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THE PRAIRIE ASTRONOMER

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MOON STILL WOBBLING FROM IMPACT 300 YEARS AGO

The moon may still be wobbling from a colossal meteorite impact 800 years ago.

This is reported in the February 24 issue of Science by two astronomers on the basis of laser observations from the McDonald Observatory of the University of Texas and a calculation of the moon's status on the night of June 13, 1178.

It was on that night that English monks reported that a "flaming torch sprang up" from the crescent moon, "spewing out, over a considerable distance, fire, hot coals, and sparks". Parts of the moon were then obscured.

Astronomers think that the impact produced the crater known as Giordana Bruno, on the far side of the moon. It is 12 miles wide.

Astronomers Odile Calame and Dr. J. Derral Mulholland believe the impact would have set in motion long-lasting lunar oscillations, resembling a great earthquake.

They used high-precision lasers and reflectors left at three moon landing sites by Apollo astronauts plus one atop an un-manned Soviet lunar vehicle to show that such oscillations can still be detected.

SOLAR ECLIPSE IN FEBRUARY, 1979, IS OBJECT OF MOORE TOUR PLANS

On Monday, February 26, 1979, at Minot, North Dakota, at about 10:43 a.m. C.S.T. there will be a total eclipse of the sun with totality lasting 2 minutes 29.0 seconds. There is about a 60% chance of overcast skies. Carroll Moore is making plans to observe this eclipse, and would like to know how many people might want to go along by bus.

The trip will begin with departure from Lincoln Saturday afternoon,
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MARCH CLUB MEETING NOTICE

The regular meeting of the Prairie Astronomy Club will be held at Hyde Memorial Observatory on Tuesday night, March 28, 1978, at 7:30 p.m.

Ed Schmidt, Professor of Physics and Astronomy at the University of Nebraska-Lincoln will make a presentation on orbiting astronomical observatories.

ATTENTION OBSERVATORY SUPERVISORS

Observatory supervisors will meet regularly one hour before the club meeting at Hyde Observatory, 6:30 p.m. This is our only chance
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THE PRESIDENT'S REPORT:

Spring has arrived, both by the calendar and by the thermometer. The thaw has turned the parking area at the observatory into a bog. The Parks Department has added some rock, but too little to be of any use. Hopefully, the problem will have been corrected by meeting night.

When the observatory first opened we planned on holding a club star party in conjunction with an open house night, but the weather soon turned frigid and such plans were scrapped awaiting warmer weather. April 8 would seem to be an ideal night to plan for such an event. The moon will be nearly new and will not interfere with deep sky observing. April 15 will serve as a rainout night.

Lee has published elsewhere (pp. 4-5) the selected observatory objects for April. Five of them are easily seen by the naked eye or small binoculars. This should give each club member at the star party a starting place in his conversations with the general public. We should try and publicize the evening and ask the public to bring binoculars with them. Any club member with a 6-volt lantern or a 3-5 cell flashlight should bring it to act as a sky pointer.

Edmund Scientific has given the club one of their \$30 28 mm. Kellner eyepieces. Since the observatory is short of eyepieces, we are temporarily loaning the new eyepiece to the observatory. Edmund has asked us to evaluate the eyepiece, so if the sky permits Tuesday night, take a look through it and see what you think.

The Observatory's Astroscan 2001 telescope has been replaced by Edmund with a much improved unit. I hope I have heard the last of comments such as, "See! I told you stars have points!" I never did convince that mother that her gradeschool son was right, and the problem was in the telescope.

See you at the meeting!

-- Rick Johnson

THE PRAIRIE ASTRONOMER is published monthly by the Prairie Astronomy Club, and is free to club members. Yearly subscription without club membership is \$4.00. Regular membership (includes one-year subscription to Sky & Telescope, club newsletter, and four quarterly issues of the Astronomical League newsletter), is \$12.00. Family membership (includes all regular privileges, plus one additional vote in club elections) is \$14.00. Newsletter Editor, Lee Thomas (489-3855). Address all correspondence to P.O. Box 80553, Lincoln, Nebraska 68501.

PRACTICE SESSIONS ARE PLANNED FOR OBSERVATORY SCOPE OPERATORS

We have had excellent turnouts at the Observatory public nights, even in unbelievably miserable weather. We do, however, need more people to help with the telescopes.

Starting this club meeting, we will have a practice session after the meeting (assuming good skies) to find the six objects for the coming month. We will also have at least one experienced observer who will help those who would like to learn. So, don't be bashful.

A reminder that Rick Johnson, Earl Moser and Larry Stepp are the only people thus far assigned the job of adjusting and keeping the scopes in good repair. It is very important that we don't have everyone making these adjustments (even though they may be very capable.) It just gets down to the fact that we will soon have a mess if each person adjusts things to his own liking.

