



Volume 16, Issue 2

March 2011

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President's Report:

John Rombi

Hello fellow MAS members.

Due to a family emergency, John is unavailable to do this month's President's Report and has asked me to step in and write something interesting. I'll give it a go, but no promises.

February 21. Our Inaugural 'Macarthur Astronomy Forum'. Our speaker for the night was Prof. Fred Watson. His topic was 'Poles Apart'. I'm quite happy to say that we very nearly had a full house for this night. Prof. Watson had everyone enthralled. At the end of his talk the questions were coming thick and fast. Once again we had a first class speaker who afterwards congratulated us on how we presented ourselves and the calibre of the questions asked.

February 26. Stargard: Approximately 15 scopes on the ground this night. There would have been more, but the early cloud deterred some of the less adventurous amongst our members. Within about an hour the sky had cleared and we went on to have a beautiful, if slightly moist night.

March 5. The Forest: Reportedly a good night for socialising, but not for astronomy.

March 12. Public Night: I can't be sure how many of the public attended as I was kept quite busy myself, but at a guess I'd say about 35 to 40. Don't shoot me if I'm wrong. The moon kept coming and going all night but was there enough to be able to show people along with the other usual suspects. The Jewel Box Cluster, a Carbon Star, Omega Centauri, The Orion Nebula, Betelgeuse, LMC, Tuc 47 and M41.

Monday March 21. Macarthur Astronomy Forum: 7.30 pm at UWS, Building 22,
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MAS Committee

President

John Rombi

Vice President

Trevor Rhodes

Secretary

Roger Powell

Treasurer

Tony Law

Merchandising Officer

Stewart Grainger

Webmaster

Chris Malikoff

Committee Members

Lloyd Wright
Stuart Grainger
Carol McVeigh

Patron

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MAS Dates 2011

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



President's Report:

John Rombi

Room 5. Guest Speaker: Les Dalrymple, columnist (Australian Sky & Telescope). His talk is entitled: "Globular Clusters – their observational history, evolution and dynamics."

Remember, should you have any questions, problems or other thoughts, feel free to discuss them with your committee. That is what why we are here.

Till next month, may you all be forced to endure astronomically perfect weather conditions...

Trevor Rhodes – Vice President

Secretary's Column:

Roger Powell

SECRETARY'S COLUMN Roger Powell

The minutes of the MAS Management Committee Meetings have always been available to members at the monthly general meetings and are now also posted on the website as well. As the author of these formal documents, I have to admit they may not make enthralling reading, which is why I began this Column soon after taking over as Secretary of MAS in 2008. I saw it as a good opportunity to review some of the routine matters being discussed at committee meetings and the decisions that were being made by the Committee on the members behalf, leaving John to concentrate on informing members of upcoming events. I hope I have achieved that aim.

With the Annual General Meeting coming up in April, it is worth mentioning again the proposed constitution that will be put to the membership at that meeting. The review of the document has been a long process, commencing last June and (following two months for members comments) has culminated in the formulation of a proposed new constitution to replace the existing one. The committee believes the improved document will better serve the members of the Society in the years ahead and recommends it's adoption at the AGM.

The Notice of Meeting for the AGM and the Proposed Constitution are published elsewhere in Prime Focus.

With the Society now over fifteen years old, the committee has reviewed the membership awards, which up to now consisted of a badge awarded to members who passed ten years of unbroken membership. It was agreed that in addition to the ten year badges, a certificate would be awarded to members who have passed five and fifteen years membership. This will mean quite

a few members will be receiving an award at this year's AGM.

With doubts over our room location for 2012, it was pleasing to receive an 'olive branch' from the University of Western Sydney earlier this month when a meeting was held with the Executive Dean to explore future collaboration between UWS and MAS. The Dean expressed a desire to work with us on a schools outreach programme and MAS agreed to this in principle, although it remains to be seen what the details will bring. MAS has always been prepared to take our telescopes or send a speaker to schools in the area, so it was felt that participation in such a programme would be within our capacity, provided it does not become too onerous a burden on the members.

The committee is investigating other means of fund raising, in the event that we are forced to pay for a room next year but we are very keen to remain at UWS if possible. As the only science-based community organisation in the region, we see advantages in continuing to work with the UWS College of Health and Science. If I have learnt anything during my three years as Secretary it is that the UWS/MAS relationship is one which needs to be constantly worked on, because the personnel and the rules there are constantly changing.

I was disappointed to receive a letter from Dr. Ragbir Bhathal, advising that he is stepping down from his position as Patron of the Society. He indicated that his commitments at UWS were preventing him from any involvement with MAS affairs. Ragbir is a lecturer at UWS and has been involved with MAS since the formative years of the Society. He has always tried to assist us whenever possible and he was always a regular at our joint MAS/

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Secretary's Column:

Roger Powell

UWS public nights at the Domes. We thank Ragbir for his contributions to the Society's affairs and wish him well for the future.

We will continue to offer to participate in open nights at The Domes, however at this stage it seems doubtful that UWS will want to do this. This is a pity, because the facility - for all its faults - remains a focal point for astronomy locally and the public nights there have been very popular with the public and also with MAS members.

We have three designated members observing sites (The Forest, Stargard Field and The Oaks Airfield). We have not used our alternative observing site at the Oaks Airfield for a long time and consideration is being given to using it one night later in the year. Meanwhile, Tony Law and Chris Malikoff are currently investigating a fourth site which might be used occasionally as another alternative to Stargard. Watch this space.

Members should also be aware that most Forest weekends include Fridays as well as Saturdays and anyone

interested in going on a Friday night is quite welcome. Just make sure you confirm that someone else will be there before you make the journey.

