TAURANGA ASTRONOMICAL SOCIETY NEWSLETTER

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Frank Bateson 31/10/1909 – 16/04/2007

Our Society's Patron Dr. Frank Bateson passed away this month. Presented here is an obituary compiled by Grant Christie of Auckland's Stardome Observatory.

Frank Bateson, outside one of the original huts of the Mt John observatory where he served as the first Astronomer in charge from 1963 until 1969.

Frank M. Bateson (OBE FRAS FRASNZ)

BATESON, Frank Maine b. 31st Oct 1909 in Wellington, NZ. d. 16th Apr 2007 in Tauranga, NZ.

Frank Bateson organised variable star observing in New Zealand, providing leadership to the field in the Southern Hemisphere for 78 years. The son of Charles **a**nd Alice Bateson, he was educated at the Hurworth Preparatory School in Wanganui, NZ and at Scots College, Sydney, Australia.

He developed a keen interest in astronomy after reading "Great Astronomers" by R. S. Ball. He made his first observations of meteors in 1923 (Donovan Prize, 1923) and then variable stars in 1924 (Donovan Prize, 1924). He joined the BAA (NSW), was lent a small refractor and allowed to use the refractor at the Sydney Observatory. Bateson left school and started working in 1925 in business administration and accountancy, a career that he followed for most of his working life. He returned to NZ in 1927 and founded the Variable Star Section (VSS) of the NZ Astronomical Society (later the Royal Astronomical Society of NZ). He served continuously as Director of the Section for the next 78 years.

In 1931 he married Doris McGoldrick and they had two daughters, June and Audrey. Throughout these years Bateson continued his observation of variable stars and worked tirelessly to expand the VSS with its network of observers. During the Depression, the Batesons moved first to Auckland and then in 1937 to a job in Whangarei which allowed plenty of time to devote to astronomy.

After the end of war in 1945, Bateson moved to the Cook Islands to manage a trading company. From the tropics he continued his own observations (now with an 8 inch refractor) while also directing the VSS.

Under his leadership, the number of active observers increased as did the number and types of variable stars covered,

most notably the dwarf novae. He established close working links with professional astronomers and provided them with data obtained through the extensive network of observers. He developed methods that allowed the observational results to be rapidly communicated.

In the late 1950s he began promoting his vision of a professional observatory in New Zealand in collaboration with Frank B. Wood of the University of Pennsylvania. Bateson conducted an extensive site-testing survey and recommended the site at Mount John near Tekapo. The Mount John Observatory was established with the University of Canterbury in 1965; Bateson served as Astronomer-in-Charge until his retirement in 1970.

From his home in Tauranga, NZ, with his wife Doris he established a private nonprofit company (Astronomical Research Ltd) to administer the network of variable star observers. Bateson's research in variable stars has achieved international recognition, particularly from the professional astronomers who made extensive use of the results he collated. Approximately one million observations have been recorded and these have been published in hundreds of publications. Over 1000 charts of southern variable stars have been published (most with Mati Morel). In addition, he has personally authored over 300 scientific papers.

Frank Bateson was elected as a Fellow of the Royal Astronomical Society of New Zealand (RASNZ) in 1963 and had been a member of the Society for over 80 years. He served on the Council for many years and was a past President (1966-67). He was also an Honorary Member of numerous astronomical societies both within New Zealand and around the world.

Over his long career, Bateson was honoured by many major prizes and awards. He was elected to full membership in the International Astronomical Union and served as the first NZ representative. He received the Jackson-Gwilt Medal and Prize of the Royal Astronomical Society in 1960 and an honorary doctorate from the University of Waikato in 1979. He was awarded the Order of the British Empire (OBE) in 1970 for services to astronomy and the Amateur Achievement Award of the Astronomical Society of the Pacific in 1980. The asteroid 2434 Bateson was named in his honour.

With justification, he has been widely recognised as the father of modern New Zealand astronomy. His autobiography "Paradise Beckons" was published privately in 1989.

Frank Bateson died peacefully in Tauranga on April 16, 2007 in the company of his family.

Today Mt John Observatory is run by the Physics and Astronomy department of the University of Canterbury.