OBSERVATORY SUPERVISORS--

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each month for everyone to get together, compare notes, and discuss problems, and plan ahead (for example, just what are we going to do about opening time during daylight savings time?) So, please be prompt for the meeting. We usually manage to chew up an hour quite easily.

Another reminder: the six selected objects should always be shown so that the public gets to see what is advertised for the month. If time permits and everyone has seen the six, then other objects of interest can be viewed. It's a good idea to remember that many people have not used a telescope, so keep up a kind of running commentary, explaining the telescope, and the object on view.

ATTENTION, POSTER PURCHASERS-- YOUR POSTERS HAVE ARRIVED!

JUST AS WE APPROACHED PRESS TIME FOR THIS ISSUE, THE POSTER ORDER FROM HANSEN PLANETARIUM ARRIVED. IF YOU ORDERED POSTERS A COUPLE OF MONTHS AGO, BE SURE TO BRING YOUR MONEY TO THIS MONTH'S MEETING.

SUBJECT FOR DISCUSSION:

We will be talking about the April meeting this month because at that meeting we would like to involve members with various kinds of telescopes, so that at least one example of each type, size and brand can be brought to the meeting in April for newer members especially to look at and ask questions about. We have been talking about this idea as an aid to members interested in buying a telescope, but uncertain about what to get.

HYDE OBSERVATORY OBJECTS FOR APRIL

M-67
(8h 48m +12°)

M-67 is located in Cancer. It is an open cluster located about 2700 light years from Earth. It contains about 65 stars clustered in an area only 12 light years across.

JUPITER

April is the last month that Jupiter is high enough in the sky for detailed viewing. Jupiter is over 400 million miles from Earth and getting farther away all the time. Soon, it will be low in the western sky and lost in the glare of the sun.

SATURN

The ringed planet is currently located in the constellation of Leo the Lion. It is located very near the star Regulus. If you watch and compare where Saturn is located in comparison to Regulus, you will note that Saturn is slowly moving in the sky. Ancient observers were puzzled by this movement, as they first thought the sky was perfect and unchanging. Now we know that Saturn's apparent change of position relative to the stars is caused by its own movement combined with that of the earth as both planets orbit the sun.

NGC 3242
(10h22m - 18°23')

This planetary nebula is located in Hydra, a very long and large constellation which circles much of the southern sky. The nebula consists of several gas shells surrounding a central star. The nebula is about 1900 light years from Earth.

M-44
(08h38m +19°52')

The Praesepe or "beehive" cluster. This cluster of about 75 bright stars can be seen with the naked eye as a fuzzy patch in the constellation of Cancer the Crab. The cluster is about 500 light years away and about 13 light years across. This cluster is best seen at low power. A pair of binoculars will show many of the individual stars in the cluster.

Mizar-Alcor
(13h22m +55°11')

This is one of the most famous double stars in the sky. It is located at the crook of the handle in the "Big Dipper", which is part of the constellation Ursa Major. On a dark night both stars are easily seen with the naked eye. Poorer nights will require a pair of binoculars to see Alcor. Mizar, the brighter member of the pair, is itself a close double star which is easily seen in the telescope. Spectroscopic analysis of the light of Mizar and its closer optical companion show both of these stars to again be double. Thus, the Mizar-Alcor system really contains five stars; two are seen by the naked eye, the third with the aid of a telescope and the last two by even more intricate means.

OBSERVING CHAIRMAN'S REPORT:**EARLY SPRING SKY IS PART WINTER HOLDOVER, PART SUMMER PROMISE**

As darkness falls on these early spring evenings, we have a few objects left over from winter that should be observed. In Cancer, look at NGC 2682, an open cluster known as M67, located 2 degrees west of Alpha Cancri. It is fairly dense and contains about 60 or 70 members.

For those with larger instruments, a galaxy, NGC 2903 in Leo, should make a good target. It is located $1\frac{1}{2}$ degrees south of the star Lambda Leonis, and is of the 10th magnitude. In southern Leo is a group of fainter galaxies containing several Messier objects. Located between the stars K and L Leonis are 3 closely clustered galaxies, NGC 3384, M105, and an unmarked galaxy. All three are fainter than the 11th magnitude and are small. South of these three are M95 and M96, a pair of small 10th magnitude galaxies located one degree north and one degree west of L Leonis.

Moving eastward, look directly between the stars Theta and Iota Leonis for a trio of galaxies, M65, M66 and NGC 3628. The first two are visible with a three- or four-inch telescope with some slight detail being apparent in an eight inch or larger instrument. Both of these are spirals. The third galaxy, NGC 3628, is a spiral seen edge-on that shows a rather prominent dark lane extending down the length of the object.

