AUCKLAND ASTRONOMICAL SOCIETY

October 2010

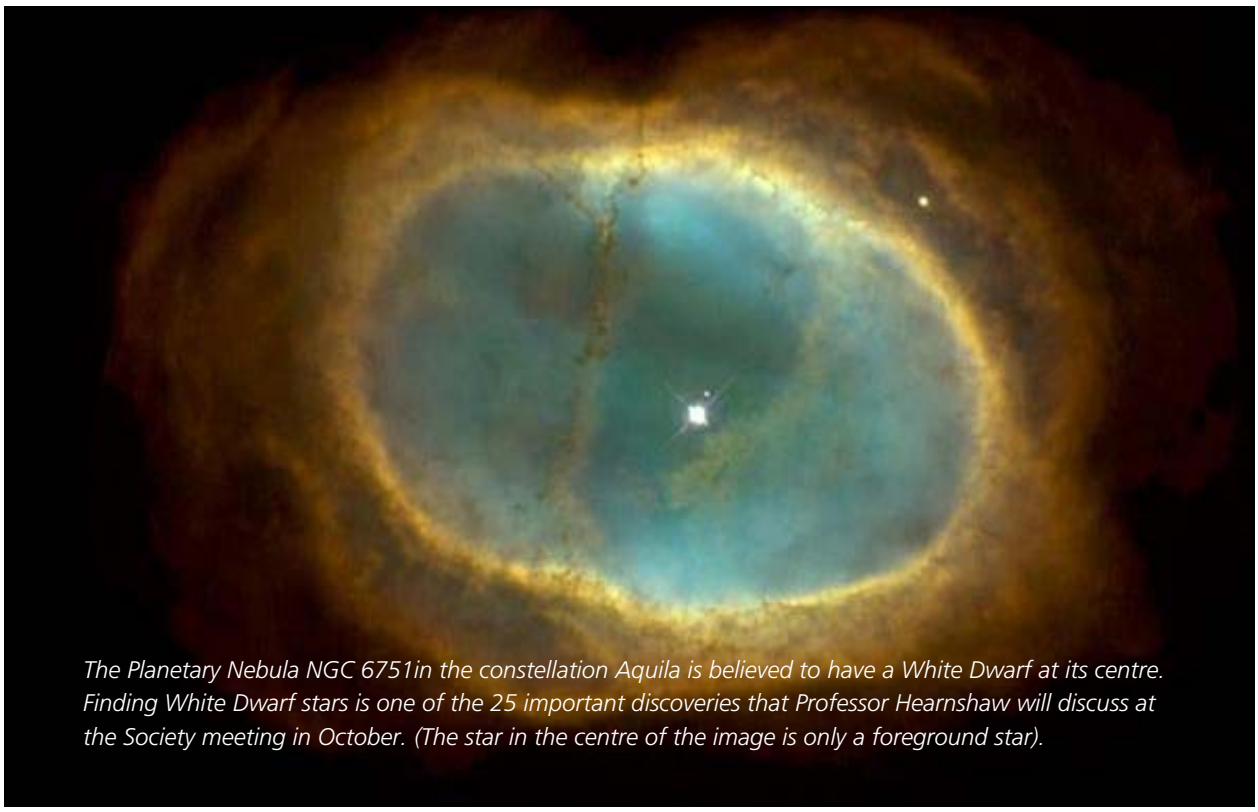
SOCIETY JOURNAL

Society Meeting

The 25 Greatest Discoveries of the 20th Century

With Professor John Hearnshaw

Monday October 11 at 8:00pm



The Planetary Nebula NGC 6751in the constellation Aquila is believed to have a White Dwarf at its centre. Finding White Dwarf stars is one of the 25 important discoveries that Professor Hearnshaw will discuss at the Society meeting in October. (The star in the centre of the image is only a foreground star).

Professor Hearnshaw will present his personal list of the 25 most important and influential discoveries in astronomy of the 20th Century. He will analyse the papers that reported these discoveries by the year they occurred, the age of the discoverers and the country where the people worked. The decade 1911-20 and the mid-1960s to mid-1970s were the most productive of the 20th Century, in spite of the later arrival of computers and observatories in space. He suggests reasons for the decline in the rate of really important papers in the final two decades of the century.

Last year John toured much of the world in his role as Chairman of the International Astronomical Union's Programme Group for the World-Wide Development of Astronomy, part of the International Year of Astronomy, when he visited and gave lectures to observatories and universities in such exotic places as Mongolia, Trinidad and Tobago, Thailand, Laos and Uzbekistan. He has recently published a book that describes his experiences during his trip and includes some of the important contributions that he has made to astronomy in New Zealand and internationally.

John is the keynote speaker for the Burbidge Dinner, where he will talk about his personal experiences during his overseas trip. Remember to contact Andrew to purchase your tickets to the dinner. Time is running out!

September Society Meeting

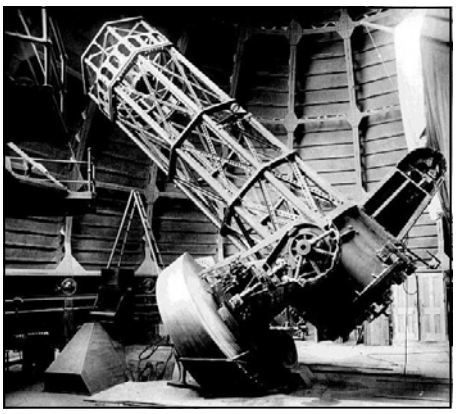
What we have learnt in 100 years with Dr Grant Christie

Report By Clive Bolt

The Great Comet and Halley's Comet were significant events 100 years ago in 1910 when such events made headlines in the papers, but little was known about them.

The orbit of Mercury is the most elliptical of all the planets in the solar system. The influence of the other planets makes its perihelion precess at a rate that was measured at about 42±2 arc seconds per century faster than could be accounted for by Newton's theory. It was suggested that another planet, given the name Vulcan, could be affecting the orbit of Mercury but it was never found. It was not until Einstein published his General Theory of Relativity in 1916 that astronomers could properly account for the precession.

The massive energy output from the Sun was a mystery in 1910. Gravitational potential energy could account for a solar lifetime of only about 25 million years, when the age of the Sun was well known, even back then, to be at least 2 billion years. When Einstein published his now famous equation relating energy and mass as part of his Special Theory of Relativity, it became obvious that the energy source was due to the transmutation of matter into energy, but no one knew how. In 1920 Arthur Eddington proposed nuclear synthesis of hydrogen into helium as a principal Solar energy source. It was not until 1939 that Hans Beth developed the nuclear synthetic pathways, including the proton -proton chain that is responsible for synthesising helium from hydrogen, that we gained a proper understanding of the energy sources that power the Sun and stars like it. George Ellery Hale was instrumental in the construction of a 60-inch reflecting telescope that was located on Mt Wilson in California. From this and other large telescopes came the landmark discoveries that we now take for granted, including the elucidation of galactic structure, the realisation that the Milky Way galaxy is one of many such



The 60 inch telescope at Mt Wilson. Today it is fitted with adaptive optics and is often used for public outreach.

galaxies and the expansion of the Universe, eventually leading to Edwin Hubble's Law in 1929.

In the late 19th and early 20th Centuries, work commenced to catalogue stars and to record their position, brightness and their colour. Eventually, as knowledge progressed and better equipment became available , it was possible to plot the absolute brightness of stars against spectral type, eventually leading to what we now know as the Hertzprung- Russell diagram. In 1925 Cecilia Payne published her PhD thesis in which she showed that the Sun was composed mainly of hydrogen, a conclusion much against the conventional wisdom of the time. Cecilia had to go to America to study astronomy because Cambridge would not confer a PhD on a woman!

The adoption of the HR diagram ultimately led to our understanding of stellar life cycles in 1957, due largely to work by Fred Hoyle and his co workers. This then lead to the discovery of distinct stellar populations. In globular clusters and galactic centres we find the old stars. In the spiral arms we find younger stars that have formed from material recycled from stellar explosions of the older population.

In 1930, Karl Jansky made the first observation of radio waves from a celestial source, a discovery that eventually lead to the development of radio astronomy as a window on the Universe at frequencies other than optical.

In 1964 Penzias and Wilson discovered the Cosmic Microwave background, by chance rather than design. Predicted by Gamow in the 1040s, it was realised that this was the hugely red shifted residual light from The Big Bang. The discovery of the CMB largely put paid to the steady state theory that had wide support at the time, including by Fred Hoyle. Today, interferometry at radio wavelengths is capable of an angular resolution of a few milli arc seconds, better than most optical telescopes. The problem is that each antenna represents one pixel in the image at radio wavelengths.

Grant finished by offering the prediction that one of the important discoveries in the not too distant future will very likely be the discovery and measurement of gravitational waves using a space based observatory. Predicting what we might discover in the future is fraught with problems because almost all of the new instruments, that have been built over the years that offered a quantum leap in capability, were used to make discoveries that were completely unexpected before the instrument was built. What an exciting prospect for the new and future projects, including CERN and the SKA!

Bell Labs' Horn Antenna in Crawford Hill, NJ - In 1964, while using the Horn Antenna, Penzias and Wilson stumbled on the microwave background radiation that permeates the Universe.

The Annual Burbidge Dinner with Guest Speaker Prof. John Hearnshaw

Saturday 9th October, Rutherford Room, Alexandra Raceway

The keynote speaker will be Professor John Hearnshaw, recently retired from The University of Canterbury, where he was Professor of Astronomy in the Department of Physics and Astronomy. John's research interests include extrasolar planetary systems, the history of astrophysics, RS CVn stars (tidally-locked G & K type binary stars), the spectroscopy of late-type stars, stellar radial velocities and the design of astronomical spectrographs. John was closely involved with the building of the MOA telescope that is purpose-designed for the study of extrasolar planetary systems using Gravitational Lensing. MOA is a highly successful collaboration between New Zealand universities and the University of Nagoya in Japan. He is the author of several books and has made contributions to many more.

