

CASMAG

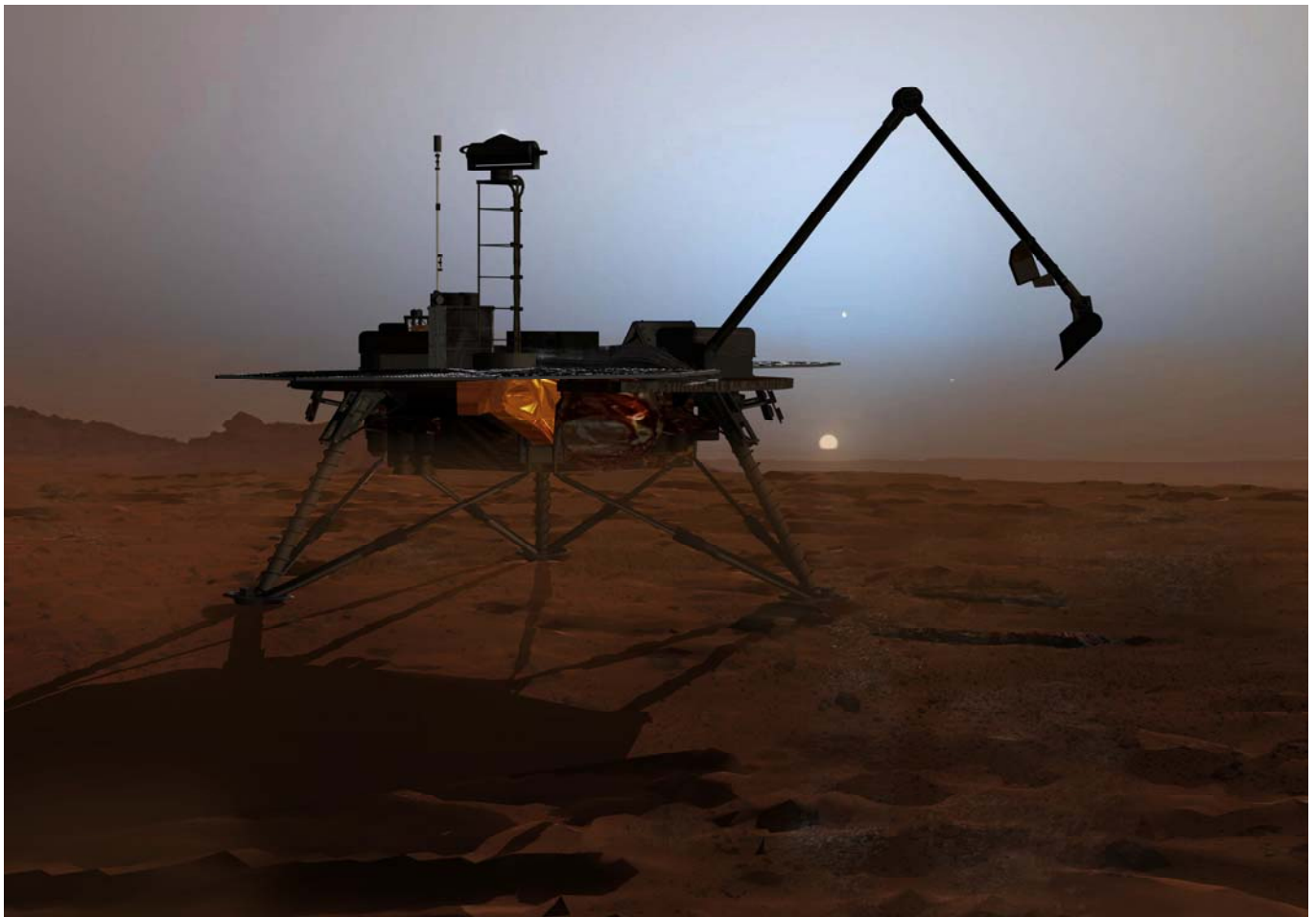
THE OFFICIAL MAGAZINE OF THE CANTERBURY ASTRONOMICAL SOCIETY INC.

Vol. 59 – No 02

May 2008

Issue Number 655

Next meeting: 20 May
***Crossing the Shadow: Emerging
Theoretical Techniques for Eclipse
Prediction in the Ancient Near East***
Clemency Montelle
(Department of Mathematics & Statistics, Canterbury University)



A NASA artist's vision of the Phoenix Mars Lander starting to shut down operations as winter sets in. The far-northern latitudes on Mars experience no sunlight during winter, which will mark the end of the mission because the solar panels can no longer charge the lander's batteries. Frost covering the region as the atmosphere cools will bury the lander in ice. *Image credit: NASA/JPL-Caltech/University of Arizona*

CAS Contact Information

Canterbury Astronomical Society Inc.
PO Box 25-137
Victoria Street Post Office
Christchurch 8144
Web: www.cas.org.nz

West Melton Observatory
Bells Road, West Melton
Phone: 347-9261
For inquiries and bookings please contact:
Lionel Hussey 021-296-4780
or email bookings@cas.org.nz

CAS Membership

Financial year: April to March
Adult membership \$50
Family membership \$75
All other classes (Junior, Senior citizen, Tertiary student, Educational) \$25

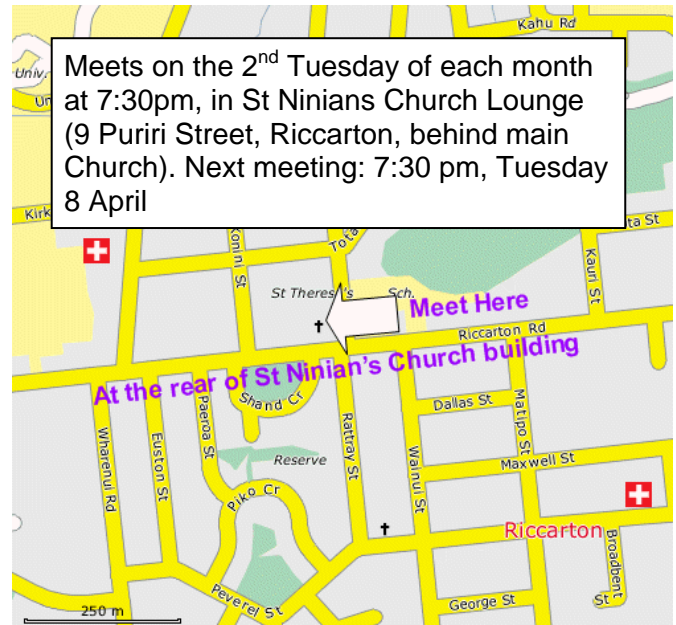
Contributions to CASMag

Member contributions to CASMag (e.g., letters, observing notes, articles, news, are most welcome. Please submit articles to The Editor, CASMag, PO Box 25-137, Christchurch 8144, or email to editor@cas.org.nz. **The deadline for the next (June) issue is 3 June.**

Small personal advertisements (less than 8 lines in a column) are free to financial members. Larger items will be charged the small advertisement rate.

