The PRETORIA CENTRE
of the
Astronomical Society of Southern Africa
www.pretoria-astronomy.co.za
Volume 1, Issue 1 Newsletter Date

NEWSLETTER, JANUARY 2005

Date and time: Wednesday 26 January at 19h15

Chairperson: Johan Smit

Beginner's Corner: A Starry Sky Observing Course by Michael Poll

What's Up: by Wayne Mitchell

++++++++++ LEG BREAK - Library open ++++++++++++

Main Topic : "Bright stars - and some history"

by Lorna Higgs

The meeting will be followed by tea/coffee and biscuits as usual.

The next social/practical evening will be held on Friday 21 January at the Pretoria Centre Observatory, which is also situated at CBC. Arrive anytime from 18h30 onwards.

INSIDE THIS NEWSLETTER

Meeting report : November 24th 2004 by

A good turn out of more than 60 members was present at a slightly different venue at CBC. Johann Swanepoel opened the proceedings with details about "Telescope Basics". Johann described the configuration and light paths of refracting telescopes and various reflectors, and some properties of telescopes such as magnification and the optical effects of the secondary mirror in a reflector.

Johan Smit presented "What's Up" indicating which interesting events could be seen until the end of January 2005, (and some that couldn't, including the occultation of Jupiter by the Moon on January 4th). However, in mid January the naked eye planets are all visible in the morning sky, and from the horizon upwards along the ecliptic are in the same order as they are from the sun.

The main topic was about the Cassini Huygens mission, given by Mike Haslam and Neville Young. They illustrated the trajectory of the craft from its launch, and showed how the Huygens probe was to be released for its encounter with Titan. Some predictions have been made as to what will be found on Titan, but we look forward to a future talk so that we can learn what *was* found!

Observing evening report: November 19th 2004 by Michael Poll

Another cloudy evening, high haze to start with and then frankly cloudy. We were able to observe the moon until the cloud thickened. Only one star, Achernar, was seen.

Five people came, and we continued with our lunar crater observing. We started with Theophilus Cyrillus and Catharina, which were slightly more favourably illuminated than last month. A crater on the terminator, with a floor totally in shadow, except for a tip of light on the central peak, was identified as Walter. Rather than being round, this crater had an angular "corner" which projected across the terminator into the un-illuminated part of the moon. We noted Aliacensis and Werner near Walter, and to the south, Stofler with its superimposed crater, Faraday.

Further towards the centre of the moon, Albategnius and Hipparcus were noted, and then Rhaeticus and Triesnecker. North of Triesnecker was a very distinctive feature in the form of a "V" or arrowhead. The crater Ukert was nearby.

Theophilus	-	Bishop of Alexandria from 385 AD. Died 412 AD.
Cyrillus	-	Bishop of Alexandria after Theophilus. Died 444 AD
Catharina	-	St Catharina of Alexandria. Died 307 AD.
Walter	-	Bernard Walter 1430 – 1504. German astronomer.
Aliacensis	-	Pierre d'Ailly 1350 – 1420 French Theologian and Astronomer.
Werner	-	Johannes Werner 1468 – 1528 German Astronomer.
Stofler	-	Johan Stofler 1452 – 1534 German Astronomer
Faraday	-	Michael Faraday 1791 – 1867 English Physicist
Albategnius	-	Muhammed ben Geber al Batani 852 – 929 AD Arabian Astronomer
Hipparcus	-	Hipparchos c190 – 125 BC. Greek author of first star calalogue.
Rhaeticus	-	Georg Joachim von Lauchen 1514 – 1576 German Mathematician and Astronomer. Pupil of Copernicus
Triesnecker	-	Franz de Paula Triesnecker 1745 – 1817. Austrian mathematician and astronomer.
Ukert	-	Friedrich Ukert. 1780 – 1851 German Historian

Lunar parallax by Barbara Cunow

In order to record the parallax of the Moon, I organised a project to photograph the Moon and the background stars from different continents at the same time. We did that during the October 28 lunar eclipse, because during totality the Moons is faint enough to allow to photograph the Moon and the background stars at the same time.

The participants are in four different countries: South Africa, Germany, USA and Canada. We agreed on taking pictures at 4.25 SAST at October 28, 4.30 SAST, 4.35 SAST, 4.40 SAST and 4.45 SAST. We did not take pictures after that, because the Moon was getting too low for the observers in the Pretoria/Johannesburg region.