Last year John toured much of the world in his role as Chairman of the International Astronomical Union's Programme Group for the World-Wide Development of Astronomy as part of the International Year of Astronomy, when he visited and gave lectures to observatories and universities in such exotic places as Mongolia, Trinidad and Tobago, Thailand, Laos and Uzbekistan.

John is an excellent speaker and he has recently published a book to mark the International Year of Astronomy and the significant part that he played in it.

Adventures of a travelling astronomer in Central Asia: in the footsteps of Marco Polo and Ulugh Beg

John will describe his experiences in recent years in three countries of Central Asia where he made astronomical visits, namely Mongolia (2004), Uzbekistan (2008) and Tajikistan (2010). The history and culture of these three countries are all completely different and the problems faced by astronomers there are also different, although they are relatively poor countries struggling to do good science. But they all share one thing in common: some of the world's best high-altitude sites for optical and infrared astronomy are to be found in this region bordering on the Himalayas.

Competition Prize Winners

The prize winners for the Harry Williams Astrophotography Competition and the Beaumont Prize for the best original journal article by a Society member will be announced.

An Astronz 8in Dobsonian Telescope will be auctioned with a $1 reserve. A good chance to get a quality telescope at a great price.

Purchasing Tickets

Please contact Andrew Buckingham on 09-473-5877 or 027-246-2446 or by email: treasurer@astronomy.org.nz. Payment can be made by Internet Banking (Direct Credit) or by deposit at any ASB branch, Account No.: 12-3061-0321397-00 Please use your member number or name as the reference, Payment by Cheque: Make out to 'Auckland Astronomical Society' and post to PO Box 24187, Royal Oak, Auckland 1345. Or give it to Andrew on the night.

Tickets need to be booked by Friday 1st October.

Calendar of Events

October Programme

Fri	1	7:30pm	Young Astronomers with Margaret Arthur
Sun	3	7:30pm	The Transit of Venus and the size of the Universe with Grant Christie
Mon	4	8:00pm	Practical Astronomy. Observing planets with Andrew Buckingham
Sat	9	6:30pm	Burbidge Dinner, Alexandra Raceway. See notice P3
Mon	11	8:00pm	Society Meeting with John Hearnshaw
Mon	18	8:00pm	Film Night with Gavin Logan
Wed	20	7:30pm	Council Meeting
Mon	25	8:00pm	Introduction to Astronomy

Film Night Monday October 18 8:00pm

Einstein & Eddington

A look at the evolution of Albert Einstein's theory of relativity, and Einstein's relationship with British scientist Sir Arthur Eddington, the first physicist to understand his ideas.

Welcome to New Members

Anne Hutley (ordinary)
Andrew Kincaid (family)
Arun Vasanthkumar (student)
Shawn Gribble (family)
Peter Lescher (student) -
Darrell Crisp (family)
Damien Brown (ordinary)

Society Contacts

Auckland Astronomical Society Inc,
P O Box 24-187, Royal Oak,
Auckland 1345, New Zealand

Email	info@astronomy.org.nz
Journal	journal@astronomy.org.nz
Website	www.astronomy.org.nz

Membership inquiries contact Andrew Buckingham at treasurer@astronomy.org.nz or by phone on (09)-473-5877 or 027-246-2446

November Programme

Mon	1	8:00pm	Practical Astronomy.
Fri	5	7:30pm	Young Astronomers with Margaret Arthur
Mon	8	8:00pm	Introduction to Astronomy Astronomy course continues with Bernie Brenner. Note change of date
Mon	15	8:00pm	Film Night with Gavin Logan
Wed	17	7:30pm	Council Meeting
Mon	22	8:00pm	Society Meeting with Jon Lomberg. A Message from Earth, The Voyager Golden Record. Note change of date

Practical Astronomy October 4 8:00pm

Observing Planets & the Gas Giants

An introduction to the Gas Giants: Jupiter, Saturn, Uranus and Neptune, followed by guide to observing planets.
If the weather permits, Venus, Jupiter, Uranus and Neptune will all be in the sky for us to try and observe.

Public Lecture Sunday October 3rd 7:30pm Stardome

The transit of Venus and the quest to measure the size of the Universe with Dr. Grant Christie

The 2010 Council

President	Grant Christie	(021) 024-04992
Vice President	David Britten	(09) 846-3657
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Council	Gavin Logan	(09) 820-6001
Council	Bernie Brenner	(09) 445-3293

Submission on Draft New Zealand Energy Strategy (NZES) and Draft New Zealand Energy Efficiency and Conservation Strategy (NZEECS)

Submission made by Gavin Logan and David Britten, representing the Auckland Astronomical Society.

The Auckland Astronomical Society's submission covers the use of lighting by making three main points:

1. Energy waste from badly-designed lighting that is polluting the night sky.
2. Unnecessary use of lighting that wastes energy resources.
3. The benefits and energy savings from correctly designed and efficient use of lighting.

We are concerned with the continuing loss of a dark night sky in New Zealand urban areas and in large areas surrounding urban centres, caused by unnecessary sky glow created by wasteful use of lighting and thus electricity. Even if one drives many kilometres out of most New Zealand cities you will still find that the glow of the city affects the sky.

This is because:

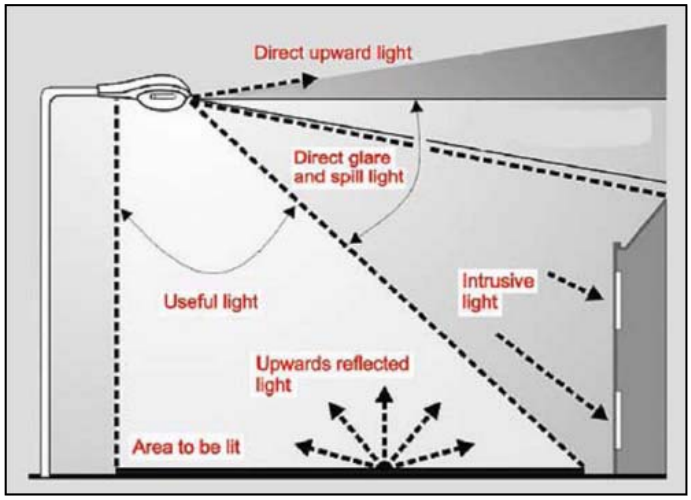
a) Street lighting, outdoor building lighting and car park lighting sends light in all directions rather than just towards the area that needs to be lit.

b) Many buildings have lights left on, using up power when the buildings are completely unoccupied and not at street level, in particular office buildings.

The Ports of Auckland before and after the lighting change.

Badly-designed lighting wastes energy resources and pollutes the night sky. Some of New Zealand's best Astronomical facilities, including Stardome Observatory in One Tree Hill Domain, Auckland and various private observatories, are being seriously affected by badly-designed lighting in surrounding areas. An example of this is the lighting erected in recent years outside the Royal Oak Pak'n'Save supermarket in Auckland, which casts clear silhouettes inside the main telescope dome at Stardome Observatory nearly half a kilometre away. Although having a perfectly dark sky is not always possible in large urban centres, it is possible to preserve much of the night sky and at the same time conserve electricity if the correct lighting policies are followed. We would like to see the following policies adopted to solve the problems of light pollution and energy wastage through poor use of lighting.

a) A nationwide policy in New Zealand to install light shrouds to protect dark sky wherever possible. We would like to see a policy adopted where all new and replacement street and exterior building lighting uses light shielding so that light is directed where it is needed and is not wastefully producing sky glow.



Useful and wasted illumination from a standard road lamp. More than half the light and thus the energy of the lamp is wasted. Correctly designed lighting prevents this waste.

b) When granting Building and Resource Consents for new commercial buildings and multi-dwelling residential complexes, we would like to see a policy in place that mandates Local Government to require the use of shrouded lighting for all exterior lights and outdoor car park lighting.

c) Laws that require the lights in office buildings be switched off when these buildings are not in use.

As an example of how effective this type of policy can be, in 2005 the Ports of Auckland replaced 1300 floodlights with 650 environmentally-friendly fully shielded luminaries. This has saved the company 15% on their annual electricity usage, which is equivalent to the electricity usage of 400 average households a year. It also provided better lighting for operating the port. In 2006 the Ports of Auckland were awarded the Illumination Engineering Society of New Zealand's Lighting Excellence Award. As can be seen from this example, the numbers involved are not small or insignificant, but in actual energy savings, they are large. If the policy of the Ports of Auckland was followed by all commercial property developers, local government and Transit New Zealand, the saving in electricity would be substantial. This would reduce the use of coal-fired or natural gas power stations in winter, thus reducing New Zealand's greenhouse gas emissions. Saving energy by reducing wasteful power consumption caused by unnecessary and wasteful lighting would be a more popular and superior policy to putting the squeeze on New Zealand households to reduce electricity consumption during peak periods in winter, as has happened many times in New Zealand's history during electricity shortages.

The enlightened guidelines prepared by the Auckland City Council in 2008 would serve as a good basis for a national

policy on lighting standards and energy efficiency. Local authorities need to be given direct authority and the appropriate tools to implement, monitor and manage lighting regulations that protect the environment and promote energy efficiency. The guidelines can be found at: http://www.aucklandcity.govt.nz /council/documents/lightingguide/planning.asp and http://www.aucklandcity.govt.nz/council/documents/lightingguide/darksky.asp

The continuing encroachment of unnecessary light pollution and sky glow devalues the environment in this country. In the age of space travel and satellite communications we live in, learning about astronomy and the Universe is an important part of education for both children and adults. Preserving a dark sky where possible is fundamental to this. If most of the stars and objects of the night sky are invisible or hard to see because of sky glow from lighting, then part of the wonder of nature is removed. It is just the same as denying people access to any other part of our natural heritage of a clean green New Zealand, as well as wasting large quantities of electrical generation capacity.

