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# THE PRAIRIE ASTRONOMER

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## Fleet of Space Probes May Welcome Comet Halley In 1986

A small, multinational fleet of spacecraft may greet and examine Halley's comet when it reappears at the end of 1985.

The European Space Agency decided two weeks ago to conduct a feasibility study for a mission to intercept the celebrated comet and, among other things, determine the nature and composition of its atmosphere. A report on the study is due in June, with a final decision in October.

Though budget constraints caused the United States to abandon its more ambitious goal of a spacecraft rendezvous with the comet, American space engineers are developing an alternative, less expensive plan for a mission that could yield images of the comet's nucleus. A commitment to develop the project will have to be made by next year if the spacecraft is to be launched in July, 1985.

Japan is also contemplating a mission to take advantage of the rare appearance of Halley's comet, which sweeps in close to the sun once every 76 years.

Scientists from the University of Tokyo have met with American space officials in Washington to discuss their plans to launch a spacecraft into solar orbit that could be steered to an encounter with Halley's com-

et.

The Soviet Union has made no announcements of its intentions, but an American space expert said, "It is our understanding that the Russians are seriously considering some sort of Halley intercept mission."

Halley's comet will become visible in late 1985 and make its closest approach to the sun on February 9, 1986. The American plan, if approved, would be for a craft, launched from the space shuttle, to fly close by the comet in March, 1986.

MARCH MEETING ANNOUNCEMENT...

The March meeting of the Prairie Astronomy Club will be held Tuesday, March 25 at 7:30 p.m. at Hyde Observatory.

Part of the program will be a discussion by Steve Wyatt of his experimental computer-controlled telescope drive.

The Hyde Observatory Committee will, as usual, have its meeting 1 hour earlier at 6:30 p.m.

## Midstates Convention Coming

The Mid-States Region of the Astronomical League will hold its annual convention on June 13-15, 1980, on the campus of Central Methodist

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## Some Messier Group Members Approach First Milestone

Our club's group of novice but serious hard-core observers has been meeting monthly at Earl Moser's place in Hickman under dark skies, and has been steadily chipping away at the Messier list under the expert direction of Steve Myatt, Rick Johnson, and Dave Knisely.

The March meeting (on the evening of March 14) was planned as a Messier Marathon, i.e., on that night it was possible, by working straight through, dusk to dawn, to see all 110 Messier objects. The night was clear and warm with excellent seeing, but everyone seemed to agree that only an experienced observer, well-familiar with his instrument and knowing his way around the sky, could possibly have seen all 110 objects that night, averaging one object every five minutes. Heck, it takes some of us rookies five minutes just to decide which end of the telescope to look through! At any rate, a few of us stayed around until well after 2:00 a.m., and the evening was judged a total success.

Many members of the group are now approaching that first level of 70 objects observed. The following list

gives the names of the members in the group and the number of objects they've recorded so far:

	On March 14	Tot So Far
Allan Daubendiek	--	?
Marvin Garber	--	--
Russ Genzmer	22	53
Steve Kell	12	25
Scott Ladd	--	--
John Lammers	12	40
Jeane Miller	10	10
Kris Miller	7	15
Steve Pierson	--	--
Merton Sprengle	--	60
Lee Thomas	--	60
Scott Underwood	--	--
Ron Veys	23	82

Our observing group meets at Earl's on Friday nearest the new moon each month with the following Friday

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THE PRAIRIE ASTRONOMER is published monthly by the Prairie Astronomy Club, and is free to club members. Yearly subscription without club membership is \$5.00. Regular membership (includes one-year subscription to Sky & Telescope, club newsletter, and four quarterly issues of the Astronomical League newsletter), is \$14.00. Family membership (includes all regular privileges, plus one additional vote in club elections) is \$16.00. Newsletter editor, Lee Thomas, 489-3355. Address all correspondence to PRAIRIE ASTRONOMY CLUB, INC., P.O. Box 80553, Lincoln, Nebraska 68501.

## Planning Begins For Club Participation In 1980 Astronomy Day

This year National Astronomy Day falls on Saturday, April 26. In connection with this annual celebration, our club is planning a number of activities, some of which are:

1. A display area on the Gateway Mall at which we will have:

- Free handouts of sky calendars, star charts, etc.,
- Telescope displays,
- A videotape of the Voyager-Jupiter photos,
- A computer graphics display showing such things as the Skalnate-Pleso star charts,
- A question-and-answer electronic board,
- Results of an astrophoto contest (?)

2. Members are asked to bring their own telescopes out to Hyde Observatory that evening for a public star party. We'll set up on the terraces behind the building and the public will be invited to inspect and look through our scopes.

3. We may have a guest speaker at the observatory that night.

4. Behlen Observatory in Mead will be open to the public the night before (Friday, April 25).

5. We also plan a lot of radio, newspaper, TV publicity and coverage of our events.

If you can help out with any of these projects, please call Ron Veys

(464-1449), and volunteer. Remember: Edmund Scientific is offering a \$500 cash prize to the club with the best program.