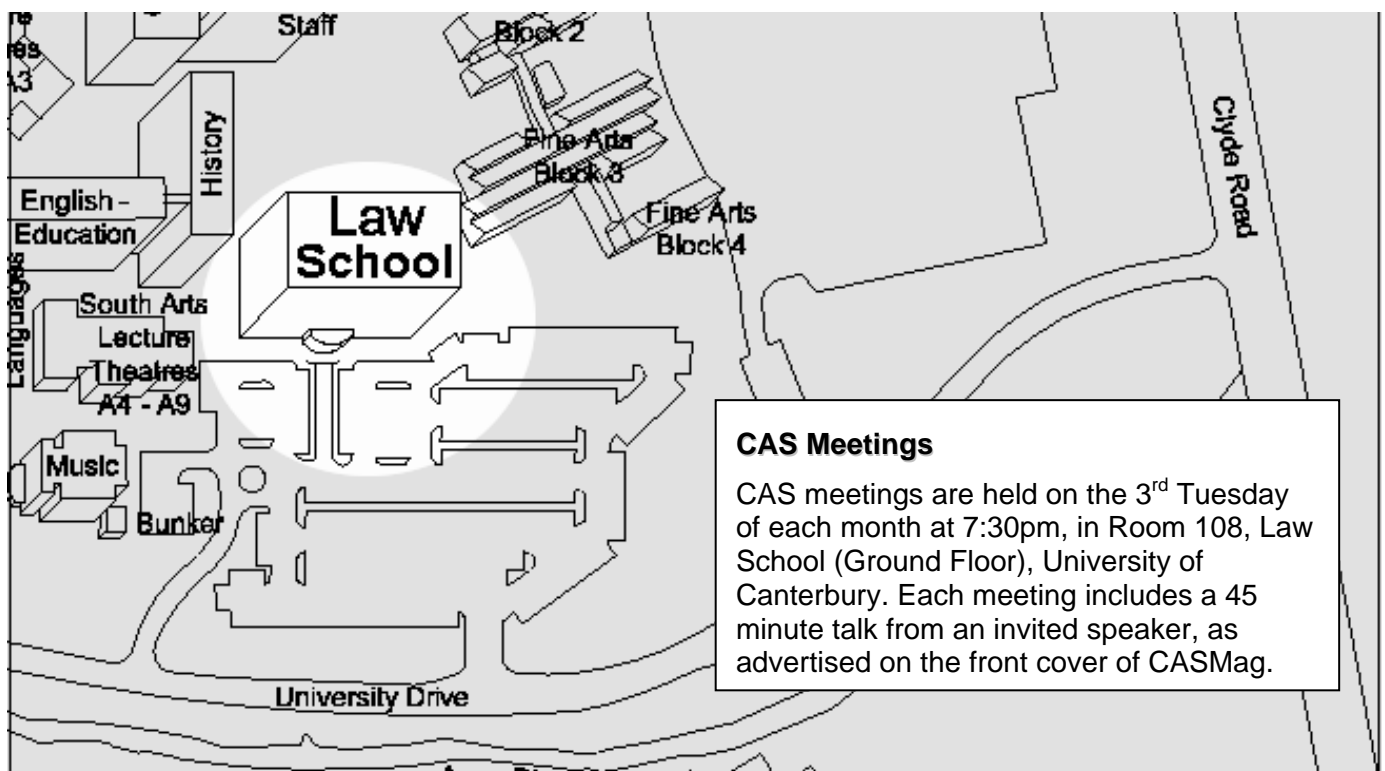
Small	\$ 5	Half page	\$25
Quarter page	\$15	Full page	\$40

New and Beginning Astronomers Group



Disclaimer

This newsletter is for general information purposes only. The views expressed herein are not necessarily those of the Canterbury Astronomical Society Inc. (CAS). CAS has taken all reasonable measures to ensure that the material contained herein is correct, but gives no warranty for, and accepts no responsibility for, its accuracy or completeness. Readers are advised not to rely solely on this information, and should seek independent advice before making any decision. CAS reserves the right to make changes at any time, as deemed necessary.



Contents

From the Editor	3	The Solar System this month	7
Who's Who?	3	May-June lunar occultations	8
Letters	4	Stories from a lifetime in astronomy	9
Bino Power	5	The man who invented Mars	10
Notice Board	6	CAS officers and committee	15

CAS Calendar, April-June 2008

(Group night every Wednesday during NZST)

May 2008						
Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June 2008						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July 2008						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

New/beginning astronomers Monthly meeting Member's night Public open night

Note that the May member's night has been postponed until May 31, to avoid clashing with the RASNZ conference.

From the Editor

Flight of the Phoenix

From my perspective squarely in the middle of the baby boomer generation, one of the more understated but profound achievements of the space age has been the transformation of the Solar System, from a bunch of fuzzy blobs glimpsed through a telescope in times of good seeing to the richly textured and diverse set of worlds we know today. The faces of big Jupiter, Saturn, Neptune, and Venus; and their attendant satellites such as Io, Europa, Callisto, Titan, Enceladus, and Triton, unknown only a few decades ago, are now familiar to (or at least accessible to) every school child.

The exquisite topographical map of Mars produced in 1999 using altimetry data collected by the Mars Global Surveyor orbiter revealed our neighbour's surface in unprecedented detail. Backed up by photographic images from Mariner 9 and its successors, and more recently from the Spirit and Opportunity rovers, we now have incontrovertible evidence that fluvial processes have actively shaped the surface at some point in the planet's geological past, although the nature of these flows remains unclear. If water was involved, as seems likely, then Mars fulfils at least one of the criteria generally considered essential for life to evolve.

On 25 May, the latest emissary from Earth is set to make landfall on Mars. The Phoenix lander will set down near the planet's north pole in the Vastitas Borealis – a vast, low-lying basin which encircles the northern hemisphere north of about latitude 50 °N, and may once have held an ocean. NASA's long-term science goals for Mars include “determining whether life ever arose”, although the Phoenix mission objectives are defined more cautiously as “to study the history of water in all its phases”; and “to search for evidence of a habitable zone and assess the biological potential of the ice-soil boundary”. Let us hope that the landing is successful, and that Phoenix continues the long and honourable history of robotic exploration of the Solar System which has served humanity so well for nearly fifty years.

Who's Who?

Euan Mason (Committee, c. 2005-2008)

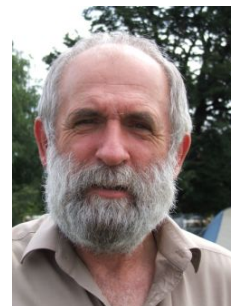
I've been an amateur astronomer for decades, and my most peaceful moments are spent at an eyepiece. I enjoy viewing and photographing astronomical objects, showing the public the sky, giving and hearing talks about astronomy, and I'm chasing Larry Field's record for the longest ever mirror grinding project. Before moving to Christchurch I was a founding member of the Rotorua Astronomical Society and I've since been made a life member. I was president of the Canterbury Astronomical



Society for many years before abdicating in favour of some new blood 3 years ago. Phil Barker and I present a night (of course) course at the University of Canterbury entitled, "Observing the night sky: A beginner's guide" which has now run about 20 times. I helped build the dome for the 5" Cooke, assisted with many of the ground renovations at CAS's observatory, and I recently built a backyard observatory that houses my Celestron CGE 11. During the day and on cloudy nights I'm an Associate Professor in Forestry at the University of Canterbury, where I make mathematical models of how trees grow.

Martin Unwin (Editor/Membership Secretary, 2008)

A childhood under clear Central Otago skies (where my father studied auroral physics) inevitably led to a healthy interest in astronomy, pursued in those days via a lovely old brass 3" refractor. Light pollution was minimal and – on clear moonless nights – the zodiacal light would stink up like a finger in the fading twilight sky. Despite this, my observing never reached any great heights: the planets, the better known constellations, the Clouds of Magellan and the Orion nebula were pretty much the limit of my knowledge. I didn't even know about Omega Centauri or 47 Tuc.



After a 30+ year career in science, starting with Physics degrees from Otago and Canterbury followed by a long sidestep into fisheries biology, it finally dawned on me that it was about time I took my astronomical interests to the next level. So I bought a small (15 cm) Newtonian on a Meade LXD75 EQ mount, and began the curious and often frustrating process of learning my way around the sky. Three years later I'm still very much a beginner, but my scope now fairly bristles with new and upgraded attachments: a piggy back mount courtesy of a work colleague; a non-inverting finder scope; a Rigel quick finder (love it); and a solar filter plus an expanding selection of dew chasers and eyepieces courtesy of Larry Field. My home in Christchurch suffers from high roof lines and is poorly suited for astronomy, but we are regular visitors to Wanaka where I do most of my observing.

The learning curve remains steep, but is showing signs of easing. It has come as a very pleasant surprise to discover that many of the objects I have known since childhood from books are readily accessible to even a small instrument such as mine, and it has been a real buzz to successfully look for and find such basic objects as the Crab, the Dumbbell, and the Silver Coin.