Note

A copy of the RASNZ submission can be downloaded from the Auckland Society website, along with a pdf copy of this submission. ..Ed

The Red Sprite brings Science and Art together.

Special August Lecture

By Gavin Logan

In August Peter McLeish, who has degrees in both science and fine arts, spoke to the Society about Red Sprites.

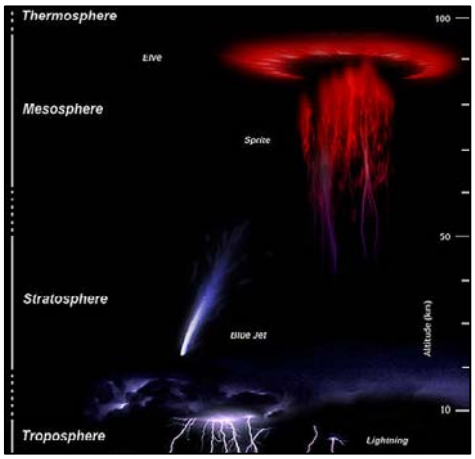
Red Sprites are upper atmospheric optical phenomena associated with thunderstorms (sometimes referred to as upper-atmospheric lightning) that have only recently been documented using high-speed video. Sprites often last only a fraction of a second.

McLeish is a Canadian-born painter, multi-media artist and filmmaker who specialises in paintings and multi-media events that highlight the beauty of science. His collaboration with American scientist Walter Lyons produced the film "The Hundred Year Hunt for the Red Sprite". He spoke to the Society about his background and how the film came about before he screened it.

It told the story of the unexpected discovery of this completely new meteorological phenomenon associated with thunderstorms in the upper atmosphere. Despite a hundred years of anecdotal evidence, the existence of Red Sprites has only recently been confirmed and the film tells the story of their discovery.

McLeish also showed his six-minute film "Lightning's Angels" that combines digitally enhanced oil paintings of a sprite, in various states of transformation that cannot be seen with cameras. McLeish explained that scientists can understand, but not visualise, a scientific event the way an artist can.

Peter McLeish speaking to the Society.



The location of Sprites, or upper atmosphere lightning, as it is known.

Peter McLeish's artwork is mostly small works done with oil on paper using layers of transparencies to get his final effect. He is hoping to have an exhibition in Auckland next year, but you will need deep pockets to buy a sample of his work, as the going price is $US5000.

A Peter McLeish painting of a Red Sprite.

Audience entertained by Space Mission of Yesteryear

By Gavin Logan

September's Film Night featured the movie",In the Shadow of the Moon" which told the story of the manned missions to the Moon made by the United States in the late 1960s and early 1970s. A good turnout of Society members watched this documentary, which reviewed both the footage and media available to the public at the time of the missions, as well as NASA films and materials which had not been opened in over 30 years.

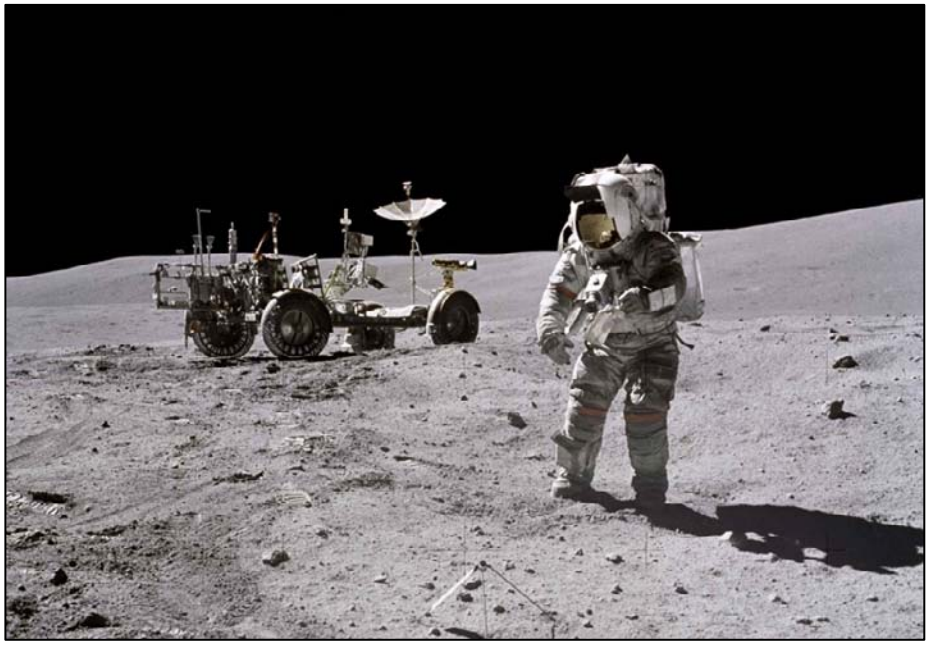
Ten of the twenty-four astronauts who orbited, looped around, or landed on the Moon appear on camera recounting their experiences of the missions. Six of the remaining fourteen astronauts who reached the vicinity of the Moon have since died. The remaining eight were not featured in the film. All manned Apollo flights, with the exception of Apollo 7, which was an earth-orbit shakedown mission, were represented in the film.

At the end of the film the audience was asked: "If they got the chance would they go to the Moon?" More than a third of the audience said they would!

Next month's Film Night is on Monday 18th October at 8pm at Stardome Observatory and features the movie "Einstein and Eddington". This human story chronicles the two men and takes a closer look at the story behind the creation of Albert Einstein's general theory of relativity and the personal lives of the men behind it.

In the Spring of 1914, with Europe on the brink of war, no one had heard of an obscure German physicist called Albert Einstein. A British astronomer, Arthur Eddington, realised that Einstein's theories could unlock whole new ways of thinking about time and space. Despite the danger of being labelled traitors, the two men began a unique correspondence. An eclipse in Africa provided an opportunity to prove Einstein's theories to the world. Eddington, an unlikely hero, set out on a journey to Africa that would change people's perceptions of the Universe forever.

This film looks at Einstein's relationship with British scientist Sir Arthur Eddington, and the introduction of this theory to the world.



Apollo 16 Astronaut John Young in Descartes Crater with the Lunar Rover in the background. NASA

Over one third of the audience for September's film would go to the Moon if they were given the chance.

The New Zealand Almanac 2011

The Almanac is a beautiful calendar with wonderful photographs taken by New Zealand astronomers. Every year the photographs seem to get better - and this coming year's edition is no exception! The Almanac is also packed with information on various astronomical events occurring throughout the year and presented in an easily-accessible calendar format.

Almanacs make wonderful Christmas presents, so consider giving them as Christmas stocking fillers.

The price is $20 plus $2 p&p. We have succeeded in keeping the price virtually unchanged for the last few years. We will continue to give discounts for members, societies and for bulk orders.

We are now taking orders, so please contact Kay Leather: Hellfa@xtra.co.nz to order your 2011 Almanac or post an order to:

Almanac 2011
P.O. Box 156,
Carterton 5743

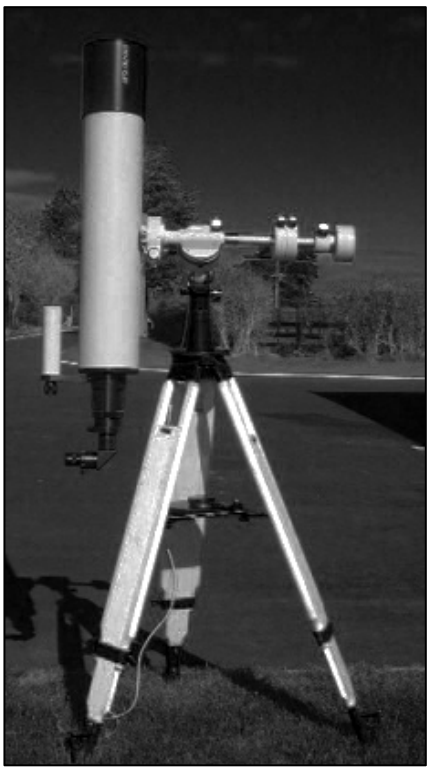
Waharau Dark Sky Weekend.

By Gavin Logan

A small number of enthusiastic astronomers arrived at Waharau Regional Park for the September Dark Sky Weekend. It ended up being a one night affair. Friday night produced a perfectly clear night with fairly steady viewing. The result was some great detailed views of Jupiter. Kevin Barker had his 130mm Zeiss Triplet apochromatic refractor in action on Jupiter, giving views that only a top refractor can.

Some large Reflectors (12 and 16 inch) were also in action on deep sky objects and I was treated to a superb view of the spiral galaxy NGC 253 (the Sculptor Galaxy).

Unfortunately the weather changed on Saturday and heavy rain caused the abandonment of the second night.



Kevin Barker's Zeiss Refractor pointing Skyward.

The Night Sky in October

by Alan Gilmore

Venus and **Jupiter** are both 'evening stars' at the beginning of the month. Golden **Jupiter** is midway up the northeast sky. Binoculars show it as a tiny disk. A small telescope easily shows its four big moons and the parallel stripes in its clouds. Jupiter is 600 million km from us just now. **Venus** is prominent in the western sky soon after sunset in early October. A telescope shows it as a crescent getting longer and thinner as it comes nearer. It slips lower in the twilight as it passes between Earth and Sun. By the last week of the month it will be lost in the Sun's glare. After passing between us and the Sun it quickly moves into the morning sky, rising in the east at dawn in early November. At closest it will be 41 million km away. **Mars** remains low in the western sky through the month; a medium-brightness reddish 'star'.

