MACARTHUR ASTRONOMICAL SOCIETY Inc.

Journal

PRIME FOCUS

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Presidents' Report

Well, here we are at our last meeting in what has been a great year for the society. Not only have we had some great guest speakers, field nights and meetings, but we have also picked up a lot of new members. I've enjoyed many friendships this year and my hope is that our association together will be long term and rewarding. Accordingly I extend my welcome to everyone here tonight.

A very big last month

We were very honoured to have Dr Russell Cannon (Anglo-Australian Observatory) talk to us last month. Dr Cannon fielded many questions and gave willingly of his time, especially considering he drove down from Siding Springs that day.

The original plan was to have a brief update on the 2df survey then expand upon the Spiral Project. However, the quality of Russell's presentation together with members questions meant the 2df update was substantial.

For an Amateur society like us to have access to this level of Astronomical research cannot be underestimated. Indeed, I think we have been most fortunate to consistently have such fantastic guest speakers over the relatively young life of the club. The challenge of course is to keep them coming!

At time of writing we are to have an Observatory public night on the 10th of November. This will be the last one for the year and I'm crossing my fingers for some clear sailing on the weather front. Again many thanks to everyone for making these nights such a success.

The Yanderra members night gave us the chance to look through a really big telescope, a 25" Starsplitter. The views of the globular cluster 47 Tucanae was a sight I will always remember. In a word it was mind blowing as thousands of stars could be seen spreading right across the field with the bright central core detailing several prominent stars within. It was like reaching out and touching a piece of heaven.

Without fail my previous viewings of galaxies reveal nothing more than a disappointing faint smudge. However, through the 25" the Silver Coin galaxy in the constellation of Sculptor could be clearly seen even though it was immersed in sky glow. So impressive was this sight that structure could be determined. By slightly nudging the telescope my averted vision came into play

which added further to the experience.

My euphoria was dampened by a fast moving blanket of cloud which effectively shut down the night. This was just typical of our run of luck with the weather gods and unfortunately adds to many months of sheer frustration.

I wish to thank Alex for his generosity in opening up this opportunity for us. He expresses the wish to have some ongoing involvement with us and perhaps this is something we can look at in the near future.

The lucky winners of the big raffle were drawn and for public record the they were:

1st prize - 2 eyepieces to Allen Martin, who also won last year.
2nd prize - Sky and Space subscription Bob Monkcom
3rd prize - Nepean Observatory pass, John Koster
4th prize - bottle of wine, Bruce Reardon

Well done and congratulations. Also thanks to everyone for supporting the raffles.

This month

Tonight we have a selection of topics by various speakers and hopefully we will have Peter Druery bring us the latest news in Astronomy. Maybe he will get to tell us about the Black Holes mentioned the other month.

The committee has ordered Astronomy 2002 at a suitable discount for purchase by the members. We have confirmed orders of about 15 books at $16.00 each. If we don't have them tonight we can catch you up at the Field nights or Xmas party, or in the New year.

Our Xmas party will be held at the Observatory on Sat. 8th December. Like last year please bring your own everything, but we should have a least 2 BBQs on site so you can cook your whatevers. Everyone is welcome so bring the Wives, Kids and Husbands.

Upcoming Dates

08/12/2001 Xmas Party at the Dome
15/12/2001 Members field night The Oaks
12/1/02 Members field night The Oaks
21/01/2002 General meeting UWS Macarthur

My sincere thankyou to everyone who has given me support and encouragement over the last year. Please have a very Merry Xmas and a happy and safe New Year.

Kind Regards
Noel Sharpe ■

Fundamentals to our Understanding:

Some of us may take alarm at the depth and wealth of scientific words and subtleties of phrases, yet no physics, chemistry, biology, engineering or law, not even sport, can exist without its special terminology which is often more exotic and artificial than the vocabulary of philosophy.

Philosophy, (the "love of wisdom") is thought to be the queen of all sciences and the science of all things that are naturally knowable in their ultimate causes and reasons, held commonly since Pythagoras in the 6th century B.C. Therefore, it could be said that a philosopher is a person humanly wise.

It is important that no technical terms be used in any branch of science, until they have been clearly defined. The most universally used words in philosophy, as well as in most branches of science, are reproduced below under the heading of Introductory Definitions of : "Cause and Effect", whose definitions constitute the rock-bottom basis of our astronomical and cosmological knowledge and understanding.
(Extracts from:
An Introduction to Philosophy; by: P.G.Glenn and Jacques Maritain).
Prepared by: Frank Kish.

1) Cause: Contributes to the being of a Reality. Every chain of events in the reality must have a cause and an ultimate First Cause.
2) Cause: cannot be an endless chain of events, and every cause must end in an Effect through a Final Cause that defines the primary aim of an action or a chain of events.
3) Cause: can never be unpredictable, as every cause is a reason with a certitude of understanding it. Reason, however, can never be a cause. (See Item 7). All causes in the reality are effects, before they may become causes of further effects.
4) Effect: is produced by the activity or operation of a Cause in the reality.
5) Reality: may lack its causes, but cannot lack its reason, the understanding it; (the "raison d'etre").
6) Chance: can never be a cause, as it is a circumstance, meaning that the effect it produces has a nature of unpredictability. If all reality in the Universe is a "chance-effect", while knowing that a cause cannot be "unpredictable", one may ask: What is the cause of all these effects?
7) Reason: can never be a cause, (see Item 3), as reason can explain only the reality that are not self-evident to the mind.
8) Reasoning: is a judgement of evidence, (from facts in the reality, sources of reliable authority and from the certitude of science).
9) Error of Judgement: does not come from proven evidence, but from the lack of it or from the failure of understanding it.

