CASMAG

THE OFFICIAL MAGAZINE OF THE CANTERBURY ASTRONOMICAL SOCIETY INC.

Vol. 59 – No 03 **June 2008** **Issue Number 656**

Next meeting: 20 May

Globular Clusters: The Golden Oldies!

Mita Brierley

(Department of Physics and Astronomy, Canterbury University)

A study in light pollution: the port facilities of Long Beach, California are illuminated with regularly spaced orange sodium vapour lights to support the round-the-clock operations of one of the world's busiest commercial cargo ports. *Image ISS016-E-27162, courtesy of Earth Sciences and Image Analysis Laboratory, NASA Johnson Space Center.*

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CAS Membership

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

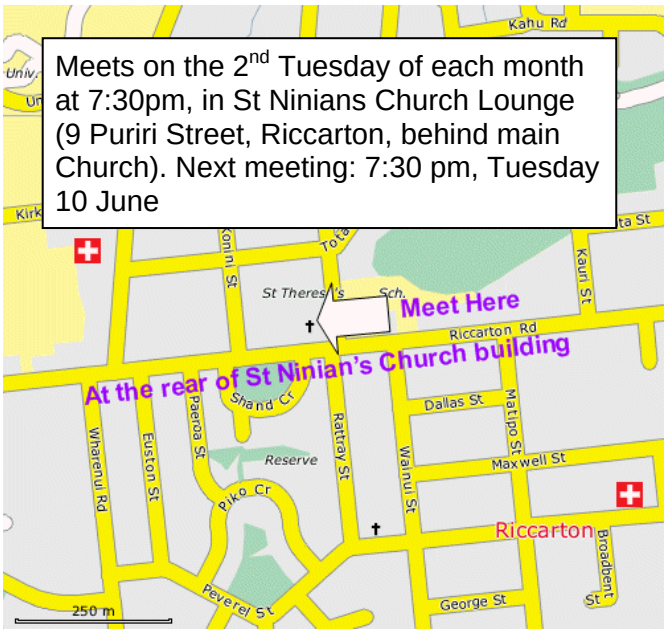
Contributions to CASMag

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 1 July**.

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



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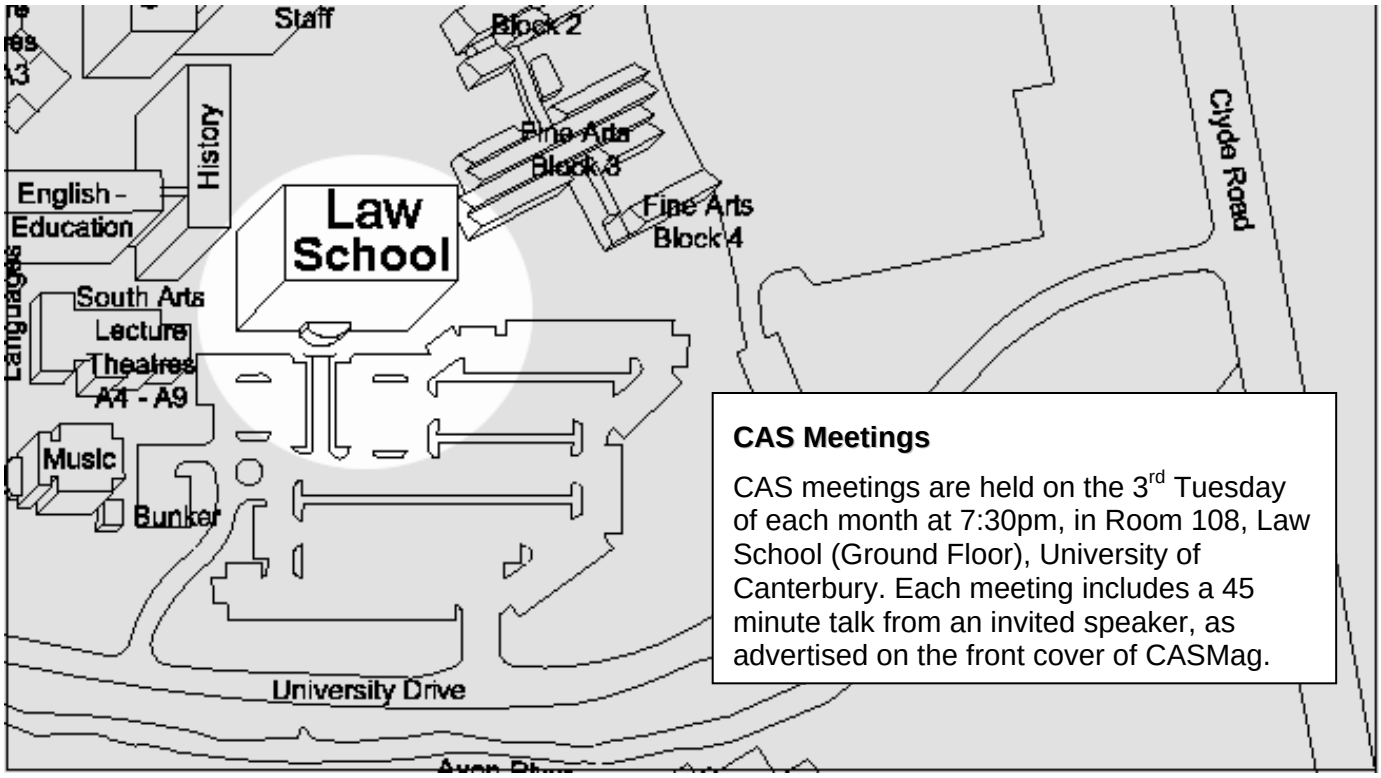


CAS Meetings

CAS meetings are held on the 3rd Tuesday of each month at 7:30pm, in Room 108, Law School (Ground Floor), University of Canterbury. Each meeting includes a 45 minute talk from an invited speaker, as advertised on the front cover of CASMag.

