THE Prairie Astronomer

Volume 29 #1
January 1988

Shirt/Jacket Sale!!!

The Prairie Astronomy Club is offering a variety of shirts and jackets with the club logo. Anyone wishing to purchase one should bring their money to the January meeting, since we must pay for the bulk order in advance. All prices and sizes below are for adult sizes...

T-shirt	$5.30	plus	.29 tax	=	$5.59
Golf Shirt without pocket	13.00	plus	.72 tax	=	13.72
Golf Shirt with pocket	14.75	plus	.81 tax	=	15.56
Nylon Jacket, unlined	13.75	plus	.76 tax	=	14.51
Nylon Jacket, flannel lined	18.00	plus	.99 tax	=	18.99
Satin Baseball Jacket flannel, lined	26.00	plus	1.43 tax	=	27.43
Satin Baseball Jacket quilted lined	30.00	plus	1.65 tax	=	31.65

SIZES: S(34-36) M(38-40) L(42-44) XL(46-48) XXL(50-52)
(add $2.50 extra for XXL size)

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President's Message

by Del Motycka

My thanks to Vice President Ron Veys for presiding at the December meeting while my wife and I were in Denver, Colorado, visiting our son and his wife. While there, we were caught in the big snowstorm – 18" to 36" over a 30-hour period with winds up to 20 to 30 miles per hour. Nevertheless, we did get partially dug out by Monday morning and proceeded to drive to downtown Denver to see the Rameses II exhibit. In a word, "outstanding".

Several exhibits included objects from the sun temple, plus a miniature reproduction of the "Ramesseum" temple, which was built on the west bank of the Nile opposite Thebes. The chief cosmic god of the Egyptians at this time was Ra, the Sun, and the first two letters of Rameses. Among the other cosmic gods were Anher-the sky, Sopdu-the zodiacal light, Nut-heaven, Geb-earth, and Shu-space. As in other early civilizations, portions of these temples were designed so that the sun shone on an object or figure only once or twice a year. Clearly the sun, moon, planets, and stars have been important to humankind and a source of wonder since the beginning. We, as amateur astronomers, are following in the footsteps of countless generations which preceded us on this planet

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 Membership... $25/yr. Address all membership 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, 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 6 days before monthly club meetings. Club meetings are held the last tuesday of each month.

Observing Chairman's Report

by David Knisely

THE NEXT SCHEDULED STAR PARTY IS FEBRUARY 12TH AT THE ATLAS SITE. The cold (and hopefully clear) skies of February offer more clusters and nebulae than almost any other time of the year. A good starting point is the combination open cluster and nebula known as the Rosette, NGC 2244, in Monoceros. Located about two degrees east and a half north of Epsilon, the open cluster portion is visible in small telescopes as a fairly large elongated group of 15 to 20 stars, while a good pair of 10x50 binoculars will show a faint wreath of haze surrounding the cluster. The Rosette is visible to the naked eye when the Lumicon UHC or Oxygen III filters are used. The best views come from richest field telescopes using the filters at very low power. In an eight inch without a filter, the nebula is only hinted at, while with the filters, much detail can be seen. A ten or twelve inch with the nebula filters will show much of the dark detail that is shown on most photographs and makes the nebula look like billowy clouds on a summer afternoon.

Farther south in Puppis lies a couple of open clusters that are prime targets for small and medium sized apertures. M47 is the brightest one and can be found about five degrees south and a degree west of Alpha Monocerotis. It has many bright stars and is a bit spread out, so use low power. About a degree and a half east of M47 is the richer but fainter cluster M46. It is best seen in apertures over four inches and is beautiful in a six. On the north edge of M47 is the faint planetary nebula NGC 2438. It is a near twin of the Ring nebula but is fainter, thus requiring a six inch or larger telescope to be seen well. Using the Lumicon UHC filter makes this planetary really stand out and makes the stars in the cluster almost vanish! Three and a half degrees south of NGC 2438 is a somewhat brighter but smaller planetary nebula NGC 2440. An eight inch will show two shells at high power. The inner one is bright bluish green with a 15th magnitude central star, and the outer one is highly elongated and diffuse at the edges.