Frank Kish ■

Mission Mars

A little bit of Mars will be simulated in the Australian outback toward the end of this year. N.A.S.A. astrobiologists and members of the Mars Society of Australia will travel to Alice Springs in October.
The survey will be called the Jarntimarra-1 scouting Expedition. It's part of a global plan to simulate Mars' conditions on Earth.

If Australia is picked as the experimental site, volunteers will arrive next year and test the prototype space suits and environmental capsule. The habitat is mainly made up of foam fibreglass and it has a diameter of 8m. It is divided into two stories; the living quarters are upstairs, with the lab and airlock downstairs.

The unit is designed to house six people for three years. This is broken up into 16 months travelling to and from Mars and eighteen months on the surface. The volunteers will stay for up to four weeks, using buggies and collecting soil samples as if they were on Mars.

Mars Society U.S.A has a base at Greenland and also intends to build three more. The proposed Australian site has been named. So if you take a trip into the Flinders Rangers next year and your confronted by Beings in space suits, don't worry you haven't had a Close Encounter of The Third Kind. If you ask nicely you might get a ride in the buggy.

John Rombi ■

How to Find Earthlike Planets

"Earth's light show is a clue to finding habitable neighbours." That's what is written in one of the articles in "Spaceflight Now." Earth would be a speck, a faint blue dot hidden in the blazing light of our Sun when it is viewed from a star in some other corner of the galaxy.

There would be an interesting flicker in the pale blue light, what aliens would find. Venus and Mars would reflect a fairly even glow, Earth would put on a little show. Earth's light would brighten and dim as it spins, because oceans, deserts, forests and clouds – which are all too small to be seen from such a distance – reflect varying amounts of sunlight. The variations, it turns out, are so strong and distinctive that a surprising amount of information could be taken from the simple ebb and flow of light.

Scientists at Princeton University and Institute for

Advanced Study conducted a study of Earth's reflection. Not insights into an alien's view of our home planet, but as a way for human scientists to learn about distant planets that may be like our own. Earth has the most complicated light curve. That's what makes it unique to the planets in our solar system.

There is a way to find earthlike planets. There are already a lot of planets found orbiting other stars and two planets orbiting the same star. In future, astronomers should be able to find more than two planets orbiting one star and a lot of surprising and interesting things before they finally find a faint blue dot flickering in a blazing light of a star. We need more powerful telescopes and a bigger space telescope then the HST to find an earthlike planet.

I think to find extra terrestrial intelligence on other planets will not happen in my lifetime but I would be excited about another faint blue flickering dot and if there can be some organic life detected.

Ursula Braatz ■

Vice President's Quickie

If you would like to share your love of astronomy with the other members of the society, or if you have new gadgets to improve telescope operation, or a book that you have read that you would like to review; do I have an offer for you.
Please put your thoughts and ideas into our monthly journal **PRIME FOCUS.**

Bob is always happy to welcome new contributors, so give it a go. I guarantee it wont hurt.

Paradox of the Night Sky (by Frank Kish)

A seemingly trivial observation points to a profound cosmological Statement: we owe our existence to the fact that the sky is dark at night.
The first was Kepler, then Halley and Cheseaux, who discussed in general terms why the sky is dark at night. Then came Olbers, who recognised the importance of this fact and formulated it into what is known today as the **Olbers' Paradox**.

In terms of our present day understanding of the observable Universe, the astronomer E. Harrison described two effects which contribute to the darkness of the night sky.

First: The Universe has a finite age. Because the light from distant stars from the very Beginning have not yet reached us, thus they do not yet contribute to the optically visible light of the night sky.

Second: Even the light from distant stars from the very Beginning will be red-shifted, when they reach us, (see the distant galaxies), thus the light energy of the photons will progressively diminish.

There are at present two opposed cosmological theories describing the nature of the Universe:

a) We live in an **infinite** Universe, without any boundaries in space, and with or without a beginning, but without an end in time.
b) We live in a **finite** Universe that has boundaries in space, and with a beginning and an end in time.

It is clear from purely philosophical as well as from cosmological points of view that the above two theories contradict one another, and "equally bizarre",(F.H. Shu, Professor of Astronomy, UCLA.), therefore not even these two basic theories are settled as yet.

Despite the above controversy between these theories, however, due to our limited mental and physical capabilities, we can observe only a **finite** part of the Universe in either of the two universes, at any time, and

this we call the **Observable Universe**.

Finally, we can outline the **Olbers' Paradox** itself: Within this Observable Universe the light from each star appears very feeble to us, although their number may be in the billions of our Sun's intensity. An **infinite,** Euclidean Universe would be filled equally with infinite number of stars, (as it is predictable mathematically). Therefore, every conceivable line of sight of ours, even within our **Observable Universe,** would eventually intercept the light from a star, as bright as our Sun. This would result in a night sky perceived to be as bright as daylight or even as bright as the surface of our Sun. Therein lies **Olbers' Paradox**. That is to say we can not have an infinite Universe with infinite number of stars and at the same time dark skies at night.

Sources of Information:
The Physical Universe, Frank H.Shu.
The Cambridge Encyclopaedia. of Astronomy.

Information from Internet
(by Ursual Braatz)

1. Omega Centauri is a globular cluster in Centaurus. The HST has taken pictures of it. There is a part of the cluster 13 light years diameter which contains 50,000 stars. HST detected two pairs of binary stars, but there must be many others. Stars collide in globulars because they are so close together. When two stars collide, they become one star. If it is a near miss, they will orbit each other as a binary. In all of Omega Cen. there are millions of stars, HST showing red, blue and white stars, as well as white dwarfs.

2. "Hot breath on Jupiter's moon Io." NASA's Galileo space craft provided a surprise – Io has the solar system's tallest plume, rising 500km.

3. HST detected a tiny and very distant galaxy (Abell 2218) which is in the constellation Draco and is 13.4 billion l.y. away. Microslensing of Abell 2218 was provided by a cluster of 1000 galaxies.