Contents

CAS Calendar, June-August 2008

(Group night every Wednesday during NZST)

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		

August 2008

Su	Mo	Tu	We	Th	Fr	Sa
31					**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

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

Coming Events

June Lecture on Globular Clusters

In this month's lecture, PhD student Mita Brierley (Department of Physics and Astronomy, University of Canterbury) will describe aspects of her research on globular clusters. Mita writes:

"Globular clusters are collections of old stars of the same age and composition that orbit galaxies. They display a variety of interesting properties that can be used to investigate stellar and galactic evolution. There are yet many aspects of GCs that are not understood and they have presented astronomers with many puzzles over the years. I will discuss some of areas of GC work I have explored over the last few years including blue straggler stars, the special case of the massive GC Omega Centauri, and describe the current work I am doing on creating synthetic spectra for use with extra-galactic GCs."

Saturday 21st June: CAS annual mid-winter Star Party

4:00 pm – 6:00 pm	Telescope training
6:00 pm – 8:00 pm	Pot-luck dinner (bring some dishes to share)
Sunset onwards	Observing until bonfire lighting time!! (Bring marshmallows to toast...)

Come along to one of the biggest events the club holds for the year, you and your family. This is a time for you to get to meet your other fellow society members.

From 7.30pm we have also put out an invite our Bells Road neighbours to share the bonfire – so make them welcome.

10-15 July Kid's Fest

From the Editor

Dark Matters

Dark mass, in one of its many guises, is a pervasive and fundamental theme in modern astronomy. At the largest scale, cosmologists are engaged in a vigorous debate over whether the expansion of the Universe is accelerating under the influence of dark energy, based on strong observational evidence that distant supernovae appear less bright – and are therefore further away – than would be the case if the expansion rate were constant. Others, such as the University of Canterbury's David Wiltshire, argue that our interpretation of the evidence is at fault, and that the observations can be explained without the need for a cosmological constant.

At the Galactic scale, recent infrared observations have allowed the Sagittarius Dwarf Galaxy – one of our smaller satellite galaxies – to be mapped in unprecedented detail. These studies reveal long, tidally distorted tendrils of stars which chronicle its losing battle against the gravitational pull of our home galaxy, and help to better define the distribution of dark matter in our cosmic neighbourhood. And so on down the scale to stellar mass black holes, and even the distant planets responsible for minute blips in micro-lensing events – planets too dark and faint to be seen in visible light, but with just enough unseen mass to leave a fleeting but unmistakeable signature. At last month's RASNZ annual conference in Tekapo, dark matter in one form or another featured in many of the talks given by amateurs and professionals alike.

But dark matters in other ways as well. Graeme Murray, of the Tekapo-based Earth and Sky Ltd., spoke passionately to the RASNZ audience about the ever encroaching threat of light pollution, and his efforts in seeking World Heritage status for a Tekapo dark skies reserve. It was disheartening to learn that vocal opposition from a small group of local developers may scupper the whole process, although this opposition could potentially be turned to advantage. Once could argue, for example, that the need to protect against the latent threats inherent in this attitude is precisely why a UNESCO-declared Tekapo Dark Sky Reserve is both appropriate and necessary. The disruption caused by the Reserve's opponents has prevented it from being declared in 2009, the International Year of Astronomy; let us hope that 2010 will see it become a reality.

Bino Power

by Heather Skinner


The Butterfly Cluster, M6

Hello again everyone, well it's great when the seeing is good and there is a dark sky, but, when the seeing is cr*p and the sky is lit with moonlight, you may say "sod it – I will not bother with observing tonight as it is not worth it". Well, I agree with you about the seeing, but there is still plenty to be enjoyed in a moonlit sky. The most obvious is of course lunar observing. Not everyone gets a buzz out of that, though I enjoy taking a look at the moon when I have finished my other observations. And for those who do enjoy looking at the moon and use a scope, can get yourself an orange filter. I find that works really well when the moon is very bright as it cuts down all the glare and allows you to see a lot of detail. I use a 2x Barlow and gradually increase the magnification of eyepieces depending on the seeing conditions. Using my orange filter I can clearly make out detail in the terracing of the craters, and see a lot of detail inside the craters.

Besides lunar observing, I have enjoyed going out in my back garden on some moonlit nights when it has been clear. The constellation I have most enjoyed studying has been Scorpius, which has a lot to see there for both binos and scopes. Two brilliant open clusters perfect for binos are M7 and – to its left – M6, also known as the Butterfly Cluster. Going directly to the left of M6 to the head of the scorpion you will find a bright yellow pair of stars, and in the same FOV, widely separated, another pair of yellow stars which is xi Sco. Moving up to the head of the scorpion you come to a sort of a triangle shape, and the right star of this is nu Sco. Looking through a scope you will be able to see that nu is a wide double. The fainter star is also a close double and the brighter star is an even closer double, but in the very light sky I just saw the wide double. Using my 8" Dob I made out and resolved the stars of the glob M4 which was still visible though faint in a light sky. However, the glob of M80 needs a darker sky to be able to see, and was beyond visibility.

If you want a WOW object along with the outstanding open clusters of M7 and M6, go to the pointy bit at the top of the sting. This is NGC 6231, which is a brilliant cluster of white and yellow stars. This is

connected to a larger fainter cluster, which is H12. The chain of stars connecting these two clusters outlines one of the spiral arms in our galaxy. “Fascinating” as Spock would say – I do enjoy my Star Trek! Either take a look at this using low power through a scope, or they are just beautiful through binos.