Steve Johnson (Committee, 2005-2008)

Hi all, I'm Steve, an Australian born Kiwi who has spent the past 20 years living in New Zealand. I'm so into Star Trek and Sci-Fi, just love it! Since I can remember I have always had an interest in the cosmos. It's something that still amazes me and I think always will. It's just amazing to look up and think what an incredible, dynamic world in which we live.



I joined the society in 2004 to be around like minded people and to learn more about just what's out there. I started as a committee member the following year. For the past six months I have also been on the Local organising committee for the RASNZ conference in Tekapo at the end of May. In addition I am also a member of the outreach sub committee. For the past month years helping Lionel Hussey and Dave Brian with the Wednesday group night at West Melton (WM) and this year I am also taking a more active role in the Friday public nights as well. All this doesn't leave much time for myself or my family including the cats (Alpha & Buddy) and friends, however I have learnt heaps, including how to use the 14" telescope in the main dome at WM. This gave me the pleasure of using it with the groups that came out on the Wednesday nights throughout the last winter season.

My back ground is in the retail sector and I am now an advertising consultant for The Press in Christchurch, a job that I enjoy very much. I hope that I can offer some of my limited skills to the society to make a difference for the better.

Letters

Night Vision

Dear CASMag

Congratulations (I think?) on being elected the new Editor.

Before it was called CASMAG it was called the CAS Journal of which I still have copies going back to the early 1960s (and a few I think in the late 1950s).

Regarding Jim Coxon's comment on retaining your dark adaptation when coming inside I remember Stuart Lauder (an Ashburton variable star observer) who used to don a pair of sunglasses when coming in for a cuppa midway during observing. His family thought it a great joke, wearing sunglasses at night.

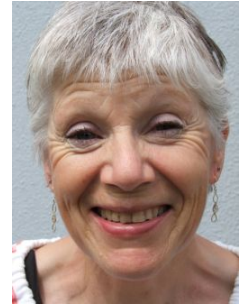
Bob Evans, Otatara, 7 April 2008

Bino Power

by Heather Skinner

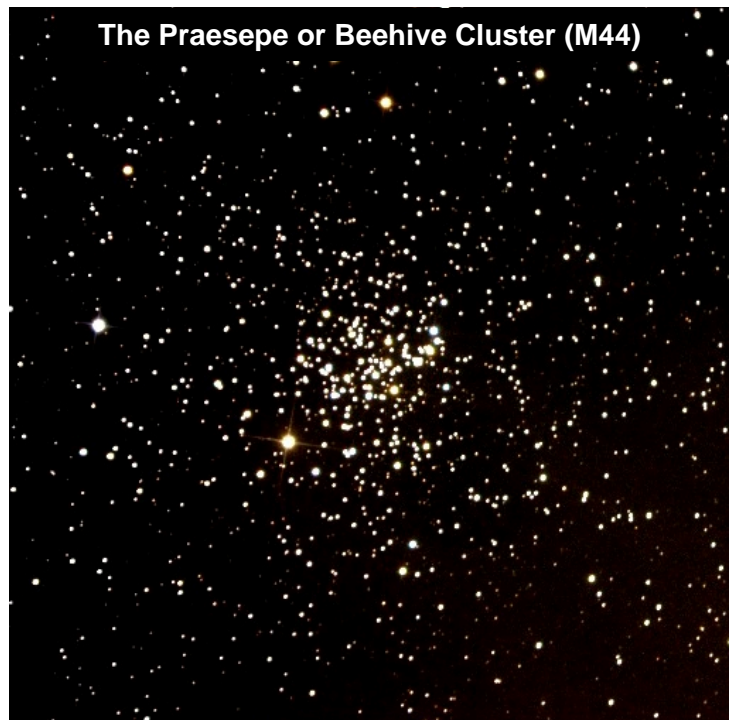


Wednesday 9 April 2008. Hello again everyone. The night of April 9 was nice and clear though fairly cold, and dewy. At about 7:30 pm a thin, waxing crescent moon was by now below my horizon. I thought I would have a look at Cancer, well placed to the north-northeast. It is a very faint constellation, and to us in the southern hemisphere is like a huge Y shape. It is best found by going from the more prominent shape of the “snake’s head” of Hydra the water snake; a little further down, there are two stars that straddle Hydra’s head. To the left is Beta, an orange star, and the star to the right is Alpha, which is a white star. Going just to the left of Alpha is a fairly faint open cluster which is M67. If you are using binos, and depending on their size, M67 may look more like a misty slightly elliptical shape. Through my 20×80 binos, and taking time to see it using SAV¹ I could just start to resolve some of the brighter stars. Next clear night I will take a look at it though my scope. But if you can't be bothered with that, thinking it is not much to look at, just follow down from the head of Hydra and on a clear night the naked eye will see a misty patch. This is a definite for binos and needs the wide FOV (field of view) to see all the stars. This is the open cluster M44, also known as The Beehive cluster or Praesepe (the Manger). It is a huge, sprawling cluster, so stay with it and just let your eyes roll around it until the photons penetrate your eyes. You should be able to start to pick out some slightly orange coloured stars.



Thank you to Jim Coxon for your suggestion of an eye patch to protect and fully dark adapt an “eyepiece eye”. I have been thinking of getting one for a while, but what if you want to use binos? Depending on what object I am viewing I like to keep both eyes open as much as I can, as I have trouble keeping one eye shut as I tend to squint with the other eye, but I will get an eye patch. It is definitely a good idea. I get blasted out by street lights when walking outside getting my gear set up for observing. One dark adapted eye is better than no dark adapted eyes. My fridge light problem? If I think I may be doing any morning observing then leave the milk out, twit! And use my red head light torch for tea, toast, and everything else including going to the toilet: lady astronomers don't need quite so much light for that! (If you really want to know why, I guess you will have to put it in to *Ask Kepler!*)

Saturday 12 April 2008. The nights are starting to get colder and damper, and everyone who has been a member for a while will probably have sussed out how to keep warm and dry, and may like to add a few of their own helpful hints. For beginners, a few – I hope – helpful hints for



¹ SAV (slightly averted vision) is the technique of looking slightly to one side of a faint visual object, so as to exploit the greater light sensitivity of the eye away from the centre of the retina. This takes a little practice, but is an essential technique for beginners to master and soon becomes second nature.

you. No gaps: try to have jackets that you can pull tight around your waist, and tuck pants into socks so cold air does not go up your legs. Wear many layers of clothes as this traps the heat, and that includes a couple of pairs of trousers, and socks. Op-shops are good; I got some pants, a little like ski pants that are lined and are damp proof for \$5. They are a couple of sizes too big and I wear them over a couple of pairs of other warm pants. Polo neck tops will help keep any cold draughts from going down your neck, and – something my mum used to do to keep me warm as a kid – a very long scarf, cross it over in the front to keep your chest warm (or, if you are a lady astronomer, keep your bxxbs warm). Pin the back ends around your back to keep your kidneys warm: works a treat. Scarves don't seem to be made very long now, so either knit one or buy two and sew the ends together; perhaps get them from an op-shop too. Polar fleece tops are lovely and warm. Snow boots from the Warehouse are good; get a pair a size too big so you can comfortably wear a couple of pairs of socks. I got some spray-on stuff from Mr. Minit Hornby Mall to make mine water proof. Also something that looks a bit strange, but who is going to see: on the bottom of a couple of pairs of warm track pants, I sewed a strip of elastic that goes under the foot. This stops the pant legs from riding up when I put my boots on and keeps my feet and ankles snugly warm. And of course don't forget a warm hat. Some extra warm clothes can be bought from op-shops if you don't already have some of this stuff, so you don't have to fork out for a brand new wardrobe if you are short of extra warm clothes. You will not enjoy observing if you are cold, and it doesn't matter what you look like. Though saying that, I still tend to wear just a touch of makeup even though I tend to look strange and rather cube-shaped with all my multi layers of clothes in all sorts of colours. My son when he was little used to say "Mum why wear makeup when no one will see you?" I said "Well I know it's there and it make me feel better." It's a female thing!

