

The Prairie Astronomer

Yet Another Solar System Scale

by Rick Johnson

In my years of taking school kids through Hyde Memorial Observatory I have tried many different ways of getting across to the kids the true scale of the universe. I tried all the various ways I found in texts but none seemed to be getting across the vast empty void of space. Finally one evening about 8 years ago I came up with a new scale that has worked for me ever since. One of our members thought the club members might find it useful, so here goes.

First I came up with a new unit of measurement. Light years are just too big for the kids to comprehend and don't work in the solar system anyway. So I came up with the unit of an Astronaut Year. It is based on the average speed the lunar astronauts traveled when they went to the moon. I used round values through out so settled on the time of three days to reach the moon. Based on multiplying this by 3/365.24 I came up with the distance a hypothetical astronaut would travel in one year. Now for the odd coincidence. It turns out that if you scale the universe by a factor of 2 trillion an Astronaut year equals almost precisely 1 inch. So now I had both a scale that would fit the solar system into the Hyde classroom and would also show about how long it would take an astronaut traveling at the rate we went to the moon, to reach each object. It is the coupling of both distance and time that seems to get across the emptiness of space.

When the scale is used the sun becomes a speck of dust .027" across that the kids could just see with difficulty. The planets become invisible dust specks. The Earth is only .00025" across. Next I borrow 10 kids to use as pointers to the invisible solar system. Each holds up a finger to represent where the dust speck is for each object. On this scale Mercury is 1 inch from the sun, Venus 2", Earth 3" and Mars 4.5" so now you have quite a close knit group of kids in the middle of the room. Jupiter, Saturn, Uranus and Pluto are 16 inches, 29 inches, 5 feet and 12 feet away respectively. For Pluto I use the tallest kid and have him hold his hand way up in the air to show that Pluto is not in the same plane as the rest of the planets. Of course now Pluto is closer to the sun than Neptune so I then walk "Pluto" to the current position of 7.3 feet from the sun making sure his finger pointing to Pluto's dust speck stays well above Neptune so they can't collide.

Next I ask them how long it would take to reach Pluto traveling one inch a year. Now they get the message of why the astronauts haven't visited Pluto or the other planets for that matter. Also I point out how if they looked into the room and it had hanging in it 10 dust specks the size of these representing the solar system that they would consider the room empty as they would see nothing without very close inspection. The idea of how small the solar system's inhabitants are begins to sink in.

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President's Message

by Ron Debus

At our last meeting we were kinda overwhelmed with WELCOMED visitors. Club member Johnson (Jake) Winemiller, who is a science and astronomy teacher at Pound Jr. High School in Lincoln, brought his astronomy class to the club meeting. On February 16th I was thrilled to have the chance to visit Jake's astronomy class. I've been out with his class at the school and at the Atlas Site, so I wasn't too surprised to find the class both serious and fun. I know Jake does a very good job teaching the class and also spends lots of time viewing with the class. I'm glad I didn't have to take the test that his class was reviewing for while I was there!!! Thanks again, Jake, for letting me attend your class. I know you will keep up the good work.

There have been a few more members to purchase the Telrad finder scopes. I would be lost without mine. I measured some star patterns with my Telrad circles, then I measured those same patterns in my sky atlas, and with a compass drew the circles from my star atlas on to a piece of clear plastic to use as an overlay. Now I can position the circles in my atlas and set my Telrad finder in the same place in the sky. So far, it's been very close to the objects I've looked for.

One more item to discuss is the club library. We need a couple more volunteers to take one or more boxes of books/magazines. We also need those members who volunteered at the January meeting to pick up a box from Rick Johnson. Rick has informed me that we need to get the library taken care of before May, when he will be leaving for the summer. I hope to see all of you at the next meeting. How sweet it is when birds of this feather can flock together!

The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc., and is free to all club members. Membership status and expiration date are listed on the mailing label. Membership dues are: Junior Members and Newsletter Only Subscribers...\$10/yr; Regular Members... \$24/yr; Family Memberships...\$27/yr; Address all new memberships, renewals, or questions to THE PRAIRIE ASTRONOMY CLUB, INC., P.O. BOX 80553, LINCOLN, NE 68501. For other club information contact one of the following officers: Ron Debus(Pres)435-5688, Dave Knisely (V.Pres)223-3968, Kim Ellen Owen (Sec)423-7440, Lee Thomas(Tres)483-5639, Jack Dunn(2nd V.Pres)475-3013. All newsletter comments and articles should be sent to Newsletter Editor JOHN LORTZ, 9255 CADY AVE #14, OMAHA, NE 68134 no later than 7 days before monthly club meetings. Club meetings are held the last Tuesday of each month at Hyde Observatory in Lincoln, NE.