If it is a clear but moonlit night and nothing but DSOs will suit you, you will just have to hope that there is something good on the telly! In the mean time I will Beam Up and be back again as soon as we are back in earth orbit.....

Bye for now and happy hunting from Heather.

Velcro and the Humble Cockle Burr (source: National Geographic, April 2008)

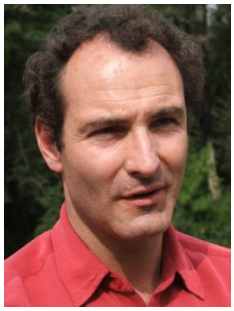
Examining burs plucked from his pants and dog's coat after a hike in 1948, Swiss engineer George de Mestral found their spines were tipped with tiny hooks – sparking his invention of Velcro. He was disappointed that fashion designers didn't rush to adopt his product “likely because of that ripping sound”, says his cousin Etienne Delessert. But Velcro found loftier applications, says Delessert, in the first artificial heart surgery and on trips into space. NASA was an early user, sending Velcro to the moon on space boots and suits, on tabs to latch down loose items in zero gravity, and inside helmets as nose scratchers.

Well, it is not something I have had sleepless nights about thinking what do astronauts do when they get an itchy nose, but I have at times wondered. But, I also wonder, do they have pieces of Velcro strategically placed in their underwear??

from Heather ...

Who’s Who?

Ashley Marles (Committee, c. 2006-2008, Observatory Director 2007-2008)



I have been a member of the CAS since 1978 when in Standard 3 (Year 5) at Primary School I joined the Juniors Section under the mentorship of Jim Coxon when the members meetings were being held at Beckenham Primary School. As a junior I attended three school holiday astro camps held at West Melton Observatory in 1979 & 1980 which were run by Sean Ryan and David Buckley who later became professional astronomers. I also got to know Graham Blow and Dennis Goodman for the first time and had my first trip to Mt. John Observatory.

I completed my B.Sc in physics and astronomy in 1996 then did a teaching diploma. Raewyn, family and I then moved to Nelson where I taught for a couple years before a taking up a winter season job at Mt John in 2000 on the MOA project. I also helped Robert Rea and Rudy Zondag reignite the Nelson Astro Group and in 2005 we organized for the RASNZ Conference to be held there for the first time. We returned to Christchurch in 2006 where I was keen to renew my links with CAS.

I met Raewyn at the Townsend Observatory in the Arts Center in 1996 when I was doing the Townsend Observer positioning, run by the University of Canterbury, during the Winter Friday nights and we got married out at the West Melton Observatory in 2003

This is the third time I have been the Observatory Director for West Melton Observatory. It is a job I enjoy because I spend a lot of time there observing so I get to know and see what needs doing to make the observatory site and buildings more comfortable for fellow observers.

RASNZ Conference 2008

by Steve (Resistance is Futile!) Johnson

Despite a blackout on Thursday night, which threatened to wipe out the CCD workshop on Friday, we enjoyed a highly successful conference in Tekapo. Much to our relief, power was restored in the nick of time – around 5 am Friday – and the workshop went ahead with no further problems.

The Friday morning trip that Carol organized to Mt Cook went well. Participants reported an interesting and informative visit, with awesome views of Mt Cook.

The conference itself began on Friday afternoon and RASNZ had assembled a great line-up of speakers, from students to professors, for the opening and the following sessions on Saturday. Lionel Hussey and David Brian did a superb job setting up the technical aspects, which Lionel then monitored throughout the conference. I would like to acknowledge his outstanding contribution. Carol's tireless efforts were also highly valued throughout the weekend along with John's help on Friday and Richard's work in distributing the emails out to the attendees

It was great to see everyone enjoying themselves at the "Dark Matters" Saturday night dinner, especially those who took the time to dress for the occasion. There was plenty to laugh about as various guests were assimilated in to the fold by Carol and I. There were rumours of some fun and laugher at some after dinner parties as well.

Sunday afternoon saw a trip to Mount John Observatory, where delegates were given an interesting and informative tour of the facilities by Alan Gilmore and Graeme Kershaw.

Carol, Lionel, John, Richard and Steve, as members of the Local Organizing Committee, would like to thank all the members of the Canterbury Astronomical Society for their support. In addition, we thank the RASNZ Organizing Committee and the many members of other societies, both national and international, who participated in the weekend's activities. We appreciate your support.

We would also like to thank the staff of the Godley Resort, particularly Sam, Rita and Pam, for all the extras, particularly the decorations for Saturday night the dinner, which made the weekend so very special.

Feedback following the conference confirms that it was outstanding success.

A glamorous Carol McAlavey with two admirers (Steve Johnson and Lionel Hussey) at RASNZ 2008.

Noticeboard

news from the Committee

2008-2009 Subscriptions

Subscriptions for the 2008/2009 financial year (1 April 2008 – 31 March 2009) are now long 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 30 June will be deemed to have resigned, and will be dropped from the membership list.**

Monthly Members Day / Night, West Melton Observatory

Our second new look monthly member's sessions at West Melton, on 31 May, was a great success. Thank to all who turned up, and we look forward to seeing you again for the mid-winter bonfire. The photos below show the pot luck meal; members receiving training on the Cooke; and Observatory Directory Ashley Marles about to fire up a video show.