Keep warm ... from Heather

Noticeboard

news from the Committee



2008-2009 Subscriptions

Subscriptions for the 2008/2009 financial year (1 April 2008 – 31 March 2009) are now overdue. If you have yet to pay your subscription please do so as soon as possible, either by posting a cheque to The Treasurer, Canterbury Astronomical Society Inc., PO Box 25-137, Victoria Street, Christchurch 8144, or via an online payment to account # 03-0802-0098273-00. If paying online please ensure that (1) your membership number, and (2) your last name and initial appear in the transaction record so we can trace your payment. Members who have not paid by 31 May risk being removed from the membership list.

May Lecture on Eclipse Prediction in the Ancient Near East

This month's lecture, by Dr Clemency Montelle, promises to be a fascinating look at the historical roots of modern astronomy. Dr Montelle writes:

"In all cultures in the ancient world that took an interest in the heavens, eclipses were events of great significance. However, out of all celestial phenomena, they presented the astronomer with the most challenges. Problems that were easy to formulate such as frequency, duration, and amount of obscuration, rested upon more advanced astronomical and mathematical theories than were available: such as spherical trigonometry, parallax, and the measurement of time, to name a few.

This talk will discuss a selection of observation reports and predictions of eclipse times by the earliest astronomers – those in the Ancient Near East – and explore their attempts to develop and improve theoretical techniques to model eclipse phenomena."

CASMag via email

A search through the membership database last month identified about 40 CAS members who were recorded as preferring to receive CASMag via post, despite having a valid email address. To find out whether this reflected a genuine preference (rather than lack of awareness of the email alternative or just procrastination), we circulated an email to all such members asking them to confirm that they still wished to receive the hard copy. Members who were happy to switch to the email list were asked not to respond.

The membership database has now been updated so hard copies go only to those who do not have an email address, or who specifically asked to remain on the hard copy list. All others have been transferred to the email list. If we have inadvertently put you on the wrong list please contact the editor as soon as possible so I can correct the mistake. We are, of course, happy to distribute the postal version to as many members as necessary, and your preference can be updated at any time.

Monthly Members Day / Night, West Melton Observatory

On Saturday 19 April we had the first of our new look monthly member's sessions at West Melton. The event was a great success, and we managed to fit in a working bee, telescope training, a pot luck dinner, and an evening's observing session with many members of the society and heaps of new faces.

A big thank you to all who turned up, and we look forward to seeing you all again next month on 31 May. Note that this is one week later than normal to avoid clashing with the 2008 RASNZ conference.

Also don't forget one of our main events for the year, the (in)famous Mid Winter Star Party and Bonfire, with mulled wine on Saturday 21st June. With the large amount of nicely dried vegetation which has accumulated as a result of the grounds tidy-up, this year's bonfire should be spectacular. We will provide more details of the event in the June CASMag, but be sure to mark the date in your calendar now. See you all there.

Ashley Marles (Observatory Director)



Happy campers at the April member's session (left); Orion dips to the west while members set up their telescopes in the early evening (right).

The Solar System this Month

by Brian Loader

Sunrise and sunset times for Christchurch:

Date	17 May	24 May	31 May
Rise	07:38	07:45	07:51
Set	17:12	17:06	17:02

Date	07 Jun	14 Jun	21 Jun
Rise	07:56	08:00	08:03
Set	04:59	04:58	04:59

Phases of the Moon, dates in New Zealand ST

New	1st qtr	Full	Last qtr
6 May	12 May	20 May	28 May
4 Jun	11 Jun	19 Jun	27 Jun

Midwinter is getting close. The southern winter solstice is at midday on June 21. But the date of earliest sunset is a few days earlier, on June 14 and 15. The times of sunset only change by a few seconds for about a week centred on these dates.

The Planets

There are a number of visually interesting groupings and conjunctions of planets, stars and the Moon during the month, including one which will be completely unobservable but reminds us of a coming 2012 transit.

MERCURY is just about unobservable during the period. It will set an hour after the Sun from mid May up to the 25th, making it a very difficult evening object very low, near to northwest. By the end of May Mercury will be closing in on the Sun, leading up to inferior conjunction early on June 8. After that it will move into the morning sky, but remain too close to the Sun to see.

VENUS starts in the morning sky in mid May rising just over half an hour before the Sun, making observations very difficult. During the rest of May and early June it gets steadily closer to the Sun until ...

On June 8 Venus starts moving behind the Sun as seen from the Earth. The planet will remain behind the Sun for 45 hours, from 5 pm on June 8 to 2 pm on June 10. That is, the planet is at superior conjunction on the far side of the Sun. But **DON'T** try to look for the conjunction if you value your eyes!

This conjunction occurs at the mid point in time between the two transits of Venus for this century, on 8 June 2004 and 6 June 2012. Weather permitting, New Zealanders will be able to watch the 2012 transit.

MARS is still visible in the early evening sky, setting at 10.00 pm (NZST) in mid May and half an hour earlier a month later. So the best time for viewing Mars will be as soon as the sky is dark following sunset, say 1 hour later. It will then be a little to the west of due north at altitude of 25 degrees.

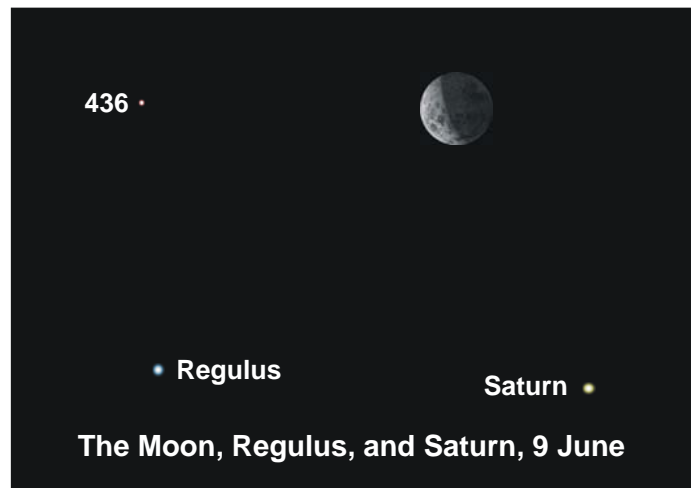
Mars will be moving through Cancer and will cross the lower, northern, edge of one of the best known star clusters, Praesepe or the Beehive, between May 22 and 24. Visually the best evening is likely to be May 23, when Mars will pass between two of the brightest stars of the cluster, themselves only 2.5' apart. The changing position of Mars should be evident in an hour viewed through binoculars. The two 6th magnitude stars have differing colours, one white, the other reddish (similar to Mars). A small telescope is likely to show up the contrast. Mars at magnitude 1.4 will be much brighter than the stars.

JUPITER rises at 9 pm in mid May and at 7 pm mid June, so will become well placed for late evening viewing, after Mars and Saturn get too low for observation. The planet remains in Sagittarius fairly near the handle of the teapot and even closer to some of the other bright stars of the constellation. On May 24 Jupiter will be joined by the 83% lit Moon. The two bodies will appear closest soon after 10pm when they will be less than 2 degrees apart.

SATURN sets 12.30 am on May 15 and 10.30 pm June 15. So like Mars, it will be best placed for viewing early evening.

The distance of Saturn from the star Regulus, alpha Leo, will increase a little during the month, but they will still make a fine pair. They will be between north and northeast with brighter Saturn to the right of the star. Early evening in May Saturn will be a little lower than Regulus, but the rotation of the sky during the evening will turn Saturn to be higher than the star later. By mid June the star and planet will be about level at dusk and again rotate anticlockwise during the evening.

A fine conjunction of the 36% lit Moon with Saturn and Regulus occurs on June 9. At 6 pm the three will form a small triangle with the star and planet forming the base and the Moon centrally above them². Again as the evening advances the three will appear to rotate, and the Moon's position relative to Regulus and Saturn will change noticeably.



Lunar Occultations

by Brian Loader

The list shows a few of the many lunar occultations visible from Christchurch during the second part of May and early June 2008. The occultations should mostly be observable using a telescope with an aperture of no more than 100 mm. Those with an upper case D or R may be observable using 50 mm binoculars.

² In this chart (as is common practice) 436 denotes a star of magnitude 4.36, the decimal point being omitted.