Canis Major offers some interesting open clusters to the patient observer. The easiest is probably M41, located about four degrees south and one half east of Sirius. It is rather spread out but its stars are fairly bright and show some bluish-white and orange colors in an eight inch. Another interesting cluster can be found on top of the bright star Tau Canis Majoris. It is NGC 2362 and looks a bit like a swarm of fireflies around a yard light. It is easy in a 60mm refractor and increasing aperture makes Tau light up the field. Fainter but more beautiful is NGC 2360, located about three and a half degrees east of Gamma. It is a fairly rich circular group of faint stars that makes quite an impression in an eight inch at star parties.

One of the more interesting planetary nebulae can be found a degree south and just over two degrees east of Delta Geminorum. It is NGC 2392, more commonly known as the "Eskimo" nebula, and is a good target for apertures four inches and up. The two shell structure can be seen quite clearly with an eight inch, but the bright central star tends to drown out the detail in the inner shell unless a large aperture and the UHC filter are used. Interestingly enough, the Lumicon Oxygen III filter makes the area between the shells light up, making it difficult to tell there are two shells present.

Sky & Telescope News

from the Compuserve information service

JANUARY 14, 1988

MORE ON COMET LILLER

The following parabolic elements for this comet have been announced by Brian G. Marsden on IAU Circular 4528:

T = 1988 Mar. 26.13 ET
e = 1
q = 1.5441 a.u.
W = 18.88 degrees)
O = 19.26 ") 1950.0
i = 84.65 ")

The same card gives magnitude estimates in the 9.8–10.0 range.

Roger Sinnott has calculated the following ephemeris for equinox 2000.0; positions are for 0 hours UT (7 p.m. Eastern standard time on the preceding day):

Date	R.A. (2000.0)	Dec.	Mag.
Jan. 14	23h 53.7m	−26d 02'	+9.8
16	23 54.1	−24 42	9.8
18	23 54.6	−23 23	9.8
20	23 55.2	−22 04	9.7
22	23 55.8	−20 46	9.7
24	23 56.5	−19 29	9.7
26	23 57.3	−18 12	9.7
28	23 58.1	−16 56	9.7
30	23 59.0	−15 41	9.6
Feb. 1	23 59.9	−14 27	9.6
3	0 00.9	−13 13	+9.6

JANUARY 13, 1988

COMET LILLER (1988a)

William Liller of Vina del Mar, Chile, has found the first comet of the new year. When picked up on the evening of January 10th it was estimated to be magnitude 13, but a day and a half later T. Cragg and R. H. McNaught in Australia pegged it at 10.2 using 20 x 120 binoculars. Liller reports that it was a diffuse object with a 1' coma and faint condensation; Cragg noted a nearly stellar nucleus. Brian Marsden, reporting the discovery on IAU Circular 4527, gives the following position observations for equinox 1950.0:

Jan. 11.0646	R.A. 23h 50.9m	Dec. −28 18
12.444	23 50.9	−27 20
12.477	23 50.9	−27 19

Liller was using an 8-inch Schmidt camera and 2415 film (2-minute exposure), as part of Ben Mayer's PROBLICOM survey. Liller's observatory was described in the December, 1987, issue of SKY & TELESCOPE, page 664.

JANUARY 4, 1987

COMET EPHEMERIDES

For your favorite comets, here are epoch 2000 positions for 0 hours Universal time (7 p.m. Eastern standard time on the preceding date).

