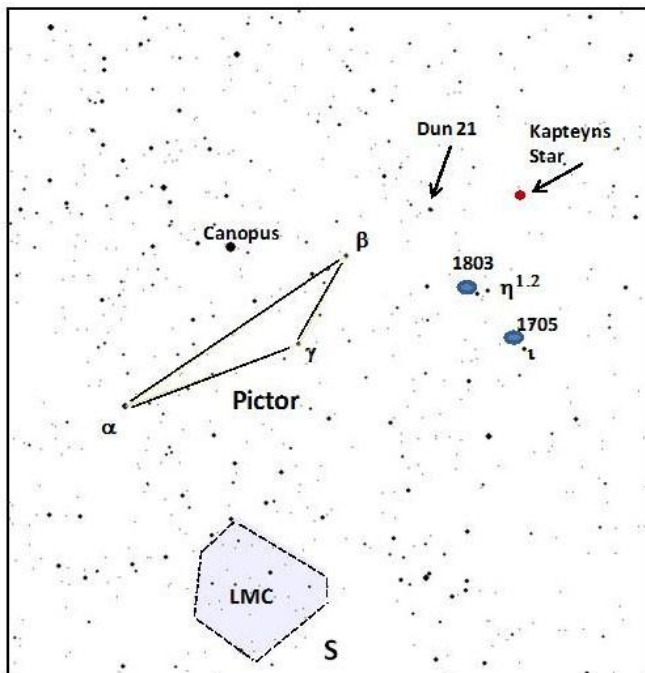
Pictor The Painter's Easel

Bob Bee

And now for something totally different...

This article is a break from the normal practice of focusing on one of the 'celebrity' constellations, full of bright and famous objects. No-one has ever accused Pictor of being a celebrity. Created by de Lacaille ca 1751 and representing an artist's easel and palette, it has been unkindly likened instead to a blank canvas. Unkind because there are a few objects of interest. Not many, I admit, but let's broaden our horizons and see what we can find on the canvas.

As you can see from the larger scale chart below, Pictor has a simple shape, and its 3rd and 4th magnitude stars can be located between Canopus (the 2nd brightest star in the sky) and the LMC in Dorado.



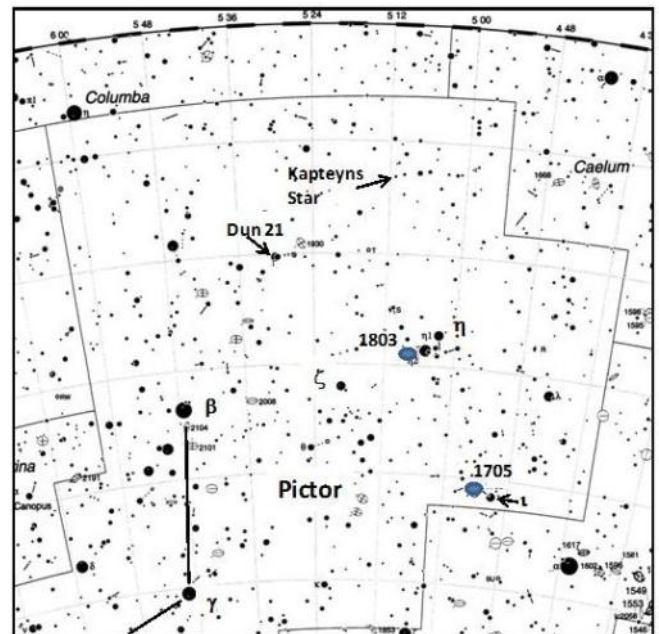
Let's look at some of the objects identified on this chart in more detail.

β Pictoris is a mag 3.9 blue-white star just 63 l.y. away. It is a very young star, believed to be only about 20 million years old. It has quite another claim to fame, however, when in 1983 (before discoveries of extra-solar planets became oh so ho-hum) astronomers photographed a disc of gas and dust around it, suggesting the birth process of a planetary system. Something to keep in mind when viewing the star in your scope.