It was a great pleasure for many of us to see Robert Zindler, our deep-thinking cosmologist, returning to MAS at the last meeting, following a very serious illness. Welcome back Robert.

Energy: What Exactly Is It?

Davy Jones

No matter how much you push the envelope – it will always be stationery

About 15 billion years ago a tremendous explosion started the expansion of the universe. This explosion was known as the Big Bang. At the moment of this event all of the matter and energy was contained at one point. What existed prior to this event is completely unknown and is a matter of pure speculation. (LaRocco)

The above paragraph is an excerpt from an article, entitled, 'The Big Bang – It sure was BIG!' Note the comment – *all of matter and energy was contained at one point – not - all of matter and energy was created at one point.*

There's no great mystery in this statement of course, it is a simple matter of physics – energy - as we 'know', cannot be 'created or destroyed' - it can only be transformed! The arguable word in the sentence is the inclusion of 'matter' being contained at this point. However, given that energy and matter are, according to Einstein ($E=mc^2$), one and the same, the semantics of the sentence are perhaps neither here nor there. What is possibly more important in this reflection is the fact that many people actually *refer* to the Big Bang as the point at which the universe was '*created*'! That basic misinterpretation muddies the cosmic waters before any logical thought as to the conceivable possibilities surrounding the greatest of all mysteries, can be considered. Just to underline the immense implications contained in this

short paragraph, one should also consider; all energy and matter must mean and include – dark energy and dark matter – or quite simply – the basic constituents for everything thereafter!

My thoughts as I read through the above article drifted to the most basic question – 'what *exactly* is energy?' On the face of it, a *simple* and certainly most obvious question, which would soon be resolved by a little research? (I have been known to make naive suppositions from time to time).

Within a short while I found myself frustrated at every new Internet page. Information categorising energy in its various forms – thermal (heat) – chemical – electrical – radiant – nuclear – elastic – sound – mechanical and luminous (light), abounded. All of the indicated forms of energy can of course be divided into the two generic groups of kinetic and potential energy.

The Internet also provides an overabundance of data relating to the above classifications, detailing where, when, how, and why they occur. There is also much made of the fact that energy is a *physical measure that expresses the amount of work that can be achieved by a force*; it then follows that all forms of energy are measurable through the use of mathematical symbols. A lot of interesting facts and figures – but no concrete explanation of exactly what energy is!

Eventually, I stumbled upon a Science Forum discussion

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Energy: What Exactly Is It? Davy Jones (cont)

page that seemed to offer 'something' I could finally nail down! The opening question appeared to offer precisely the information I needed: *'What exactly is energy... without using symbols and metaphors?'* There was no doubt about it – as I waded into the opening comment – the first participant began by stating the obvious – that molecules move, they are 'hot' and have lots of kinetic energy. But, then asked: *what exactly is energy?*

The discussion progressed along similar fumbling lines to my research – going through all of the categorisation mentioned above, including the mathematical concepts involved. Several comments into the forum I came across the first glimmer of hope in the following comment: *... 'energy is the capacity to do work of some sort. It is categorically not a substance in itself that pervades the universe'*. Naturally a swift rejoinder to this comment followed, which suggested that if the previous writer thought *energy* was just an abstract concept – they should try sticking a fork into an electrical socket. Whilst amusing – this comment still didn't assist me in my quest to define 'energy' per se. We all know that 'electricity' is a *form* of energy. And, as with just about every form of energy I can think of, in certain circumstances, too much of it can do extreme damage to the fragile human atomic structural arrangement! At its worse – we call that damage – death – that being, in terms of physics, just another 'changed state' in a seemingly endless process!

The next comment suggested that *'everything'* was energy because all matter, irrespective of state is a form of energy. A fair enough comment – but it still didn't answer the basic question! It is amazing how trains of thought can become bogged down when dealing with oddly esoteric questions. Further again into the discussion the term: *'creation of the universe'* inevitably raised its head. The very use of the word – *creation* – of course, suggests a creator – and therefore moves the discussion from a purely scientific one to a philosophical and spiritual one. This manipulation of any discussion seems to be the ultimate human response when frustration and a lack of logical answers set in; a *third party* is introduced that conveniently provides all the answers. Even the illustrious Einstein is recorded as resorting to the same conclusion at one very frustrating moment in his quest for answers.

Despite this natural diversion, the discussion continued in a reasonably focused direction. Some participants were beginning to show obvious signs of frustration – evident in their comments becoming more personal and derogatory towards other forum participants. Much was made of the fact that energy determines the path of change – energy is evident through observable change – and the amount of energy determines the rate of change.

All pertinent points – but still none that addressed the original question: What exactly *is* energy?

Towards the end of the discussion there were a few comments relating to molecules and particles, and the movement of these 'producing energy'. Finally, a respondent came up with the following explanation: *Energy*, he said, *has no reality apart from its mathematical dependence on measurable variables*. The respondent noted that an object's kinetic or potential energies are not measured – but the associated state variables are - velocity and position respectively. (sic)

This answer was expanded upon, by one I assumed to be the convener, who warned that whilst it wasn't an easy question to answer – that didn't make the question impossible to answer. He indicated most physicists know exactly what energy is, and continued thus: *the concept of energy is ultimately a tool – invented by humans – to understand the world around us*. He stated that whilst this was not a definition of energy – the whole point was – energy can be MANY things and it is this vagueness that makes the concept useful.

As an example, he cites the notion of length – which is close to our primitive perception; length – we understand as being that there is, "here" and "there". The concept of energy, however, he describes as being a higher order type of tool. It doesn't correspond so simply to our direct experience in that no one can point to a primitive notion and state that it is an example of *energy*. Therefore – *energy* – is simply an abstraction. However, it does enable a unified description of diverse phenomena. Energy, as such, is simply a tool and an additional way to organise our understanding of the universe.