Unfortunately, it was cloudy in Germany and the US, but we had clear skies in South Africa and Canada. The South African participants are all ASSA members, and the Canadian participants belong to the Royal Astronomical Society of Canada (the Canadian society for amateur astronomers).

The following people were able to obtain pictures which could be used for this project:

Larry McNish in Calgary, Canada

Gerry van Dyk in Edmonton, Canada

Koos van Zyl and myself in Pretoria

Francois Nortje in Johannesburg

Cliff Turk in Cape Town

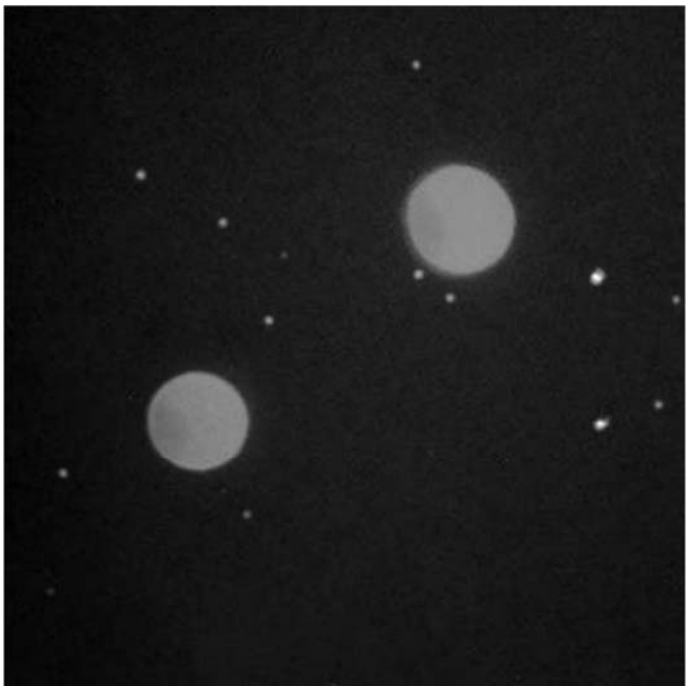
In order to see the Moon's parallax, you have to take two pictures from different continents and match them using the background stars pattern. The you get two images of the Moon at different positions, which is due to the parallax.

The attached image is one of the resulting images we were able to obtain. It is a combination of two images taken at 4.25 SAST: one taken by Larry McNish, the other one taken by me. North is up and East to the left. The Moon in the northwest in the Moon seen from Pretoria, the southeastern Moon is the Moon seen from Calgary. The distance between the centres of the two Moons is 3.3 Moon diameters.

The largest lunar parallax you can observe from the Earth surface is 3.67 Moon diameters. For anything larger than that, you have to leave our planet. So with our result of 3.3 Moon diameters we are close to the absolute maximum of 3.67 Moon diameters, and we can claim that we managed to photograph one of the largest lunar parallaxes ever photographed from the Earth's surface.

I have set up a web page which contains a description of the parallax project and the results (including all images). The address is

http://astro.unisa.ac.za/~cunow



Canis Major by Michael Poll

The constellation of Canis Major is visible in the evening sky from December, when it is low in the east, until May, when it is setting in the west. Between these dates, it is high in the sky in the evenings. It lies south east of Orion. A line projected from Orion's belt stars points to the star Sirius.

Canis Major lies between about 10° and 30° south of the celestial equator (i.e its *declination** is between –10° and –30°), so it passes overhead as seen from Pretoria (which is at 26° south latitude). For example, the constellation is at the zenith at 21h00 on February 15th , and is there 4 minutes earlier each night. By March 20th, it is at the zenith at 19h00. The brightest star in the constellation, Sirius, is at declination –17°, so when at its highest, it passes 9° north of overhead as seen from Pretoria. An observer situated at 17° south latitude would see Sirius itself pass exactly over head, with more of the constellation lying to the south.

The constellation represents a dog, and Sirius is the "Dog Star". The association with a dog goes back to antiquity. The Chaldeans, Assyrians, Phoenicians Egyptians Greeks and Romans called the constellation the dog. In one mythology, the constellation represents one of Orion's hunting dogs, although the concept of *two* dogs (Canis Major and Canis Minor) did not appear until much later, in the first century BC.