The Solar System this Month

by Brian Loader

Sunrise and sunset times for Christchurch:

Date	07 Jun	14 Jun	21 Jun
Rise	07:56	08:00	08:03
Set	16:59	16:58	16:59

Date	28 Jun	05 Jul	12 Jul
Rise	08:03	08:02	07:59
Set	17:01	17:05	17:10

Phases of the Moon, dates in New Zealand ST

New	1st qtr	Full	Last qtr
4 Jun	11 Jun	19 Jun	27 Jun
3 Jul	10 Jul	18 Jul	26 Jul

The southern midwinter solstice is at midday on June 21, to be more precise 11:59 am! At this time the Sun is below the horizon longest during a 24-hour period. The earliest sunsets are a few days earlier, on June 14 and 15, while the latest sunrises are a few days later on 27 and 28 June.

The Planets

Mars catches up with Saturn in July, the two being closest on July 10. Jupiter is at opposition a day earlier and will be the "star" of the late evening sky.

MERCURY is in the morning sky although it will not be readily visible until late June.

At the beginning of July Mercury will rise an hour and three-quarters before the Sun. The planet will be then visible as a magnitude 0.5 starlike object, low and almost round to the north-east.

On July 1 it will be at about half the height of the 1st magnitude star Aldebaran 50 minutes before sunrise. Betelgeuse, in Orion and a similar magnitude to the planet, will be almost level with Mercury and some 16° to its right.

Mercury it at its greatest elongation, some 22° from the Sun on the morning of July 2. Following this Mercury will start moving back towards the Sun, so that it rises closer to the time of sunrise. By the morning of July 11 this will be 80 minutes before the Sun. But by then the planet will also be a magnitude brighter.

VENUS will move into the evening sky following its conjunction on June 9. But it will be setting soon after the Sun making observation difficult.

By mid July Venus will set about 45 minutes after the Sun. Very shortly after sunset, it will be only 5 or 6 degrees up, in a direction between west and northwest. So given a clear low horizon, it should be possible to pick in the bright evening twilight.

MARS will be chasing **SATURN** during most of the period. Mars moves into Leo, the same constellation as Saturn, on June 11. Each night Mars will get closer to the ringed planet, on its way passing Regulus. The star and planet will be closest on the evening of July 1, when Mars will be just over 40', a little more than the diameter of the full moon, below the star. Regulus has a magnitude 1.4, Mars will be at 1.6, so the star is slightly brighter. It may be difficult to tell the difference.

Having moved past Regulus, Mars will continue on its way towards Saturn, until July 10 and 11 when the two planets are also just over 40' apart. They will in fact be slightly closer on the first evening. More noticeable will be their differing relative positions on each evening. Saturn will be the brighter by the better part of a magnitude.

By the time they are in conjunction Mars and Saturn will be setting just after 9 pm. So the best time to look for them will be early evening once the sky is dark.

A few days before Mars passes Saturn, the crescent Moon will join them. On the evening of July 6 there will be a nice line up of the 13% lit Moon, Regulus, Mars and Saturn. The four will be almost evenly spread along a line just over 8° long. The following evening the 22% lit Moon will be 6° above Saturn.

JUPITER is at opposition on July 9 so by then will rise at sunset and set at sunrise, so being in the sky all night. However it will be low at first, so the best time for Jupiter will be after Mars and Saturn have set. The planet will be very obvious to the east almost directly below the handle of the "teapot" in Sagittarius.

On the night of June 20, the Moon, just past full, will be 2 degrees from Jupiter. The two will be closest just after 2 am.

Lunar Occultations

by Brian Loader

The list shows a few of the many lunar occultations visible from Christchurch during the second part of June early July 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 June be observable using 50 mm binoculars.

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.

On the night of July 14/15 Antares will be occulted by the 87% Moon with a disappearance at the unlit limb. An occultation of Antares is one of the easiest occultations to observe, although with the Moon 87% lit binoculars or a small telescope are likely to be needed. The reappearance about an hour and a quarter later is at the lit limb, even so still observable using a telescope. At this occultation the 5.2 magnitude secondary star will not be visible.

Date	Time	P	Star	Mag	%ill	alt	CA	Notes
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	
21 Jun	00:27:24	R	ZC 2834	5.0	97%	63	34S	
22 Jun	02:20:00	r	ZC 2964	6.8	92%	67	50S	
23 Jun	02:28:07	r	ZC 3091	6.7	86%	60	46S	
23 Jun	07:14:23	R	ZC 3108	5.3	85%	37	22N	Graze of ZC 3108 to west of W Melton
25 Jun	05:51:23	r	ZC 3477	6.5	58%	45	87N	
27 Jun	06:49:59	r	ZC 51	6.8	47%	39	59S	

28 Jun	07:25:05	r	ZC 191	7.2	35%	32	42N	
29 Jun	05:48:19	r	ZC 320	5.7	25%	19	15N	
07 Jul	18:44:16	D	ZC 1567	6.4	21%	30	61N	
08 Jul	21:52:45	D	ZC 1685	4.3	32%	13	24S	
10 Jul	21:31:44	d	ZC 1885	7.3	51%	39	54N	
12 Jul	23:44:09	d	ZC 2108	6.6	71%	38	83N	
13 Jul	00:25:15	d	ZC 2109	6.1	71%	30	77S	NB these last 2 on the same night
15 Jul	00:19:49	D	ZC 2366	1.1	87%	52	90S	Antares. Just after midnight Jul 14/15
15 Jul	01:33:08	d	ZC 2373	6.1	87%	39	64S	
15 Jul	01:36:09	R	ZC 2366	1.1	87%	38	-82S	Antares. R at Moon's lit limb
16 Jul	18:41:18	d	ZC 2476	6.6	94%	45	61N	

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.