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## Hyde's Solar Heating System Is Appraised By NASA For January

NASA has informed us that during January, 1980, the solar heating system at Hyde Observatory supplied 37.6% of the total heating load for the month. The total energy savings for the month amounted to 2988 cubic feet of natural gas, which amounts to a financial savings of about \$9.32.

This savings is fairly low for two main reasons:

1. Part of the system was inoperative for most of the month, and

2. January was a very mild month, meaning that the total heating bill was low in the first place. (The heating bill was about \$15.50, instead of the usual \$25.00--a savings of \$9.50, or 39%.)

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## MESSIER GROUP NEWS--From Page 2

(nearest third-quarter moon) as a rain-out date. We encourage those in the group to show up and keep plugging away, and invite anyone else interested in observing to come on out, whether you're a member of the Messier Group or not.

## COMA IN NEWTONIAN TELESCOPES, Part 3

An Article

By LARRY STEPP

In Part 1 of this series we discussed the importance of understanding the effects of the aberration coma, and examined the concept of the "coma free field" of a telescope which is used in several books written for amateur astronomers, demonstrating that the concept amounted to a photographic standard of image size. In the second installment, the concept of a diffraction limited standard was developed, but it proved to be more restrictive than experience with telescopes would suggest is reasonable. In this part, a standard will be presented which is based on the eyesight of the observer.

## OBSERVER LIMITED STANDARD

To develop a visual criterion of an "acceptable" standard for the size of the comatic image we need to determine the actual image degradation which can be detected by a typical observer. The average person with good eyesight can resolve detail which appears to the eye as being 2 minutes of arc or larger (the size of a dime at 100 feet). How does the apparent size of the comatic image at the edge of the field of view of a typical telescope eyepiece compare to this criterion of 2 minutes of arc? The linear size of the field of view of a typical telescope eyepiece (with an apparent field of 50°) can be found by:

$$r = e(\tan(50^\circ/2)) = 0.466(e)$$

The apparent angular size of this comatic image can be found by:

$$c = \frac{2(\arctan(s/2e))}{2(\arctan(0.0437/f^2))}$$

Notice that the focal length of the eyepiece does not enter into the equation. The apparent angular size of the comatic image at the edge of the field of view remains the same regardless of the focal length of eyepiece used. As the focal length of the eyepiece decreases, the linear field decreases and the size of the comatic image decreases proportionately, while the magnification of the image increases by the same factor. Column 2 of Table 4 lists the apparent angular size of the comatic image at the edge of the field of view for an eyepiece with a 50° field, calculated for different focal ratios.

It can be seen that the apparent size of the comatic image at the edge is fairly gross for a telescope at f/4, approximately 1/3 the apparent size of the full moon to the naked eye! On the other hand, the comatic defects are at the limit of vision for an f/12 telescope.

A visual, or observer limited standard, does not define a coma free field in linear terms, but it can be used to define the apparent field of view which is "coma free". By setting the maximum allowable apparent image size at 2 minutes of arc, the coma free apparent field of view is

defined by:

$$A = 2(\text{arc tan}(r/e)) =$$

$$2(\text{arc tan}((16/3)(sf^2/e))) =$$

$$2(\text{arc tan}((16/3)(2f^2 \tan(c/2))))$$

Now, since  $c$  is taken to be the criterion of 2 minutes of arc,

$$A = 2(\text{arc tan}(0.0031(f^2)))$$

Values for the size of apparent coma free fields for different focal ratios are listed in column 3 of table 4.

In the next part of this series we will contrast the three different standards that have been developed, and draw some conclusions.

## Comet Bulletins Available

As we mentioned at last month's meeting, you can subscribe to "COMET NEWS SERVICE" (a quarterly review of cometary news and research, with additional timely special bulletins for newly-discovered bright comets) by sending a supply of six stamped, self-addressed, long envelopes to:

COMET NEWS SERVICE  
3463 Hallwood Place  
Cincinnati, Ohio 45229

These bulletins are published by McDonnell Planetarium and are very useful to anyone interested in comets. (Sample issues were distributed at the last meeting to members).

TABLE #4

<u>Focal Ratio</u>	<u>Apparent Angular Size</u> (minutes of arc)	<u>Coma Free Apparent Field</u> (degrees)
4	18.3	6
5	12.0	9
6	8.3	13
7	6.1	17
8	4.7	22
10	3.0	34
12	2.1	48

## A Brief History Of The Prairie Astronomy Club, Part 1

The Prairie Astronomy Club can trace its beginnings to the time of November 7, 1960, when Mercury transited the sun. An item in the newspaper prior to the event was noted by several interested people in the Lincoln area. Earl Moser was one of these people, and he recalls observing the transit from Hickman.

The news item mentioned that Professor Carroll Moore was going to observe the transit from Nebraska Wesleyan University. Several astronomy enthusiasts joined Professor Moore for the event, and afterwards decided to have a meeting sometime in the near future. Widespread publicity by the news media brought the attention of others interested in astronomy, and they gathered to discuss the possibility of forming a club. Informal meetings were first held in the basement of Van Fleet Hall of Science at Wesleyan.