COMET BRADFIELD (1987s)

Date	R.A. (2000)	Dec.	Mag.
Jan. 5	23h 55.6m	+26d 29'	+7.2
10	0 25.2	26 24	7.5
15	0 51.9	26 08	7.9
20	1 16.0	25 45	8.2

continued from page 4

	25	1	37.6	25 19	8.5
	30	1	57.1	24 51	8.9
Feb.	4	2	14.8	24 25	9.2
	9	2	30.9	24 00	9.5
	14	2	45.8	23 37	9.8
	19	2	59.6	23 16	10.1
	24	3	12.4	22 57	10.4
	29	3	24.5	22 39	10.6
Mar.	5	3	36.0	+22 23	10.9

COMET ICHIMURA (1987d1)

Date		R.A. (2000)	Dec.	Mag.
Jan.	5	18h 35.4m	-36d 00'	+3.5
	10	18 37.9	27 11	2.5
	15	19 05.9	18 04	4.2
	20	19 37.1	11 21	6.1
	25	20 04.1	6 16	7.6
	30	20 27.4	-2 13	8.7
Feb.	4	20 47.6	+1 09	9.6
	9	21 05.4	4 02	10.3
	14	21 21.4	6 32	10.9
	19	21 35.8	8 44	11.5
	24	21 48.9	10 44	12.0
	29	22 00.8	+12 33	12.4

COMET FURUYAMA (1987f1)

Date		R.A. (2000)	Dec.	Mag.
Jan.	5	2h 21.9m	-10d 16'	+9.8
	10	2 11.5	12 35	9.9
	15	2 03.1	14 31	10.0
	20	1 56.4	16 08	10.1
	25	1 51.2	17 29	10.1
	30	1 47.2	18 39	10.2
Feb.	4	1 44.3	19 39	10.3
	9	1 42.3	20 33	10.3
	14	1 41.1	21 21	10.4
	19	1 40.5	22 05	10.4
	24	1 40.6	22 48	10.5
	29	1 41.1	23 29	10.5
Mar.	5	1 42.0	-24 09	10.6

DECEMBER 31, 1987

LEAPIN' LIZARDS

Actually, it's leap seconds and leap years. New Year's Eve has been awarded an extra second. This is the first since June 30, 1985. and the 14th since astronomers began adding them in 1972. A leap second is necessary now and then because the Earth's rotation is slowing very gradually. The time adjustment is scheduled for 7 p.m. Eastern standard time on New Year's Eve. And of course there's a whole leap day in 1988 on February 29th.

Your Article Goes Here!!!

Telescope Making and YOU!

Terence Dickinson continues his discussion of planetary telescopes. Downloaded from Compuserve.

PLANETARY TELESCOPES PART III

(Conclusion -- Part II ended with a discussion of various measures of telescopeoptical quality.)

Of course central obstructions and large Optical Path Difference values are not all that degrade image detail in planetary observation -- atmospheric turbulence, or "SEEING" also does it. In reasonable one arc second seeing (the smallest resolvable details that can penetrate our atmospheric veil are 1/3600 degree or 1/1800 full moon diameters) a good 4-inch telescope reaches its theoretical resolution and larger scopes add no more detail. In poor seeing no telescope will show more detail than a good unobstructed 3-inch!

In average (3/4 arc second) seeing a 6-inch of high contrast efficiency reveals more than smaller scopes, and in good (1/2 arc second) seeing you can profit by an 8-inch aperture. In very rare "perfect" (1/3 arc second) seeing a 12-inch contrast effective scope operates at its theoretical limit. No larger scope will ever reveal finer detail unless you wait at the top of 14,000 ft high Mauna Kea for very rare spells of incredible 1/4 arc second seeing when a 16-inch can deliver 100% ! (Ed. Note: In my locality "average" seeing occurs about once in a half-dozen clear nights.)