The writer wraps up by providing what he describes as an exact definition of energy: *"Energy is the generator of time translations"*. Having given this murky definition, he explains that – *this is why no one gives the exact definition of energy, because it takes years of intensive training just to comprehend what such a statement really means!*

In this instance, I can only agree. Having put myself through this meticulous research process, I now wonder what *'diverse phenomena'* are? I'm sure no one will ever bother to explain it to me – simply because I wouldn't understand - even if they bothered!

So, at the moment of the Big Bang – all *diverse phenomena* were present – or were they?

Any readers' comments on this small reflection would be most welcome; particularly if a convincingly simple answer is forthcoming.



Energy: What Exactly Is It? Davy Jones (cont)

Refs:

Encyclopedia, W. T. F. (1999). *Energy*. Retrieved February 18, 2011, from Wikipedia: http://en.wikipedia.org/wiki/Energy#Forms_of_energy.

LaRocco, C. E. A. *The big bang it sure was big*. Retrieved February 18, 2011, from University of Michigan: <http://www.umich.edu/>

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 Sciforums, P. (2006). *What exactly is energy*. Retrieved February 18, 2011, from SciForums.com: <http://www.sciforums.com/showthread.php?t=54423>.

MAS MONTHLY FINANCIAL REPORT

Tony Law, Treasurer

Term deposit:	\$7,000.00
Cash account:	\$3,023.35
PayPal account:	\$42.37
Refreshment float:	\$40.00
Merchandise float:	\$100.00
Cash undeposited:	\$64.00
TOTAL CASH ASSETS:	<u>\$10,269.72</u>

Prime Focus Article Submission

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

Monday 11th April 2011

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



Annual General Meeting and Constitution Changes

NOTICE OF ANNUAL GENERAL MEETING

Notice is given that the Annual General Meeting of the Society will be held at the University of Western Sydney on Monday 18th April 2011, commencing at 7.30 pm. Formal business will include the presentation of Annual Reports by the President, Treasurer & Merchandise Officer; the Auditor's statement; a motion to change the Constitution; election of office-bearers for 2011-12; and the presentation of membership awards.

The motion to be put at the AGM will be as follows: *"That: (i) the current Constitution of Macarthur Astronomical Society be rescinded; and (ii) the proposed Draft Constitution, as displayed on the Society's website for the last six weeks, be adopted as the new constitution of Macarthur Astronomical Society; and (iii) the old constitution shall remain in force until such time as the new constitution is accepted in writing by The Department of Fair Trading and at least until 1st June 2011. "*

The committee recommends the members adopt the new constitution, which is published in full below:

CONSTITUTION

of

MACARTHUR ASTRONOMICAL SOCIETY Incorporated

*Registered as an Association by the NSW Office of Fair Trading on the 18th June 1996.
Registration Number Y2418036*

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1.1 Name

The name of the organisation shall be '*Macarthur Astronomical Society Incorporated*' hereinafter referred to as the Society.

1.2 General definitions

In this document:

Ordinary member means a member of the Society who is not an office-bearer of the Society, as referred to in clause 5.1(a).

Secretary means the person holding office under this constitution as secretary of the Society, who shall also be the Public Officer of the Society.

Annual General Meeting means a meeting of the membership to conduct formal business including receiving annual reports for the previous financial year and electing office-bearers for the next twelve months.

Special General meeting means a meeting of the membership to conduct formal business.

Ordinary General Meeting means a meeting of the membership for the purpose of informal discussion and workshops and to provide a platform for guest speakers.

General Meeting means an Annual General Meeting, a Special General Meeting or an Ordinary General Meeting.

Management Committee Meeting means a meeting of the office-bearers to manage the affairs of the Society.

1.3 Functions

In this document, a reference to a function includes a reference to a power, authority and duty; and a reference to the exercise of a function includes, if the function is a duty, a reference to the performance of the duty.

2. OBJECTIVES

2.1 To foster the science of Astronomy

2.2 To organise observational field nights for the purpose of carrying out astronomical observation.

2.3 To assist and give advice regarding astronomical instrumentation.

2.4 To participate in / co-operate with other scientific societies and groups with a similar scientific interest in astronomy.



3. POWERS

The powers of the Society are:

3.1 To subscribe to become a member of and co-operate with any other association, club or organisation whether incorporated or not, whose objectives are altogether or in part similar to those of the Society, provided that the objectives of said association, club or organisation are consistent with clause 7.

3.2 In furtherance of the objectives of the Society to buy, sell and deal in all kinds of articles, commodities and provisions both liquid and solid for the members of the Society or persons frequenting the Society's premises.

3.3 To purchase, take on lease or in exchange, hire and otherwise acquire any lands, buildings, easements property, real and personal, and any rights and privileges which may be requisite for the purposes of, or capable of being conveniently used in connection with any of the objectives of the Society: Provided that in case the Society shall take or hold any property which may be subject to any trusts the Society shall only deal with same manner as is allowed by law having regard to such trust.

3.4 To enter into any arrangements with any government or authority that are incidental or conducive to the attainment of the objects or the exercise of the powers of the Society; to obtain from any such government or authority any rights, privileges or concessions which the Society may find it desirable to obtain; and to carry out, exercise and comply with any such arrangements, rights, privileges and concessions.

3.5 To appoint, employ, remove or suspend such managers, clerks, secretaries, servants, workmen and other persons as may be necessary or convenient for the purposes of the Society.