Jim adds:

The Tauranga Astronomical Society has been in existence for five years and has been honoured to have had Dr. Frank Bateson as it's Patron for all that time. At the end of 2004 Frank Bateson retired from his active role in astronomy and the Royal Astronomical Society of New Zealand held a conference in Tauranga to honour him with speakers from several overseas countries and at that occasion Dr. Frank Bateson was presented with a plaque from the Tauranga Astronomical Society to be later transferred to Mt. John Observatory which epitomizes the work Frank did during his working life and in particular the choosing and overseeing the construction of Mt. John Observatory.

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Recent Meetings……

January

Ted Harper gave a wonderful presentation on the solar system. This was a well prepared power point presentation and was enhanced by Ted's use of the Starry Night Pro software to take us on a virtual tour of the solar system using this very powerful program. We were able to not only hear about amazing facts but were able to enjoy "fly bys" of various plants and moons. One of my personal favourites of the evening was watching a sunrise from the surface of Mars. I

wonder how long it will be until a human witnesses this event through their own eyes….

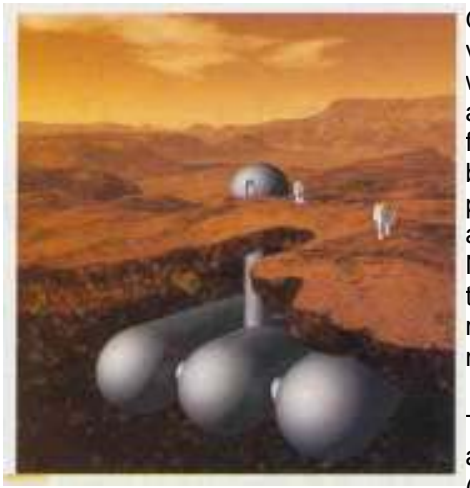
February

Society Secretary Jim Barrowclough presented the talk for Feburary's meeting. The topic for which was Cosmic and Gamma Rays. Jim explains further…

COSMIC AND GAMMA RAYS

The topic explains that the perils of Cosmic rays will prevent astronauts from journeying to the moon for any length of time and Mars at all, or for many years into the future. The trip to Mars would be a three year journey as it takes seven to eight months to reach Mars, another twenty one months approximately would be required so that after the return trip they would find Earth at the nearest point in its orbit with Mars.

The term Cosmic rays is a misnomer, originally named as they came from out in space, but in actual fact they are positively charged ions having lost nearly all their electrons on their journey through outer space at about the speed of light. On hitting the Earth's atmosphere the nucleus breaks up producing mesons or pions and gamma rays which decay on their way through the atmosphere with a few more changes and the remaining amount of radiation to penetrate our bodies is the equivalent of a couple chest of x-rays in a year.



Of course outside the atmosphere the bombardment of Cosmic rays would be very intense and would cut a third of an astronaut's DNA each year he or she was out in space. Now for astronauts to survive out in space away from the atmosphere they would require shielding from several sources being, at least five metres of water which would weigh 500 tons, far too much to send to Mars by rockets. Next they could use ethanol which could be remanufactured into polyethanol, a plastic which could be moulded around a space station but that also would weigh nearly the same amount as water – that would be out too. Next magnetic fields could be used with the space station being like a circular tube with a highly positively charged ring around it to deflect the positive cosmic rays coming from outer space, the only trouble being that the amount of magnetism required would most likely be far too much for humans to endure.

To counter that another powerful magnet could offset the positive charge with another inside ring with a negative charge which may modify the 20 odd Teslas (unit of magnetism) inside the space station, but the whole set-up is so unwieldy and not very practical. Another suggestion was to charge the space station from earth with an immensely strong positive charge – this would require around two billion volts which would also require a very large power station and the positive charge would repel the cosmic rays again but forgetting that the positively charged space station would instantly attract many billions of negatively charged electrons that are everywhere in space, a lot from the Sun in the solar wind and a number from solar ejections also sent out at colossal speeds at nearly the speed of light from the Sun. When these strike the highly positively charged space station would cause about the same destruction as the Cosmic rays hitting the space station in the first place. Remember like poles of magnetism repel each other and opposite poles of magnetism attract each other.