All the listed events in June take place after midnight, so for example the first event listed takes place at 2:42:20 am on the night of 14/15 June.

In July there are two events listed on the night of July 12/13, one just before midnight and one just after, hence the two dates shown differ. Note also the 3 events on the night of 14/15 July, including both a D and R of Antares.

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

Bookshelf

by Katie Grady

Recent additions to the CAS Library

The following items have been kindly donated to the CAS library.

- Hartung's astronomical objects for southern telescopes : a handbook for amateur observers by David & Frew, David, J. Malin
- Hydrogen deficient stars: Proceedings of a colloquium held in Bamberg, Germany, 28 August- 1 September 1995. Edited by C S. Jeffery
- Godzone skies: astronomy for New Zealanders by Vicki Hyde
- The world treasury of Physics, Astronomy, and Mathematics by Timothy Ferris
- The southern hemisphere constellations and how to find them. 1963 Edition by Sir. W. Peck
- Billions and billions: thoughts on life and death at the brink of the millennium by Carl Sagan
- Tycho and Kepler: the strange partnership that revolutionised science by Kitty Ferguson
- The wandering astronomer by Patrick Moore

To find out more about these and the other books in the CAS library go to http://www.librarything.com/catalog/caslib. Full details of how to navigate caslib can be found in the April 2008 issue of CASMAG.

I am still holding these at my home as they have yet to be labelled. If anyone does want to borrow them please just drop me an email to Katie.grady@hotmail.com, or call me on 981 9951 (I have an answer-phone, so you can leave a message) and I will bring them to either a club meeting, new astronomers night or club night out at the observatory.

Good reading, Katie

Reflections: stories from a lifetime interest in astronomy

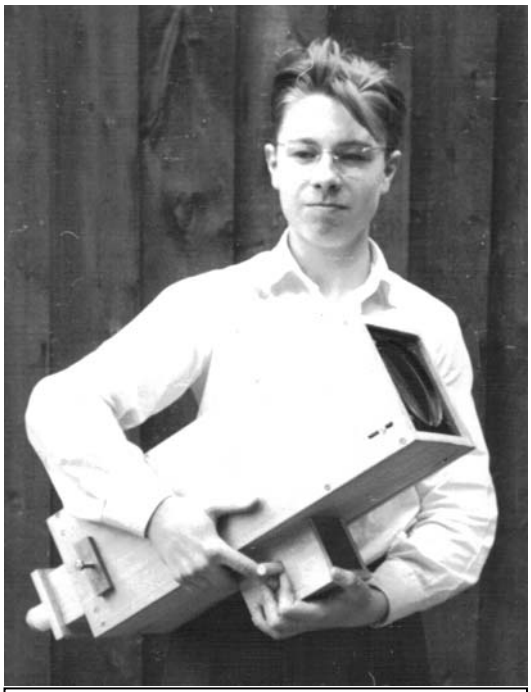
Malcolm Flain

Malcolm Flain continues his historical reminiscences about his astronomical beginnings in post-war London. Here he describes the pleasure of acquiring and using a well-crafted piece of high quality optical equipment, which still stands the test of time five decades later.

Three years after the war everything was in short supply in London where I grew up. Luxury items such as optical equipment were not being manufactured, and the only available instruments were late Victorian and jealously retained. In this climate the only option was to make your own equipment. However, in those austere times one window of opportunity did open up, and it came as a result of the war.

I can't remember precisely when, but sometime in my pre-teens I received a catalogue from H.W. English of Rayleigh Road, Brentwood, Essex. This gentleman obviously had certain key things going for him. He clearly had some disposable capital, along with storage space and the entrepreneurial wit to recognise an opportunity when it arose. He clearly attended post-war military department sales, and speculated on what would have been offered in bulk and at knock-down prices.

The items were quality made when cost was not a major consideration, as the prime imperative was to win a war and minimise troop loss. Mr English also produced an annual catalogue of goods for sale. These items from his store of bargain priced goods he sold off at reasonable prices with an additional profit, and incorporated inflation over the years he traded them.



A teenage Malcolm Flain with his home-made 5" RFT refractor.

Needless to say the best items went in the early years, and so towards the end of the business the catalogues shrank and became devoid of their gems. There were eyepieces from gun predictors, bomb sights, rangefinders (symmetrical, orthoscopic, Erfles) etc. Super wide angle photographic lenses to giant size telephotos for formats from 16 mm to 9 - 10 inches, scavenged from spy cameras to aerial surveillance cameras. Binoculars of all varieties including giant ones confiscated from the German and Japanese forces. Elbow telescopes, signalling telescopes, prisms, optical flats, filters, and all manner of mounts with slow motion controls.

To see an example of how these items were reused by amateur astronomers you need look no further than the satellite tracking scope at West Melton. The mount is ex War Department, the telescope is a modified elbow telescopic warship gun sight with an add-on 5" objective to increase its light grasp and accuracy. These cobbled together instruments were distributed throughout the world as part of "Project Moonwatch" to measure orbital data on NASA satellites.

Amateur astronomers were quick to recognise the possibilities afforded by these ex-WD goods, which were otherwise virtually unobtainable. I had my eye on one item in particular, but as a young boy it was beyond my reach. Mr English initially offered large German binoculars (20 x 125 mm) for sale; clearly the price was too high as a single item because later he advertised them as parts – i.e., 125 mm achromatic objectives, eyepieces, and prisms. Many years later in a more affluent society he advertised to buy the parts back so he could reconstitute them as (by then) desirable giant German binoculars.