3.6 To remunerate any person or body corporate for services rendered, or to be rendered, and whether by way of brokerage or otherwise in placing or assisting to place or guaranteeing the placing of any unsecured notes, debentures, or other securities of the Society or in or about the Society or promotion of the incorporated Society or in the furtherance of its objectives.

3.7 To construct, improve, maintain, develop, work, manage, carry out alter or control any houses, buildings, grounds, works or conveniences which may seem calculated directly or indirectly to advance the Society's interests, and to contribute to, subsidise or otherwise assist and take part in the construction, improvement, maintenance, development, working, management, carry out, alteration, or control thereof.

3.8 To invest and deal with the money of the Society not immediately required in such manner as may from time to time be thought fit.

3.9 To take or otherwise require and hold shares, debentures or other securities of any company or body corporate.

3.10 To further the objectives of the Society to lend and advance money or give credit to any person or body corporate; to guarantee and give guarantees or indemnities for the payment of money or the performance of contracts or obligations by any person or body corporate, and otherwise to assist any person or body corporate.

3.11 To borrow or raise money either alone or jointly with any other person or legal entity in such manner as may be thought proper and whether upon fluctuating advance account or overdraft or otherwise to represent or secure any monies and further advances borrow or to be borrowed alone or with others as aforesaid by notes secured or unsecured debentures or debenture stock or otherwise, or by mortgage charge, lien or other security upon the whole or any part of the Society's property or assets present or future and to purchase, redeem or pay off any such securities.

3.12 To draw make, accept, endorse, discount, execute and issue promissory notes, bills of exchange, bills of lading and other negotiable or transferable instruments.

3.13 In furtherance of the objectives of the Society to sell, improve, manage, develop, exchange, lease, dispose of, turn to account or otherwise deal with all or any part of the property and rights of the Society.



3.14 To make or hold mortgages liens or charges, to secure payment of the purchase price, or any unpaid balance of the purchase price, of any part of the Society's property of whatsoever kind sold by the Society, or any money due to the Society from purchases and others.

3.15 To take any gift of property whether subject to any special trust or not, for any one or more of the objectives of the Society but subject always to the provision of clause 3.3.

3.16 To take such steps by personal or written appeals, public meetings or otherwise, as may from time to time be deemed expedient for the purpose of procuring contributions to the funds of the Society, in the shape of donations, annual subscriptions or otherwise.

3.17 To publish any electronic or printed material the Society may think desirable for the promotion of its objectives.

3.18 To do all such things as are incidental or conducive to the attainment of the objectives and the exercise of the powers of the Society.

3.19 To appoint honorary patrons to enhance the scientific reputation of the Society; or for other reasons deemed beneficial to the Society.

4. MEMBERSHIP AND FEES

4.1 Membership of the Society

Shall consist of ordinary members of any of the following classes:

- i) Full member
- ii) Family Member
- iii) Student Member
- iv) Pensioner Member
- v) Associate Member
- vi) Honorary Member

These memberships are unlimited in number. Resources are available to members for use after a qualifying period of time as set by the committee. Membership is restricted to individuals, one membership per person.

a) Full membership is for a person who has attained the age of 18 or over. They shall be entitled to voting rights and access all the Society's functions and facilities upon payment of such membership fee as may be charged.

b) Family membership is for parents and student children under the age of 18. Voting rights are limited to two adults.

c) Student membership is up to the age of 18 or any person studying at university or college. Full membership will be required when student status is no longer held by the student member. Voting rights are restricted to those aged eighteen or above.

d) Pensioner membership with the right to vote includes any person on an aged, invalid or single parent pension.

(e) Associate members may partake in all club activities except for elections and standing for office. An Associate member may only hold this type of membership with approval of the management committee.

f) An honorary membership may be conferred upon a person by the management committee who in the opinion of the committee, has rendered valuable service to Astronomy and the advancement of the Society. Honorary members have the same rights as full members.

4.2 Membership Fees



- (a) An applicant for membership of the Society shall prior to admission pay to the Society the joining fee as determined by the committee in accordance with the constitution and by-laws.
- (b) In addition to the joining fee an applicant for membership of the Society shall pay to the Society an annual membership fee for the sum as determined by the committee in accordance with the constitution and by-laws.
- (c) The annual membership fee shall fall due on the first day of the Society's new financial year or as determined by the by-laws.
- (d) A member whose subscription has fallen two months in arrears will cease to be a member and will not be reinstated until a joining fee and full arrears has been paid, unless extenuating circumstances can be substantiated.
- (e) Membership applicants who are accepted to membership by the Management Committee after 1st November of each year shall also be deemed as financial until the end of the following financial year.
- (f) The joining date for new members is deemed to be the date of formal acceptance of the application by the Management Committee.
- (g) Membership fees and joining fees are non-refundable, unless extenuating circumstances can be substantiated or unless the member's initial application for membership is rejected.

4.3 Admission and Rejection of Members

- (a) Every applicant for admission to membership of the Society shall complete and sign the membership application form. The completed application form together with the current joining fee and annual subscription will be passed to the treasurer for processing. The treasurer shall submit every application for membership to the next committee meeting.
- (b) At the next meeting of the Management Committee after the receipt of any application and the fee applicable for any class of membership, the application shall be considered for acceptance or rejection.
- (c) Any applicant who receives a majority of votes of the members of the Management Committee present at the meeting at which such application is being considered shall be accepted to the class of membership.
- (d) Upon the acceptance or rejection of an application for any class of membership the secretary shall forthwith give the applicant notice in writing of such acceptance or rejection.
- (e) Upon an application for membership failing to gain a majority vote by the Management Committee for membership the application will be void and monies will be returned by the Secretary.