It is to the right of Venus at the end of the first week of October, then Venus slips lower. The two planets aren't really close, just on the same line-of-sight: Mars is on the far side of the Sun, 340 million km away.

Canopus, the second brightest star, is in the southeast at dusk. It swings up into the eastern sky during the night. Canopus is a truly bright star: 13,000 times the Sun's brightness and 300 light years away. On the opposite skyline is **Vega**, setting in the late evening. Vega is the 5th brightest star. It is 50 times brighter than the Sun but dimmed by its distance of 25 light years*.

In the southwest are 'The Pointers ', Beta and **Alpha Centauri**, making a vertical pair. They point down to **Crux** the Southern Cross. Alpha Centauri, the top Pointer and the brightest star in that area, is the closest naked eye star. It is 4.3 light years away. And it is a binary star: two Sun-like stars orbiting each other in 80 years. A telescope magnifying 50x will split the pair. Beta Centauri, like most of the stars in Crux, is a blue-giant star, very hot and very luminous, hundreds of light years away.

Midway down the western sky is the orange star **Antares**, marking the heart of the Scorpion. The Scorpion's tail loops up the sky in the evening, making a back-to-front question mark with Antares being the dot. The curved tail is the 'fish-hook of Maui' in Maori star lore. The name Antares is Greek for 'rival to Mars'. Just now one can see how it got its name. Above and right of the Scorpion's tail is 'the teapot' made by the brightest stars of **Sagittarius**. It is upside down in our southern hemisphere view.

The **Milky Way** is brightest and broadest in **Scorpius** and **Sagittarius**. In a dark sky it can be traced down past the Pointers and Crux into the south. In the other direction, past Sagittarius, it tracks down the north sky to the right of Vega. From northern parts of New Zealand the star **Deneb** can be seen near the north skyline. It is in a broad part of the Milky Way and is the brightest star in Cygnus the swan.

The Milky Way is our edgewise view of the galaxy, the pancake of billions of stars of which the Sun is just one. The thick hub of the galaxy, 30,000 light years away, is in Sagittarius. The hub, or bulge, is mostly hidden by dust clouds in space. These 'interstellar' dust clouds appear as gaps and slots in the Milky Way. A scan along the Milky Way with binoculars shows many clusters of new stars and some glowing clouds of left-over gas. There are many in Scorpius and Sagittarius and in the **Carina** region below Crux.

The Large and Small Clouds of Magellan, **LMC** and **SMC**, look like two misty patches of light in the southeast sky. They are easily seen by the naked eye on a dark moonless night. They are galaxies like our Milky Way but much smaller. The Large Cloud is about 5% the mass of our Galaxy and the small one 3%. That is still many billions of stars in each. The LMC is around 160,000 light years way; the SMC around 200,000 light years away. They may be satellite galaxies of the Milky Way, taking two billion years to make one orbit.

On moonless evenings in a dark rural sky the Zodiacal Light is visible in the west. At first glance it looks like late twilight. On closer inspection one sees a faint broad column of light passing through Libra. It is sunlight reflecting off meteoric dust in the plane of the solar system.

*A **light year** (**lay**.) is the distance that light travels in one year: nearly 10 million million km or 10^{13} km. Sunlight takes eight minutes to get here; moonlight about one second. Sunlight reaches Neptune, the outermost major planet, in four hours. It takes four years to reach the nearest star, Alpha Centauri.

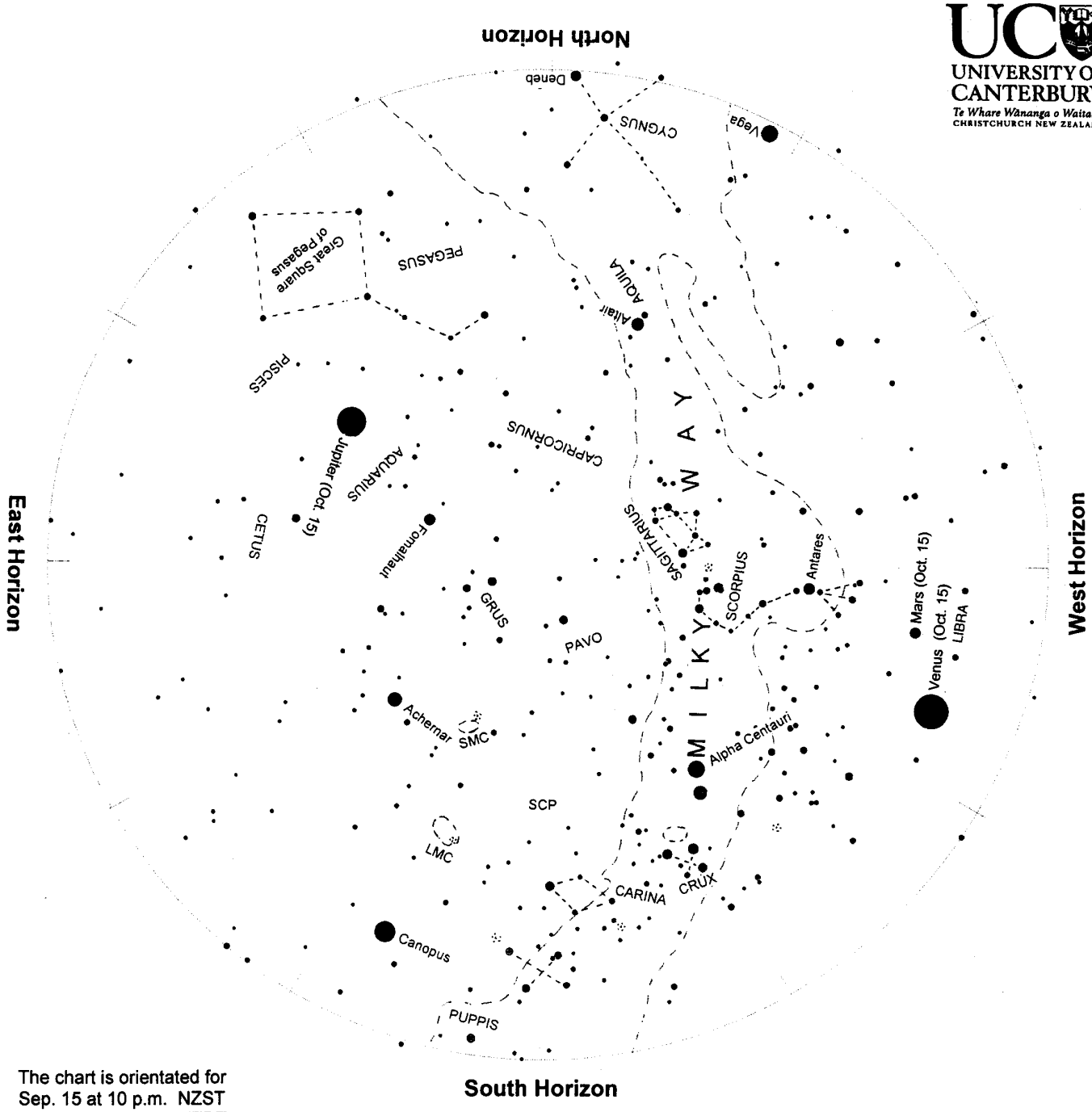
Notes by Alan Gilmore, University of Canterbury's Mt John Observatory, P.O. Box 56, Lake Tekapo 7945, New Zealand.

www.canterbury.ac.nz

Diary of Solar System Events for October 2010

Diary events derived from Dave Herald's OCCULT 4, reprinted from RASNZ

Date (NZDT)	Diary of Solar System Events in October 2010 for New Zealand
October 1	Saturn at conjunction with Sun.
October 1	Moon at last quarter 4.52pm NZDT (03:52 UT).
October 5	Crescent Moon 13% lit, 3.5° above Regulus magnitude 1.4, low in dawn sky.
October 7	Moon at perigee, its closest to the Earth for the lunar month, 359456 km.
October 7	Mars 40' from Double star Alpha Librae, evening sky.
October 8	New Moon at 7.45am NZDT (Oct 7, 18:45 UT).
October 8	Venus stationary.
October 9	3% lit crescent Moon, 7.5° below Venus evening sky.
October 10	9% lit crescent Moon, 4.5° above Mars, evening sky.
October 11	17% lit Moon 5° below Antares, magnitude 1.1, brightest star in Scorpius.
October 12	Moon furthest south, so highest southern hemisphere transit for the month.
October 15	Moon at first quarter at 10.27am NZDT (Oct 14, 21:27 UT).
October 17	Mercury at superior conjunction at far side of Sun.
October 19	Moon at apogee, its greatest distance from the Earth for the Lunar month, 405433 km.
October 20	93% lit Moon 7.5° below Jupiter, and 6° below Uranus, late evening sky.
October 23	Full Moon at 2.37pm NZDT (01:37 UT).
October 27	Moon furthest north, so lowest southern hemisphere transit for the month.
October 29	Venus at inferior conjunction between Earth and Sun.
October 31	Moon at last quarter 1.46pm NZDT (Oct 31, 12:46 UT).



The chart is orientated for
Sep. 15 at 10 p.m. NZST
Oct. 1 at 10 p.m. NZDT
Oct. 15 at 9 p.m. "

Evening sky in October 2010

To use the chart, hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge. As the earth turns the sky appears to rotate clockwise around the south celestial pole (SCP on the chart). Stars rise in the east and set in the west, just like the sun. The sky makes a small extra clockwise rotation each night as we orbit the sun.