4. There is a website of a German magazine 'Der Spiegel.' In one science article, it suggests that comets spray life on planets in the universe. Very long ago, life was developed somewhere in the universe. Comets, which are not just dirty snowballs, carry cells and bacteria with them which are developed first somewhere else in the universe.

There are some billions of galaxies in the universe and each galaxy has at least billions of stars. There must be at least millions of solar systems like ours with earthlike planets which can support life which is spread in the form of cells from comets and can develop into plants, animals and intelligent beings.

Ursula Braatz. ■

Greek Alphabet

The brightest stars in each constellation are assigned Greek letters to indicate their relative brightness (though this is not always adhered to.)

As a bit of a refresher, here is the complete Greek alphabet, with the name for each letter. Enjoy!

α (alpha)	β (beta)
γ (gamma)	δ (delta)
ε (epsilon)	ζ (zeta)
η (eta)	θ (theta)
ι (iota)	κ (kappa)
λ (lambda)	μ (mu)
ν (nu)	ξ (xi)
ο (omicron)	π (pi)
ρ (rho)	σ (sigma)
τ (tau)	υ (upsilon)
φ (phi)	χ (chi)
ψ (psi)	ϖ (omega)

Help Needed

Contact Daniel Ross if you are interested in helping out at a school astronomy night in late November or early December. See Daniel for details or contact at djross@optushome.com.au

Flights of Fancy

After 6 years with MAS and countless years before, I've finally discovered Grus, the Crane. They tell me it's always been up there and easy to find. I suppose I've been guilty of concentrating on those constellations with the higher profiles and better press agents. But for one reason or another, it kind of caught me by surprise.

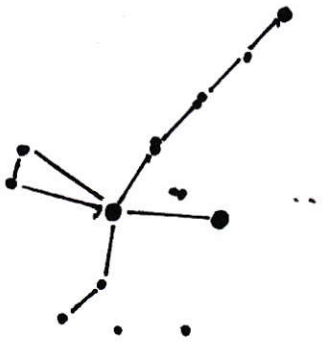
I came across Grus by a number of avenues coincidentally. In no particular order, there was IC's excellent article in the September Prime Focus. Then there was the 'Constellation of the Month' in Astronomy 2001. And finally was my own research for my book on southern binocular viewing. At the September Oaks night, I was doing some verification viewing with my binoculars and was checking out this 'obscure' constellation Grus. Where the heck was it?

I followed my star map and, lo and behold, it was directly above my head. If the crane had done a dump, it would have got me on my bald patch. What amazed me is that it was so plurry obvious. There it is, winging across the sky for all to see. Why hadn't I seen it before?

Of course, I could see the shape of the crane immediately. Wings out stretched, legs trailing, head and neck thrust forward but bent a bit to the north west. Obvious!

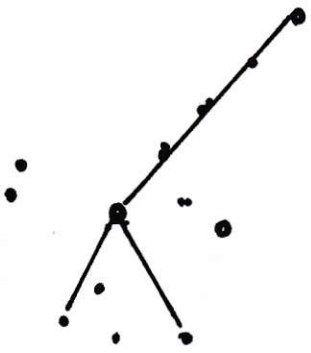
But while doing some research on the net for a Heavens Above! article, I made an interesting discovery. There is no unique way of drawing lines between the stars to achieve a crane shape. I found three published shapes and there could be more.

I mean, there are only ten main stars, so how many ways could there be to join them and still get a crane? Let's have a look.

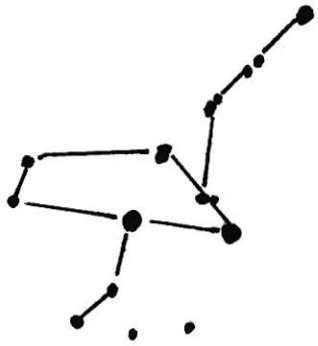


This is (or was) my preferred shape. Majestic in flight, soaring beneath the heavens.

But then I found this simpler, more stylistic arrangement:



All right for a company logo perhaps. Then there is this one:



How's that for creativity? Not only is it different, it produces a whole new concept. Not in flight at all, but standing on the ground, maybe with its feet immersed in lily pads, waiting for that fish to swim by. The classic crane pose. The problem with this one is that it's harder to see in the sky. The Shape 1 seems to leap out at you (or at least fly over you.).

Anyway, there they are. Next time you're out in the dark, look up (it is presently directly overhead) and decide which shape strikes you. Once you've done that, pull out the September PF and see if you can spot the doubles, nebulae and galaxies listed. I will be.

Bob Bee ■

FOR SALE

TASCO 114mm (4½") reflector. F/8 with 2 Huygenian eyepieces (20 and 4 mm), finderscope, Barlow lens, slow motion controls and tripod. Good beginners scope. AS NEW. All reasonable offers considered.

Contact Daniel Ross

Cosmology Discussion Group

Are you interested in talking about cosmology and associated subjects with others of like interest? Robert Zindler would like to start a small discussion group to do just that. It would have to be outside normal meeting times so you can chew the cosmological fat in a relaxed mode.
If you are interested, talk to Robert at a MAS meeting or call him at home on (02) 95215212.

M.A.S. Battles the Sandman

Well the day had finally come, after one postponement because of bad weather; the dawning of September 15th brought with it a beautiful day and the challenge of the first **M.A.S. 100 Marathon**.

The original date was August 18th. Dick Everett and I had decided on 94 Messier and 6 N.G.C. objects to observe. By the time we were able to reschedule the event the Sun had made its way into Virgo, making it impossible to see The Virgo Cluster of Galaxies. This necessitated a change to the list which now read 82 Messier and 18 N.G.C. and I.C. objects.

What is a 100 Marathon, you ask? It is the challenge of trying to view as many of the 100 objects on the list between sunset and sunrise on the one night.

