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March 1988

The Prairie Astronomer

Astronomy Day 1988

by David Knisely

ANNOUNCING: ASTRONOMY DAY 1988, SATURDAY, APRIL 23RD, MUELLER PLANETARIUM, State Museum (Morrill Hall), UNL

This year's celebration will be a bit different than last year's. We didn't get the kind of public response at the shopping malls that we have had in previous years. So, this year, we are targeting those who may have some interest in the sciences by holding Astronomy Day in the lobby of Mueller Planetarium provides.

This year, the co-chairmen of P.A.C.'s Astronomy Day (the guys who get the blame) are Jack Dunn and David Knisely. We want as many members to help with the display as we can get. If you can help, please sign up at the March meeting or call Jack at the Planetarium to indicate when you can be there and if you can bring anything. We need six to eight telescopes for display purposes plus computers, videos, posters, models, signs, and anything else that might be of interest to the general public. We especially want home built instruments and small refractors so the public can see how easy it is to get started in amateur astronomy. The event will get started sometime in the morning and will run until near museum closing time around 4:00p.m. We will need set-up and tear-down help, as well as help manning the displays. As an added incentive for our members, Rick Johnson will be bringing his telescope equipped with the famous "T-SCANNER" solar filter if the sky is clear. So sign up and help us show the public what Amateur Astronomy is all about.

President's Message

by Del Motycka

489-2520

I am happy to report that the gate to the Atlas site has been repaired and reinforced. The work was done promptly after my conversation with the Co-op manager last month. We did, however, receive a bill from the Co-op for \$25 which represented one-half the repair costs. Based upon the authority granted to the president at the February meeting permitting expenditures up to \$100 for strengthening the gate, I authorized payment of this bill.

Due to a busy schedule, I was unable to schedule the annual clean-up at the Atlas site. I was down there on March 20th and there doesn't seem to be much debris on the paved areas. There are 8 to 10 small volunteer cedar trees that could be dug and planted along the north boundary to start a winter wind break. Hopefully this could be done at the same time, so someday we can have shelter from the north wind when using the site in the winter. Anyone else wishing to volunteer for spring clean-up and tree transplanting, please let me know by telephone or at the March meeting.

At the next meeting...

Sky & Telescope has decided to again raise their subscription fees. The magazine price is going from \$14.50 to \$16.00 (for club members). This means that the PAC will probably need to increase dues by \$1.50 to cover the change. The program at the March meeting will be presented by Jim Plant who will speak on the building and use of a 10" telescope.

The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc., and is free to all club members. Membership status and expiration date is listed on the mailing label. Membership dues are: Junior Members and Newsletter Only Subscribers...\$8/yr; Regular Members...\$22/yr; Family Memberships...\$25/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: Del Motycka (Pres) 489-2520, Ron Veys (V.Pres) 464-1449, Kim Ellen Owen (Sec) 423-7440, Dan Neville (Tres) 476-7772, Ron Debus (2nd V.Pres) 435-5688. 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.

Minutes of the Last Meeting

by Ellen Owen

The meeting was called to order at 7:37 by President Del Motycka. The Secretary's report was read; Donn Baker moved to accept it as read and the motion was seconded and carried.

Lee Thomas made a brief presentation concerning abstracts and papers for presentation at the National Astronomical League/Mid-States Convention in Council Bluffs, IA.

Ron Debus announced that the shirts ordered from Diers had arrived, and distributed them. The jackets are still on order. Ron is to be commended for his excellent handling of the ordering and distribution of the shirts and jackets. Thank you Ron, from all of us!

Due to the absence of Dan Neville, there was no Treasurer's report.

Under Old Business, Del announced that the gate at the Atlas Site has been repaired, a gusset welded in with 1/4" steel. Rick Johnson mentioned the empty (and full) beer bottles found on the site recently. Dave Knisely reported that the sheriff is checking on the site on a regular basis, and suggested that if anyone approaches the site while you are

there, to try to get a license number of the car. Lee Thomas asked for a status report on circumventing the gate, and Rick replied that the old accesses around the gate are secured with one (count 'em, one!) strand of barbed wire, which Del says does deter passage. Del suggested to the group that if we would be willing to contribute \$50.00 to \$100.00, we could work with the Firth COOP to repair the gate more securely, add wire, and make the east side more impassable. Ellen Owen moved, and Dave Knisely seconded, that the club contribute funds between \$50.00 and \$100.00 for the above purposes. The motion carried. A "No Trespassing" sign was also discussed.