I was fortunate enough, before this, to write to him to ask if he had any objectives left as they had disappeared from his catalogues. I still have the reply of 1953: "We have one 5" x 24" (actually 25") focus achromat at £6-10 shillings ex govt., and in good condition". Talk about being the last boy in the queue! That lens is still with me today and has undergone many upgrades as a telescope.

Malcolm's 5" 4^{o} f5 RFT, alongside an 80 mm f5 Vixen refractor.

At the time of purchase I was a member of the British Astronomical Association, whose monthly meetings were held at Burlington House – a stone's throw away from Picadilly Circus. After the formal meetings members would go up one floor to the library for tea/coffee and a chat. Harold Wildey was head of the telescope making section and was also the mirror maker for the firm Broadbent and Clarkson (Royal Charter Appointment). When talking with him I mentioned my purchase, what it cost, and what I was going to use it for. His first response was "You couldn't buy the optical blanks for that price". It's interesting to note that – decades later – he specialised in making 5" short focus rich field refractors.

I bought the objective then and still use it now as a rich field telescope (RFT). Large light grasp, low magnification, wide field of view, and small physical size – hence mobile and convenient. I use it in alt-azimuth mode with slow motion controls and a 2" diagonal and eyepiece, thus making it very user friendly. It's an instrument that should be used in the darkest of skies hunting comets and telescopic meteors. Satellite hourly rate in light polluted Christchurch is around 12-15. If you want to know more about RFTs and richest rich field telescopes (RRFTs), read the articles in Amateur Telescope Making Book 3, a copy of which is held in the CAS library.

I bought the objective out to New Zealand with me in 1964 as I correctly anticipated obtaining one here at that time would be most unlikely. It's only relatively recently that this has changed. Asian imports, along with the presence of an active importing form, have made all manner of delights available.

My 5" achromatic objective I regard with considerable affection. The two pieces of glass are still held together with their original balsam, and survived use by observers on the German front line during WWII. They were transported to England after being confiscated by the British, extracted, sold into the caring hands of a juvenile enthusiast, transformed into a RFT, and transported to observing sites all over England. Then shipped halfway around the world to New Zealand, to be upgraded and transformed several times to its present state. On reflection I can't think of anything except some photographs that have been with me longer, and it has always provided me with interests and pleasures. What a return for such a small cost!

With me almost as long has been my 10" (250 mm) F7.1 mirror, which waited about 50 years to see first light. But that's another story.

Editor's note: As this issue of CASMAG was being compiled, Malcolm had the misfortune to be taken ill while at the RASNZ meeting in Tekapo, requiring an ambulance trip to Timaru for surgery. He is now recuperating at home, and we wish him well for a speedy recovery.

John Archibald Wheeler (1911-2008)

Dennis Overbye

As the man who added the term "black hole" to the English language, John Wheeler should be far better known than he is. Arguably the last of the 20th century giants of physics, his career spanned well over six decades, from the 1930s to the 1990s. Yet he remains very much a physicist's physicist: well known and highly respected within the field, but virtually unheard of in the world at large. Opinions will differ as to Wheeler's greatest contribution to modern physics, but from an astronomical perspective he deserves much of the credit for bringing general relativity squarely into the realm of mainstream physics, to where it is now a pervasive and fundamental tool in modern astronomy. His legendary textbook Gravitation, co-authored with two former students, introduced GR to a generation of students and contains the most succinct summary of Einstein's theory ever written: "Spacetime tells matter how to move. Matter tells

spacetime how to curve." The following obituary by Dennis Overbye is a fitting tribute to Wheeler's legacy.

John Wheeler, a visionary physicist and teacher who helped invent the theory of nuclear fission, gave black holes their name and argued about the nature of reality with Albert Einstein and Niels Bohr, died Sunday at his home in Hightstown, New Jersey. He was 96. The cause was pneumonia, said his daughter Alison Wheeler Lahnston.

Wheeler was a young, impressionable professor in 1939 when Bohr, the Danish physicist and his mentor, arrived in the United States aboard a ship from Denmark and confided to him that German scientists had succeeded in splitting uranium atoms. Within a few weeks, he and Bohr had sketched out a theory of how nuclear fission worked. Bohr had intended to spend the time arguing with Einstein about quantum theory, but "he spent more time talking to me than to Einstein," Wheeler later recalled.

As a professor at Princeton and then at the University of Texas in Austin, Wheeler set the agenda for generations of theoretical physicists, using metaphor as effectively as calculus to capture the imaginations of his students and colleagues and to pose questions that would send them, minds blazing, to the barricades to confront nature.

Max Tegmark, a cosmologist at the Massachusetts Institute of Technology, said of Wheeler, "For me, he was the last Titan, the only physics superhero still standing." Under his leadership, Princeton became the leading American centre of research into Einsteinian gravity, known as the general theory of relativity – a field that had been moribund because of its remoteness from laboratory experiment. "He rejuvenated general relativity; he made it an experimental subject and took it away from the mathematicians," said Freeman Dyson, a theorist at the Institute for Advanced Study across town in Princeton.

Among Wheeler's students was Richard Feynman of the California Institute of Technology, who parlayed a crazy-sounding suggestion by Wheeler into work that led to a Nobel Prize. Another was Hugh Everett, whose Ph.D. thesis under Dr. Wheeler on quantum mechanics envisioned parallel alternate universes endlessly branching and splitting apart – a notion that Bryce DeWitt, of the University of Texas in Austin, called "Many Worlds" and which has become a favourite of many cosmologists as well as science fiction writers.