There are many thoughts that go through your mind preparing for the night. Will I have enough food to sustain me, and will I be able to find all the objects? The biggee of course is, can I stay awake for the entire night? With the late night party scene behind most of us I thought the ability to keep one's peepers open for 24 hours would be impossible.

The Marathon night coincided with the regular observing night for our society at The Oaks. The number of members that attended was a record at 15. We had four that took up the challenge to view as many objects as possible till about 1.00am and four more that braved it till sunrise. I'll get to the stayers later on.

Dick Everett, Daniel Ross, Lloyd Wright and I all arrived at the observing site about ½ hour before sunset to assemble our scopes and connect the wiring necessary for our heaters to keep the dreaded dew off our primary mirrors and lenses; and also to set up the star charts needed to find our prey. The creature comforts were next, comfortable chairs to rest the weary body when time permitted. The usual warm clothing, beanies, scarves, solid shoes etc all to make sure that we were able to combat the challenging and changing environment during the night. A quick look into the latter's cars would have shown you to what extent we went to make ourselves comfortable. Each vehicle was fitted out like a king's bedroom: mattress, scatter pillows, curtains all the important things just in case we could not make it through the night.

As soon as darkness fell and with the sky clear the race was on, not against each other (I think) but against the clock. The early group of objects had to be catalogued before they disappeared over the horizon. A ½ hour into the race we were caught up in the beautiful centre of our galaxy, with one glorious sight after another. A few that had not ventured into this area for a long time were heard cursing my name under their breath. There was also the livelier sound of "I've finally found

it" that brought a loud chuckle from the other frustrated astronomers. Every couple of hours the observing was punctuated by a break, the wonderful home made soup made sure we stayed warm and enthusiastic about our challenge.

Around 2.30- 3.00am the dreaded noddies started to affect us all and although still committed to the task, the call of a warm bed was becoming overpowering. I wonder if the cute fellow in tights and holding sackfuls of sand, dancing through the observing area had anything to do with it.

One of Four and Two of Four could not hold out any longer and made themselves comfortable in their alcoves, ready for regeneration. Three of Four and Four of Four resisted the temptation and continued with the Marathon.

On our trip between each constellation, objects that were not on our list tempted us with their beauty, Jupiter with the four Galilean Moons and of course the temperate and equatorial belts were a great distraction. Saturn beckoned with its multi-ring system, but we stood firm and continued on our journey. The night had been kind to us all with the temperature hovering around 5°. After regenerating, the two wayward astronomers were reassimilated into the collective and continued on their task. The long trip finally ended at 05:00hrs at the co-ordinates of zero one zero, in The Terran System. The four friends sat around their campfire satisfied with their great nights work and celebrated with a hearty breakfast of Gahk and Rokay Blood pie, which was washed down with copious quantities of Blood wine (For us Earthlings that's Bacon and Eggs with coffee) whilst being serenaded by the huge herd of cows that were making their way past us and on to the milking shed. The final act of our night was watching the spectacular rising of our own star, Sol.

P.S. The story you have just read may not have happened exactly this way, and certain parties have not been named to protect the guilty, but when you've been awake for such a long period the lines between reality and fiction tend to get blurred. If you were after technical information I'm sure any of the above would be happy to comply. **Thanks for a great night guys.**

John Rombi.

The Bethlehem Star

This Article is for all the novices, uninterested spouses and other halves out there that see all manner of Astronomy Magazines, articles and books lying around the house, coffee table, computer table, W.C. and other literary nooks that lie within the confines of our domicile.

For the most part, I dust around, move to a better location, put in a pile, or sort in date order the Astronomy magazines that litter all the nooks mentioned above. I was not in the habit of reading said magazines and articles, until I happened to notice on the front cover of one of John's magazines, the title 'The Bethlehem Star'.

I am very interested in Theology and faith of any kind, and found myself drawn to this title and the article that followed, written by Bradley Schaefer. His article was about a book written by Michael R. Molnar entitled "The Bethlehem Star: The Legacy of the Magi." The article was a review of the book and had quite a profound effect on this reader in that it answered many questions that I had floating around in my head and posed many more for reflection. The article reads as follows. December 1999.

During this Christmas season, the Star of Bethlehem will be an ever-present astronomical icon for the birth of Jesus Christ. But the biblical basis for our knowledge of this wondrous event is just four verses in the Gospel of Matthew. Based on this fragmentary evidence, astronomers since the time of Johannes Kepler have searched for astronomical spectaculars to identify as the Messianic omen. Venus has been identified as the star as well as a Mars/Jupiter/Saturn

conjunction, a nova, a supernova, a comet, Halley's Comet, a triple conjunction of Jupiter and Saturn, and occultation of Jupiter. This bounty of claims immediately warns us that no such claim can be adopted because it is hardly unique.

Now, Michael Molnar offers the first revolution in Star of Bethlehem research since Kepler's days. Molnar's big advance comes by considering what the Magi themselves would have deemed important. I have divided the book's logic into three steps: First, Molnar points out that all the old identifications are merely events that would appear spectacular to a *modern* astronomer. But the Magi were astrologers who did not care about what *we* find exciting. More specifically, they paid attention only to their mathematical calculations and rarely looked up. Comets and exploding stars were ignored in their horoscopes, and simple planetary massings or conjunctions varied widely in both importance and meaning. That is, all of the astronomical events that have been identified as exciting candidates were totally irrelevant to the Magi (the one group whose beliefs matter). As such, we can be confident that all previous claims are simply wrong.

Molnar's second advance is to realize what was the key for the Magi, and that was that the Star of Bethlehem must have been a horoscope predicting the birth of a very great king in Judea. The wise men would have been looking at calculated horoscopes (not at the sky) to find an omen powerful enough to induce them to travel to Judea.

