**Monthly Meeting - 6 June 7:30pm**  
Cawthron Seminar Room, Milton Street  
**Brown Dwarfs - Misfit Stars**

Half planet, half star, newly discovered brown dwarfs are only as warm as a summer's day on Earth, defying definition even as they tempt astronomers with new insights. Brown Dwarfs, often dubbed "failed stars", never quite realise their potential for full starhood. Unable to shine like normal stars, they are destined to cool and darken.

**EDITORIAL**

I am working on this editorial while attending the RASNZ annual conference in Invercargill. I call this section the editorial, but what it really is I think is just some writing I do where I write about any subject I feel like writing about to fill up half a page. I will give a report on the conference at the next meeting, but since some of you may not make it to the June meeting that gives me an excuse to write about the conference. There is big time astronomy going on in Southland! While it might be considered a fringe area, the Unwin Radar Facility is run primarily by La Trobe University and is beaming radar up into the atmosphere to learn more about the upper atmosphere and the aurorae. Also just on the outskirts of Invercargill is the Awarua Tracking Station. This European Space Agency facility is manned by French workers to track rocket launches of cargo vehicles that supply the International Space Station. A launch is scheduled for early in June. Because of this facility one of the featured speakers was a French fellow who works for the European Space Agency. One of the topics that always comes up at these conferences is the subject of members, and why astronomy clubs in general seem to have stagnating and aging memberships. There needs to be more fun things put on the schedule to attract more people. One of the fun things can be star parties. This year Herrie is again attempting to organize a getaway in the Marlborough Sounds, and I encourage you to support this event. Unfortunately I had tried to arrange my trip to the northern half of the world so as not to conflict with the Cissy Bay event, but last minute changes mean I will not be there this year. Next month Carl Horn is promising a talk about the Face of Mars. If the meeting is held on the Thursday I will miss this talk. However something we can discuss at the June meeting is possibly changing the date of the monthly meeting to Tuesday for June. This is a totally selfish request on my part so I can hear Carl's talk. If people object, I guess I will have to hear about the talk upon my return.

Robert Rea

**UPCOMING EVENTS**

14 June - Public Night, Cawthron Atkinson Observatory, see Leader for times  
4 July - Monthly Meeting Topic - Mars: The Big Picture, Speaker - Carl Horn  
5 - 7 July - Cissy Bay Star Party, contact Herrie @ frontier36@xtra.co.nz

**Mysterious Black Hole**

The faint X-ray flare Swift J1357.2-0933 13 came from a mysterious binary system. The system contains a red dwarf zipping around a black hole every 2.8 hours, one of the shortest periods ever recorded for a black hole binary. Follow-up visible light observations revealed that the system's brightness temporarily faded by up to 0.8 magnitude every few minutes, coming at progressively longer intervals over a roughly two-month span. That evolution suggests that whatever blocked the light was also moving away from the black hole over time.

**Contributions**

Want to get published? Send your articles, comments etc. to 8 Regent Lane, Richmond or reamarshal@ihug.co.nz
The large constellation of Virgo dominates the north this month, with the maiden holding the bright star Spica. This blue giant star would normally be the brightest object in this area of the sky, but this year it’s outshone by Saturn. Virgo contains a multitude of beautiful deep sky objects, particularly galaxies (many belonging to a group called the Virgo cluster about 55 million light years away), but a large telescope is needed to see them well. Low towards the northwest is Arcturus, the fourth brightest star in the sky. Is is a red giant lying 37 light years away and marks the tip of the constellation Bootes. The constellation of Hercules will have crept above the horizon by 10pm. This, the fifth largest constellation does not rise very high in New Zealand. With a small telescope, it may be possible to find M13, a globular cluster containing several hundred thousand stars. The bright star Vega lies towards the east of Hercules in the constellation of Lyra. This is the fifth brightest of the sky and relatively close by at only 25 light years away. Vega is one of the most intensely studied of all stars and is remarkable for a number of reasons. In particular, it is surrounded by a dusty disk and there is some evidence it has a planet similar to Jupiter orbiting it. Finally early in the morning from mid-June Matariki (Pleiades) can be seen rising in the northeast at dawn. This marks the beginning of the Maori New Year.