Observing Chairman's Report

by Dave Knisely

THE NEXT SCHEDULED STAR PARTIES ARE MARCH 3RD AND MARCH 31ST AT THE ATLAS SITE. Late winter skies offer an interesting mix of objects for the patient observer. M50 is a fairly easy open cluster located about 3.75 degrees north and two east of Theta Canis Majoris. This group is a moderate to large cluster of about 100 fairly bright stars and is a good target even for small telescopes. Another pretty open cluster is M93, located about a degree north and one west of Xi Puppis. It is a rich group of faint stars that is tough to see in a 2.4" refractor but is beautiful in larger instruments. This group has several nice star chains in the middle and a fairly rich background.

Down in Hydra is the fairly bright planetary nebula NGC 3242. This object lies about 1.75 degrees south and 1/3rd of a degree west of Mu Hydrae and can be seen as a fuzzy 9th magnitude star in small telescopes. This planetary will show an interesting three-shelled structure in an eight inch telescope under good conditions. The innermost shell is tiny and surrounds the central star, while the middle shell is elliptical and the outer one is faint and circular. The whole thing looks a bit like an eye when observed in a 10 inch at high power.

Not too far away in Sextans is the famous "Spindle Galaxy", NGC 3115, located about 3.2 degrees east and a half north of Gamma. This is a fairly bright galaxy that should appear as a faint moderate sized fuzzy oval in a 2.4" refractor. An eight inch will show the galaxy as a very elongated fairly bright fuzzy patch with very pointed ends and a brighter center.

In cancer are a pair of easy open star clusters, M44 and M67. M44, also known as the "Beehive", is a large group of bright stars visible to the unaided eye as a hazy patch north-west of Delta Cancri. It is best seen in binoculars or rich-field telescopes and has a central region that looks a little like the constellation Cepheus. M67 is about two degrees west of Alpha and is of moderate size, but has fairly faint stars. An eight inch will show this group as a rich and roughly circular cluster of about 50 stars.

To the north in Lynx is the interesting edge-on spiral galaxy NGC 2683. Located about five degrees west and one south of Alpha, this object appears as a faint fuzzy needle of light in a four inch. An eight inch makes it seem brighter and very easy, plus hints at vague dark detail to one side of the center.

In Ursa Major is a faint but interesting face-on spiral, NGC 3184. It lies about 3/4 degree west of Mu Ursa Majoris and appear as a moderate sized diffuse circular patch of light in a six inch. An eight shows the small brighter nuclear region and irregularities in the outer haze, while a ten inch shows hints of faint patchy detail. Another interesting galaxy in the area is NGC 3079, located 1.6 degrees north and 1.7 degrees east of Psi Ursa Majoris. It is difficult in small apertures, but an eight inch does show it as a fairly long moderately faint fuzzy streak of light with a brighter center and hints of dark detail.

For a final challenge, those with at least six inches of aperture should try to find NGC 3198, located 2.75 degrees north and a half east of Lambda Ursa Majoris. In an eight inch, it appears as a large highly elongated faint fuzzy patch with a brighter mottled middle and hints of other vague detail.

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The next question really hits them hard. I ask where to put an 11th kid representing the closest star besides the sun. Most are under the impression that all the stars are inside the solar system! Since the schools start with the solar system the kids are under the impression that it is the universe that contains everything. Some teachers seem to be under this impression also! Many therefore want to put the stars in the gap between the bunch of kids representing the 073 inner solar system from the outer solar system. Finally they get the idea the 11th kid will be outside the building. Some will even vote for as far away as the bus in the parking lot. One will usually go for "across the lake". So far no one has gotten the right answer which is 5 miles beyond the airport (nearly 13 total miles!). At one inch a year the vast distance to the stars begins to sink in. Sirius is the nearest naked eye star visible from Nebraska and its distance on this scale would be nearly 30 miles or about the distance from Lincoln to Wahoo. That's a lot of Astronaut years. Now they can start to appreciate the distance a light year really is; 3 miles on this scale (6 trillion miles / 2 trillion) or 190,000 Ay. At this point they are so blown away it is time to start a slide show.

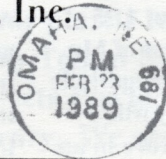
I hope you find this scale as useful as I have.

The Prairie Astronomer

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Next PAC Meeting February 28, 1989