A vital part of this second advance is that we have to know exactly what the Magi would have been looking for. Astrology changes over the centuries and there is no possibility of deducing the arcane rules without being explicitly told. Fortunately, many voluminous books survey the detail that the codes and interpretations of astrology as it was actually practiced in the Middle East around the time of the birth of Christ. For example, Ptolemy's *Tetrabiblos* is the bible of ancient astrology and explicitly states that the zodiacal sign Aries ruled Herod's kingdom of Judea. So, astrologers of the time would identify the location of a birth associated with Aries to be in Judea.

This second advance immediately solves two old problems that have plagued the traditional "astronomical" Stars. The first dilemma is why the Magi saw the Star in the east but then travelled west. Actually, the New Revised Standard Version of the Bible says, "For we observed his star at its rising," which Molnar points out means the heliacal rising (in the eastern skies) to an astrologer. If the horoscope indicated the birth in Judea, then the wise men would see the Star in the east but travel west to the capital of Judea. The second dilemma is why no one in Jerusalem had sighted the Star. If the omen were a comet or a supernova or such, then the Star would be widely known. Molnar points out that the Jews in Judea generally did not practice astrology and hence would miss the always-subtle geometric relations between planets prized by astrologers.

The first two advances are merely correcting a typical error made in historical studies. Evaluating old societies by modern standards and assigning motivations to historical events in accordance with currant principles is an easy trap to fall into. It is now blindingly obvious – in retrospect – that a fundamental error has been made and how to correct it.

Molnar's third advance is to identify a unique date for which the regal portents were the highest possible and indicated a birth in Judea. On April 17, 6B.C., the planets aligned in the most auspicious configuration imaginable. Such a powerful horoscope could have driven the wise men to seek out the divine king. This date happens to be near the middle of the time span (roughly 10 to 4 B.C.,) in which historians have placed the birth of Christ.

What is so magical about the horoscope? In astrological

terms, the Sun was exalted (made most powerful) in Aries, the beneficent Venus was also exalted, the three rulers of the Aries trine were all in Aries, both the Sun and the Moon had their planetary attendants nearby, Jupiter was at its heliacal rise position in Aries, and the Moon occulted Jupiter that day. Wow, this would have blown the turban off any astrologer. And the primacy of Aries pointed directly at Judea.

A possible interpretation of Molnar's revolution is that the wise men foresaw the birth of a great king in Judea, travelled to its capital, were directed to Bethlehem, and there worshiped at the birth of Jesus Christ of April 17, 6 B.C. Alternatively, perhaps the story of the Magi was invented around the year 70 A.D. to embellish the recent discovery of the awesome portent as calculated by a Greek convert seeking an omen for the birth of Jesus. Between these extremes, there is a whole spectrum of possibilities. The existence of the Star decides neither on the divinity of Jesus nor on the historical nature of many details in the biblical account.

Let me summarise the implications of the new paradigm in my own words: First don't buy any other book on the Star of Bethlehem, because the old astronomical views are guaranteed to be irrelevant. Second, the new astrological paradigm forces the realization that astrology was an important force in historical times so that the disregard of the topic by most historians is blatant chauvinism. Third, the existence of a stunning astrological horoscope for April 17, 6B.C., announcing the birth of a great king in Judea will now force scholars of religion to reconcile the event with their own beliefs.

The author is well qualified. For many years before this revolution, I have been impressed with the quality of Molnar's research on astrology from Roman times throughout the eastern Mediterranean with special attention to regal horoscopes and numismatics. His book is easy and fun to read as appropriate for a popular audience. Nevertheless, scholars will be satisfied with the many detailed notes and citations in footnotes.

Millennialistic fervour is often associated with the anniversary of the birth of Christ, so it is appropriate that Molnar's staggering revolution appears in print during this particular Christmas season.

This is the article in its entirety. I suggest that you read through it several times in order for it to sink in. I have handed the article to many of my friends and I think if you do the same it will create a very interesting dinner party conversation. As Molnar has stated, "It is an extremely interesting hypothesis that is yet to be proven, but it is food for thought and reflection." It certainly is.

The surprising thing for me was that when I took the time to look at John's astronomy magazines, I found not only this article but many others that I think you may find interesting as well. I hope you enjoyed the article as much as I did.

Jenny Rombi. ■

A Date with E.L.E

If the Earth dated this dangerous lady, unfortunately it would be its last.
That's because E.L.E. stands for Earth Level Extinction.
This subject has reared its head in science fiction over the years, the most recent being the films *Deep Impact* and *Armageddon*.

Well, what is the possibility of Earth being KO'd by a huge rock from space? First we must remember that particles ranging in size from microscopic up to the size of a car are entering our atmosphere every day. Luckily our atmosphere burns up the majority of these. So that they fall harmlessly to the ground, "most of the time". Is there a large asteroid or comet with our name on it, just around the corner?

In 1994 the comet Shoemaker-Levy 9 gave all astronomers a front row seat

as to the devastation that a large comet can cause, fortunately the impact occurred on Jupiter and not Earth. I'm sure we all watched as Jupiter's gravitational field tore up the comet and then we saw hit after hit as it scarred the face of the planet; these markings lasting for several weeks.

We have a very close neighbour, the Moon, that has positive proof of the size and quantity of objects that have visited this part of space. A quick look through any optical instrument will show you many craters of different sizes. The Earth itself has been hit by large asteroids, the most famously known is the Dinosaur killing rock that hit the Earth some 65 million years ago.