Venus, Mercury and Jupiter will all be very low in the west after the Sun sets. You will have to look for them very early in the evening before they all set. Saturn is the big attraction in June as far as planets go. It is near its highest in the north after the Sun has set. The planet fades from magnitude 0.3 to 0.5 during June, it shrinks a bit in a telescope, and its rings close up a tiny trace more. Although few will be willing to make the effort, both Neptune and Uranus will rise in the middle of the night, and can actually be spotted with binoculars with the help of a good finder chart. The Sun will arrive at solstice at 6:04 p.m. and June 21.

Crab Nebula Flares

On March 3rd, NASA’s Fermi Gamma-ray Space Telescope spotted a flare from the Crab Nebula (M1) that was three times greater than the average gamma-ray output. The Italian AGILE satellite also detected it. The flare faded over several days, ending around March 15th. Since 2007 AGILE and Fermi have detected about a half dozen flares, the most fantastic in April 2011, when the Crab Nebula erupted in an outburst at least 30 times brighter than the nebula’s norm. The 2013 flare is the brightest since that event; such flares put out 1,000 times more power than the Sun does at all wavelengths. Astronomers still don't understand these events. The Crab Nebula is the remnant of a supernova seen in AD1054. Inside it a pulsar spins;ins 30 times a second and a hot, magnetized wind of electrons and positrons streams away from the pulsar, energizing the surrounding gas and making it glow. It is thought this wind could be the culprit. Somewhere in the wind, magnetic fields might suddenly snap into new configurations, accelerating electrons that then emit gamma rays. These flares should originate within about one-third of a light-year from the pulsar and come from a region about the size of the solar system. Attempts to nail down the flares’ location have failed. Gamma-ray telescopes have poor angular resolution, and observations in radio, infrared, and X-rays haven’t detected conclusive signs of a flare. The Crab Nebula was once thought to be a steady emission source, and it’s often been used to calibrate X-ray and gamma-ray observations. Detecting the variability has only become possible; in the last five years or so with the advent of new instruments.

Drilling on Mars

The first full-depth hole drilled in Martian rock by NASA’s rover Curiosity has revealed what cold be a former habitable environment. The drilled bedrock appears to lie in an ancient network of stream channels descending from Gale Crater’s rim. By weight the rock is 20-30% smectite, a group of clay minerals that form in the presence of water. The water was not too salty, and the presence of carbon sulfates indicates it probably had a relatively neutral pH. The results suggest that the region as once a lake bed. It is estimated that the lake existed 3 billion years ago. Elements identified by on of Curiosity’s instruments include oxygen, hydrogen, sulfur, and phosphorus and a hint of carbon and organic compounds. It is unclear whether the compounds are natural to Mars or residual contaminants (from Earth) on the drill. Carbon would be exciting because microbes could use it in their metabolism. What is also exciting is that the rock contains sulfur compounds in both oxidized and unoxidized forms. This combination could have created an "energy gradient," a chemical battery that could have powered primitive microorganisms. None of these initial results means that microbes actually existed on Mars.

Three Van Allen Belts

Just days after launch, NASA’s Van Allen Probes discovered a third, temporary region of trapped high-energy particles in between Earth’s two radiation belts. The Van Allen Probes recorded the three belts last September. The third belt lasted for a month until a passing interplanetary shock wave disrupted it. During that month the outer belt also weakened and even disappeared for a week, and it’s possible that the third belt might have just been a split in the outer belt.

BRITE

Two basketball-size Bright Target Explorer (BRITE) satellites are giving new views of stars brighter than visual magnitude 4. Each satellite has a 70mm, f2.3 lens. The satellites hitched a ride to orbit with the Indian Polar Satellite Launch Vehicle. BRITE could help understand the evolution and internal workings of stars by revealing brightness variations.