Under New Business, Astronomy Day was discussed. Last year, either to the location at East Park or a saturation of public interest, there seemed to be low interest by the general public. Jack Dunn offered the Planetarium, which is celebrating it's 30th Anniversary, visiting as the site of Astronomy Day at Mueller Planetarium, the motion was seconded and carried. Dave and Jack will act as co-chairman to head up the job.

Since there was still no volunteer for a site manager for the Atlas Site, Del will volunteer for the job with the provision that the club be willing to help him as necessary. Such work will include removal of rocks from the cement area, transplanting cedar seedlings for a windbreak, pouring concrete over the former access shaft (like in April),

and removal of the cottonwoods and willows that are blocking the view south of the pad, east of the old parking area, and those too close to the asphalt on the north.

A motion was made by Earl Moser to adjourn the meeting, and the motion carried.

The program was a fascinating array of slide and photography techniques by Rick Johnson, and the presentation of a Bushnell Air gun rifle scope for use in polar alignment. Thank you Rick!

Notes From the 2nd V.P.

by Ron Debus

First, I must thank the PAC for the thanks and 'pat on the back' concerning the club jackets and shirts. I'm very pleased that I was able to do this for our members. At first I wasn't sure just what I had gotten myself into, but as progress was made, everything kinda fell into place. Now all the shirts and jackets have been delivered except for one. I sure hope the one person who has not received their jacket can be at the march meeting (NORMA!!!). I've noticed lots of people reading the logo on my jacket and I've had one person even ask about the club. I feel this is one of the best ways to advertise the PAC. I can hardly wait to see all

the shirts and jackets at the next meeting and at Astronomy Day.

I know there is a lot of enthusiasm running through the club right now. I'm certain I'm not the only one who gets a certain high from our successful gatherings and projects. Thanks again, PAC, for your support on programs and for backing me in this latest project. See you all at the next meeting... let's have a good turn out.

Observing Chairman's Report

by Dave Knisely

THE NEXT SCHEDULED STAR PARTY IS ON APRIL 15TH (quite TAXING, isn't it?). Spring skies offer the largest number of galaxies of any time of the year. Start in eastern Leo halfway between Theta and Iota for the trio of galaxies M65, M66, and NGC 3628. M65 should be visible in a 60mm refractor as a faint elongated fuzzy spot with a brighter center. It shows little detail unless very large telescopes are used. M66 is in the same field and shows some detail in moderate sized apertures. One spiral arm can be glimpsed in a good eight inch, with a ten inch showing some mottled structure. The third member of the trio, NGC 3628, is a faint edge-on

spiral that should just be visible in a six inch less than a degree north of M66. An eight inch should begin to show the narrow dark lane that runs down the middle of the galaxy.

The happy hunting ground for most galaxy lovers is the so-called "Marxian Chain" of galaxies that marks the center of the Virgo cluster of galaxies. It is located roughly halfway between Denebola and Epsilon Virginis and is centered on the bright elliptical galaxy M86. Small telescopes will show three or four of the galaxies in the chain, which runs roughly north-east to south-west. My eight inch reveals at least ten galaxies in a one degree field centered on the M86, and you can't go a degree in any direction without running into at least one other galaxy! Instead of star-hopping to identify galaxies, large instrument users have to galaxy-hop! Most of the bright galaxies are ellipticals with a few edge-on spirals thrown in for good measure.

The Virgo cluster extends into Coma Berenices where there are a number of interesting spirals. M98 can be found less than a degree west of 6 Coma and should be visible in a four inch. It is rather elongated and shows hints of detail near the ends when viewed in an eight or ten inch telescope. M99 can be found about a degree south-east of 6 Coma, appearing as faint slightly oval fuzzy patch with a slightly brighter core when

viewed in small instruments. Eight or ten inch telescopes will show mottling and hints of the spiral structure in this object. M88 is a tilted spiral that lies about three degrees east and a half south of 6 Coma. Again, it takes larger apertures to show anything of the spiral structure in this galaxy. One degree to the east is NGC 4548, a faint barred spiral that shows vague detail in telescopes eight inches and up. I have seen its central bar in an eight inch, with other detail being revealed in a ten.