In 1978 the Uni of California were searching rock layers for iridium. They figured that since iridium drizzled down from space at a steady rate in the form of meteor dust, that measuring the amount in these layers could help them work out how fast sediments collected on the ancient ocean floors. What they found lead them to a terrifying conclusion. The rock boundary between the Cretaceous and Tertiary eras showed a major infusion of iridium. This border marks the end of the age of dinosaurs 65million years ago. They found enough iridium in the boundary area to equal a **10km diameter asteroid impact.**

In 1991 scientists discovered evidence of a crater under Mexico's Yucatan Peninsula. They have estimated from its size that an object hit this area with a force of more than **five billion atomic bombs (100 million megatons.)**

The impact was not the only cause of the dinosaurs demise; the immense fire storm immediately after created its own problems. The return to Earth of the molten rock that had been thrust into the atmosphere caused wide spread devastation. The lighter material stayed in the atmosphere for a number of years and caused the suppression of photosynthesis that ultimately killed off most of the plant life on Earth.

As I mentioned earlier meteors are constantly hitting the Earth, the amount has been measured at approx **100 tonnes every day.** There are times when the atmosphere cannot burn up the debris, so it continues to travel at its space speed of 15-20km/s and on impact its release of energy is **100 times its mass in T.N.T.**

(To be continued: Next issue - Playing chicken with Armageddon)

John Rombi. ■

Astronomy and Earth Exploration in Queensland

I have been on trip to Queensland and back to N.S.W. with my husband from the 2nd June to 27th July. We went along the coast and stopped at caravan parks and free rest areas. On most of the places there was a bit too much light for observing the stars. On the 9th June, we visited a nice rest area called Calliope, near Gladstone QLD.

At 7.00pm the night was dark and full of stars but about 9.00pm the moon was rising, it was 3 days after full moon. I took my binoculars and swept across the sky. Mars appears the biggest and brightest object in the sky, twice as bright as Antares in Scorpius. Close by were the beautiful Messier objects of the Milky Way, The Lagoon Nebula was the most spectacular.

On the 11th we drove to Rockhampton, then Yeppon and we stayed in a caravan park. I woke up at 5.00am on the 12th and saw Venus in the east and Mars in the west. I imagined how amazing it would look, if we could see our beautiful blue planet in the middle between the bright yellow and orange planet from the I.S.S.

It is better for us when we stay on our blue planet and observe the universe with the help of all the observatories

on Earth plus the H.S.T. On our trip we explored a bit of Mother Earth, and learned about its history. The area all around The Great Barrier Reef was volcanic many thousands of years ago.

Many of Yeppoon's beaches are covered by rocks and with large hills of basalt that protrude from the land and water. On the 14th we arrived at our rest area at St Lawrence between Rockhampton and Mackay. The night sky was clear, but there was light pollution from the lights on the amenities block. I only took out my telescope to see Mars and two star clusters in Scorpius. It would be more interesting if I could see the icecaps on Mars, but I have trouble with the other eyepieces. I looked around the sky and in the north I saw Ursa Major again like last year, when we made the trip to The Gulf of Carpentaria. With my binoculars I could see the two stars of Ursae Majoris, Mizar the multiple star system.

On the 16th we were in Seaforth, which is between The Whitsunday and Mackay. We were in a caravan park at the beach and we could see some of the Whitsunday Islands. How did the islands develop? This must have been a fiery place long ago, with lava coming out of the sea and land. All the islands and mountains have volcanic rocks. After sunset I went to the beach, in the west the sky was still light from the sun and in the east the horizon was dark blue and above, the sky was orange-red. This must be the aura of the Sun.

The islands in the sea were dark, everything looked terrific. We went out for dinner that night to celebrate my birthday. Later on we went for a walk on the beach and saw the beautiful starry sky above our heads. Ursa Major was higher in the sky and very easy to see. The Milky Way was very prominent; we were lucky the moon was not in the sky.

From Seaforth we drove to Bowen and then onto Townsville, we saw a lot of interesting things, so when night fell I was too tired for observing the stars but I never missed seeing Mars. About 50km after Townsville we stayed at two rest areas at a town called Rolling Stone. At the post office we faxed a message to our son to send us our important mail. In the packages that arrived I was excited to receive Prime Focus. I read that the moon would be partially eclipsed on the 5- 6 July, I did not want to miss it.

On the 4th July we went to Mission Beach and met some good friends. When they left later that night I was determined to watch the Lunar eclipse. I saw it start at 11.30pm and I made some sketches at 10 min intervals until 1.00am. The moon was half covered in an orange hue, there wasn't anybody else around to share it with. The birds were very noisy at this time and it created an eerie feeling. It was early morning and I could not wait to get back to sleep but the eclipse did not end until 2.00am.

We left Mission Beach and left for Kurrimi Caravan Park. We also visited Innisfail and called in on the local crocodile farm (they are the surviving cousins of the dinosaur.) On the 11th July we were in Cairns and travelled on the Sky Rail over the rain forest to Kuranda and return. Our next visit was to Port Douglas- Mossman were we visited The Daintree National Park and Cape Tribulation.

Heading south we went over the Atherton Tablelands. We saw the spectacular waterfalls and the amazing Curtain Figtree with its roots hanging from ground level to treetop. Our next southbound stop was Rockhampton and then we travelled inland to N.S.W. We were always followed by sunny days and clear nights. I did a lot of observing but with all the exciting things to do, my observing schedule suffered on the final days of our trip. We finished off our holiday by visiting the hot mineral springs at Moree. There was to be a stopover to see the observatories in N.S.W. but because of the late rainfall this was cancelled, we will explore this region on another trip.

Ursula Braatz ■

The Moon, Slugs and Vapour Trails.

In the wee small hours strange dark shapes appear and surround me, an invasion of my observing area is now in progress. Darkness surrounds the environment of the Amateur Astronomer and armed with only a red flashlight I duly investigated the goings on and came upon some rather large and very slimy slugs.

The area of set up has to be not only workable but comfortable, one such area available to me is right on my doorstep placed conveniently to the side of the laundry just behind the garage door. Orientating myself to the South Celestial Pole is relatively easy thanks to the handy position of the other pole, the clothesline pole that is, where one can angle a tripod to the path and aim just to the left of the said clothesline reaching the alignment necessary for photography. That's photography of stars and planets, not the items of clothing on the line as it's rather impolite to focus on unmentionables.