Times are for the square in Christchurch. The actual times at other places in Christchurch will differ a little, usually (but not always) a few seconds earlier to the west and a few seconds later to the east.

Included is a daytime occultation of Mars on June 8. The planet will be low at the disappearance which is shortly after midday. The reappearance, just over an hour later is at the lit limb of the Moon. This event will need a moderate telescope to have any chance of viewing.

Date	Time	P	Star	Mag	%ill	alt	CA	Notes
15 May	00:14:43	D	ZC 1652	5.4	73%	22	27S	
22 May	22:17:24	r	ZC 2558	6.3	95%	40	69N	
24 May	22:21:21	r	ZC 2857	6.5	83%	21	79S	
25 May	01:03:55	r	ZC 2872	6.4	83%	49	34N	2872 is double: 6.3+7.0, 0.056", 346.6
25 May	01:18:24	R	ZC 2875	6	83%	51	40N	
28 May	07:36:20	R	ZC 3270	5.8	53%	52	75S	ZC 3270: Sun altitude -3°
30 May	03:55:59	r	ZC 3507	6.5	33%	21	28S	3507 is double: 7.2+7.2, 0.050", 350.0
30 May	06:23:12	R	ZC 3512	5.6	32%	40	58S	
31 May	05:44:52	R	ZC 89	6.5	22%	24	74N	89 is double: 7.3+7.3, 0.10" 90.0
07 Jun	17:46:43	d	ZC 1269	6.9	16%	21	53S	Sun altitude - 8°
08 Jun	12:28:46	d	Mars	1.5	24%	7	79N	
08 Jun	13:38:29	r	Mars	1.5	24%	17	-66N	
15 Jun	02:42:20	d	ZC 2045	6.4	85%	18	78N	
17 Jun	01:58:49	D	ZC 2273	5.9	96%	47	51S	
15 May	00:14:43	D	ZC 1652	5.4	73%	22	27S	

Key: *Date/time:* New Zealand date/time, times NZST; *P:* phenomenon (D/d = disappearance, R/r = reappearance); *Star:* catalogue number (S = SAO, ZC = Zodiacal Catalogue); *Mag:* magnitude of the star; *%ill:* percentage of Moon sunlit; *Alt:* lunar altitude in degrees at the time of the event; *CA:* cusp angle of the event, the angle round the dark edge of the Moon from the lit cusp at which the star disappears or reappears. N means measured from the north cusp (lower as seen from NZ), S from the south (upper) cusp.

Most disappearances (D/d) take place in the evening, times indicated "p" for pm. As an example there are 3 events on the night of 24/25 May, the first taking place before midnight on May 24 at 10:21:21pm, the other two later on the same night, a few minutes after 1am, so dated May 25.

Most reappearances (R/r) occur after midnight, times indicated "a" for am, with the date of that morning.

Events take place at the unlit limb of the Moon, unless otherwise noted. All reappearances are on the west side of the Moon, disappearances are on the east side.

More information about observing these interesting events can be obtained from Brian Loader, or on the RASNZ Occultation web site: <http://occsec.wellington.net.nz>

Reflections: stories from a lifetime interest in astronomy

Malcolm Flain

Malcolm Flain is one of the more experienced observers in CAS and is well known for his immense technical knowledge, with the recent installation of a Go To EQ mount on the 5" Cooke refractor being only one of his many contributions to the Society. As a child growing up in post-war London he was able to join the British Astronomical Association and pursue his newly-discovered hobby of astronomy in the company of such well-known figures as Patrick Moore and Arthur C. Clarke. Here, he describes the excitement of realising a childhood dream after a wait of over 50 years.



I remember being gifted a little 25 mm collapsible telescope on holiday at Hastings in England at age 9 in 1948, just three years after the war ended – now 60 years ago. I was impressed by the detail I could see with it, and rapidly moved into a hobby of astronomy and a wish-list of future instruments. One of these was a 6" (150 mm) F5 rich field refractor.

Move halfway around the world to Christchurch, New Zealand, and 52 years on. I finally had enough disposable income to consider it. I looked in a CAS magazine for the leader of the Society's instrument section, to inquire if he knew of somebody who might have such an objective, preferably in a cell. "No",

but leave it with him. A few days later a phone call to come around and check an offer on his laptop. A fifty year itch was about to be scratched with a vengeance. Thank you Phil Barker!

Don R. Surles, working for Du Pont in Washington, USA, answered Phil's ad. He had two 6" achromats in cells – around F8, he thought. Purchased at bargain price at the end of a science fair, to make a large binocular. His job with travels, plus making large reflectors (his current project was a 24") meant he was prepared to sell them at bargain price. I really only wanted one, but postage costs, bank fees etc. made it worthwhile to buy both. I did offer to go halves with Phil, but he felt he already had too many telescopes!

It was a bit of a gamble – sight unseen, quality unknown, damage in transit (each sent separately) a possibility. When they arrived securely packed, undamaged, and in mint condition, I was rewarded with a series of satisfying revelations. They were Jaegers (USA) bloomed objectives, in their cells. Out of curiosity I weighed them and they were identical at 2 505 g – a portent of even better specifications. They turned out to have identical focal lengths of 1,600 mm at f10.5: perfect twins. Ultimately the long focal length dissuaded me from making binoculars, so unintended I made a pair of refractors. This has left me with a problem: the objectives are such a perfect pair it would be stupid to separate them, hence I now have two 6" refractors.

After a period of use they needed their first and only cleaning so far. This led to the following conjecture on my part. Pencilled on the edge of one (as was common practice – all Jaegers were hand finished) was 60732T 3/69, and on the other was 60739T 4/69. I believe the first series of numbers is the production number, and the second series shows the year and month of completion. If so, then these objectives were factory selected for optical twinning for the science fair.

Jaegers first advertised in *Sky and Telescope* in November 1953. Thirty-four years later they placed a fire notice in the May 1987 issue, ending a 34 year production. The 1969 production date on my objectives puts them right in the middle of this period, and at the height of their reputation. It's also interesting to note that in the April 1987 issue of *Sky and Telescope* – now 20 years ago – the cost of one 6" objective in its cell was US\$795.

Finally both telescopes were completed, within months of receipt of the objectives, and performance-wise there is nothing to choose between them. On one memorable night in 2002 I was showing Saturn to a father and his Boy Scout son with one of these Jaegers and they really got lucky. The seeing was 10/10 and the image was like an etching – I imagine the sort of quality you would get in space. All three of us could see Encke's Division – just 0.1 arc seconds wide. They told me what they could see – I made sure they didn't know what to look for! Performance like that from a 6" refractor is very satisfying.



Malcolm Flain's twin home made 6" refractors

The Man Who Invented Mars

Nancy Zaroulis

Long before the space race and space shuttle, a brilliant, wealthy, charming Boston Brahmin named Percival Lowell popularized the idea that we are not alone in the universe. As the next US spacecraft prepares to descend upon the Red Planet, it's an idea worth revisiting.

AT 7:36 pm on May 25, if all goes well, a stranger from Earth will land near the north pole of Mars. It is called Phoenix. To the unscientific eye, it looks like a giant winged bug. It has three legs and a 5-foot-wide central science deck. With its two solar panels deployed, it measures about 18 feet long. It is 7 feet high. It weighs 772 pounds. Its landing parachute is 39 feet wide. When it touches down on the Martian landscape, it will have travelled 423 million miles – the equivalent of almost 18,000 trips around Earth.

Approximately 17 minutes after it lands, its first signals will be received by its controllers. Then it will begin the task for which it was designed – a task that has never been performed before. It will extend its robotic arm and scoop up dirt and ice from beneath the Martian surface for analysis. It will be looking for evidence of life. “Finding organic compounds on Mars will increase the probability that life may have or does exist there,” says Tufts University professor Samuel Kounaves, the lead scientist for the wet chemistry investigation on NASA’s Phoenix mission.