The last hope to conquer this problem is to cover the space station with five metres of soil which would be great but first they would have to carry a very heavy mechanical digger say all the way to Mars, which with today's rockets is out of the question also.

As at present there aren't any solutions to the cosmic ray problem but the new type rockets now on the drawing board would carry much bigger payloads and could provide an answer.

March

Janine Neustroski delivered March's talk. This was an informative presentation about the problems future space farers will encounter at the Moon and Mars due to dust. Her presentation discussed the problems encountered by the astronauts of the Apollo missions to the moon between 1969 and 1972. Highlighted was the fact that the dust had been particularly abrasive causing rapid wear to equipment including the seals of the astronaut's space suits.

While these earlier missions had been relatively short (Apollo 17 being the longest mission at 12.5 days) , Nasa's current plans to return to the moon may involve missions that last 6 months or more. The dust problem must be addressed before this can happen.

It appears that travellers to Mars will face similar problems with the dust of that world. Janine highlighted dust issues that have appeared during surface missions to the red planet. Dust storms and the accumulation of dust on solar panels, to the point that electricity generation is effected, appear to be the biggest issues.

Apollo 17 Astronaut Harrison H. Schmitt Collecting samples at the Taurus-Littrow landing site December 1972. Note Harrison's dust covered suit.

Building a German Equatorial Mount Part 1

By Andrew Walker

One of my favourite pastimes is the sheer enjoyment of clear views of the planets at high Magnification (200x up) on nights of good seeing. The problem is that my main instrument, a home built 10 inch f6.7 Newtonian, is mounted on a Dobsonian Alt-Azimuth mount. While I find it relatively easy to follow an object across the sky at low to medium power, once I start to use high power it gets harder to keep the object under observation within the field of view. It is also impossible to share the views with friends or family who are not used to using Dobsonian mounted telescopes. The solution I struck upon to this is to buy or build an Equatorial mount.

The first thing I did was to work out if it was feasible to buy or better to build the mount. After scouring the Internet for information and prices I found a mount I liked the look of by a company called Opticraft engineering in the States but at USD$850 for the Equatorial head with out a drive or any extras meant the price was prohibitive. And this was one of the cheapest new mounts that would be suitable for a telescope that weighs in at around 15kg (the EQ 6 at 18kg capacity could just take the weight but was at the upper limit of what the mount was designed for and at USD$1000.00 was also out of the question). After reading an article on the mechanical design of Telescopes for Amateurs by Bob Lombardi (http://www.tfn.net/~blombard/book/MechanicalDesign.htm) I decided to build.

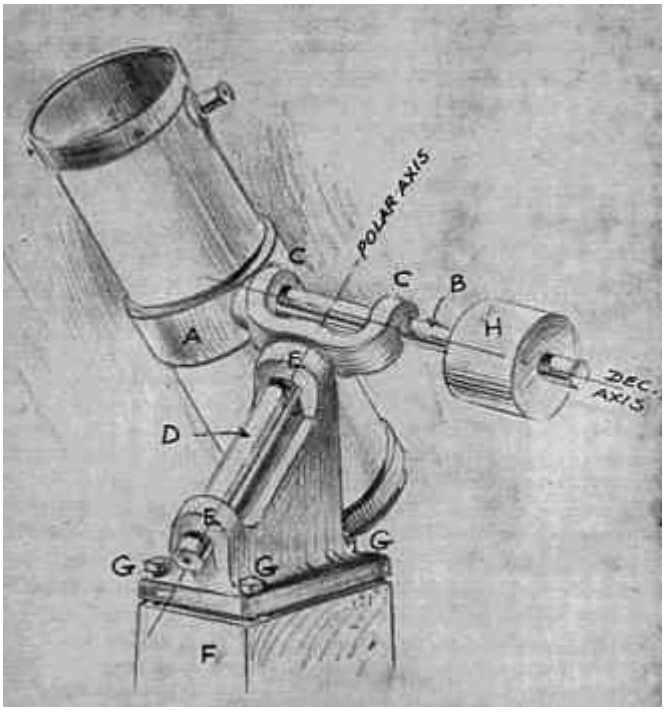
Right, with the decision to build made. Next step is to decide what sort of mount I should build. Texereau (the French optician and author of "How to make a telescope") recommends the English mount due to it's inherent strength, the Cross Axis mount is also highly recommended and one I particularly like after seeing the 72inch Plaskett telescope at the Dominion Astrophysical Observatory in British Columbia, Canada. The experience of seeing such a large elegant telescope on it's massive cross axis mount left a real impression of stability (as well as awe and wonder, the observatory dome alone weighed 300 tonnes). The fork mount has much to commend it, however I thought the nearly two-metre length of my telescope tube with the balance point around mid-ship could lead to a mount with a vibration problem (the fork acting like a tuning fork).