On this particular night I tried to locate the alignment stars by using only the polar scope and a viewfinder. It all relies upon locating the constellation of Apus then star hopping a few degrees around the place. Suffice to say I was successful but it did take a while. It always seems to be a victory when you hunt down the Pole Stars and this can be reward in itself.

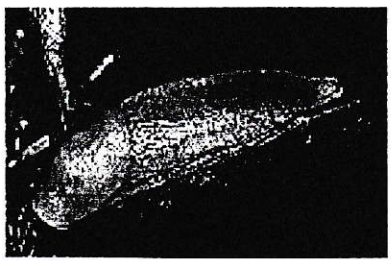
All prepared and ready except for one slight miscalculation as the subject of my photography was placed right over the roof of the patio, so an extended wait was to be expected until the Moon would come into view. With time to kill I equipped myself with snail and slug pellets and left little calling cards appropriately placed. I counted 30 odd slugs taking up residence upon my observing area. Well with the sky clouded over what else does one do?

The down time in observing can be put to good use. I have a dog and two young children and indiscriminate use of a poison is not recommended. By utilising my set up and wait times I could bait certain sections and monitor results and clean up afterwards.

After waiting patiently for the moon to be in all its glory it clouded over. I cannot recall how many times the weather gods have been unkind to us and it's wearing a little thin, I can tell you. With little else to do except wait I reclined in my chair and glanced upwards and saw a slow moving streak of light with twin tails blazing a white trail just under the cloudy moon. Reaching for my binoculars I observed flashing red lights at the front of the trails and concluded without doubt this was a plane leaving a monster of a vapour trail.

I have never seen one at night before and it certainly was a spectacular sight. The sky was now clearing sufficiently, however, the atmosphere was bubbling all over the place which would make photographic results poor. Given the situation some Lunar observations were in order and I endeavoured to reach a balance between magnification and good seeing. As a personal conclusion I find my Lanthanum 15mm eyepiece to be consistently a good performer. The focal length of my telescope is 1800mm which gives me a magnification of 120x when using the 15mm eyepiece. It was getting late and the sky clouded over again. The slugs were in a state of demise and it was not a pleasant sight. There has to be a better way. I remembered reading that a more environmentally friendly option is to treat the slugs to a round of fine ale placed in shallow saucers around the garden. Apparently they are attracted to the beer, crawl in and have a right royal slugfest. Sounds to me to be a waste of good beer!

Yours, Noel Slug.



What IC This Month
November 18 – January 14, 2001

Highlights
Mercury moves to evening sky.
Moon visits Jupiter twice.
Saturn & Jupiter at opposition
Return of Orion.
Blue Moon in December.

Trivia Answer
What have GUTs and TOEs to do with Astronomy? Einstein searched for 30 years for a way to unite Space-time and Gravitation with Electro-magnetism. This joining together of scientific areas with their principles and relationships is called Unified Field Theory. A GUT is a Grand Unified Theory, which would explain everything that happens in the Universe on the smallest scale (Particle Physics) and the very largest (Cosmology). A TOE is a Theory Of Everything, much the same thing. In astro-physics it is an attempt to bring together the interactions of Gravitation, Electro-magnetism, 'the strong nuclear force' (a short range force that holds atomic nuclei together), and 'the weak nuclear force' (causing radioactive decay).
Best offering for a TOE at the moment is something called Superstring Theory. So far all attempts for GUTs and TOEs are unsuccessful but recent events keep the boffins going.

Evening Sky Planets

Mars rises in Capricorn with **Uranus and Neptune** then in December moves to Aquarius. 26/11 it will come within 1° of Uranus. See Moon views also. Setting about midnight during November and 11 pm in December, it will travel on to Pisces in January when it will be less than 5° from a quarter Moon on the 19/1. Passing Taurus in the daylight early next year, it returns to the night sky very close to the dawn Sun in September 2002.

Saturn rises in Taurus about 8 pm. It will be about 4° from Aldebaran all month. At opposition now the disk of the planet is 25% larger than it was in May. The rings are tilted up allowing good views all night. See Moon views.

Jupiter rising at 10.30pm in Gemini is 50% larger than in June. It will be directly overhead mid December and rising by 7 pm at opposition on New Year's Day. See Moon views

Mercury is lost in the Sun till late December when it will appear in Sagittarius on the western horizon setting one hour after the Sun. Watch for a thin crescent Moon less than 4° from Mercury on the 15/1 at 8 pm

Venus is in the Sun till late January when it will appear as the Evening Star.

The **Earth** will be at Summer Solstice on 22/12, the Sun directly above and the longest day in daylight hours.

The Moon during
November - January 2002
21/11 **Mars** 5° from Crescent Moon (CM)
30/11 CM - **Saturn and Aldebaran** Triangle
01/12 FM and **Saturn** 6°
03/12 Past FM & **Jupiter** 3°
15/12 New Moon
20/12 CM and **Mars** 6°
28/12 Almost FM 1.5° from **Saturn**
30/12 **Blue Moon** 2° from Jupiter
30/12 A **Penumbral Eclipse** will cast a slight shadow on the bottom of the Full Moon between 8.00 – 10.30pm.
Watch out for **Lunar Fever** on New Year's Eve with an almost Full Moon.
New Moon is on the 13/1.

Favourite Star
Orion is high in the sky and **Betelgeuse** brings satisfaction to Bob Bee and Chris Barnett. An M class red supergiant large and unstable, swelling from 300 to 400 times the size of our Sun, it varies in brightness from 0.5 to 1.3. Chris likes it ever since he saw it through a mate's telescope many years ago. Bob likes it because it's big, red and points out the shoulder of Orion. It reminds him of a red rash in the armpit of the giant.