Also in Coma Berenices is the "Black-Eye" galaxy, M64, located about a degree east and a bit north of 35 Coma. I have seen this galaxy in instruments as small as a pair of 10x35 binoculars, but the black-eye feature takes at least an eight inch telescope and high power to be seen. Most people miss this feature because they look for something big way out near the edge. In reality it is fairly small and hugs the small bright nucleus on its north side. I use at least 110x on an eight inch and about 200x on a ten for the best views of the dark lane.

This month's challenge is NGC 4038, the "Ring-Tail" galaxy in Corvus. It should just be within the grasp of a six inch, if you look about a degree north and a bit west of 31 Crater. An eight inch shows it as a fuzzy oval with a brighter edge and a faint hook on one side. A ten inch shows a patchy ring in the galaxy and hints of the longer tail, making it look like a shrimp.

Sky & Telescope

News

from the Compuserve Information Service

MARCH 18, 1988

COMETS McNAUGHT & LILLER

Here are epoch 2000 positions for 0 hours Universal time (8 p.m. Eastern daylight time) for COMET McNAUGHT 1987b1:

	R.A.(2000)	Dec.	Mag.
Mar 20	0h 04.8m	+64d 22	9.8
	25 0	39.5 +65 03	10.1
	30 1	12.5 +65 21	10.3
Apr 4	1 43.3	+65 21	10.5
	9 2	11.5 +65 09	10.8
	14 2	37.2 +64 47	11.0

Latest magnitude report: March 6th, mag. 9.0, by John Bortle.

Elements from IAU Circular 4539:

T = 1987 Dec. 11.9455 ET
e = 0.998706
q = 0.841265
W = 17.4277 degrees)
O = 260.6439 ") 1950.0
i = 97.1264 ")

For COMET LILLER 1988a, here are epoch 2000 positions for 9 hours UT:

	R.A.(2000)	Dec.	Mag.
Mar 20	0h 36.7m	+23d 20'	7.0
	25 0	42.2 +27 49'	6.9

	30 0	48.3 +32 28	6.8
Apr 4	0 55.6	+37 19	6.7
	9 1	04.4 +42 23	6.7
	14 1	15.7 +47 40	6.7

Latest magnitude estimate: Feb. 22, mag. 8.3, by G. R. Chester with a 5.5-inch reflector.

Elements by Daniel Green on IAU Circular 4538:

T = 1988 Mar. 31.187 ET
e = 1.000
q = 0.84842
W = 56.931 degrees)
O = 30.667 ") 1950.0
i = 73.427 ")

FEBRUARY 29, 1988

COMET WILSON DIVIDES

Astronomers report that the nucleus of Comet Wilson has split in two. The first indications of fragmentation were noted a couple of weeks ago by Karen Meech using the 2.2-meter telescope atop Mauna Kea. David Levy and colleagues confirmed the observation both photographically and visually using a 1.5-meter telescope in Arizona. Levy says the two nuclei are 10 arc seconds apart and differ in brightness by about two magnitudes. Comet Wilson passed perihelion last April 20th and, at roughly 18th magnitude, is now inaccessible to most amateur telescopes.

Finders of All Powers

by Steve Dodson

Note: because of some downloading problems, continuation of Gregg Beach's discussion of PPA will be presented next month...[Ed.]

This file is in response to current lively interest in TELRAD (tm) finder. This instrument is a finely-tuned and practical version of the combining-glass type unit-power finder. (For more reading see TELRAD.TH0 by Dick Wiesen in DL2 of the Astronomy Forum -- GO ASTROFORUM from any "!" prompt.)

The optical principle employed in this type of finder is presented in a diagram (1 c) on page 183 of Sky and Telescope for March 1975. The accompanying article, "Some New Illuminated Finders" is by Bob Cox, a 50 year veteran of Telescope Making in both professional and amateur modes. He remarks that such devices are similar to a sight he built at McDonnell Douglas in the 1960's for use on board the Mercury and Gemini spacecraft. Of course even that application is pre-dated by the heads-up displays used in military aircraft.

To see how the combining-glass unit finder works imagine making a peep-sight for your telescope by placing a Light Emitting Diode (LED) on the upper end of your tube and a circle the size of the pupil of your eye in line with the LED further down the tube. If you look at the stars through the circle you will not at the same time be able to focus on the LED. It will look like a fuzzy blob against the sky. You could then sharpen-up the LED for your infinity-focused eye by placing a small lens (say 10 inches focal length) between your eye and the LED. If the LED is at the focal point of the lens you will now be seeing a sharp image of the LED seemingly PROJECTED onto the starry sky. The only trouble is the lens will be blocking off several degrees of sky!