John Archibald Wheeler was born on July 9, 1911, in Jacksonville, Florida. The oldest child in a family of librarians, he earned his Ph.D. in physics from Johns Hopkins University at 21. A year later, after becoming engaged to Janette Hegner, he sailed to Copenhagen to work with Bohr, the godfather of the quantum revolution, which had shaken modern science with paradoxical statements about the nature of reality. "You can talk about people like Buddha, Jesus, Moses, Confucius, but the thing that convinced me that such people existed were the conversations with Bohr," Wheeler said.

Their relationship was renewed when Bohr arrived in 1939 with the ominous news of nuclear fission. In the model he and Wheeler developed to explain it, the atomic nucleus, containing protons and neutrons, is like a drop of liquid. When a neutron emitted from another disintegrating nucleus hits it, this "liquid drop" starts vibrating and elongates into a peanut shape that eventually snaps in two.

Two years later, Wheeler was swept up in the Manhattan Project to build an atomic bomb. To his lasting regret, the bomb was not ready in time to change the course of the war in Europe and possibly save his brother Joe, who died in combat in Italy in 1944. He continued to do government work after the war, interrupting his research to help develop the hydrogen bomb, promote the building of fallout shelters and support the Vietnam War and missile defence, even as his views ran counter to those of his more liberal colleagues. He was once officially reprimanded by President Dwight Eisenhower for losing a classified

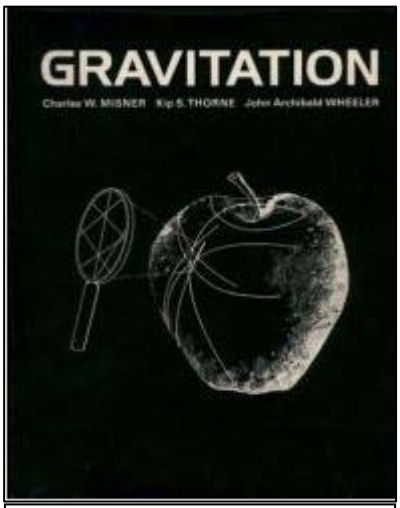
document on a train, but he also received the Atomic Energy Commission's Enrico Fermi Award from President Lyndon B. Johnson in 1968.

When Wheeler received permission in 1952 to teach a course on Einsteinian gravity, it was not considered an acceptable field to study. But in promoting general relativity, he helped transform the subject in the 1960s, at a time when Dennis Sciama, at Cambridge University in England, and Yakov Borisovich Zeldovich, at Moscow State University, founded groups that spawned a new generation of gravitational theorists and cosmologists.

One particular aspect of Einstein's theory got Wheeler's attention. In 1939, J. Robert Oppenheimer, later the head of the Manhattan Project, and a student, Hartland Snyder, suggested that Einstein's equations had made an apocalyptic prediction. A dead star of sufficient mass could collapse into a heap so dense that light could not even escape from it. The star would collapse forever while spacetime wrapped around it like a dark cloak. At the centre, space would be infinitely curved and matter infinitely dense, an apparent absurdity known as a singularity.

Wheeler at first resisted this conclusion, leading to a confrontation with Oppenheimer at a conference in Belgium in 1958, in which Wheeler said that the collapse theory “does not give an acceptable answer” to the fate of matter in such a star. “He was trying to fight against the idea that the laws of physics could lead to a singularity,” Charles Misner, a professor at the University of Maryland and a former student, said. In short, how could physics lead to a violation itself – to no physics? Wheeler and others were finally brought around when David Finkelstein, now an emeritus professor at Georgia Tech, developed mathematical techniques that could treat both the inside and the outside of the collapsing star.

At a conference in New York in 1967, Wheeler, seizing on a suggestion shouted from the audience, hit on the name “black hole” to dramatize this dire possibility for a star and for physics. The black hole “teaches us that space can be crumpled like a piece of paper into an infinitesimal dot, that time can be extinguished like a blown-out flame, and that the laws of physics that we regard as 'sacred,' as immutable, are anything but,” he wrote in his 1999 autobiography, “Geons, Black Holes & Quantum Foam: A Life in Physics.”



Gravitation, co-authored with former students Kip Thorne and Charles Misner and published in 1973, introduced general relativity to a generation of students.

In 1973, Wheeler and two former students, Misner and Kip Thorne, of the California Institute of Technology, published “Gravitation,” a 1,279-page book whose witty style and accessibility – it is chockablock with sidebars and personality sketches of physicists – belies its heft and weighty subject. It has never been out of print. In the summers, Wheeler would retire with his extended family to a compound on High Island, Maine, to indulge his taste for fireworks by shooting beer cans out of an old cannon. He and Janette were married in 1935. She died in October 2007 at 99. Wheeler is survived by their three children, Lahnston and Letitia Wheeler Ufford, both of Princeton; James English Wheeler of Ardmore, Pennsylvania; 8 grandchildren, 16 great-grandchildren, 6 step-grandchildren and 11 step-great-grandchildren.

In 1976, faced with mandatory retirement at Princeton, Wheeler moved to the University of Texas. At the same time, he returned to the questions that had animated Einstein and Bohr, about the nature of reality as revealed by the strange laws of quantum mechanics. The cornerstone of that revolution was the uncertainty principle, propounded by Werner Heisenberg in 1927, which seemed to put fundamental limits on what could be known about nature, declaring, for example, that it was impossible, even in theory, to know both the velocity and the position of a subatomic particle. Knowing one destroyed the ability to measure the other. As a result, until observed, subatomic particles and events existed in a sort of cloud of possibility that Wheeler sometimes referred to as “a smoky dragon.” This kind of thinking frustrated Einstein, who once asked Wheeler if the moon was still there when nobody looked at it. But Wheeler wondered if this quantum uncertainty somehow applied to the universe and its whole history, whether it was the key to understanding why anything exists at all. “We are no longer satisfied with insights only into particles, or fields of force, or geometry, or even space

and time," Wheeler wrote in 1981. "Today we demand of physics some understanding of existence itself."