Meteors
Refined mathematical sums predict a good show for the **Leonid Meteor Shower** this year. From the radiant in the sickle shape of Leo between 3-4.30am on the 18th or 19/11 we may see anything from 350 to 8000 zhr. Grab this exciting opportunity!
After midnight from 7-17/12, **The Geminids** are bright and fast. About 100 zhr max on 13/12 near the star Castor in Gemini

November – December Constellations

To keep you busy over the New Year we have constellations in the North, Equatorial and South regions this issue. Firstly carrying on the story of Andromeda is –

Perseus – Son of Zeus

The Greek god Zeus (Roman name Jupiter) had an affair with a human woman and Perseus was born. The woman's husband, Polydectes, King of Seriphos, was angry but waited till Perseus grew up for his revenge. He sent him on an impossible mission – to kill Medusa, one of the Gorgon sisters. The Gorgons had heads covered with poisonous serpents and were so ugly that anyone who looked at them was immediately turned to stone. Perseus, knowing he was in a fix, appealed to Athena, the goddess of wisdom, who gave him a shield with a mirror on one side, and a pair of winged sandals made by Hermes (Roman name Mercury). Perseus made short work of finding Medusa by air and approached walking backwards. Using the mirror he cut off her head while she slept. As he carried her head off into the sky, something big with wings sprang out of Medusa's neck. But that's another story.

The constellation lies in a rich part of the Milky Way but so far north we cannot see all of it. Perseus flies upside down for us, with Medusa's head centred on the red star Algol

α is a yellow supergiant vmag 2 star called **Algenib** (also Mirfak). Located at +50° latitude, to the right of Capella and closer to the horizon. Binoculars show a bright-scattered star cluster close by called **Melotte 20**. If you are on a high hill with a clear atmosphere, on the same latitude but 20° away to the left you may see **M76** very low down. δ is a blue giant star vmag 3, 5° away to the right of Algenib and slightly above.

β **Algol (the Red Demon Star)** is an eclipsing binary and variable. Every 2.5 days Algol sinks from vmag 2 to 4, then returns to normal brightness 10 hours later. ρ, 4° south of Algol is a red giant varying every 7 weeks. ε is a blue-white star with a fainter companion. Further south lies ξ next to **NGC 1499, the California Nebula**, which gives the nebula its glow.

Higher in the sky you can spot ζ a blue supergiant with a faint companion visible to small scopes. 10° to the left of Algol and slightly lower you come to **M34,** an open cluster with about 60 stars visible in binoculars and larger in size than the Moon.

Monoceros – The Unicorn

Monoceros appeared on Persian globes a century before western astronomy credited Jacob Bartsch for its invention in 1624. Called The Unicorn (a mythical figure) perhaps a mistake for the Rhinoceros. Situated between Orion and Canis Minor with the Milky Way running through the centre, it fills the space inside what some northern people call **'The Winter Triangle'** (Sirius-Procyon-Betelgeuse) to balance the 'Summer' one. It has more than 50 open clusters, several nebula, and contains one of the stars where extra solar planets have been detected. The head is aimed towards Betelgeuse, with M50 in the belly of the animal.

The stars are 4th mag or fainter and the width of 30° makes it hard to spot the shape. In line with and about 15° away from the belt stars of Orion is β **Mon** a fine triple system of blue-white stars in a curving arc. Component A is a true binary and C has a companion star, making this a quintuplet. About 5° to the

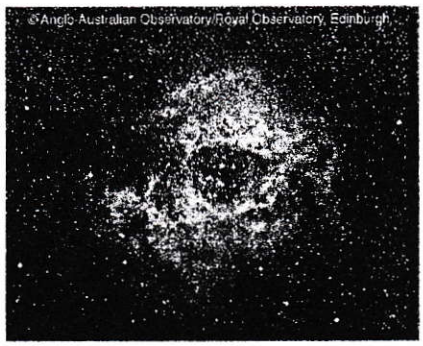
north of β is the open cluster **2232,** about 20 stars the size of a full moon.

Midway between Betelgeuse and Procyon lies the area of most interest. A little to the south will bring you to **S Mon** an intense luminous blue-white double star within the open cluster **2264, the Christmas Tree Cluster.** Measuring 40x20 arc min with S Mon at the northern end 30 stars cluster together surrounded by nebulosity. The nebulosity is the visible part of an enormous cloud of hydrogen gas and tiny solid particles with many newly formed stars visible in infra-red. **The Cone Nebula** with its straight tapered sides is the largest of these dust clouds, but shows well only in photographs.

On the southern side of this area is **2261** a very small (3x2') bright curious wedge shaped nebula in a fine star field. Only for 10" scopes and upwards I'm afraid.

Photo by David Malin

Moving south another nebula comes into view about 3° to the right of ε **Mon,** a double of yellow and blue stars. NGC2237-9 **The Rosette Nebula** is a pale pink nebula almost a deg across with scattered edges. Boosting magnification will reveal the rectangular open cluster NGC **2244** inside the nebula circle.

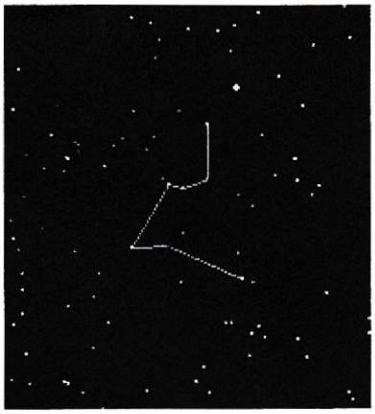


Just under midway between Sirius and Procyon you find **M50** an open cluster with a red star at the centre, easily visible in binoculars.

M50

Another pretty cluster of pairs and groups **2353** is 4° further south, one of several within 7° around M50.

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 α β and γ, 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

Fly to the heavens with Perseus and enjoy the Serpent and the Unicorn.

Good seeing IC