4.4 Termination of Membership

- a) A member may resign or terminate membership from the Society at any time by giving notice in writing to the secretary. Such resignation shall take effect at the time such notice is received by the secretary unless a later date is specified in the notice when it shall take effect on that later date.
- b) If a member-
- (i) is convicted of an indictable offence; or
 - (ii) fails to comply with any of the provisions of this constitution; or
 - (iii) is guilty of conduct considered to be injurious or prejudicial to the character or interests of the Society;
- the Management Committee shall consider whether the membership shall be terminated.
- c) The member concerned shall be given a full and fair opportunity to present a case and if the Management Committee resolves to terminate the membership it shall instruct the secretary to advise the member in writing accordingly.
- d) A member who gives notice in writing that current membership will not be renewed shall cease to be a member after the last day of the old financial year or on the date of receipt by the secretary of such notice, whichever is the latter.



4.5 Appeal Against Rejection or Termination of Membership

- a) A person whose application for membership has been rejected or whose membership has been terminated may within one month of receiving written notification thereof, lodge with the secretary written notice of intention to appeal against the decision of the Management Committee.
- b) Upon receipt of a notification of an intention to appeal against rejection or termination of membership the secretary shall convene, within three months of the date of receipt by the secretary of such notice, a Special General Meeting to determine the appeal. At any such meeting the applicant or member shall be given the opportunity to fully present a case and the Management Committee or those members thereof who rejected the application for membership or terminated the membership subsequently shall likewise have the opportunity of presenting a case. The appeal shall be determined by the vote of the members present at such a meeting.
- c) Where a person whose application is rejected, does not appeal against the decision of the Management Committee within the time prescribed by this Constitution or so appeals but the appeal is unsuccessful, the secretary shall forthwith refund the amount of any fee paid.

4.6 Register of Members

- a) The Management Committee shall cause a register to be kept in which shall be entered the names and residential addresses of all persons admitted to membership of the Society and the dates of their admission.
- b) Particulars shall also be entered into the register, of deaths, resignations, terminations and reinstatements of membership and any further particulars as the Management Committee of the members at any General Meeting may require from time to time.
- c) The register of membership names shall be open for inspection at all reasonable times by any member who previously applies to the secretary for such inspection.

4.7 Voting Rights at Meetings of the Society

Voting rights conferred by clause 4.1 may only be exercised at a meeting called under clause 6 by registered financial members over eighteen years of age, whose memberships have been formally accepted under clause 4.3 and who are financially paid up prior to the commencement of the meeting.

5. MANAGEMENT COMMITTEE

5.1 Membership of Management Committee

- a) The Management Committee of the Society shall consist of President, Vice President, Secretary, Treasurer, all of whom shall be members of the Society and such number of other committee members as provided in the bylaws.
- b) At the Annual General Meeting of the Society, all the members of the Management Committee for the time being shall retire from office, but shall be eligible upon nomination for re-election.
- c) The election of officers and other members of the Management Committee shall take place in the following manner; -
- (i) Any two members of the Society shall be at liberty to nominate any other member to serve as an officer or other member of the Management Committee;
- (ii) The nomination, which shall be in writing and signed by the member and a proposer and seconder, shall be lodged with the secretary at least fourteen days before the Annual General Meeting at which the election is to take place;



- (iii) A list of the candidates names in alphabetical order, with proposers and seconders names shall be posted in the journal and on the website at least seven days immediately preceding the Annual General Meeting.
- (iv) Balloting lists shall be prepared (if necessary) containing the names of the candidates in alphabetical order and each member present at the Annual General Meeting shall be entitled to vote for any number of such candidates not exceeding the number of vacancies;
- (v) An election for membership of the Management Committee shall be carried out by a secret ballot of the members present at the meeting. The successful candidate shall receive at least 50% +1 of the total formal votes cast.
- d)** Should, at the commencement of such a meeting, there be insufficient number of candidates nominated, nominations may be taken from the floor of the meeting.
- e)** All Management Committee Members have an obligation to attend Committee Meetings. In the event of a Committee Member not attending three consecutive Committee Meetings their position on the Committee will be vacated.

5.2 Resignation or Removal from Management Committee

- a)** Any member of the Management Committee may resign from membership of the Management Committee at any time by giving notice in writing to the secretary but such resignation shall take effect at the time such notice is received by the secretary unless a later date is specified in the notice when it shall take effect on that later date.
- b)** The Society in Special General Meeting may by resolution remove any member of the management committee from the office held by the member before the expiration of the member's term of office and may by resolution elect another member to hold office until the expiration of the term of office of the member so removed.
- c)** A member of the management committee subjected to a proposed resolution of removal from office, may make reasonable representations in writing to the secretary requesting that the representation be transmitted to the ordinary members and/or read out at the meeting at which the resolution is considered. The secretary shall transmit a copy of the representations to each ordinary member and/or read it to the Special General Meeting prior to the motion being put to a vote.

5.3 Vacancies on Management Committee

- a)** The Management Committee shall have power at any time to appoint any member of the Society to fill any casual vacancy on the Management Committee until the next Annual General Meeting.
- b)** The continuing members of the Management Committee may act notwithstanding any casual vacancy in the Management Committee, but if and so long as their number is reduced below the number fixed by or pursuant to this constitution as the necessary quorum of the Management Committee, the continuing member or members may act for the purpose of increasing the number of members of the Management Committee to that number or of summoning a Special General Meeting of the Society, but for no other purpose.

