

POLARIS



Royal Astronomical Society of Canada
London Centre Newsletter
August 2009

3D-Parallax-Parsecs Patrick Whelan

Isn't it wonderful to have bilateral symmetry? Do you know what that means?

It means that our bodies are, more or less, the same on the right as on the left. If we put the edge of a mirror along the middle of our bodies we would still look normal, like a person.

We have left and right arms, hands, legs, feet, ears, eyes, eyebrows and, well you get the picture!

I want to talk about one small bit of this symmetry. Or two bits of it I guess, the eyes.

Having two eyes gives us a tremendous ability. We can detect distance and see in three dimensions (binocular vision or stereopsis). Try walking around with a patch over one eye and you will quickly 'see' what I mean. It will get hard to judge distances, and if you don't move around, things will look flat.

In nature predators usually have binocular vision while prey do not. Think of predator animals, wolves and dingoes and hyenas and lions and tigers and cougars. Think of prey animals, deer and antelope and zebras. The predators have two on the front of their head. They see in three dimensions and can gauge how far their prey is. Prey animals have two eyes but one on each side of their head. They don't see so much three dimensions but they see a lot more all around them. One eye sees pretty everything to the left and other eye everything to the right. If they detect movement, perhaps a predator, they are ready to run.

Two eyes on the front of the head. Three dimensional vision. How does this work? Look at a distant object. It doesn't have to be really far away. The other side of the room you are in or if you are outside, something on the horizon. Now put your hand in front of you with one finger pointing up. (careful which finger you choose if there is anyone else around..) Close one eye leaving the other open and notice where your finger is in relation to the distant object. Now close the other eye and open the one you closed the first time. You should notice that your

finger now has a radically position in comparison to the distant object.

If your finger is close to your face and you try this, you should notice that your right eye sees more of the right side of the object and your left eye sees more of the left of it. When you have both eyes open your brain fuses these two images together and that is how we see things in three dimensions. This is the basis of depth perception.

Strictly speaking you don't need two eyes to perceive depth. Try this experiment. If you are in a room, pick out something that is half way between you and the wall. If you are outside, pick something that is about 3 to 7 meters away. Now with only one eye open look at the object and its position relative to the wall or an object on the horizon. Now move your head to the right and left. You will see the near object moves in relation to the distant object. Using only one eye you can tell the object is closer to you by the way it moves. That it parallax.

If you have ever viewed 3D pictures you know exactly what I mean. The ViewMasters so many of us had as children are a perfect example. There are two pictures of a scene. One picture represents one eye's view of the scene and the other picture represents the other eye's view of the scene. When we view them with a 'viewing device', they become three dimensional.

So what does all this have to do with astronomy? Up to now, nothing. But here it comes:

We can use the principle of parallax to measure astronomical distances! How? We measure and note the positions of stars in regards to other stars. We can then measure the positions again after 6 months. Why after six months? Our planet Earth circles the Sun. The diameter of the orbit is approximately 300,000 kilometers. If we take pictures or measurements 6 months apart that is like having our eyes 300,000 kilometers apart from each other! So in essence we are 'blinking our eyes' (which are

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Moon Phases



July 22 2009



July 28 2009



August 6 2009



August 13 2009

Starfest: A Celebration of Astronomy

This is an annual tradition for many people including myself. If you haven't been to a LARGE star party you need to go to Starfest.

It is hosted by the North York Astronomical Association (NYAA) and it is held at River Place Park RR 3, Ayton, Ontario, Canada, Phone: 519-665-2228

How to find River Place Park:

They are located 8½ miles north of Mount Forest and 1½ miles west of highway #6 on Normanby Township road concession 12.

<http://www.nyaa.ca/index.php?page=sf09/sf.home09>

Longitude 80° 50' 27" west

Latitude 44° 04' 28" north

Elevation 400 meters

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Find the Polaris newsletters on the internet at: www.patusratus.ca/Polaris

LONDON RASC MONTHLY MEETINGS

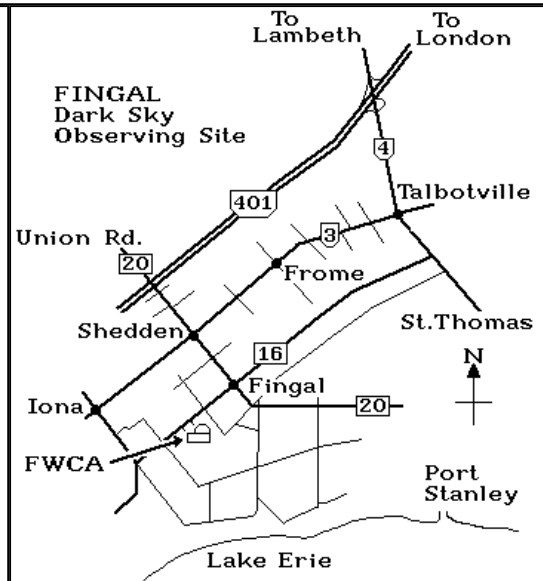
The London RASC group meets at Fanshawe college in London Ontario, September through July on the third Friday of the month at 19:00. They meet in room B1073.

Everyone interested in astronomy is invited to attend and enjoy our guest speaker, member activity and observing reports, announcements of new discoveries and upcoming events, telescopes and telescope accessories show and tell, and other fun activities. Have a look at our future and past activities on our website to see what we are doing.