The Egyptians worshipped Sirius as early as 3285 BC, because its first appearance in the eastern sky before sunrise (i.e. its *heliacal rising*), which occurred in mid to late July in Egypt, gave notice of the annual flooding of the Nile.

The earliest Greek reference to Sirius is in Homer's *Iliad*. (Ilium is the Greek name for Troy). The Iliad dates back to the 6th century BC, and is a story about the Trojan War. Sirius is described in the Iliad as "the star they give the name of Orion's dog", and Homer further states that Sirius is "Brightest among the stars" The Greek word for the star was "Kyon" or "Kuon" which means "the dog", but is also translated as "scorching" "searing", because its heliacal rising of Sirius coincided with the hottest time of year, a period called the "dog days" of summer, and the brightness of Sirius was thought to add to the sun's heat when they rose together.

There are bright stars and interesting objects in Canis Major. The outline of the constellation is a pair of stars, comprising Sirius and Beta (Mirzam), to the north, and a bright triangle to the south. The stars in the bright triangle are only slightly less bright than the three stars of Orion's Belt.

Alpha (α) : Sirius. At magnitude –1.44, Sirius is the brightest star in the night sky. It is white in colour, spectral type A1, with a surface temperature of about 10 000°K. Sirius is about 24 times as bright as the sun, and about twice the diameter. Although Sirius appears bright to us, this is only because it is comparatively close. Its distance is only 8.6 light years, making it the 8th closest star to Earth, or 9th closest if the sun is included.

Beta (β) Mirzam : an Arabic name, meaning "The herald of Sirius". It is west of Sirius, and so rises before it. Its magnitude is 2.0, distance 500 light years.

The bright triangle of stars to the south of Sirius consists of **Delta, Epsilon** and **Eta.** These stars of Canis Major are intrinsically much brighter than the sun or Sirius, Delta and Eta being about 50 000 times brighter than the sun.

Delta (δ) Wezen The name is from the Arabic meaning "weight". Its magnitude is 1.8, and it is more than 1500 light years away. It has a dramatic arc of fainter stars around it to the south east. The arc can be seen with binoculars.

Epsilon (ε) Adhara Magnitude 1.5, distance 430 light years. Arabic for virgins.

Eta (η) Aludra Magnitude 2.5, distance more than 1500 light years.

Sigma (σ) Magnitude 3.5. This star has a distinct red tint, best seen in binoculars. Compare it with the white colour of nearby epsilon.

Messier 41 (M41, NGC 2287). This is a conspicuous open cluster 4° south of Sirius. It is about one third of the distance be-

tween Sirius and Delta, but just west of the line joining them. It is visible with the naked eye, but better shown in binoculars. It is in the same field as Sirius in a pair of 7 x 50 binoculars. The brightest stars in the cluster are magnitude 7.

M41 is the only Messier object in Canis Major, and was discovered by John Flamsteed in 1702. However it may be that Aristotle has recorded an observation of the cluster around 325 BC - he described it as A a star with a tail@. This observation would make M 41 the faintest object reported in ancient times.

***** Declination is the celestial equivalent of latitude on Earth, lines of declination are lines of latitude projected onto the sky. The projection of the Earth's equator onto the sky defines the celestial equator.