Venus and Jupiter are 'evening stars' for most of the month. Venus slips lower in the dusk, disappearing in the last week of October. Jupiter remains the brightest star-like object in the evening sky. Canopus is in the southeast moving up into the eastern sky. Vega sets on the opposite horizon. Crux, the Southern Cross, and the Pointers are in the south-west. Midway down the western sky is orange Antares at the heart of Scorpius. The Scorpion's tail, a.k.a. the fish-hook of Maui, curls up the sky. The Milky Way spans the sky from north through west and into the south. The Magellanic Clouds, nearby galaxies marked as LMC and SMC on the chart, are misty glows above Canopus.

Chart produced by Guide 8 software; www.projectpluto.com. Labels and text added by Alan Gilmore,
Mt John Observatory of the University of Canterbury, P.O. Box 56, Lake Tekapo 7945, New Zealand. www.canterbury.ac.nz

The Milankovitch cycles

By Jeffrey A. Lee , Eoearth.org

Once Isaac Newton described his laws of motion and of gravity, the orbit of each planet became predictable, not only under the influence the Sun, but the much weaker influences of all the other planets and the Moon as well. Milutin Milankovitch did not discover the cycles, nor was he the first to calculate their changes. He did, though, improve on the methods of calculating them and relating them to Earth's climatic variations. Here is a brief description of the three cycles.

Precession (also called Precession of the Equinoxes): the gravitational pull of the Sun and Moon on Earth's equatorial bulge causes the poles to slowly wobble. Over 25,800 years, the polar axis traces out a circle with respect to the stars.

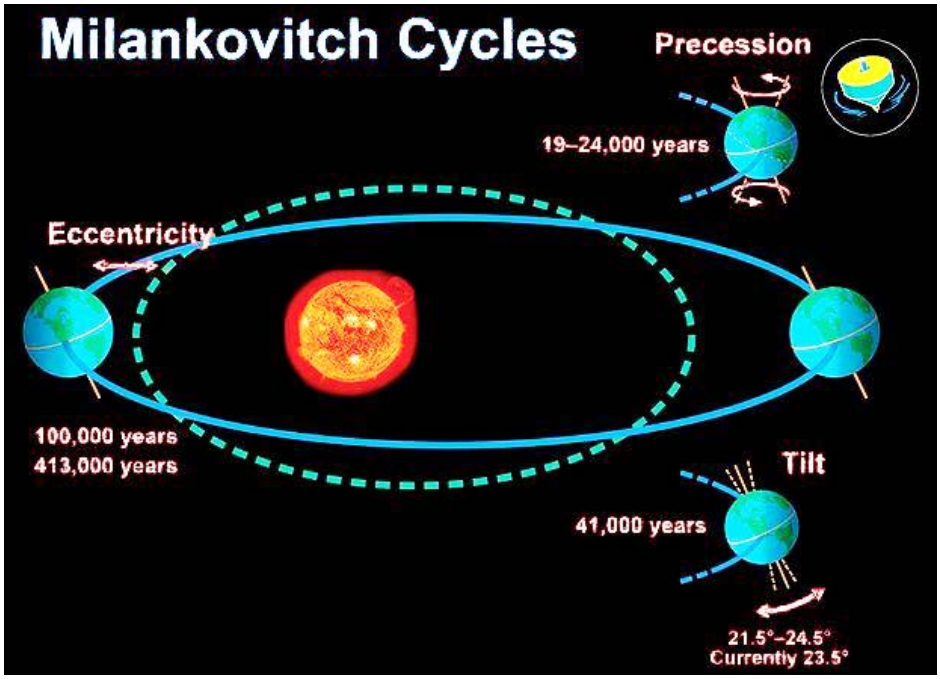
Now the North Pole points to Polaris and all other stars visible in the Northern Hemisphere appear to rotate around that star in the night sky.

In one half cycle, or 12,900 years, the North Pole will point to the star Vega, which is forty-seven degrees away from Polaris. In another 12,900 years, the North Pole will be back to Polaris.

Astronomers in 4,000 BC, for example, noted that the axis pointed to the handle of the Big Dipper (part of the constellation Ursa Major), not Polaris, which is the end of the handle of the Little Dipper (part of the constellation Ursa Minor). An effect of this change is that the time of year that Earth is closest to the Sun, called perihelion, varies through the cycle.

Now perihelion is January 3, so the Northern Hemisphere has slightly milder winters and the Southern Hemisphere has slightly cooler winters. And, conversely, summers are a bit cooler in the North and warmer in the South. In 12,900 years, the North will have colder winters because Earth will be furthest from the Sun (aphelion) in January.

Another aspect of the precession is the length of winter and summer. Because the Sun is not at the centre of the orbital ellipse (discussed in the next paragraph), it currently takes seven more days for Earth to travel from the vernal equinox to the autumnal equinox than from the autumnal to the vernal. In other words, the Northern Hemisphere winter now is shorter than the Southern Hemisphere winter. In 12,900 years, the North will have longer winters and shorter summers.



Milankovitch Cycles. Showing the three characteristics of eccentricity, obliquity and precession. Source: UCAR

Eccentricity of Orbit: Earth travels around the Sun along a flat surface called the plane of the ecliptic, thus named because eclipses occur when the Moon intersects this plane. The path taken along this plane is almost a circle, but not quite. It is elliptical, with the Sun just off centre as one 'foci' of the ellipse. Gravitational pull of other planets causes the path to become slightly more or slightly less elliptical. In other words, it becomes more or less of a flattened circle. Venus, because it is close to Earth, and Jupiter, because it is so massive, have the greatest effect on the eccentricity. There are peaks in eccentricity every 95,000 years, but superimposed on those are larger peaks at 125,000 and 400,000 years. When the orbit is more elliptical, the perihelion is closer to the Sun and the aphelion is farther away than when the orbit is more circular.

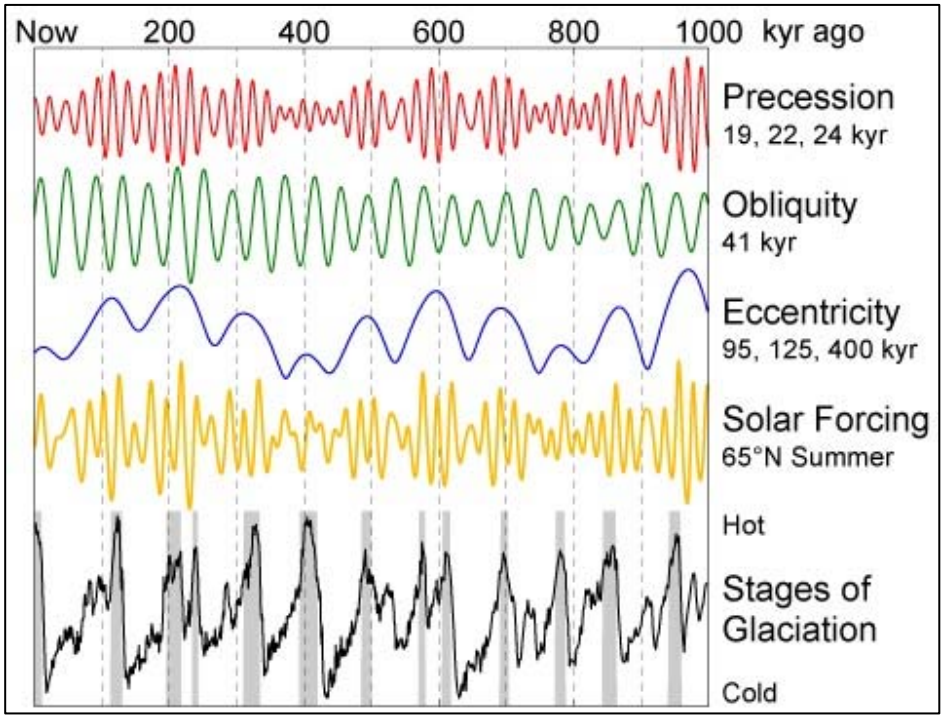
Axial Tilt (also called Obliquity): The axis of rotation intersects the plane of the ecliptic at an angle and that angle changes over time. This change is caused by the fact that the Moon's orbital path is not precisely along Earth's plane of the ecliptic and so the gravitational attraction of the Moon varies in direction over time. The angle of axial tilt affects the difference between winter and summer in each hemisphere, especially at higher latitudes. Not only does the axial tilt vary over time, but the plane of the ecliptic varies, too. Taking the two into consideration, the obliquity of the axis varies on a 41,000 year cycle and varies from 22.1° to 24.5° from a line perpendicular to the plane of the ecliptic, with the current value at about 23.44°.

Soon after the existence of an ice age had been proposed, scientists sought an explanation of their cause. In 1842, Frenchman Joseph Alphonse Adhémar suggested that the varying lengths of

winter and summer, an effect of the precession, causes ice to accumulate in the hemisphere with the longer winter. He used the massive ice sheet in Antarctica as evidence, since the Southern Hemisphere currently has longer winter and shorter summer.

Scotsman James Croll combined the eccentricity of the orbit and the precession and in the 1860s and 1870s presented his ideas on the effects of the cycles and how they might influence climate, especially the colder winters, when they correspond with the aphelion. In fact, what are typically called 'Milankovitch Cycles' are sometimes referred to as 'Croll-Milankovitch Cycles.'

Milankovitch gets most of the credit for relating the cycles to ice ages because he incorporated all of the pertinent cycles, dealt with them in much greater mathematical precision and showed much more thoroughly how they affect climate. At the suggestion of Wladimir Köppen and Alfred Wegener, he, investigated the role of cooler summers in instigating ice ages. Milankovitch Cycles clearly play an important role in the comings and goings of ice sheets, but the details of just how this happens are far from well understood.