Somewhere, a 19th century Boston Brahmin named Percival Lowell will be smiling. Long before NASA was established in 1958, before JFK’s impassioned speech about the space race, and before any of the Apollo missions or space shuttle successes and disasters, Lowell devoted much of his career and considerable fortune to trying to prove that Mars hosted intelligent life. Viewed through his telescopes, the ancient, baleful Red Planet was about the size of a dime. Lowell believed he was seeing a network of canals on its surface. Therefore, he declared, Mars holds intelligent life. It is not necessarily like human life, he emphasised, but it is intelligent enough to build canals.

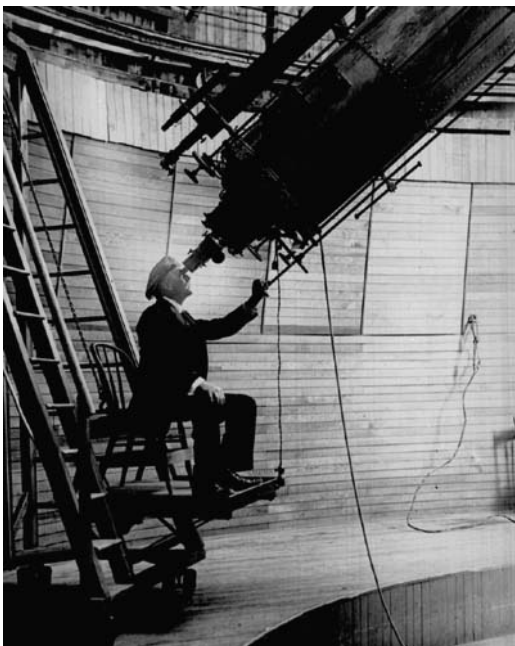


Percival Lowell (1855-1916)

It is Lowell’s vision of Mars that has enthralled and inspired earthlings ever since. In 1895, he published a book about what he believed he saw. He wrote articles about it for *Popular Astronomy* and *The Atlantic Monthly*. He lectured widely about it. He became famous and immensely popular. He was “of medium height, slim and handsome, with an athletic build and an intense expression,” his biographer, David Strauss, professor emeritus of history at Kalamazoo College in Michigan, writes in an e-mail. “His erect bearing and fastidious dress contributed to a commanding presence.” Lowell enchanted the public with his charisma and the power and conviction of his beliefs. “He was a very effective populariser of his ideas,” says Robert Millis, director of the Lowell Observatory. “He was the Carl Sagan of his day.”

The scientific community was less enthusiastic than the general public about the notion of intelligent life on Mars. No matter. Wealthy, brilliant, charming when he wanted to be, Lowell was confident in his heritage and convinced of his superiority to the European “ruck and rubble” flooding America’s shores. He was also seriously inner-directed. And with what he was certain was his discovery of the canals, he had found his life’s work: to promulgate his sensational belief that Mars was the home of Martians.

LOWELL WAS BORN at 131 Tremont Street in Boston on March 13, 1855, into a family at the pinnacle of what passed for American aristocracy. The first Percival Lowle, as it was then spelled, arrived in America in 1639 from Bristol, England (“the Venice of the West”), and settled in Newbury, north of Boston. His descendants flourished in the law, business, and the arts.



Percival Lowell at the Lowell Observatory

Percival Lowell’s upbringing was entirely conventional for a boy of his time and class: early instruction at a “dame school,” a couple of years’ education in France, attendance at Mr. George W. C. Noble’s school to prepare for Harvard. At college, he excelled in both history and mathematics. He won a Bowdoin Prize for his essay on England as a European power, and he gave a commencement address on “The Nebular Hypothesis.” Some people thought him the most brilliant young man in Boston.

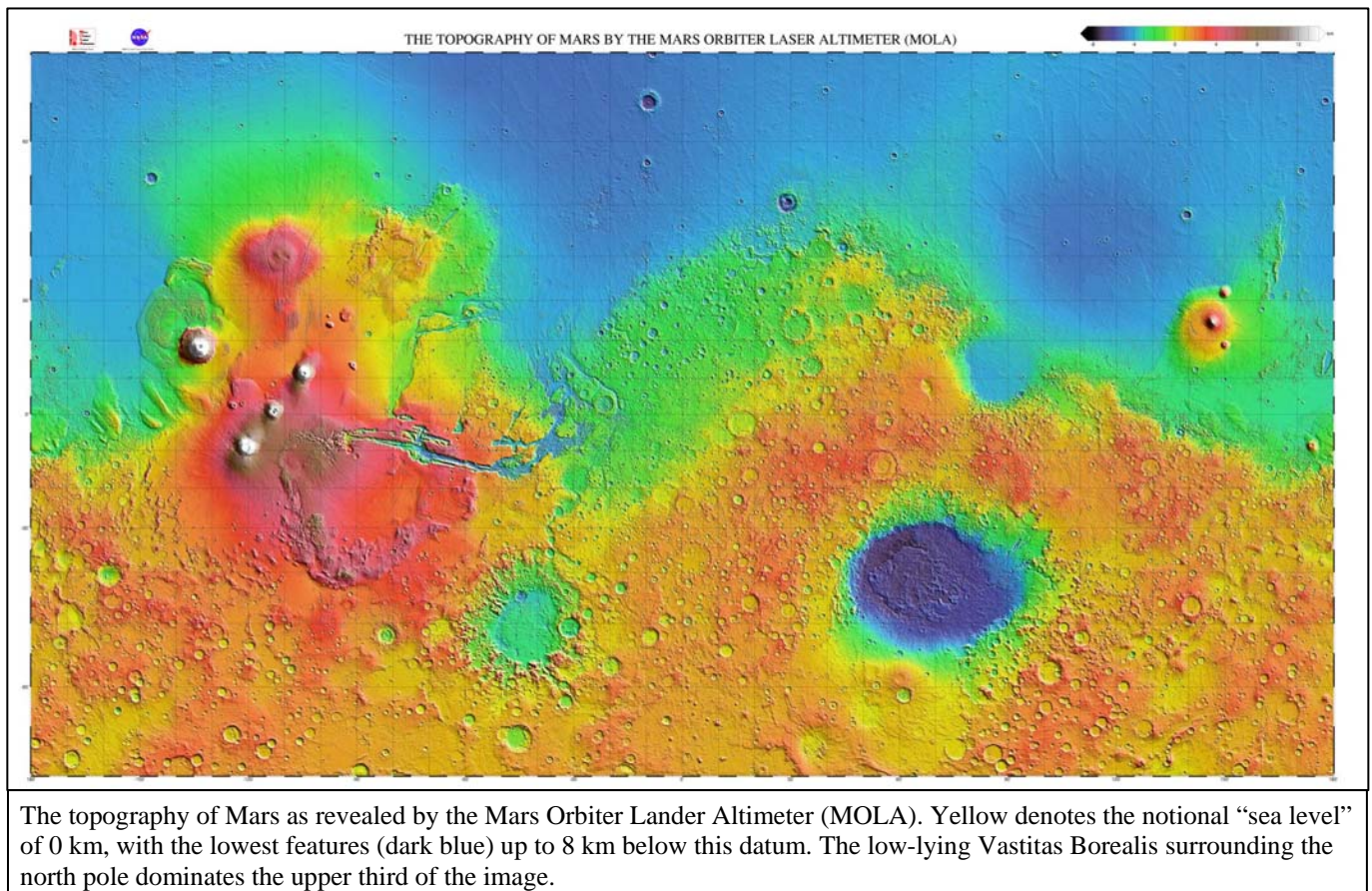
After graduation and the obligatory tour of Europe, he settled into the family business, much of which involved the textile mills in the city of Lowell. There were – and are – many canals in that city. Before the first brick of the first cotton factory was laid there in the 1820s, Irish canal-cutters – intelligent life – dug the canal beds and built the granite walls to channel the Merrimack River’s water to power the mills.

Lowell chafed at life in cold, caste-ridden Boston. He was the most eligible bachelor in the city, but he was not happy. He served as best man at the wedding of Edith Jones and Teddy Wharton, but he himself did not want to be married. He became engaged to a Boston girl, but broke off the engagement – a more serious matter then than it is now.