Principal references

Guide to the Evening Sky

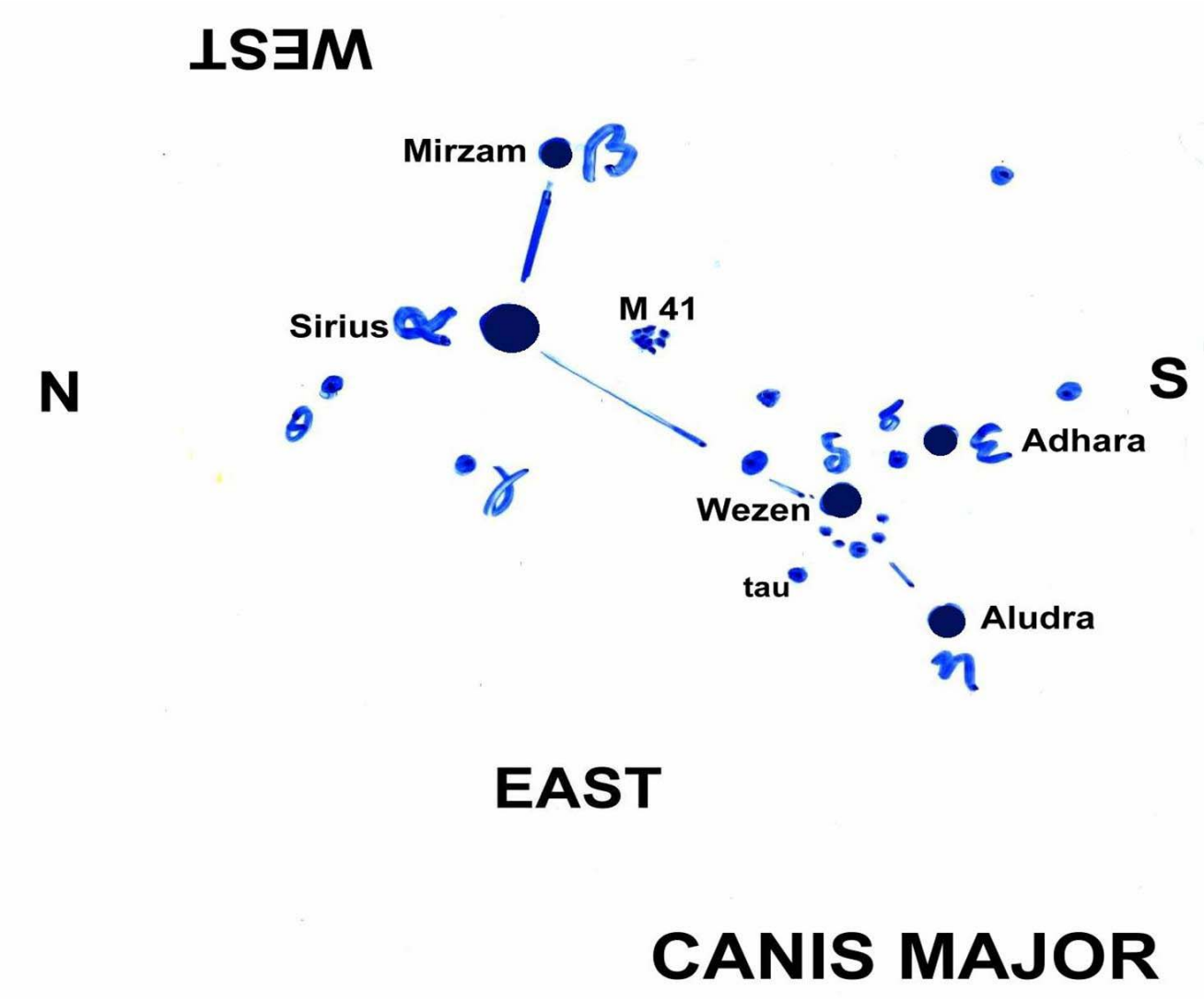
by Fred Schaaf in Sky & Telescope :

Feb 2000 p 90 / Feb 2001 p 106 / Feb 2002 p 82

Rambling Through the Skies by E C Krupp in Sky & Telescope : April 1998 p 80

Guinness Book of Astronomy Facts and Feats by Patrick Moore

Guinness Superlatives 1979



The Hubble telescope has caught a cosmic dance between two spiral galaxies. The larger galaxy, NGC 2207, is on the left; the smaller one, IC 2163, is on the right. Their dance has already caused quite a stir. Strong gravitational forces from NGC 2207 have distorted the shape of its smaller dance partner, flinging out stars and gas into long streamers that extend 100,000 light-years toward the right-hand edge of the picture. Eventually this dance will end. Billions of years from now the two galaxies will become one.

Credit: *NASA and Hubble Heritage Team (STScI)*

ASTRONOMICAL WEBSITE ADDRESSES

This website has over 600 pictures of ALL spiral galaxies larger than 3 minutes of arc in ALL constellations, arranged by constellation and viewing month:

http://www.spiral-galaxies.com

This one gives many website addresses which contain information on galaxies:

http://www.galacticsurf.com Click on “New sites”.