The calculated effect of the three orbital characteristics on the solar heating in the northern hemisphere and the consequent effect on the mean temperature and the Earth's glaciation. The mean temperature over the past 350,000 years is obtained from the oxygen isotope ratios of the Vostock Ice cores.

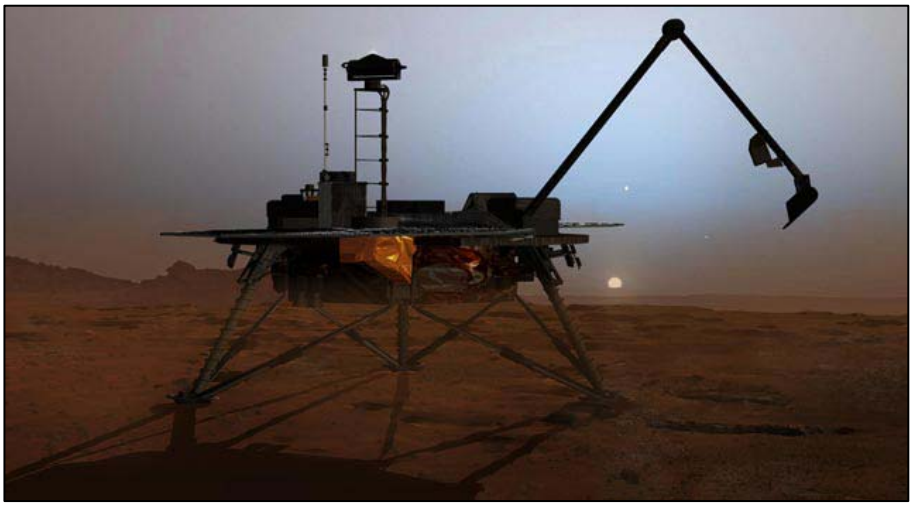
Missing Piece Inspires New Look at Mars Puzzle

From NASA

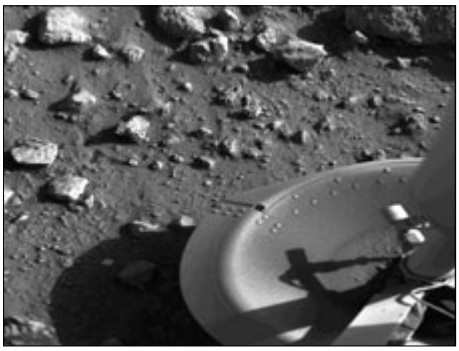
Experiments prompted by a 2008 surprise from NASA's Phoenix Mars Lander suggest that soil examined by NASA's Viking Mars landers in 1976 may have contained carbon-based chemical building blocks of life.

"This doesn't say anything about the question of whether or not life has existed on Mars, but it could make a big difference in how we look for evidence to answer that question," said Chris McKay of NASA's Ames Research Centre, Moffett Field, Calif. McKay co-authored a study published online by the Journal of Geophysical Research - Planets, reanalysing results of Viking's tests for organic chemicals in Martian soil.

The only organic chemicals identified when the Viking landers heated samples of Martian soil were chloromethane and



In this artist's concept illustration, NASA's Phoenix Mars Lander begins to shut down operations as winter sets in. The far-northern latitudes on Mars experience no sunlight during winter. This will mark the end of the mission because the solar panels can no longer charge the batteries on the lander. Frost covering the region as the atmosphere cools will bury the lander in ice.



This is the first photograph ever taken on the surface of the planet Mars. It was obtained by Viking 1 just minutes after the spacecraft landed successfully on July 20, 1976. Image Credit: NASA

dichloromethane -- chlorine compounds interpreted at the time as likely contaminants from cleaning fluids. But those chemicals are exactly what the new study found when a little perchlorate -- the surprise finding from Phoenix -- was added to desert soil from Chile containing organics and analysed in the manner of the Viking tests.

"Our results suggest that not only organics, but also perchlorate, may have been present in the soil at both Viking landing sites," said the study's lead author, Rafael Navarro-González of the National Autonomous University of Mexico, Mexico City.

Organics can come from non-biological or biological sources. Many meteorites raining onto Mars and Earth for the past 5 billion years contain organics. Even if Mars has never had life, scientists before Viking anticipated that Martian soil would contain organics from meteorites.

"The lack of organics was a big surprise from the Vikings," McKay said. "But for 30 years we were looking at a jigsaw puzzle with a piece missing. Phoenix has provided the missing piece: perchlorate. The perchlorate discovery by Phoenix was one of the most important results from Mars since Viking." Perchlorate, an ion of chlorine and oxygen, becomes a strong oxidant when heated. "It could sit there in the Martian soil with organics around it for billions of years and not break them down, but when you heat the soil to check for organics, the perchlorate destroys them rapidly," McKay said.

This interpretation proposed by Navarro-González and his four co-authors challenges the interpretation by Viking scientists that Martian organic compounds were not present in their samples at the detection limit of the Viking experiment. Instead, the Viking scientists interpreted the chlorine compounds as contaminants. Upcoming missions to Mars and further work on meteorites from Mars are expected to help resolve this question.

The Curiosity rover that NASA's Mars Science Laboratory mission will deliver to Mars in 2012 will carry the Sample Analysis at Mars (SAM) instrument provided by NASA Goddard Space Flight Centre, Greenbelt, Md. In contrast to Viking and Phoenix, Curiosity can rove and thus analyse a wider variety of rocks and samples. SAM can check for organics in Martian soil and powdered rocks by baking samples to even higher temperatures than Viking did, and also by using an alternative liquid-extraction method at much lower heat. Combining these methods on a range of samples may enable further testing of the new report's hypothesis that oxidation by heated perchlorates that might have been present in the Viking samples was destroying organics.

One reason the chlorinated organics found by Viking were interpreted as contaminants from Earth was that the ratio of two isotopes of chlorine in them matched the three-to-one ratio for those isotopes on Earth. The ratio for them on Mars has not been clearly determined yet. If it is found to be much different from Earth's, that would support the 1970s interpretation.

If organic compounds can indeed persist in the surface soil of Mars, contrary to the predominant thinking for three decades, one way to search for evidence of life on Mars could be to check for types of large, complex organic molecules, such as DNA, that are indicators of biological activity. "If organics cannot persist at the surface, that approach would not be wise, but if they can, it's a different story," McKay said.

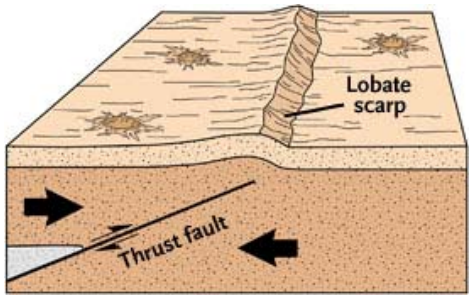
The Incredible Shrinking Moon

From Sky and Telescope

At one point during the Apollo 17 mission, moon-walking astronauts Gene Cernan and Harrison "Jack" Schmitt tried to drive their lunar rover up the face of a 200-foot-high rise known as the Lincoln-Lee Scarp. It didn't seem that imposing a task, but the rover's wheels slipped so much that the astronauts were forced to climb it at an angle, much as a sailboat tacks into a stiff wind.

Lincoln-Lee is the kind of feature created when one slab of rock overrides another due to horizontal compression (what geologists term a thrust fault). On Earth, good (if enormous) examples of thrust faults occur where crustal plates collide — think how the towering Andes rim the west coast of South America, and you get the idea.

What Cernan and Schmitt couldn't have known back in 1972 is that Lincoln-Lee is not an isolated feature but one of likely hundreds of small thrust faults all over the Moon. That revelation came to light only recently, thanks to the incredibly



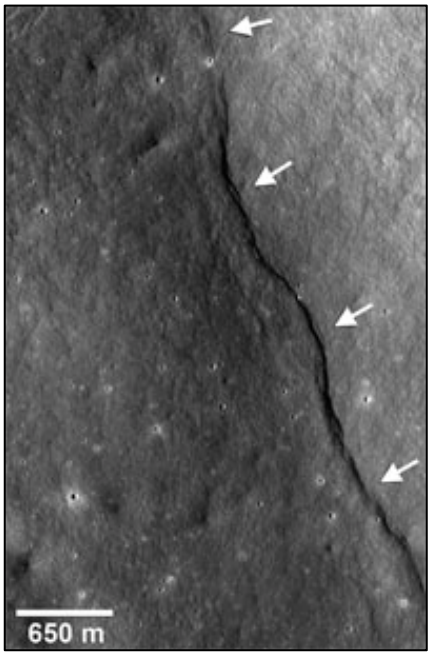
Thrust faults occur when the lunar crust is compressed laterally, breaking the rocky materials below and forming a long scarp on the surface

detailed images of the lunar surface being beamed to Earth by two Narrow Angle Cameras aboard NASA's Lunar Reconnaissance Orbiter. (These same cameras have taken snapshots of the historic Apollo 11 landing site and others.)