> *Einstein's description of gravitation as curvature of spacetime led directly to that greatest of all predictions of his theory, that the universe itself is dynamic. Physics still has far to go to come to terms with this amazing fact and what it means for man and his relation with the universe.*
>
> *John Archibald Wheeler*

At a 90th birthday celebration in 2003, Dyson said that Wheeler was part prosaic calculator, a "master craftsman," who decoded nuclear fission, and part poet. "The poetic Wheeler is a prophet," he said, "standing like Moses on the top of Mount Pisgah, looking out over the promised land that his people will one day inherit." Wojciech Zurek, a quantum theorist at Los Alamos National Laboratory, said that Wheeler's most durable influence might be the students he had "brought up." He wrote in an e-mail message, "I know I was transformed as a scientist by him – not just by listening to him in the classroom, or by his physics idea: I think even more important was his confidence in me." Wheeler described his own view of his role to an interviewer 25 years ago. "If there's one thing in physics I feel more responsible for than any other, it's this perception of how everything fits together," he said. "I like to think of myself as having a sense of judgment. I'm willing to go anywhere, talk to anybody, ask any question that will make headway. "I confess to being an optimist about things, especially about someday being able to understand how things are put together. So many young people are forced to specialize in one line or another that a young person can't afford to try and cover this waterfront – only an old fogy who can afford to make a fool of himself. "If I don't, who will?"

http://www.iht.com (Monday, April 14, 2008)

Revolutionary Insoles Combine Five Forms of Pseudoscience

Browsing through a local newsletter while on holiday in Wanaka earlier this year, I noticed a small advertisement from a local "bodyelectrician" offering "spiritual healing". Such ads are relatively common in the thriving counter-culture of the upper Clutha, but this one was particularly striking. It claimed to "accelerate the vibrations of the human body by removing negative attachments ... holding the vibration to the lower levels", referring obliquely to "quantum intergalactic physics". I have absolutely no idea what this egregious piece of nonsense was supposed to mean, but it can hardly matter: the young man who placed the ad clearly didn't have the faintest idea either.

Pseudoscientific howlers such as this one are nothing new, of course, and many CAS members will have their own favourite examples. But while such nonsense is easy enough to identify, it is much less common to see it parodied so skilfully as in this piece from that marvellous satirical newspaper The Onion *("America's finest news source"). This deadpan feature may not have a lot to do with astronomy, but it has everything to do with bad science – for which astronomy has long provided fertile ground.*

MASSILLON, OH – Stressed and sore-footed Americans everywhere are clamouring for the exciting new MagnaSoles shoe inserts, which stimulate and soothe the wearer's feet using no fewer than five forms of pseudoscience.

"What makes MagnaSoles different from other insoles is the way it harnesses the power of magnetism to properly align the biomagnetic field around your foot," said Dr. Arthur Bluni, the pseudoscientist who developed the product for Massillon-based Integrated Products. "Its patented Magna-Grid design, which features more than 200 isometrically aligned Contour Points™, actually soothes while it heals, restoring the foot's natural bio-flow."

"MagnaSoles is not just a shoe insert," Bluni continued, "it's a total foot-rejuvenation system."

According to scientific-sounding literature trumpeting the new insoles, the Contour Points™ also take advantage of the semi-plausible medical technique known as reflexology. Practiced in the Occident for over 11 years, reflexology, the literature explains, establishes a correspondence between every point on the human foot and another part of the body, enabling your soles to heal your entire body as you walk.

But while other insoles have used magnets and reflexology as keys to their appearance of usefulness, MagnaSoles go several steps further. According to the product's website, "only MagnaSoles utilise the healing power of crystals to re-stimulate dead foot cells with vibrational biofeedback – a process similar to that by which medicine makes people better."

In addition, MagnaSoles employ a brand-new, cutting-edge form of pseudoscience known as Terranometry, developed specially for Integrated Products by some of the nation's top pseudoscientists.

"The principles of Terranometry state that the Earth resonates on a very precise frequency, which it imparts to the surfaces it touches," said Dr. Wayne Frankel, the California State University biotrician who discovered Terranometry. "If the frequency of one's foot is out of alignment with the Earth, the entire body will suffer. Special resonator nodules implanted at key spots in MagnaSoles convert the wearer's own energy to match the Earth's natural vibrational rate of 32.805 kilofrankels. The resultant harmonic energy field rearranges the foot's naturally occurring atoms, converting the pain-nuclei into pleasing comfortrons."

Released less than a week ago, the $19.95 insoles are already proving popular among consumers, who are hailing them as a welcome alternative to expensive, effective forms of traditional medicine.

"I twisted my ankle something awful a few months ago, and the pain was so bad, I could barely walk a single step," said Helene Kuhn of Edison, NJ. "But after wearing MagnaSoles for seven weeks, I've noticed a significant decrease in pain and can now walk comfortably. Just try to prove that MagnaSoles didn't heal me!"

Equally impressed was chronic back-pain sufferer Geoff DeAngelis of Tacoma, WA.

"Why should I pay thousands of dollars to have my spine realigned with physical therapy when I can pay $20 for insoles clearly endorsed by an intelligent-looking man in a white lab coat?" DeAngelis asked. "MagnaSoles really seem like they're working."

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