The type of mount I finally settled on was the German Equatorial. This type of mount has it's origins in Germany in 1824 when the Scientist / optical engineer / genius, Joseph Von Fraunhofer (1783 – 1826 image at left) used the mount for the Dorpat refractor. This Instrument was a 9 inch refractor for the Dorpat Observatory in Russia and was the largest most modern refractor of it's day. It was extremely well regarded due to it's excellent optics. It was fitted with an accurate clock drive and a number of micrometers for measuring distances between stars (Astrometry or measuring the positions of stars, was a major pursuit of the astronomical community at the time).

In essence the German Equatorial is an Alt Azimuth mount (amount that can point up and down, Altitude, or left and right, Azimuth) tilted so that the Azimuth Axis is now pointed at the celestial pole. The two Axis are known as the Polar Axis (see diagram below) or RA shaft (short for Right Ascension) and the axis at right angles to this is known as the Declination axis (labelled Dec Axis on the diagram).

The reason this design was chosen over others is that it is very compact. Mechanically it has it's weaknesses (a lot of

cantilevered loading on the RA shaft as well as the necessity of a counterweight), but the fact that it does not look like a trapeze apparatus meant that it would fit in aesthetically with our front section. The compact design also meant it could be mounted on a pier and provides only the minimum of structure that could pose a tripping hazard at night. By using large bearings in pillow blocks the amount of engineering work required could be kept to a minimum. I hope to complete the project for under $500 and spread the cost out by purchasing parts as I can afford them. The next step is to assemble the parts required and to make a start……



Sketch of a German Equatorial mount by Russell W. Porter 1871 – 1949

Changing of the Guard

Having compiled the Tauranga Society newsletter for some time now, I think that a new face and new ideas are long overdue !

I think I may have had this particular role for 3 years, but prior to that did about 4 years as the Wellington Astronomical Society newsperson. I took that job over from a well-known and much admired fellow called Tony Dodson, who was an expert telescope maker. He always had time for people and would take them out to his amazing workshop and show them what he was creating. He piled me up with several years back issues of the Wellington Society news articles, and promised to help out wherever he could.

For Tauranga, Andrew Walker will now take the reins, and do a fantastic job I'm sure. If anyone out there is keen to do some writing then by all means send it on to Andrew. It may be about your experience of Comet McNaught, or what you last saw when you looked up into the sky one crisp, clear night. And if you've always wanted to know what a quasar is, well, how about doing a little research and writing a short article? It all adds up to your own learning experience - you don't have to be amazingly knowledgeable.

Remember we are all still learning this fascinating and far-reaching subject (pun intended), and any encouragement towards giving others knowledge is a bonus.

I'd also like to thank the committee for their appreciation of my contribution to the Society. George played 'flower girl' a few days ago and brought round a fabulous bouquet of flowers and a lovely card. Thanks guys !

Let's extend a big hand to Andrew, and I hope he enjoys being Editor.

And it's "Goodbye" from me, Ursula Macfarlane.

TROG……Tauranga Roaming Observers Group

This is a phone/email list which you can put your name down for if you are interested in ‘spur of the moment’ observing. This has been down at Ferguson Park in Matua, Tauranga, or at my home in rural Te Puke (nice and dark), but other sites are being checked out constantly. Contact either the editor or Jim if you are interested in joining the observing group. My phone number is 573 8550.

NOTE: Public Meeting Visitors;

Casual visitors to public meeting nights will be able to come along free of charge for two public meetings or viewing nights, thereafter a charge of $5 per meeting or viewing night if the person does not pay the annual subscription.

Andrew Walker

Newsletter editor