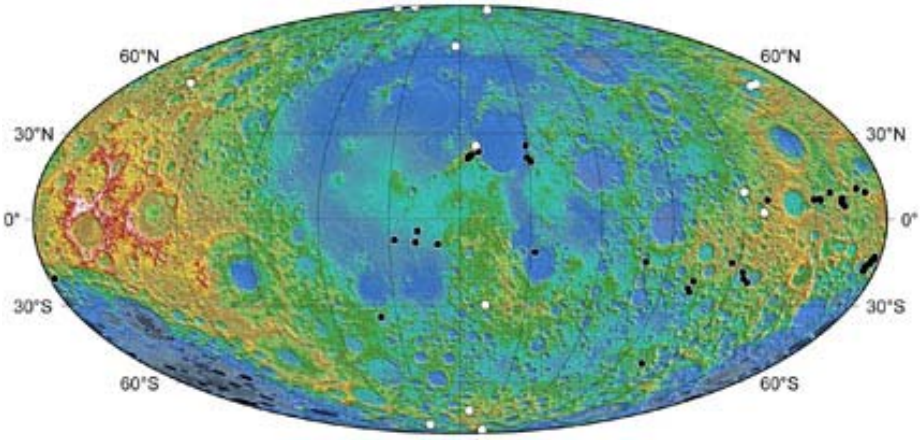
It wasn't until LRO arrived on the scene that geologists realized the subtle fractures are pervasive. After pouring over images from LRO, a team led by Thomas Watters (Smithsonian Institution) has identified 14 new scarps in addition to the three dozen already known. As the map here shows, half of the new finds are poleward of 60° in latitude. (Most of the previously recognized scarps had been spotted by cameras mounted into the orbiting command modules of Apollos 15, 16, and 17 — but these craft never strayed far from the lunar equator.)

In the August 20th issue of Science, the researchers reach a startling and unexpected conclusion: "We have now found that these lobate scarps occur everywhere on the Moon," Watters explains, "which means the Moon has been contracting or shrinking globally."

All told, the lunar diameter hasn't changed much, probably only about 700



A thrust fault crossing the floor of Gregory crater on the lunar far side. NASA / Arizona State Univ. / Smithsonian Inst.



The distribution of lobate scarps known as of mid-2010. Black dots indicate previously known features, while white dots mark those found in images by the Lunar Reconnaissance Orbiter. Click here for a larger version.

NASA / Arizona State Univ. / Smithsonian Inst.

feet (200 m). But the scarps look so fresh that they must have formed in the recent past, geologically speaking. "These scarps can't be any older than 800 million to 1 billion years," Watters noted during a press briefing yesterday, and they could be much younger. "We're finding the Moon is a truly dynamic planet," adds Michael Wargo, chief lunar scientist at NASA headquarters. "Who'd have thought that tectonic processes would still be occurring today?"

The scarps escaped notice until now because they're only a mile or two long and just tens of feet high — completely invisible to backyard telescopes and even to previous lunar-orbiting craft. Most likely, they result from the gradual contraction of the lunar interior as it cools, a process that apparently didn't end when the last maria filled with lava some 3 billion years ago.

Thrust faults appear on the surfaces of Mars and especially Mercury, but they're huge by comparison. Some of the Mercurian scars are hundreds of miles long and more than a mile high, implying that the planet shrank by at least a couple of miles as its molten interior cooled and contracted.

Yet at one time the Moon must have been really, really hot as well. After all, it likely accreted by picking up the white-hot pieces after something enormous collided early on with Earth. So shouldn't there likewise be giant thrust faults jutting skyward across the lunar landscape? Some researchers think the Moon did undergo substantial contraction, but the surface scars from that have been erased over time. Watters thinks otherwise. "Our results are really more consistent with a cooler initial starting temperature," he explains, "one that didn't allow the entire Moon to melt."

As I listened to yesterday's press briefing, I wondered what Cernan and Schmitt were thinking as they struggled up the slope of Lincoln-Lee Scarp all those years ago. So I asked one of them.

"We were well aware of the Lee-Lincoln scarp and that it is a potential thrust fault or wrinkle ridge," Schmitt recalls. "We drove up it to Station 2 at the base of the South Massif, and along and down it going to Station 4 [Shorty crater]. It was entirely covered by a light mantle or avalanche deposit. The avalanche probably flowed off the South Massif about 100 million years ago, as it appears to have been triggered by [nearby impacts from] Tycho ejecta. Lee-Lincoln would be at least older than the avalanche and I suspect much older than that."

Watters and other lunar geologists should eventually be able to say more about how and when all these lobate scarps formed. As of now, LRO has mapped only about 10% of the lunar surface at high resolution. But give it another three years (assuming the funding holds out), and there'll be enough coverage to inspect the entire lunar globe down to a resolution of just a few feet.

Ancient Mars rocks may be remains of life

From Cosmos.com

Rocks in the Nili Fossae region of Mars are similar to the earliest evidence of life on Earth – the 'stromatolites' of Western Australia – scientists said.

"We have found a location on Mars that is very similar to an ancient part of the Earth that is known to have been inhabited," said Adrian Brown of the SETI Institute in California.

The Nili Fossae is a fracture on the western edge of the Isidis impact basin, where there is evidence of methane plumes and carbonates – which can be formed when minerals generated by life are buried.

Similar to 'stromatolites'

In a paper published in Earth and Planetary Science Letters, Brown and his colleagues found evidence that points to hydrothermal processes, similar to those that occurred in the Pilbara region of Western Australia billions of years ago.

"I have studied the Pilbara region of Western Australia which has rocks that are 3.5 billion years old and those rocks have wavy forms called 'stromatolites' which indicate life was present at that time. This is some of the best, earliest evidence for life on Earth," Brown said.

The researchers considered the potential of the Archean volcanics in the East Pilbara region of Western Australia and compared it to the discoveries they made in the Nili Fossae on Mars.

Nili Fossae habitable 3.9 billion years ago

"They indicate that biomarkers or evidence of living organisms, if produced at Nili [Fossae], could have been preserved, as they have been in the North Pole Dome region of the Pilbara," said Brown, in a statement.

Using an instrument called the Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) on the Mars Reconnaissance Orbiter (MRO) the team located a region on Mars where rocks of similar chemistry and mineralogy to the Pilbara rocks have been found.

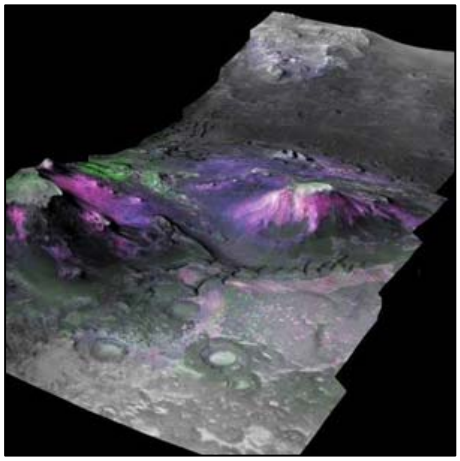
The finding suggested that this location on Mars, which dates back to 3.9 billion years ago, was habitable, according to Brown.

"Did Martian microbes come to the party?"

"The question that remains now is - we know Mars was habitable, but was it 'inhabited' by life? The conditions were right, but did life take advantage of them?

"To borrow a metaphor, 'The table was set, but did Martian microbes come to the party?'" Brown said.

"Finding evidence for the circulation of warm water is not the same as evidence for life … I do, however, think that this strengthens the reasons for visiting this site with future landers," said Michael Manga, a geologist at UC, Berkeley.



3D of a trough in the Nili Fossae region of Mars shows a type of minerals called phyllosilicates (in magenta and blue hues) on the slopes of mesas and along canyon walls. The abundance of phyllosilicates shows that water played a role in changing the minerals of a variety of terrains in the planet's early history.

Credit: NASA/JPL/JHUAPL/University of Arizona/Brown University

"It's important to note that these measurements are not evidence that life did exist on Mars, but rather, that conditions in some locations might have been more favourable for life than we had previously known," said Taylor Perron, a geologist at Massachusetts Institute of Technology in Boston, who was not an author on the paper.

"A site with a warm, wet, pH-neutral past would be one of the first places to look for evidence of ancient biological activity," Perron said.

A request from the Curator of Instruments

We hired out an 8 inch Dob in March this year and the member unintentionally has overlooked returning it to the Society. This can easily happen so we would appreciate any participating hire members simply checking in their garage or back rooms to see if it is hiding there. There are no penalties or back rental fee problems. Overlooking a return is simply a fact of life and something us humans do occasionally. We just need to account for it to enable other members to take advantage of our telescope hire policy. Thanks all.

Contact Ivan at ivazey@surfer.co.nz

Supernova shrapnel found in meteorite

DR EMILY BALDWIN, ASTRONOMY NOW

Traces of an ancient supernova event have been identified in a meteorite, explaining the curious chemical fingerprints found in the rock.

Chromium 54 is the cosmic chemical that has fallen under the scrutiny of University of Chicago cosmochemist Nicolas Dauphas and colleagues, which is found to vary from one planet and meteorite to another. This was unexpected, since all elements are thought to have been evenly spread throughout the cloud of gas and dust that collapsed to form our Solar System.

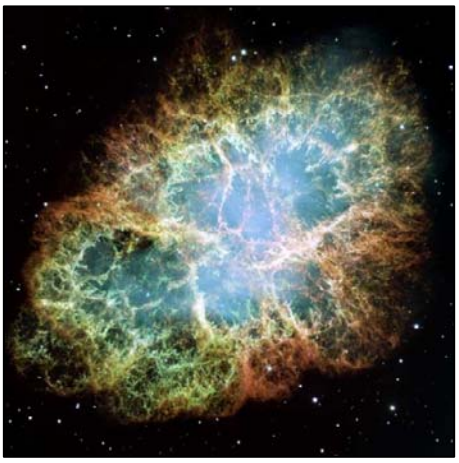
"It was a very well-mixed soup," says Clemson University professor Bradley Meyer, who was not involved in the new study. "But it looks like some of the ingredients got in there and didn't get completely homogenized, and that's a pretty interesting result."