All of the Mars Global Surveyor images are archived here:

http://www.msss.com/mars_images/moc/index.html

Images taken by the High Resolution Stereo Camera (HRSC) on board ESA's Mars Express spacecraft:

http://www.esa.int/SPECIALS/Mars_Express/SEMAVQMKPZD_0.html

Theo Pistorius

Theo was jare lank 'n aktiewe lid van ons Sentrum se komitee. Hy het onlangs na Australië geëmigreer. Hy is egter nog steeds 'n lid van ons Sentrum, en wil graag kontak met ons behou. Lede kan hom kontak by sy e-pos adres :
theolien@ananzi.co.za

Sky Guide Africa South 2005

Dit is beskikbaar is by ons lede-sekretaris, Rynhardt van Rooyen, @ R40.00 elk.
As jy 'n waarnemer is, is hierdie gids 'n moet.

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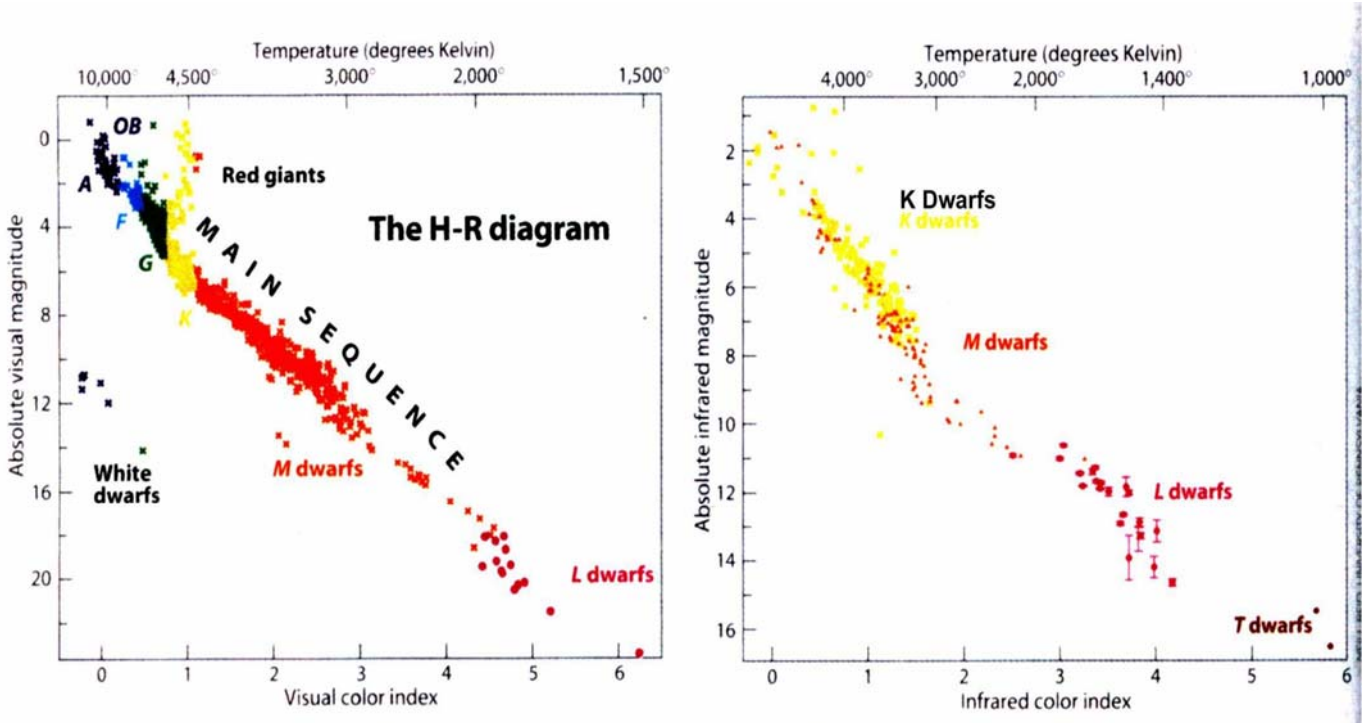
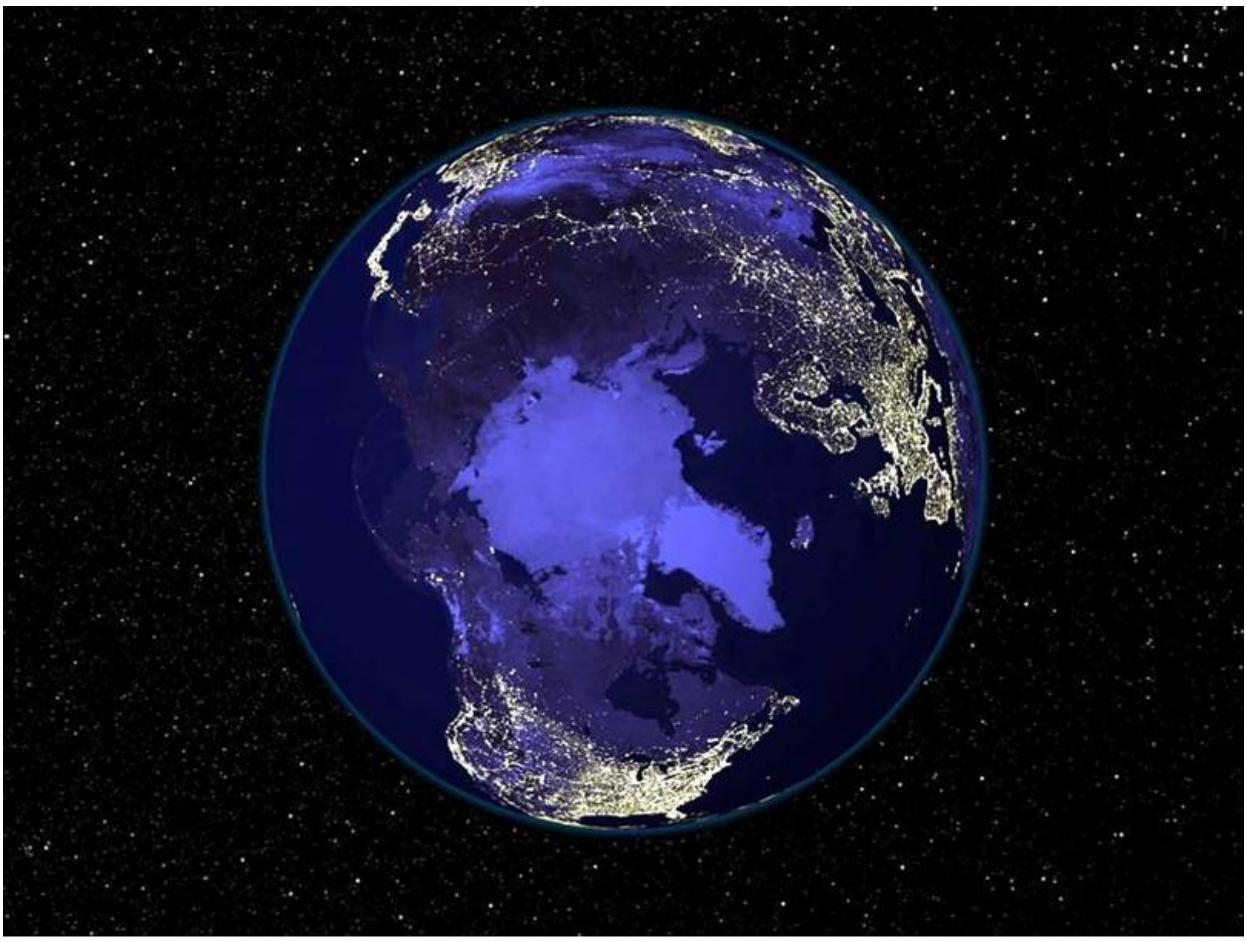
The diagrams below go together with the article "Stellar spectral types re-visited. Part 2" by Michael Poll in the November 2004 newsletter.



In the early 1900s two astronomers — Ejnar Hertzsprung in Denmark and Henry Norris Russell in the United States — independently discovered the relationship between a star's temperature and absolute magnitude (a measure of its intrinsic brightness). When stars' absolute magnitudes are plotted against their temperatures (or, equivalently, their colors), most of the points in the resulting "H-R diagram" lie along a smooth curve called the main sequence. The two H-R diagrams here — one for visible-light data *(left)* and one for infrared *(right)* — show the entire main sequence from the hottest, brightest objects to the coolest, dimmest ones. (On the horizontal axis, color index refers to the difference between an object's magnitude measured at two different wavelengths.) *T* dwarfs are so cool and dim they can't be observed visually. Their temperatures start around 1,000° Kelvin but may be as low as 750° Kelvin.

Die derde planeet van die Son af, gesien van bo sy noordpool gedurende die noordelike halfrond se winter, toe hierdie pool in skaduwee gehul was



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