All three can be placed within a one degree field of view.

Moving into Ursa Major, we find a famous pair of galaxies, M81 and M82, located about two degrees east of the 5th magnitude star 24 Ursa Majoris. M82 is an elongated patch with some intricate dark structure crossing it, and M81 is an egg shaped patch of light slightly brighter than, and less than a degree south of, M82. Both should be visible in a large pair of binoculars or a 2.4 inch refractor under good conditions, with detail being visible in larger instruments. Those with larger telescopes should look less than a degree southeast of M81 for the faint elliptical galaxy NGC 3077, and also look $1\frac{1}{2}$ degrees southwest of M81 for NGC 2976, another faint member of a small cluster of galaxies which includes M81, M82, NGC 3077 and a few other faint members.

--David Knisely

SOLAR ECLIPSE TOUR PLANNED

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with layover in Mitchell, South Dakota Saturday night (266 miles later). Sunday will be spent enroute to Minot (418 miles), with an overnight stay there Sunday night, and a 50-mile jaunt to Mohall, North Dakota, for the eclipse on Monday morning. Return to Lincoln will occur Monday. Let's talk about it at this month's club meeting.

HELPFUL HINTS ON WHAT TO LOOK FOR IN AN EYEPIECE (PART ONE)

Several new and a few longtime members have been asking questions about what eyepieces they should buy. Since there is much mis-information about eyepieces, this article may be of some help in sorting through all the advertising claims. Next month I'll continue with some specific suggestions.

Eyepieces come in all optical configurations and all price ranges. In order of optical complexity and cost here are the most commonly available eyepiece types: Ramsden, Kellner, Symmetrical, Orthoscopic, Erfle, and Plossl. Each type has advantages and disadvantages which must be balanced when choosing an eyepiece.

Terms often associated with eyepiece selection are: Focal Length, Exit Pupil, Field of View, Eye Relief, Para-focal, Fully Corrected. This month I only have space enough to discuss some of these terms as they apply to advertising claims or general eyepiece selection.

Focal Length: The focal length determines the magnification of the telescope, the shorter the focal length the higher the magnification. The formula for magnification is simply: Focal length of the objective/focal length of the eyepiece. Be Sure both focal lengths are in the same units, usually millimeters. Thus, if you have a 6" f/8 telescope with a 16 mm eyepiece, your magnification is 76.2 determined as follows: Focal

length of the 6" objective is diameter times focal ratio or 48 inches. Multiply this by 25.4 to convert to millimeters and then divide by 16mm which is the focal length of the eyepiece to get 76.2 power. When selecting eyepieces you wish the powers to cover as wide a range as you can afford.

Exit Pupil: This term refers to the point at which all light rays cross after leaving the eyepiece. The size of this point is important, as if it is too big you have light that cannot enter your eye, as your eye's pupil will be smaller than the exit pupil of the eyepiece. If the exit pupil is less than 1/2 millimeter, diffraction effects will reduce the clarity of the image. Exit pupil size is determined solely by the size of the objective lens of the telescope and the magnification being used. It is not effected by eyepiece design. The standard formula for exit pupil size is: Diameter of objective in mm/Magnification. This formula is correct, but can be hard to use as you must convert inches to millimeters. An easier formula is Focal Length of Eyepiece/F ratio of telescope. Based on our example used before, the exit pupil is 2mm obtained by the second formula by dividing 16mm by f/8. Using this formula you quickly find that with your 6" f/8 telescope the shortest focal length eyepiece you can use is 4mm, as this gives the minimum 1/2

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EYEPIECE SELECTION HINTS (Continued from Page 7)

mm exit pupil (4 mm/f/8).

The next question is how long a focal length can be used before light is lost. This depends on the viewer's eye. Some can accept up to and even more than a 7mm exit pupil. Most individuals over 30 have a maximum eye opening of less than 7mm. Mine is 6mm in pitch darkness, which I never seem to have at the observing site and I thus find a practical maximum (in my case) of 5mm. This would represent a 40mm focal length eyepiece for an f/8 telescope. (A common fallacy is

that a 6" f/4 telescope is richest field while a 6" f/8 is good only for high powers. Equip the f/8 with a 40mm eyepiece and the f/4 with a 20mm eyepiece of comparable quality and the views should be identical--well, the f/4 will be slightly inferior! More on this next month, I can't kill too many giants all at one time!

-- Rick Johnson

(Part two of this article will appear in next month's PRAIRIE ASTRONOMER.

--Ed.)

THE PRAIRIE ASTRONOMER
c/o The Prairie Astronomy Club
P.O. Box 80553
Lincoln, Nebraska 69501



FIRST CLASS MAIL

Mr. Earl Moser
Richman,
Nebraska 68372

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