Now combining this seeing information with the idea of representing a planetary image with "resolution bits" or pixels we get the following table WHICH WORKS ONLY WHEN SEEING IS ADEQUATE TO FULLY EXPLOIT EACH APERTURE. The planetary disc exemplified is Mars at perihelion opposition (35,000,000 miles away):

APERTURE	PIXELS	RESOLUTION ON MARS
2.4"	125	600 km
3	200	475
4	360	350
6 *	800	240
8	1400	180
12 **	3200	120
16 ***	5600	90

* Seeing frequently a problem
** Rarely possible *** Seeing hardly ever permits

To achieve these results a low Optical Path Difference (OPD) scope of small or

no central obstruction is needed together with seeing consistent with aperture. Using more aperture than conditions allow can be self-defeating.

Instrument-induced seeing is a little discussed factor that is the least disturbance to refractors, and increasingly affects the following types in the order listed:

1) Schmidt-Cassegrains (SCT's) 2) Maksutovs 3) Newtonians (most because of the open tube)

Optical scatter from polishing defects much smaller than the surface accuracy value causes a little glow around a planet in a reflector, but hardly ever in a good refractor, which will show the disc against a black background.

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Adding all this up shows "it is time for each scope to stand on its own merit and faults. It is time for refractors to take their rightful place in the repertoire of Amateur Astronomers. ... A good test of your optics is to see if you can detect Cassini's division running across, in front of, the disc of Saturn." A 5-inch planetary telescope (low OPD and small or no obstruction) will show an impressive array of details on Mars and Jupiter. Coming very close to the ideal are the Roland Christen's AstroPhysics Apochromatic Triplet refractors and the Schuppmann Medial Telescope. A long 6-inch reflector with fine optics and a small diagonal is similar in performance. Other scopes show quite a bit less (although the author has not tested all the 5-inch apochromats on the market!).

Looking at smaller scopes, the standard 3-inch f/15 refractor normally functions at apochromatic levels, but of course with less "pixels" available.

In conclusion planetary viewing is available in the city and on moon-lit nights when nothing else interesting is visible. "As I said in the beginning I concentrate on planetary astronomy but I enjoy all elements of Astronomy. Like I'm sure when you go outside and you see the stars and whether you're looking at them with the naked-eye or with binoculars or looking at the features on a planet or resolving the stars in a globular cluster it is possible to be transported into a different environment. I feel this regularly, and I think most of you do. You feel something COMPLETELY different that you do NOT feel at any other time. You sort of join with whatever it is, the force, the fabric of the universe. You can almost reach away from this planet and reach out among the stars and galaxies. It's just a magical experience that you can't explain to someone who doesn't have astronomy in their blood, and I'm glad to be among people who have it!

Thank you! <thunderous applause!!>

Terence Dickinson
StarFest '86
Ontario

Lessions in Astrophotography

Gregg Beach is back with another installment of his continuing series concerning astrophotography. Downloaded from Compuserve.

A SIMPLE EQUATORIAL MOUNT FOR ASTROPHOTOGRAPHY

From time to time I will have a guest author visit here. They will share with you the fun they've had with the night sky and photographic film. This week I introduce Fred Boyer, President of the Sudbury Astronomy Club. Fred has been experimenting with a simple, inexpensive equatorial mount for wide field photography that anyone can build. The materials required may even be sitting in that box of scrap lumber you have in the garage! His results have been very impressive.

-- Greg Beach

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Have you ever stood under a clear, dark night

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sky and wished you could capture all that beauty on film. I have many times.

I've spent many hours in a dark-room with my brother-in-law developing films of clusters, nebulae and galaxies. All the exposures were taken with borrowed equipment. The owners of the various clock-drives were very generous in lending me their telescopes and cameras for mostly piggy-back, wide angled photos. However if you're like me, you long for your own equipment. It doesn't matter what the age or its state of repair. Having your own equipment gives you the freedom to pack up and go whenever you wish.

The same brother-in-law mentioned in the preceding paragraph and another astronomical friend gave me this freedom in a very roundabout way.

The brother-in-law talked my wife into buying the right camera for a Christmas present. The friend pointed me to an article in TELESCOPE MAKING MAGAZINE #7 called "Build this simple astro mount" by Ken S. Hume.