Scientists suspect that a supernova occurred around 4.5 billion years ago, possibly triggering the birth of our Sun – the evidence coming from traces of aluminum 26 and iron 60, two short-lived isotopes found in meteorites but not on Earth. "It seems likely that at least one massive star contributed material to the Solar System or what was going to become the Solar System shortly before its birth," says Meyer.

Aluminum 26 and iron 60 could have been generated in a Type II supernova, caused by the core-collapse of a massive star. While supernovae shrapnel from Type II supernova have been extracted from meteorites before, they have not been identified from Type Ia supernovae, which result from the explosion of a white dwarf binary star. Dauphas and his team hope to identify which supernova type contributed the chromium 54 found in the meteorite that they were studying, the Orgueil meteorite. Just one grain, measuring less than 100 nanometres in diameter (1,000 times smaller than the diameter of a human hair) was found to contain an excess of chromium 54.

The scientists speculate that the ancient supernova event sprayed finely grained particles of different elements into the birthing pool of the Solar System, where dynamical processes sorted the grains by size, such that they became disproportionally incorporated into the meteorites and planets newly forming around the Sun.

"It's remarkable that you can look at an isotope like chromium 54 and potentially find out a whole lot about what happened in the very first period of the Solar System's formation," says Meyer.



The Crab nebula is one of the most well-known supernova remnants. Image: NASA, ESA, J. Hester and A. Loll (Arizona State University).

"The test will be to measure calcium 48," adds Dauphas. "You can make it in very large quantities in Type Ia supernovae, but it's very difficult to produce in Type II." So if the team find grains that are highly enriched in calcium 48, they no doubt came from a Type Ia supernova.

The results of the study are reported in the 10 September issue of the *Astrophysical Journal*.

Raisin' Mountains on Saturn's Moon Titan

From NASA

Saturn's moon Titan ripples with mountains, and scientists have been trying to figure out how they form. The best explanation, it turns out, is that Titan is shrinking as it cools, wrinkling up the moon's surface like a raisin.

A new model developed by scientists working with radar data obtained by NASA's Cassini spacecraft shows that differing densities in the outermost layers of Titan can account for the unusual surface behaviour. Titan is slowly cooling because it is releasing heat from its original formation and radioactive isotopes are decaying in the interior. As this happens, parts of Titan's subsurface ocean freeze over, the outermost ice crust thickens and folds, and the Moon shrivels up. The model is described in an article now online in the Journal of Geophysical Research.

"Titan is the only icy body we know of in the solar system that behaves like this," said Giuseppe Mitri, the lead author of the paper and a Cassini radar associate based at the California Institute of Technology in Pasadena. "But it gives us insight into how our Solar System came to be."

An example of this kind of process can also be found on Earth, where the crumpling of the outermost layer of the surface, known as the lithosphere, created the Zagros Mountains in Iran, Mitri said.

Titan's highest peaks rise up to about two kilometres (6,600 feet), comparable to the tallest summits in the Appalachian

Mountains. Cassini was the first to spot Titan's mountains in radar images in 2005. Several mountain chains on Titan exist near the equator and are generally oriented west-east. The concentration of these ranges near the equator suggests a common history.

While several other icy moons in the outer Solar System have peaks that reach heights similar to Titan's mountain chains, their topography comes from extensional tectonics -- forces stretching the ice shell -- or other geological processes. Until now, scientists had little evidence of contractional tectonics -- forces shortening and thickening the ice shell. Titan is the only icy satellite where the shortening and thickening are dominant.

Mitri and colleagues fed data from Cassini's radar instrument into computer models of Titan, developed to describe the moon's tectonic processes and to study the interior structure and evolution of icy satellites. They also made the assumption that the moon's interior was only partially separated into a mixture of rock and ice, as suggested by data from Cassini's radio science team.

Scientists tweaked the model until they were able to build mountains on the surface similar to those Cassini had seen. They found the conditions were met when they assumed the deep interior was surrounded by a very dense layer of high-pressure water ice, then a subsurface liquid-water-and-ammonia ocean and an outer water-ice shell. So the model, Mitri explained, also supports the existence of a subsurface ocean.

Each successive layer of Titan's interior is colder than the one just inside it, with the outermost surface averaging a chilly 94 Kelvin (minus 290 degrees Fahrenheit). So cooling of the moon causes a partial freezing of the subsurface liquid ocean and thickening of the outer water ice shell. It also thickens the high-pressure ice. Because the ice on the crust is less dense than the liquid ocean and the liquid ocean is less dense than the high-pressure ice, the cooling means the interior layers lose volume and the top "skin" of ice puckers and folds.

This mosaic of radar images obtained by Cassini shows parallel mountain chains on Saturn's moon Titan. Image credit: NASA/JPL-Caltech

Since the formation of Titan, which scientists believe occurred around four billion years ago, the moon's interior has cooled significantly. But the moon is still releasing hundreds of gigawatts of power, some of which may be available for geologic activity. The result, according to the model, was a shortening of the radius of the moon by about seven kilometres (four miles) and a decrease in volume of about one percent.

"These results suggest that Titan's geologic history has been different from that of its Jovian cousins, thanks, perhaps, to an interior ocean of water and ammonia," said Jonathan Lunine, a Cassini interdisciplinary scientist for Titan and co-author on the new paper. Lunine is currently based at the University of Rome, Tor Vergata, Italy. "As Cassini continues to map Titan, we will learn more about the extent and height of mountains across its diverse surface."

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. JPL manages the Cassini-Huygens mission for NASA's Science Mission Directorate. The Cassini orbiter was designed, developed and assembled at JPL. The radar instrument was built by JPL and the Italian Space Agency, working with team members from the United States and several European countries. JPL is a division of the California Institute of Technology in Pasadena.

Society Telescopes For Hire

The Society has a wide range of telescopes for hire to members.

If you are looking to purchase or upgrade a telescope and are not sure what to buy, this is a very good way to evaluate some of the available equipment. See also the advertisement on the back page.

To inquire about hiring or for advice on what to buy and for information about equipment, contact Ivan Vazey, curator of instruments, on (09) 535-3987

The Library Corner in October

By Tony Reynolds, Society Librarian

Featured Section – QB720 Comets

The Solar System section begins at QB500-General (520-Sun, 600's for Mercury, Venus, Earth, etc.) and by QB720 we're out with the comets.

This section contains a dozen titles on the subject ranging from light works, such as 'Comets, meteors and asteroids' by John Man, to the more in-depth such as 'The Mystery of Comets' by Fred Whipple himself.

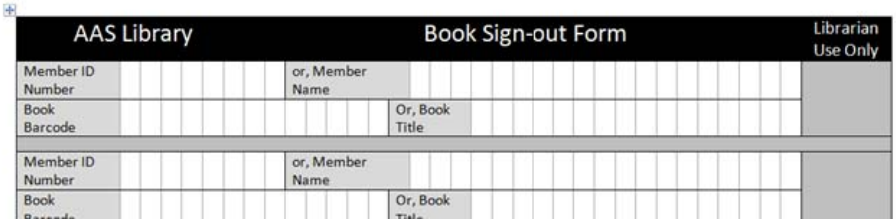
Halley's Comet is also well covered including a local work entitled 'Halley's Comet over New Zealand' by Brian Mackrell.

User's Guide – Borrowing a Book, Updated

Since my last article on borrowing books, I have updated the form. As I still want you to borrow as many books as you want as often as you like, I have reprinted my notes on borrowing along with the updated form.

1. If I am in the library ask me and I can put your details directly into the computer with a simple barcode scan.
2. Otherwise, check the book out yourself on the form provided and the details will be transferred to the computer at a later date.

   a. The form is usually on the table near the door and looks like this:



   b. Locate the AAS Library barcode number of the book you're checking out. It is usually on the inside front cover for books and directly on the front of magazines.

   c. Fill in the form (except the last column) and you're all done. You only need your ID number or name, and the barcode or title of the book.

3. The lending period is:

   Books – 4 weeks with renewal on request.

   Magazines – 2 weeks for recent releases, 4 weeks for older copies. Please note that the recent magazines are very popular so please return them on time or even earlier if possible.

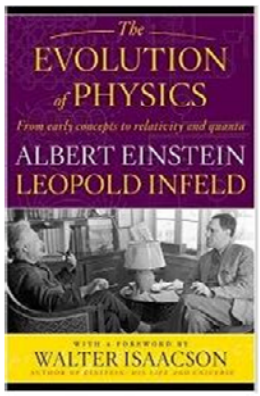
4. Returning a book means simply dropping it in the 'Book Returns' box. There is nothing to sign; the librarian will do the rest.

Recent Acquisitions

The Evolution of Physics:

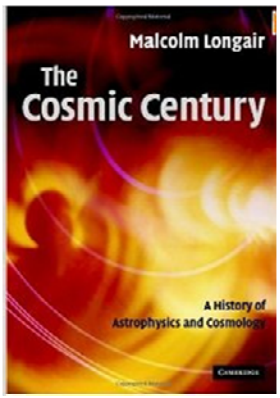
From Early Concepts to Relativity and Quanta

Authored by Albert Einstein and Leopold Infeld.
"A masterly exposition of physical thought since Galileo".
Kindly donated by Peter Felhofer.
QC7



The Cosmic Century: A History of Astrophysics and Cosmology

The title says it all really. The century referred to is the twentieth and covers topics such as stellar spectra, the nature of spiral nebulae and the early Universe.
QB15



Other titles added recently include;

- The Cosmos, A Beginner's Guide, Adam Hart-Davis, Young Astronomer's section
- Voyage Across the Cosmos, Giles Sparrow, Young Astronomer's section

Remember to purchase your tickets to the Burbidge Dinner!

See the notice on page 3

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Astronomy NZ Ltd • PO Box 39496, Howick, Auckland 2145