5.4 Functions of the Management Committee

- a)** Except as otherwise provided by this constitution and subject to resolution of the members of the Society carried at any Special General Meeting the Management Committee:
- (i) shall have the general control and management of the administration of the affairs, property and funds of the Society; and
- (ii) shall have authority to interpret the meaning of this constitution and any matter relating to the Society on which this constitution is silent.
- (iii) shall determine the duties of office bearers in the by-laws.
- b)** The Management Committee may exercise all the powers of The Society:



(i) to borrow or raise or secure the payment of money in such a manner as the members of the Society may think fit and secure the same or the payment or performance of any debt, liability, contract, guarantee or other engagement incurred or to be entered into by the Society in any way and in particular by the issue of debentures, perpetual or otherwise, charged upon all or any of the Society's property, both present and future, and to purchase, redeem or pay off any such securities.

(ii) To borrow money from members at a rate of interest not exceeding interest at the rate for the time being charged by bankers of New South Wales for overdrawn accounts on money lent, whether the term of the loan be short or long, and to mortgage or charge its property or any part thereof and to issue debentures and other securities, whether outright or as security for any debt, liability or obligation of the Society, and to provide and pay off any such securities; and

(iii) To invest in such manner as the members of the Society may from time to time determine.

5.5 Meetings of the Management Committee

a) The Management Committee shall meet monthly at least ten times per year to exercise its functions. The time of a Management Committee Meeting shall not coincide with the time of an Ordinary General Meeting. The proceedings of the meeting shall be minuted by the secretary.

b) A Special Meeting of the Management Committee shall be convened by the secretary on requisition in writing signed by not less than one third of the members of the Management Committee, which requisition shall clearly state the reasons why such Special Meeting is being convened and the nature of the business to be transacted thereat.

c) At every meeting of the Management Committee a simple majority of a number equal to the number of members elected and/or appointed to the Management Committee as to the close of the last General Meeting of the members, shall constitute a quorum.

d) Subject to this constitution, the Management Committee may meet together and regulate its proceedings as it thinks fit: Provided that questions arising at any meeting of the Management Committee shall be decided by a majority of votes and, in the case of equality of votes, the question shall be deemed to be decided in the negative.

e) A member of the Management Committee shall not vote in respect of any contract or proposed contract with the Society in which the member holds an interest or any matter arising therefrom, and if the member does so vote shall not be counted.

5.6 Sub-Committees

The Management Committee may delegate any of its powers to a sub-committee consisting of such members of the Society as the Management Committee thinks fit. A sub-committee so formed shall in the exercise of the powers so delegated, conform to any regulations that may be imposed on it by the Management Committee. Any sub-committee may elect a member to chair its meetings. If no such Chairperson is elected or if the Chairperson is not present within ten minutes after the appointed time of the meeting, the members present may choose one of their number to chair the meeting. A sub-committee may meet and adjourn, as it thinks proper. Questions arising at any meeting shall be determined by a majority of votes, in the case of equality of votes, the question shall be deemed to be decided in the negative.

6. MEETINGS

6.1 Annual General Meetings

The Annual General Meeting shall be held within six months of the close of the financial year. The business to be transacted at every Annual General Meeting shall be:-

a) The receiving of minutes of the previous Annual General Meeting, Management Committee reports and the statement of income and expenditure, assets and liabilities and mortgages, charges securities affecting the properties of the Society for the preceding financial year;

b) Receiving the auditor's report upon the books and accounts for the preceding financial year;



c) The election of the Management Committee.

6.2 Special General Meetings

The Secretary shall convene a Special General Meeting:

a) when directed to do so by the Management Committee; or

b) on the requisition in writing signed by not less than one third of the members presently on the management committee or not less than the ordinary members of the Society which equals double the number of members presently on the Management Committee plus one. Such requisition shall clearly state the reasons why such Special General Meeting is being convened and the nature of the business to be transacted thereat; or

c) on being given a notice in writing of an intention to appeal against the decision of the Management Committee to reject an application for membership or to terminate the membership of any person.

6.3 Ordinary General Meetings

Ordinary General Meetings shall be convened monthly at least ten times per year or at such other times deemed appropriate by the Management Committee.

6.4 General Meetings

a) At any General Meeting the number of members required to constitute a quorum shall be double the number of members on the Management Committee plus one.

b) No business shall be transacted at any General Meeting unless a quorum of members is present at the time when the meeting proceeds to business.

c) If within half an hour from the time appointed for the commencement of the meeting a quorum is not present, the meeting, if convened upon the requisition of members of the Management Committee or the Society, shall lapse. In any other case it shall stand adjourned to the same day, in the next week, at the same time and place, or to such other time and place as the Management Committee may determine, and if at the adjourned meeting the quorum is not present within half an hour from the time appointed for the meeting, the members present shall be a quorum.

d) The chairperson may with the consent of any meeting at which a quorum is present (and shall if so directed by the meeting), adjourn the meeting from time to time and from place to place, but no business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which the adjournment took place. When a meeting is adjourned, notice shall be given as in the case of an original meeting. Save as aforesaid it shall not be necessary to give any notice of an adjournment or of the business to be transacted at an adjourned meeting.

e) The secretary shall convene all General Meetings of the Society by giving not less than 14 days notice of any such meeting to members of the Society.

f) The manner by which such notice shall be given shall be determined by the Management Committee: provided that notice of any meeting convened for the purpose of hearing and determining the appeal of a member against the rejection or termination of membership by the management committee shall clearly state the nature of the business to be discussed thereat.

g) Unless otherwise provided by this constitution, at every General Meeting:

(i) The President shall preside as chairperson or if there is no President, or if the President is not present within fifteen minutes after the time appointed for the holding of the meeting or is unwilling to act, the Vice-president shall be the chairperson or if the Vice - president is not present then the members present shall elect one of their number to be chairperson of the meeting;



- (ii) The chairperson shall maintain order and conduct the meeting in a proper and orderly manner;
- (iii) Every question, matter or resolution shall be decided by a majority of votes of the members present.
- (iv) Subject to clause 4.7, every member present shall be entitled to one vote and in the case of equality of votes the chairperson shall have a second or casting vote:
- (v) Except as provided elsewhere in this constitution, voting shall be a show of hands, unless not less than one fifth of the members present demand a ballot, in which event there shall be a secret ballot. The Chairperson shall appoint two members to conduct a secret ballot in such manner as the chairperson shall determine and the result of the ballot, as declared by the chairperson, shall be deemed to be the resolution of the meeting at which the ballot was demanded.
- (vi) The Secretary shall minute Annual General Meetings, Special General Meetings and any formal business proceedings carried out at Ordinary General Meetings.