In April, 1961, a constitution was adopted by the 14 charter members, and the Prairie Astronomy Club of Lincoln was formally established.

The charter members were:

Walter Erbach  
 Harlan Franey\*  
 Faun Fritz  
 Dick Hartley\*  
 Jim Hoskins  
 Phillip Johnson  
 Richard Johnson  
 Werner Klammer\*  
 Carroll Moore\*  
 Tom Pansing

Philo Prell  
 Eugene Robertson  
 Pete Schultz  
 Jess Williams

The meeting place was moved from the basement to the upstairs lecture hall of the Van Fleet Building sometime in 1961. The club held its meetings for awhile in 1963 at the University of Nebraska museum. In 1964 and 1965, it met at Union Loan & Savings at 56th & O. In 1966, meetings returned to Van Fleet Hall until 1969 when, in January, Wesleyan opened its new Olin Hall of Science. Meetings continued there until December, 1977, when Hyde Observatory was dedicated and the club, in exchange for its activities in running the Observatory for the Lincoln Parks & Recreation Department, was able to claim as its home an honest-to-goodness astronomical observatory facility.

The Prairie Astronomy Club was first affiliated with Sky & Telescope on October 16, 1962, and has offered its members the magazine as part of its membership privileges ever since.

The PRAIRIE ASTRONOMER, the club's official newsletter, was published first on April 6, 1962. The editor was Pete Schultz. (EDITOR'S NOTE: I hate to dispute Earl's memory, but in perusing through the club's historical file, I came across an informal, 3-page newsletter that included the club's constitution and several

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OBSERVING CHAIRMAN'S REPORT:

At a recent club meeting, I heard several complaints from users of small to medium sized telescopes about me not mentioning objects visible in these instruments. This will be difficult in the coming months because, aside from the major planets, the majority of spring objects are faint galaxies.

However, since I used a 2.4-inch refractor for many years, I do have a few objects in mind that most definitely can be seen in smaller telescopes. First, a few words on the proper technique for observing faint deep sky objects with smaller telescopes.

The most important thing to remember is to be properly dark adapted. This means spending 10-20 minutes in total darkness. You gain several magnitudes of light efficiency over those who do not dark adapt and it also gives you time to think about what you want to observe. You also should use a heavily filtered red flashlight if you wish to look at charts, but use the light sparingly. Although the human pupil won't contract as much with exposure to red light as with exposure to the white beam of a flashlight, it does contract, cutting the amount of light entering the inner eye, so go easy on the light. Also, choose an observing site that is really dark. For most objects, you should use as low a power as possible to concentrate on what little light the telescope

gathers into as small an area on the eye as possible, thus making the object easier to see. A black cloth thrown over the head to block out any light at the observing site is also very useful in blocking out unwanted interference reflecting off a shiny eyepiece. Also, use averted vision as much as possible, and move your eye rapidly around the field of view.

Try using these techniques on a pair of galaxies in Ursa Major, M81 and M82. Look six degrees north and two degrees east of the 3.5 magnitude star Eta Ursa Majoris. M81, the brighter of the two, appears as a faint oval patch in small telescopes and large instruments only make the galaxy brighter. M82 is a narrow cigar-shaped patch just north of M81. It shows considerable dark detail in large telescopes, but even small telescopes will show a faint dark band near the center of the galaxy. Both galaxies will be easily seen in a 2.4-inch refractor and both will fit nicely into a one degree field of view. More next month.

-- DAVID KNISELY

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CLUB HISTORY-- From Page 6  
news notes, including the fact that Jim Hoskins had put out a previous newsletter, and that "we sure miss Pete Schultz and wish him the best at school." The editor initialed his items "JW", which could only be Jess  
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ASTRONOMICAL LEAGUE CONVENTION--  
Continued from Page 1

College in Fayette, Missouri.

Registration is \$4.00 for individuals and \$5.00 for families, with a \$1.00 discount if the fee is paid before June 1.

Two nights' lodging including six meals is available for \$25.00.

The convention will include paper presentations, swap shops, telescope making talks, door prizes and guest speakers. For more details, talk to Earl Moser.

Earl would also like to know if anyone in our club might want to take on the responsibilities of hosting the 1981 Mid-States Convention here

in Lincoln. If you are at all interested, please talk to Earl.

CLUB HISTORY-- Continued From Page 7

Williams. This would indicate that THE PRAIRIE ASTRONOMER, though not at that time carrying the name, had been founded at least one issue earlier, which would put it very early in 1961, about the time the constitution was adopted. By the way, dues then were \$5, which gives you an idea of where inflation has taken us!

In August, 1962, it was first suggested that the club join the Astronomical League.

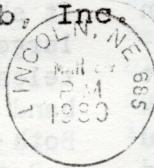
(Continued next month)

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