A man of his time and class, Lowell was a patron of London tailors, a sometime presence on the American expatriate scene in Europe, a connoisseur of wine and spirits deeply opposed to the idea of Prohibition (which fortunately for him did not come in his lifetime). He was an avid reader of Greek and Latin classics in the original and of Chaucer in Middle English. He liked detective stories, too. An enthusiastic polo player, he was one of the founders of the Dedham Polo Club. Within his own household, he was something of a tyrant and was once witnessed kicking his butler down the front steps of his Beacon Hill home and throwing the unfortunate servant's trunk after him.

At a lecture in 1882, Lowell heard about this exotic, faraway land called Japan – at the time, a place as alien, as mysterious, as Mars is to us today, possibly more so. Having made a comfortable fortune in his own right, he decided to go there. For a few years, Japan was all he desired in the way of adventure and separation from Boston. He wrote three well-received books about Japan, and he published a book of photographs about Korea – the first ever seen by the American public of that land. For a time, he served as minister for the first Korean delegation to Washington. The lure of the Far East faded, however, when he encountered the writings of the Italian astronomer Giovanni Schiaparelli and the French astronomer Camille Flammarion. There were, Schiaparelli said, “*canali*” on the planet Mars; Flammarion enlarged upon that idea. In Italian, *canali* means “channels”; a secondary meaning is “canals,” and that was the meaning – the misinterpretation – that was given to Schiaparelli's assertion.

WHEN LOWELL WAS A BOY, he had been given a small telescope, and with it he gazed in fascination at the heavens from the roof of the family home at “Sevenels” in Brookline. Now, as an adult, he was about to embark on a new career: astronomy. It would bring him more fame – and more scorn – than he could have imagined. Mars was to be in opposition to Earth in 1894 – closer than usual as it travelled its elliptical orbit, and thus in prime position for viewing. Lowell borrowed two telescopes and ordered another, with a 24-inch lens, from the best manufacturer in the country, Alvan Clark & Sons of Cambridgeport. He delegated a man to find a place with the clearest atmosphere for “good seeing.” Flagstaff, in the Arizona Territory, was delighted to receive him; the townspeople understood that the



Lowell Observatory would bring them worldwide fame. Lowell built his observatory there on “Mars Hill”; eventually he built a 25-room “Baronial Mansion” there, too.

In the clear desert and mountain air, far from the constraints of Boston and free to gaze at the stars with his cherished “Clark,” Lowell was happy at Mars Hill. He spent much of the rest of his life there. From his garden and the surrounding desert and mountains, he sent exotic plants to professor Charles Sargent of the Arnold Arboretum. He hosted his many friends and, often, strangers; improbably, he dressed up as Santa Claus to help the local children celebrate Christmas.

The appearance of Lowell’s book about Mars in 1895 came at a time of canal-building on earth. The Suez had recently been constructed; the Panama was in the works. For both Lowell and his adoring public, the prospect of canals on a neighbouring planet was too captivating to dismiss. Let the stuffy academic scientists and astronomers carp and criticize, let them proclaim that there could not possibly be life on Mars because the Martian atmosphere was too thin, its gravity too weak. Lowell knew what he knew. He envisioned Mars society as a kind of utopia, with a place for every man and every man in his place. On Mars, there was no nonsense about workers’ rights or labour unions or Progressivism or Socialism or any of the other discontents in the America of his time.

In 1897, Lowell had a nervous breakdown. At first his family tried to nurse him at home with the most up-to-date treatment: solitary confinement, no visitors, no reading material, no distraction or intellectual activity of any kind. Such a cure, Lowell said, was worse than the illness itself. After a month, he abandoned it. He went to Bermuda and then to the south of France to recuperate, returning to Flagstaff in 1901. Night after night, when the seeing was good, he would climb the ladder in his observatory to peer through the lens of his Clark telescope at the object of his obsession. He published his second book about the Red Planet, *Mars and Its Canals*, in 1906.

Because Lowell wanted a base in Boston separate from his family, he bought a house at 11 West Cedar Street on Beacon Hill. The seller was a neighbour, an interior decorator, a woman not of his exalted class. In 1908, he married her. While in London on their honeymoon, they ascended 5,500 feet over Hyde Park in a balloon because Lowell wanted to photograph the paths to see how they (or the canals on Mars) would look from the air. In that year, he published his third and final book on the planet, *Mars as the Abode of Life*.

Back at his observatory on Mars Hill, Lowell renewed his attention to another matter: the possibility of a ninth planet beyond Neptune, which he called “Planet X.” The issue of intelligent life on Mars receded, but not much. By then, George du Maurier had published *The Martian* and H.G. Wells had produced a sensational fiction piece about Martians invading Earth, *The War of the Worlds*. Edgar Rice Burroughs, a pulp writer who later found immortality with his Tarzan stories, published the first of his Mars fantasies, *A Princess of Mars*, in 1912. It was an immediate hit. Burroughs wrote several sequels. Along with works by other writers, it was the beginning of the cottage industry that came to be called science fiction.

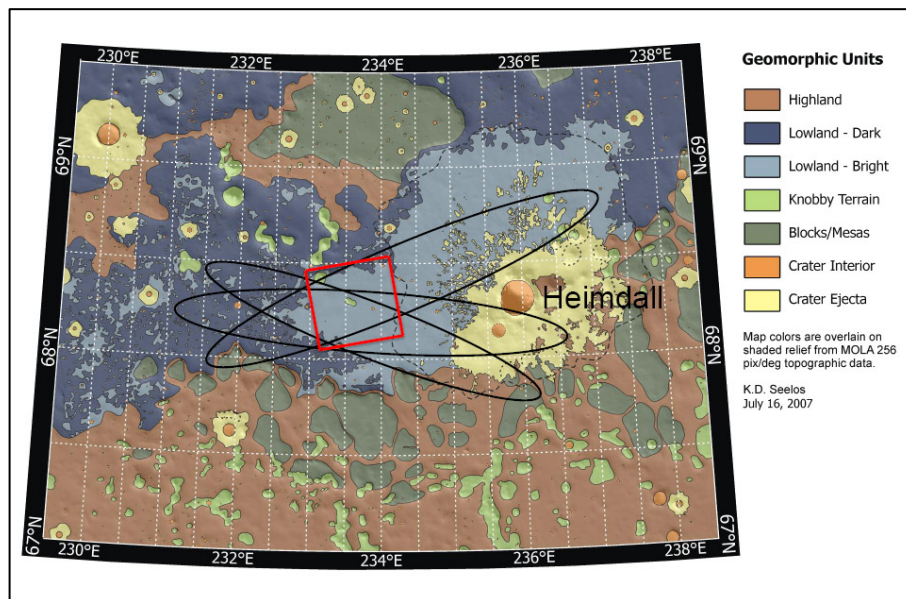
Despite having another breakdown in 1912, Lowell concentrated increasingly on Planet X. He never found it. He died at Mars Hill of a cerebral haemorrhage on November 12, 1916. A member of the Mars Hill community remembered that shortly before his fatal stroke, he had exploded in anger at a servant. He is buried there in a mausoleum shaped like an observatory with a blue glass dome.

Fourteen years later, in 1930, Lowell Observatory announced the discovery of a ninth planet: Lowell’s Planet X. Pluto, as it was named, has since been downgraded to dwarf planet status because it is so small, so lacking in what might be called gravitas.

NINTH PLANET OR NO, Percival Lowell’s greatest achievement was to popularize the idea of life on Mars. Astronomers had speculated about that possibility for centuries, but it was Lowell who implanted in the minds of earthlings, once and for all, the idea that we are not alone in the universe – an idea once as unthinkable, as heretical, as the notion that the earth revolves around the sun. Accordingly, in the decades after Lowell’s death, the science-fiction genre flourished. Novels, pulp magazines, and the new media of radio, film, and TV kept Lowell’s basic concept of Martian life alive, even if that fictional life was not quite the kind he would have approved of.

The public adored these speculative fictions – and sometimes believed them. On the night of October 30, 1938, Orson Welles and his Mercury Theatre company appeared in a radio production of *The War of the Worlds*, updated to suburban New Jersey. At the beginning of the program, an announcer stated that it was a fictional presentation, but many people didn't hear that disclaimer. What they heard was a vivid, spine-chilling account of the invasion of New Jersey by Martians – not Percival Lowell's wise and rather hidebound creatures, but quite nasty super-intelligent beings intent on destroying earthlings. Panic ensued; Welles was thrilled at his success. The lesson was that two decades after Lowell's death, people were prepared to acknowledge that life existed beyond earth – and that it could come here with hostile intent.