Parking is free on Friday evenings, and there is plenty of room in the east parking lot off Oxford St. and parking spaces on the south side of B building. Enter the college by B building doors near Oxford Street, just west of the bus stop. College signs at key hallway locations will help you find us. The London RASC webpage can be found at:

www.rasc.ca/London

They have a preferred observing site at Fingal Wildlife Management area.



Sky Events for July, August and September 2009

July 18 Moon 0.5° N of Pleiades (M45)	September 3 Double shadow transit on Jupiter
July 21 Total solar eclipse	September 10 Moon 0.3° N of Pleiades (M45)
July 31 Antares 0.5° S of Moon	September 13 Mars 1.1° S of Moon
August 2 Mercury 0.6° N of Regulus	September 16 Zodiacal light
August 5 Penumbral lunar eclipse	September 16 Venus 3° N of Moon
August 12 Perseid meteor shower peak	September 17 Uranus at opposition
August 12 Double shadow transit on Jupiter	August 19 Double shadow transit on Jupiter
August 14 Moon 0.5° N of Pleiades (M45)	August 24 Mercury greatest elongation E
August 14 Jupiter at opposition	August 27 Double shadow transit on Jupiter
August 17 Venus 1.7° S of Moon	August 27 Antares 0.6° S of Moon
August 17 Neptune at opposition	September 2 Venus 1.5° S of Beehive (M44)
August 18 Vesta 0.4° S of Moon	September 3 Jupiter without Galilean satellites
August 19 Double shadow transit on Jupiter	September 3 Double shadow transit on Jupiter
August 24 Mercury greatest elongation E	September 10 Moon 0.3° N of Pleiades (M45)
August 27 Double shadow transit on Jupiter	September 13 Mars 1.1° S of Moon
August 27 Antares 0.6° S of Moon	September 16 Zodiacal light
September 2 Venus 1.5° S of Beehive (M44)	September 16 Venus 3° N of Moon
September 3 Jupiter without Galilean satellites (they are all hidden in front or behind Jupiter)	September 17 Uranus at opposition

R.A.S.C. London Centre Library Books of the Month June 2009 *By Robert Duff*

In order to make our library collection available to members, I bring three books to our general monthly meetings. These "Books of the Month" are available for loan, to be returned at the following monthly meeting.

The books for July 2009 are as follows:

Burnham's Celestial Handbook: an Observer's Guide to the Universe Beyond the Solar System, by Robert Burnham. Revised and Enlarged Edition. c1978.

Volume Two, Chamaeleon—Orion.

Kepler's Witch: an Astronomer's Discovery of Cosmic Order Amid Religious War, Political Intrigue, and the Heresy Trial of His Mother, by James A. Connor. c2004.

NightWatch: a Practical Guide to Viewing the Universe, by Terence Dickinson. 3rd Edition, Revised and Expanded for Use Through 2010. 1998 (2003 printing).

For a complete listing of our library collection please see our RASC London Centre Web site at: <http://www.astro.uwo.ca/~rasc/>



If there is a particular book or video you wish to borrow, please feel free to contact me by telephone at (519) 439-7504 or by e-mail at rduff@sympatico.ca

Sky and Telescope Subscriptions

Sky & Telescope subscriptions are available at a discounted rate through the London Centre. The cost is \$39.95USD instead of the normal \$49.95USD subscription rate. Please see Bill Gardner for details.

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300,000 kilometers from each other) and trying to see if any stars move around compared to others. And there is! By using this technique we can figure out which stars are really far away, (they don't move at all) and which stars are really quite close since they do move. You can see what I mean by looking at the diagram.

When we measure the angle that a star moves in relation to distant stars we can then determine the distance in 'parsecs'. The parsec (3.26 light-years) is defined as the distance for which the annual parallax is 1 arc second. The nearest star to the Sun (and thus the star with the largest parallax), Proxima Centauri, has a parallax of 0.77 arc second, which is 1.29 parsecs. This angle is approximately what an object 2 centimeters in diameter would look like 5 kilometers away! Because the angles are so small, using parallax to measure stellar distances only works out to a distance of about 160 light years. That is about 1/10 of a percent of the size of our galaxy. There is a satellite that was launched to increase the sensitivity of parallax called Hipparcos. It can measure up to 1600 light years away, but that is only 1% of the size of our galaxy.

From predators and prey to binocular vision to measuring distances to stars. Have a great month!

There normally isn't an August Polaris.

John Kulczycki wanted to create the August version of his Pocket Sky Atlas Challenges and so I thought I would create the online only version of the Polaris.

This is basically the July Polaris but I wrote a cover article and John did his article.

I hope you enjoy the surprise edition!

Patrick Whelan



August Pocket Sky Atlas Challenges

John Kulczycki

Nights are getting a bit longer and darkness is coming sooner each evening. Last moment camping trips and over night outings bring opportunities for late summer whole sky observing, so don't forget you Pocket Sky Atlas, even if you don't bring an instrument with you. Toward the end of the month there will be those who will lament summer's passing but those who see the glass half full will look forward to the longer, cooler nights of September and start planning projects now.

I've indexed the object to its star chart page.

Naked Eye:

Antares (Mag. 1 star)Page 56, Zubenelgenubi (Mag. 3 star) Page 57 and Nekkar (Mag. 3.5 star)Page 53

Small Scopes and binoculars:

Zubenelgenubi (Can you see the double?) Page 57 , M5 Page 57 and CR 350 Page 67.

Larger Scopes:

M11 Page 67, M7 Page 69, M55 Page 66

Bonus objects:

UGC 10822 Page 63

NGC 7008 Page 62

Happy hunting.