This is where the "combining glass" comes in. This is a piece of reasonably thin and transparent glass placed diagonally (at a 45 Deg. angle) across your line of sight somewhere around where the lens was. Now imagine swinging the LED/Lens combination through 90 degrees so that it is perpendicular to your line of sight and in line with the combining glass (like a side-arm off your tube). Partial reflection from the smooth surface of the glass will allow you to again see the LED projected on the sky, but this time you see the stars through the glass with no blockage. The LED image seems to be truly floating among the stars!

For compactness you can now fold the LED/Lens "side-arm" back along the tube using a small silvered mirror, and VOILA: you have the nice compact arrangement of the TELRAD! Of course we don't want to use a bare LED. We use the LED to light-up a transparent bullseye pattern located at the focus of the lens.

A small short focus concave mirror can be used instead of a lens. I bought a surplus sight based on a 2 1/2-inch mirror from Herbach and Rademan (401 E. Erie Ave., Philadelphia, Pa 19134), placed an LED behind the bullseye reticle, and used it exactly like a TELRAD!

Here's a surprising and useful experiment you can try with any unit-power combining glass finder, TELRAD or otherwise. Stand behind the finder with a pair of binoculars or a hand-held finder scope. Look along the line-of-sight of the unit-power finder through the magnifying instrument. As soon as the combining glass intrudes even slightly into the cone of starlight on its way to the magnifying instrument, a correctly positioned magnified image of the bullseye pattern will appear in your field of view!

Any instrument can thus be given a well aligned illuminated reticle without any mechanical modifications! After reading this you can probably think of several ways of doing it.

Since the unit-power finder does nothing to improve the visibility of your target object a relatively high-power finder is a good companion tool. As pointed out by some Astronomy Forum members the term "finder" in this context can be broadened to include even the main telescope with a low-power eyepiece! But what would be the ideal size for a finder to use as the "companion"?

In order to make comparisons it is necessary to adopt some standard criterion, and I propose the following: The finders should have the widest field consistent with the best contrast between an extended object and the sky. The best contrast is achieved with an exit pupil of about 5mm (rather than the mythical 7), meaning an eyepiece should be chosen which gives about 5 power per inch of aperture. In order to get some comparison figures let's suppose that we can get the correct eyepiece focal lengths in the 60-degree apparent field commercial lines. (There are now plenty of choices in that wide-field bracket). Since the true field of a telescope is the apparent field divided by the magnification we can now see how the OPTIMUM HIGH CONTRAST FIELD depends on the APERTURE of the finder. We get approximately the following results:

APERTURE	MAG.	FIELD
2 inches	10x	6.0 Deg.
3 inches	15x	4.0 Deg.
4 inches	20x	3.0 Deg.
5 inches	25x	2.5 Deg.
6 inches	30x	2.0 Deg.
8 inches	40x	1.5 Deg.
10 inches	50x	1.2 Deg.

12 inches 60x 1.0 Deg.

If these two twelve inch finder objectives all happened to have focal ratios of 5.0 then the eyepiece focal length to achieve the above figures would be 25 mm in each case. Ideally faster objectives would use shorter focus eyepieces (eg. at f/4 use 20 mm eyepieces.) With a bit of fiddling you can come close to the magnifications and fields above.

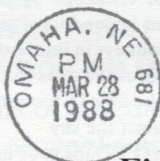
But, you say, "I can use a longer-focus eyepiece and get a still wider field". You should know the penalties, however, that go along with insufficient magnification. The first small decrease in power will reduce contrast between your deep sky quarry and the sky. Further decreases will cause the exit pupil of the instrument to exceed the size of the pupil of your eye, with the result that you be using only part of the objective of your instrument -- light from the rest of the objective will be intercepted by the iris of your eye!

If I had a 12-inch telescope I would conclude that when using it "as a finder" I would probably have about a 1 Degree field, and that I might want to go from the unit-power finder to maybe a 3-degree field before looking through the main scope. That means a complete system might ideally include a 4-inch finder as well.

Because of the narrower field of the 29-inch telescope I might end up with TWO magnifying finders. The bigger one could be of 6, 8, or even 10-inch aperture. It would show all but the faintest objects I would want to examine with the main scope and would make it easy to centre the object in the main field.

The Prairie Astronomer

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Next PAC Meeting
March 29th