7. FUNDS AND ACCOUNTS

- a) The funds of the Society shall be deposited in the name of the Society in such bank or non-bank financial institution as the Management Committee may from time to time direct.
- b) Computerised accounts shall be kept in accordance with applicable accounting standards and other mandatory professional and statutory reporting requirements, in the English language, showing correctly the financial affairs of the Society and the particulars usually shown in books of a like nature.
- c) All monies shall be deposited as soon as practicable after receipt thereof.
- d) Written receipts shall be made immediately monies are received.
- e) All amounts of twenty dollars or over shall be paid by cheque signed by any two of the President, Secretary, Treasurer or other member authorised from time to time by the Management Committee.
- f) The Management Committee shall determine the amount of Petty Cash, which shall be kept, on the imprest system.
- g) All expenditure shall be approved or ratified at a Management Committee Meeting.
- h) A soon as practicable after the end of each financial year the Treasurer shall cause to be prepared a statement containing particulars of:-
 - (i) The income and expenditure for the financial year just ended; and
 - (ii) The assets and liabilities and of the Society at the close of that year.
- i) All such statements shall be examined by the auditor who shall present a report upon such audit to the secretary prior to the holding of the Annual General Meeting next following the financial year in respect of which such audit was made.
- j) The income and property of the Society whencesoever derived shall be used and applied solely in promotion of its objects and in the exercise of its powers as set out herein and no portion thereof shall be distributed, paid or transferred directly or indirectly by way of dividend, bonus or otherwise by way of profit to or amongst the members of the Society provided that nothing herein contained shall prevent the payment in good faith of interest to any such otherwise owing by the Society to him or her of remuneration to any officers or servants of the Society or to any member of the Society or other person in return for any services actually rendered to the Society provided further that nothing herein contained shall be construed so as to prevent the payment or repayment to any member of out of pocket expenses, money lent, reasonable and proper charges for goods hired by Society or reasonable and proper rent for premises demised or let to the Society.



The income and property of the Society whencesoever derived shall be used and applied solely in promotion of its objectives and in the exercise of its powers as set out herein. No portion thereof shall be distributed, paid or transferred directly or indirectly by way of dividend, bonus or otherwise by way of profit to or amongst the members of the Society. However, nothing herein contained shall prevent the payment in good faith of interest to any such otherwise owing by the Society of remuneration to any officers or servants of the Society or to any member of the Society or other person in return for any services actually rendered to the Society. Also provided further that nothing herein contained shall be construed so as to prevent the payment or repayment to any member of out of pocket expenses, money lent, reasonable and proper charges for goods hired by Society or reasonable and proper rent for premises demised or let to the Society.

8. DOCUMENTS

- a) The Management Committee shall provide for the safe custody of books, documents, computer files, website, instruments of title and securities of the Society.
- b) Destruction or disposal of records and assets must be authorised by the management committee.

9. FINANCIAL YEAR

The financial year of the Society shall close on last day of February in each year.

10. BYLAWS

The Management Committee may from time to time make, amend or repeal by-laws, not inconsistent with this constitution, for the internal management of the Society and any by-law may be set aside by a Special Meeting of members.

11. ALTERATION TO CONSTITUTION

- a) Subject to provisions of Government Acts, this constitution may be amended, rescinded or added to by resolution carried at any Annual or Special Meeting; provided that no such amendment, rescission or addition shall be valid until approved by the government department controlling such matters.
- b) One months notice shall be given to ordinary members concerning any proposed changes to the constitution. Such notice shall be displayed in the Society's Journal and on the website and sent electronically using the most recent contact address provided by each member.
- c) A resolution to change the constitution shall be deemed carried if it at least seventy five per cent of the members at the meeting vote in favour of it.

12. DISSOLUTION

The Society may be dissolved by the affirmative vote of two thirds of the adult members present and entitled to vote at a Special General Meeting called for that purpose. Should the number of adult members fall below five (5) the Society shall forthwith be dissolved. The dissolution shall be executed in accordance with the the relevant Acts of Parliament governing associations.

13. DISTRIBUTION OF SURPLUS ASSETS

Following dissolution, if there remains after satisfaction of all its debts and liabilities, any property whatsoever, the same shall not be paid to or distributed among the members of the Society, but shall be given or transferred to some other institution or institutions having objectives similar to the objectives of Macarthur Astronomical Society Inc.





Draft Report Project EKENER by NACA (National Aeronautics Colonisation Authority)

The following is a draft report on the proposal to terraform the planet Mars by use of mass planting of trees. This is based on the common wisdom that trees utilise the carbon dioxide in the atmosphere to grow and expel oxygen, thus increasing the percentage of oxygen in the atmosphere while reducing the level of carbon-dioxide.

This unconventional proposal was discovered by serendipity when a NACA employee, Bob Apis, on holiday in Australia, attended a local astronomy society's seminar where the guest speaker, a planetary expert known to NACA, expounded said terra-forming method. With NACA approval, the proposal was subjected to further research and a costing, under the title PROJECT EKENER*. This is the report.