Dunlop 21 (named by the James Dunlop from Parramatta Observatory in his catalogue of double stars) is a nice wide double star. My research suggests that it is also known as 25 Pictoris but that is hard to verify and isn't recognised by my star chart software. Regardless,

it comprises two Class F mag 5.5 stars a comfortable 3' apart, suitable for binoculars and small telescopes. It is easily located just 5° from β along the line from α to β. More detail is given in the chart below.

Further past Dun 21, there is a very interesting star named **Kapteyn's Star**. (The fact that it has a possessive name like that always suggests it is of special interest.) Kapteyn's Star (aka HD 33793, SAO 217223, VZ Pictoris and many more) is a **red dwarf** only 12.78 light-years distant. (That takes it just outside the list of Top 20 closest stars.) It has the second highest proper motion of any star discovered so far after Barnard's Star in the [constellation Ophiuchus](#). It was first documented by the Dutch astronomer Jacobus Kapteyn. With a visual magnitude of 8.86, the star can only be seen in a telescope. This star is distinctive in another regard: it orbits the [Milky Way](#) in a [retrograde](#) motion. That is, it's going the wrong way around the round-about. At magnitude 8.86, it may be a challenge to identify from its companions. But it should look red. The chart below shows its 'current' location (5 hr 11.7m, -45° 01') but it is travelling across our sky at the rate of 1° every 415 years, or 8.7 arc-seconds per year. Its current coordinates are: 5h 11m 35.210s, -45° 00' 16.2".



There are two more doubles of interest. Coincidentally (and conveniently), they are located very close to the only two galaxies of amateur interest in Pictor (and they are the best of a poor offering) so they are very useful in locating said galaxies.

η (eta) Pictoris is a wide double located just 7.2° from β Pic, 3° beyond ζ Pic. Its components have a 33' separa-



Pictor The Painter's Easel

Bob Bee

tion (just over a Moon diameter). η^1 is an F4 star, mag 5.4 and just 87 ly away, while η^2 is class M2, mag 5.0 and 424 ly away.

Just 4' separation from η^2 , **NGC 1803** is a tiny galaxy which, at mag 12.6 and with a diameter of around 1.1', will be a nice challenge. The position shown on the chart above is fairly accurate, indicating that 1803 is 4' from η^2 in the direction back towards ζ . For those with GoTos, its coordinates are: 5h 5.696m, $-49^\circ 33.13'$.

Moving southwards 4.5° below η , ι (**iota**) Pic is another nice double, this time a lot closer. It comprises a mag 5.6 and mag 6.4 just 12" apart. My star chart suggests they are both class F0 stars but distances are uncertain. Does anyone have more up-to-date data?

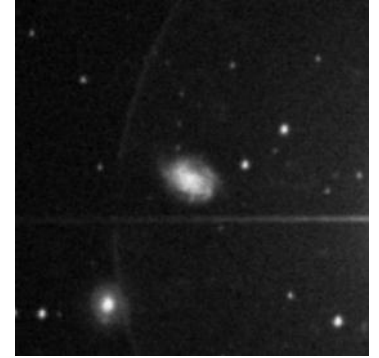
Again, happily, the next Pictoris galaxy or interest, **NGC 1705**, is just 30' from ι Pic, in line with the direction back towards β Pic. NGC 1705 is a dwarf irregular galaxy 2,600 light-years wide (less than 3% as wide as our Milky Way) and approximately 16.6 million light-years distant. Like 1803, it will not be easy to view but worth a try. They will both be extremely small, looking like a hazy patch. 1705 has an angular diameter of 1.8' and, for those with GoTos, is located at position: 4h 54.76m, -53°

20.95'.

So, out with the paint brushes and... good hunting.



NGC1705



NGC1803

Prime Focus Article Submission

Deadline for article submissions for the next edition of Prime Focus is

Monday 14th March 2011

All articles can be submitted via email to editor@macastro.org.au