The mount is based on one devised by Professor George Haig and is described in the April 1975 issue of SKY & TELESCOPE magazine. (I guess that's why they're called Haig mounts.)

You require 3 boards, preferably 2x4s, at least 12 inches in length. Cut the end of one board to the angle of your latitude. Hinge the other two boards together and attach one of them to the angled cut made on the first board. The hinge should be on the right hand side looking down the angle-cut board. What you should have now is something that looks like a "T" that you can take half the top off. Drill a hole in the middle of the moveable board approximately 11.4" from the centre of the hinge. Make the hole large enough to accept a 1/4-20 bolt without binding. Countersink a normal 1/4-20 nut or a T-nut (available at most hardware stores) into the hole you drilled. Round off the end of a 4 - 6 inch 1/4-20 bolt and thread it into the nut from the top. You will find that by turning the bolt far enough, the 2 boards will start to move apart. Attach a large turning knob and some king of pointer (I used a large cotter pin) to the bolt. You may want to place some sort of bearing surface under the bolt where it pushes on the stationary board. Lastly, attach a ball and socket type camera mount anywhere on the moveable board.

The camera you use should have a bulb or time setting, allowing the shutter to stay open. A cable release would be of great help. The only thing you need now is a watch with a sweep second hand. (I will explain in a moment.)

On a clear night, place your mount on something solid and of reasonable height. Aim the hinge so it just covers Polaris. Pick a target, open the shutter and lock it, finally turn the knob on the bolt at 1 r.p.m. for 15 minutes. How do you know your turning the knob at 1 r.p.m.? Remember the watch with the sweep second hand?

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Try and match the second hand of the watch to the pointer of knob and voila 1 r.p.m. (Don't worry if your not quite in sync. Close is good enough.)

CAUTION !!!. Try and stick to shorter focal length lenses (less than 80mm f.l.) Remember the longer the focal length, the shorter the exposure. A 50mm lens is good for about 20 minutes with no or little trail on 35mm film.

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PART TWO...

In my last article I explained how you could hinge two boards together and make a primitive but very functional astro-camera platform. This time I would like to explain a couple of variations of the same mount.

Remember the sweep hand watch in the last write-up?

Your going to need it again but this time the watch will not be held in your hand. Instead we are going to attach it to the bolt that pushes the two boards apart. (By the way, the watch should be an old one that works but you are willing to part with.) A small battery fired LED (red of course) should be used to light up the face of the watch. How this is done is left to your ingenuity.

One way of mounting the watch is to counter-sink it into the turning knob. In this way the watch will be facing you and the LED can be mounted right along side of the watch. If, like me, you put the bolt right through the knob, the protruding bolt-head makes a convenient reference point for the sweep hand. This is important, you must have some sort of reference mark for the sweep hand or this method will not work. The mark can be anywhere around the circumference of the watch and should be made easy to see. (The LED maybe?)

After you have lined up your camera and are ready to shoot wait until the sweep hand points at the reference mark and keep it there by turning the knob. Keeping the second hand on the mark will give you exactly one revolution per minute. It also frees up one hand that you can keep warm in cold weather.

This variation was developed by Astronomy Forum member Steve Dodson. If you have more questions perhaps you could leave him a message on the message board. (GO ASTROFO-RUM to get there).

My own variation is somewhat more compli-cated mainly because I'm lazy.

My Haig Mount uses a 1 rpm 110 volt electric motor in place of the turning knob. The previous mounts usually have the bolt threaded though the top board, pulling it up when the bolt is turned. On mine the bolt is threaded through the bottom or stationary board pushing up on the moveable board. The one drawback is when I reset the mount for the next picture. The motor has to be removed but the inconvenience is worth it.