* The source of project title "EKENER" is obscure. Bob Apis, being an amateur student of Greek mythology, was of the belief that Ekener was the son of Davidus, the demi-god of bovinity. However, his references to that information have since been unrelatable and cannot be confirmed. Unfortunately, it was decided so much documentation has been created with this title it would not be cost effective to change it.

Separate teams were established to investigate the different problems that were identified with the proposal. Their detailed reports, totalling some 6,000 pages, are summarised here.

Report EKENER-1 Compatibility of Martian atmosphere and climate with trees:

The team immediately noted that the atmospheric pressure at Mars' surface level was a mere 7.5 millibars. This is equivalent to the pressure at a height of 22 miles (or 35km as the other 95% of the world would say) above the Earth's surface. After detailed calculations, it was decided that this is very thin indeed.

In addition, our landers have measured surface temperatures ranging from a summer maximum of -29°C to a winter minimum of -100°C.

Put together, that indicates extremely low temperatures at hyper-extremely low atmospheric pressures. [Note: One team member, who recently climbed to the peak of Mount Everest with a height of 7 miles (11 km), said he distinctly noted a lack of trees near the mountain top.] However, the proposal source clearly has expert knowledge on these matters and further enquiries are being made with the botanical sciences as to the existence of a strain of tree that can exist under such extreme conditions. If not, can one be developed?

Report EKENER-2 Quantification of number of vegetabular structures required:

Introduction and assumptions:

After extensive consultation with the botanical sciences, a conservative estimate of the percentage of planetary surface area needed to be tree-planted was determined to be, at a minimum, 10%. Ideally, it should be much higher, allowing a desired outcome at only 100 years. However, for the logistical reasons outlined here-in, a lesser number is calculated, with an outcome period of 800 – 1,000 years.

It was determined that, allowing for ultimate mature growth size, there should be one tree per 100 m².

[Note: At this point, though it causes the team great distress, the report will use metric units so that future collaboration with non-American parties will be more easily facilitated.]

Calculation of number of trees required to be planted:

Diameter of Mars: $d = 6,790\text{km}$
 Surface Area of planet: $A_P = 4\pi d^2/4 = 144,859,082\text{ km}^2$
 Surface with trees: $A_T = A_P * 0.1 = 14,485,908\text{ km}^2$
 At 100 m² each, No. of trees per km² = 10,000
 Total Number of trees required = 144,859,082,200.
That's around 150 billion trees.

Report EKENER-3 Transportation of trees:

Introduction and assumptions:

After due consultation, the following assumptions have been made to facilitate calculations:

- Trees would have to be transported as seedlings.
- Seedlings would come in 50mm tubs (rectangular for packing)
- Seedlings initially 150mm tall (tub and plant), growing to 200mm by end of 9 month journey.

Calculation of Storage Volume required:

Each seedling occupies a volume = $0\text{mm} * 50\text{mm} * 200\text{mm} = 0.0005\text{ m}^3$
 Total volume of all seedlings = No. of Trees * $0.0005\text{ m}^3 = 72,429,541\text{ m}^3 = 72.43\text{ km}^3$.

However, the trees will require to be watered on-route.

Calculation of quantity of water required on-route



Draft Report Project EKENER by NACA

(National Aeronautics Colonisation Authority)

Assume require 100ml per day per plant: $100\text{ml} = 10^{-4}\text{m}^3$
 Therefore, Total amount of water on 9 month trip out with plants = No. of trees* 10^{-4} * 365×0.75
 $= 3,965,517,355\text{m}^3 \approx 4\text{ billion m}^3$.
 Add volume of seedlings: **Still 4 billion m³.**

Calculation of size of Transport ships:

Assume we build a space transport with a storage volume of 1 million m³.

This could be a cylindrical vessel 50m diameter, 500m long.

To transport trees and on-route water, how many of these would we need?

4 billion m³ / 1 million m³ per ship = 4,000 ships.
 [Note: How big is our budget?]

Report EKENER-3

Transportation of Post-planting Water:

Introduction and assumptions:

Once the seedlings are planted, they require ongoing watering. [Note: We assume some other team has solved the problem of the water turning instantly to ice once applied to the seedling. Good luck!]

Our advice is a seedling will require, at minimum, 10 litres at initial planting and 10 litres per week for 3 years. [Why 3 years? It is assumed someone will find a better way to do this in that time. Otherwise it will be for a millennium.]

Calculation of volume of water to be transported for Post-planting:

Volume of water (m³) required = No. of seedlings*10 litres*156 weeks/1000 =

225,980,168,232 m³. i.e. 226 billion m³

Assume we use the same 1 million m³ transport ships.

How many deliveries of water over 3 years = 226 billion m³ / 1 million m³ = 226,000 trips.

That equals approx 75,000 deliveries per year = 206 per day.

One can immediately see a difficulty here as...

NACA Director's note:

I thank the various teams for their input into the analysis of this interesting terra-forming proposal. I note that I haven't yet received the report from team EKENER-4 on the impact of cosmic radiation on the viability of tree growth on Mars. Please pass it on to my successor.

I regret to advise you all that after absorbing the intriguing data you provided, such as the challenge of building and launching over 200 one million ton space ships per day towards Mars [Note: has anyone calculated the quantity of fuel that would be required? Oh, and the minor matter of how we can land it all on the planet's surface?] I have been advised by my doctor to take a long absence of leave.

[Note to Secretary – please ensure Bob Apis undertakes no more trips to Australia. It's a dangerous place; especially that astronomical society.]