During the first wave of Lowell's fame at the end of the 19th century, Robert Goddard of Worcester dreamed of a voyage to Mars. His subsequent development of the liquid-fuel rocket was known to German scientists who made the V-1 and V-2 rockets during World War II. After the war, many of those scientists came to the United States, while some went to the Soviet Union, and the space race was on.



The leading US space scientist was the former head of the German rocket manufactory (and slave camp) at Peenemunde, Wernher von Braun. Like many of his peers, von Braun was enchanted by the idea of man going to Mars. He was also, like Percival Lowell, a populariser. He published articles and a book about a Martian expedition; he also wrote a novel about Mars.

The space program needed government financing, and the hundreds of science-fiction writers and filmmakers flourishing by the mid-20th century fostered the public's support for the program. People were eager to know about Mars, in particular. In 1976, Viking 1 and Viking 2 transmitted spectacular pictures of a ruddy landscape studded with giant volcanoes and riddled with deep

The proposed Phoenix landing site at approximately 68 °N, with ellipses marking the highest probability of landing for different launch windows and flight schedules. The map also shows a colour-coded interpretation of geomorphic units based on surface textures and contours. The yellow-coded area surrounding a crater informally named "Heimdall" appears to have even fewer boulders on the surface than other units. This mapping is overlaid on a shaded relief map based on data from the Mars Orbiter Laser Altimeter on NASA's Mars Global Surveyor orbiter. Image credit: NASA / JPL-Caltech / Washington Univ. St. Louis / JHU APL / Univ. of Arizona.

canyons separated by stretches of vast desert. No sign of life was apparent. There has also been a continuing effort to receive a signal from space. This program, SETI (Search for Extraterrestrial Intelligence), is of two kinds: active and passive. Those who favour passive listening warn that when we do encounter extraterrestrial life – or when it encounters us – it may not be friendly.

Finally, early in the 21st century, came life-altering news. The Mars Opportunity Rover had found evidence that Mars had been “soaking wet” in the past. Water meant life – or possible life, at any rate. Soon after that discovery, someone left a glass of champagne at the mausoleum of Percival Lowell with a note: “Far away, hidden from the eyes of daylight, there are watchers in the sky” (Euripides, *The Bacchae*, circa 406 BC).

THE MARS WE SEEK, WITH OR WITHOUT CANALS and no matter what the Phoenix mission demonstrates, is Lowell's. The Mars of our imagination is his fantasy, transmogrified a thousand times by writers and filmmakers. The questions that haunted him – questions to which he believed he had found the answers – are questions that haunt us still. Is there life on Mars now? Or was life there once, long ago? If so, what form did it take, and how and why did it die? Is the secret of life on Mars the secret of our own fate?

Now scientists anticipate the landing of the Phoenix next month. "We are investigating if the soil has the ability to support life, past, present, or for future humans who may land there," says Tufts' Kounaves. The Phoenix will carry four wet chemistry labs to analyze the Martian ice and soil, as well as the first optical and atomic-force microscopes. The craft has been sterilized in accordance with NASA's planetary protection policy to ensure against contamination by earth organisms.

Some people wonder if the space program is worth all the money and effort. Most definitely, says Maria T. Zuber, E.A. Griswold Professor of Geophysics and head of the department of earth, atmospheric, and planetary sciences at MIT. "If you look at how our understanding of the universe, the solar system, and the earth itself have advanced from observations made since the dawn of the Space Age 50 years ago, it's clear that the results have been every bit worth the investment."

The Phoenix mission and its search for evidence of life on Mars is an important step forward in that understanding. Meanwhile, plans for "terraforming" Mars proceed. Terraforming means making the planet – any planet – fit for human life. This research is being conducted in Mars-like environments like Siberia, the Antarctic, and the Canadian Arctic. "The key challenge in making Mars habitable is warming it," says Christopher McKay of NASA's Ames Research Center, a lead researcher in planning for future Mars missions. "The way to warm Mars using technologies we have already demonstrated is to use super-greenhouse gases."

McKay estimates it will be at least 25 years before we can establish a long-term research base on Mars and that warming the planet might take 100 years. One problem will be water: how to melt it, possibly make it fit for human use, and then transport it from the planet's ice caps to the equatorial regions where the colonizers will want to be.

The late Carl Sagan had a solution. If we wanted to transport water across Mars, he said, "we would build canals."

Nancy Zaroulis writes frequently about Massachusetts and its people. See http://www.boston.com/bostonglobe/magazine/articles/2008/04/27/the_man_who_invented_mars/?page=full for the full article.

CAS OFFICERS AND COMMITTEE 2008/2009

President	Ian Crumpton	342-5375	president@cas.org.nz
Vice-President	Geoff Wright	348-5387	gandjwright@xtra.co.nz
Secretary	Graham Townsend	322-6445	
Treasurer	John Osborne	355-0593	treasurer@cas.org.nz
Membership Secretary and Editor	Martin Unwin	385-9019	editor@cas.org.nz
Observatory Director	Ashley Marles	359-5843	ashleymarles@xtra.co.nz
Assistant Director	David Brian	347-7687	o2bdave@hotmail.com
Librarian	Katie Grady	981-9951	katie.grady@hotmail.com
Committee	Euan Mason	348-2671	euan.mason@canterbury.ac.nz
	Jim Turnbull	337-9802	jim_turnbull@nrl.moh.govt.nz
	Raewyn Newnham	359-5843	raewyn.newnham@harcourts.co.nz
	Steve Johnson	981-9636	make.itso@paradise.net.nz

SPECIALIST SECTIONS

Aurorae/solar astronomy/ comets	Orlon Petterson	377-8328	o.petterson@clear.net.nz
New astronomers	David Downing	385-8170	david@hynlar.co.nz
Occultations/minor planets	Brian Loader	(03) 318-7659	palbrl@clear.net.nz
Astrophotography/CCD imaging/telescope making	Phil Barker	383-3683	phil.sonja@xtra.co.nz
Variable stars/photometry	Clive Rowe	(03) 318-3166	c.rowe1@xtra.co.nz

Canterbury Astronomical Society Inc.

APPLICATION FOR MEMBERSHIP

To: The Treasurer

Canterbury Astronomical Society Inc.

P.O.Box 25-137

Victoria Street

CHRISTCHURCH 8144

Receipt number: _____

Date: _____

Elected: []

Member advised: []

Editor advised: []

Applicant's name in full (block letters): _____

Address: (Note: a P.O. Box is NOT a legal address) _____

Phones: Home: _____ Work: _____ Mobile: _____

eMail: _____ Date of birth (if under 18) _____

Occupation: _____

Membership Category (*tick one; subscription must accompany application*)

<input type="checkbox"/>	Adult (any person 18 years of age or over who is not eligible for any other category)	\$50
<input type="checkbox"/>	Family (two or more persons living at the same address) §	\$75
<input type="checkbox"/>	Junior (under 18 years of age on 1 April of the current year)	\$25
<input type="checkbox"/>	Senior Citizen (over 65 years)	\$25
<input type="checkbox"/>	Student (any person studying full-time at a tertiary institution; must reapply annually)	\$25
<input type="checkbox"/>	Educational (schools only)	\$25
<input type="checkbox"/>	Corporate (members have voting rights of one member but cannot take office)	\$25

§ If family membership, please list the other persons involved.

Name	Date of birth (if under 18)	Signature

All CAS members receive CASMag, a monthly newsletter. Would you prefer to receive this (please tick):

☐ by email as a .pdf attachment (in colour)? | | or by post as a hard copy (black and white)?

Do you have access to a telescope? What type and size? _____

What are your astronomical interests? _____

I, the undersigned declare that the information given herein is true.

Signature: _____ Date: _____

Proposer: _____ Second: _____

Address: _____ Address: _____