The reason I say more complicated is where do you find a 1 rpm motor easily and how do

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you power it away from a convenient outlet? The motor comes from obsolete timers in the plant where I work and the portable power comes from a 100 watt 12 volt DC invertor I built myself.

I've explained how to build the mount and even what lenses and length of exposure to take but what about results.

My best results were with Hypered TP2415, a 50 mm lens and a 10 minute exposure of the Scutum-Sagittarius region. I had no trailing and the many M objects in that area were easily picked out. I've also had good luck with Kodachrome 200 at -20 deg C of Orion in the dead of winter.

As a footnote on winter photography I discovered, much to my chagrin that cold kills batteries in cars, power-packs and modern electronically controlled camera shutters. A word to the wise is to use the simpler mounts in winter or carry spare batteries.

The descriptions I have given you of the Haig mount are to say the least, sketchy. If you do want more information on this easy to build camera platform please look up the April 1975 issue of Sky & Telescope, Telescope Making Magazine #7 or leave me a message in the Astronomy Forum. The variations of this mount are only limited by your imagination. Above all experiment and have fun.

Good luck.

-- Fred Boyer

At The Last Meeting...

by Ellen Owen

The meeting was called to order by Ron Veys at 7:34:30; Del Motycka was out of town. Greetings were extended to new members and visitors.

The secretary's minutes of the previous meeting were read and approved. Earl Moser expressed appreciation of the reading of the minutes, which he said had not always been done at prior meetings.

Rick Johnson and Dave Knisely reported that the last star party was clouded out. In addition, the gate to the Atlas Site was broken, but there is now flimsily strung barb wire to block the unofficial accesses to the site.

The bill to Strohmeyer Excavating (now General Excavating) has been paid. General Excavating will be sending out a questionnaire to determine the degree of satisfaction we placed on their work. The club consensus was

that the work was performed well. Ron will fill out the questionnaire.

Calendars are still available to be purchased:

Wonders of the Universe calendar $6.99 through the Observatory.

Observers Handbook – no extras, but if you have not picked up your handbook you should get right on it.

Astronomical Calendar – available only if you ordered it before.

Dan Neville read the list of people who have yet to pick up and pay for their orders.

Ron Debus presented samples of the jackets and shirts that will be available to order at the end of January. [See page 1 for costs]

Samples of each were shown at the meeting, and may be available at the next meeting for you to try for fit. The orders will take about 4 60 6 weeks to be processed and filled.

A letter from an Air Force major was received. He is selling a 5" Tasco catadioptric, equatorially mounted telescope. It includes an orthoscopic .965 eyepiece and 2 focusing holders. The price is $325.00 without case, and $350.00 with case and insurance.

The program in January will feature binoculars of several different types and sizes by several club members. The pros and cons of the different models will be discussed.

The business portion of the meeting was adjourned at 8:02.

The program was provided by Larry Stepp, who is now a "New Generation" telescope maker at Kitt Peak. Larry went into a great abount of detail about the various specifications of major telescopes throughout the world, and details of the telescopes currently being constructed and planned. It was a great program, and full of interesting information.

Respectfully Submitted,

Kim Ellen Owen

Notes From The 2nd V.P.

by Ron Debus

First I want to thank Rick Johnson for setting up our December program. I'll let our secretary fill in the notes on that evening.

At our upcoming January meeting, I will again try to bring club T-shirts and jackets. I met earlier this month with the club president and treasurer, preparing to send in the order on February 1st (give or take a day).

Our January meeting will be on binoculars. I've gathered together a few experts on the subject, trying to seek out the hidden talents of our club members. This will no-doubt be a very interesting program.

That's all for now, thanks for listening. See you all at the January meeting. Let's have a good turn-out!!!

The Prairie Astronomer

c/o Prairie Astronomy Club, Inc.
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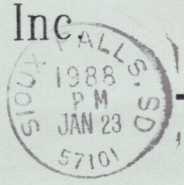

1st Class Mail

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Next PAC Meeting
January 26th