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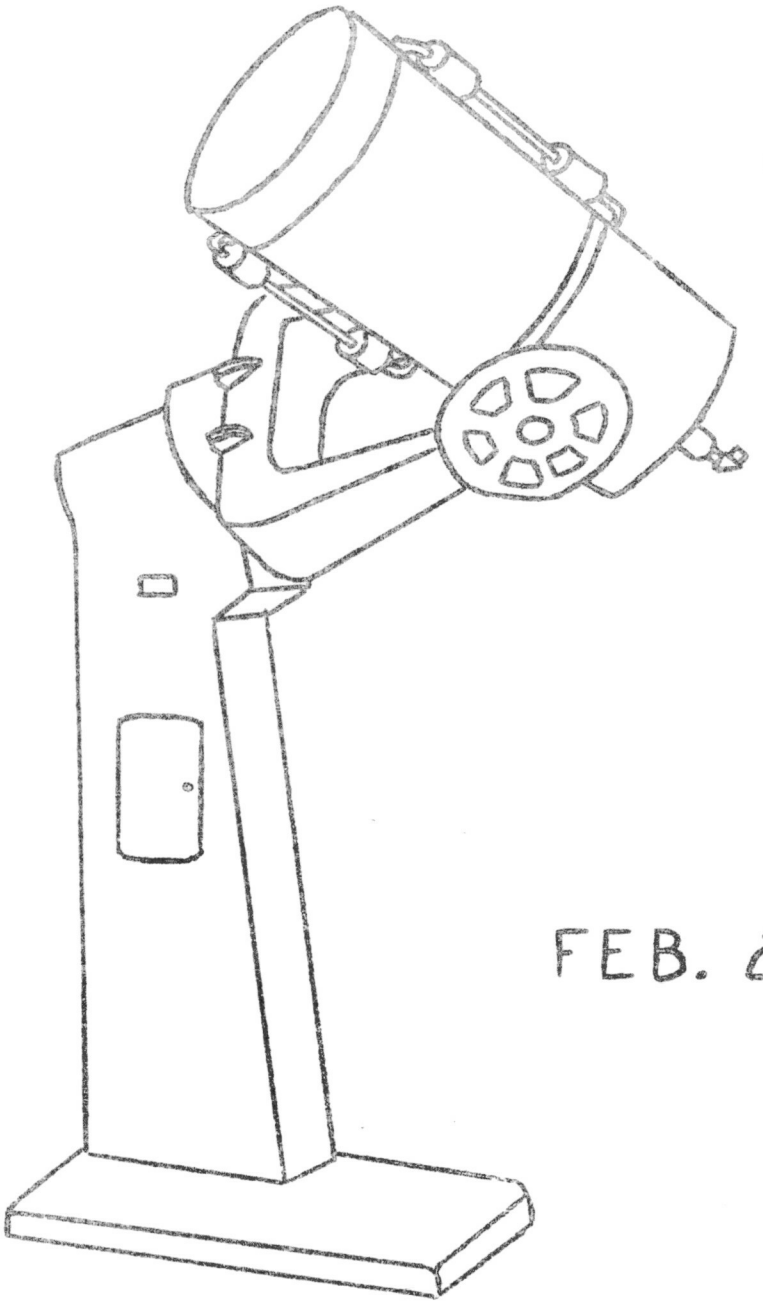
THE PRAIRIE ASTRONOMER



VOL. 2 NO. 2

FEB. 27, 1968

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EDITORIAL

This month's meeting will be devoted primarily to business matters, namely, the question of raising the yearly dues.

The present situation is as follows: Any member who wishes to have a subscription to Sky and Telescope, in addition to his yearly dues, pays a sum of six dollars. Also, any person wishing to be a member, yet without the magazine, pays two dollars.

In the new proposal, there will be two sets of dues, those for people under 16 (a junior section) and those over that age. For these over 16, dues with the magazine will be eight dollars, while without the subscription will be three dollars. For the junior section, dues with Sky and Telescope will be seven dollars, and without will be the present two dollars.

The reasons for the increase are 1. Sky and Telescope rates are up one dollar as of July 1, 2. Postal rates have increased, 3. Membership in the Astronomical League is included, 4. materials used in the newsletter have gone up, and 5. We need an increase in the treasury to get our observatory project on the road.

Also included in the new proposal is making every members dues payable during September, and any member entering mid-way during the year will pay partial dues to carry them to the standard September dates, also any people joining the club before this September will pay the old rates only.

The voting of this issue will be at this meeting, so be sure to come and express your views.

- Scott Coatsworth

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THE MEETING

This month's meeting will be held on February 27, 1968, at 7:30 p.m. at Nebraska Wesleyan's old Science Building.

There will be the voting on the issue of dues, and planning for future trips and occultations. There will also be refreshments.

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I have just received a letter from Steve Kunkee, he wishes all the members to know that his services of lathe work are still available, he soon plans to adding milling equipment. So if you have any work of this type to be done, say on a telescope, write him a letter and give him a description of the work to be done. I'm sure the prices will be very reasonable.

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Due to circumstances beyond our control, there will be no President's Report this issue.

ASTROPHOTOGRAPHY

Part 2: Photography with a Telescope

Those who have a telescope or access to one may wish to try planetary photography through a telescope. For this a single lens reflex type camera is best as it allows you to see exactly what you are photographing and the ground glass provides a reasonably good focusing screen.

There are several methods of taking pictures through a telescope. Which one is best depends on what you are taking and the equipment available to you. It is best if the lens can be removed from the camera. This is because when a picture is taken through the lens it mustbe wide open or else the size of the picture will be reduced and a wide open lens is rarely free of distortion and also reduces the light getting to the filam and increases the exposure time. If the lens cannot be removed, it is still possible to take a reasonably good picture so don't get discouraged. Put a low power eyepiece in and focus it visually. If you nedd glasses be sure you are wearing them! Focus the camera at infinity. Hold the camera over the eyepiece and as close as possible to it. With a fast lens and fast film, fair results may be obtained with a 1/30 second exposure using a 20mm. eyepiece in an F8 telescope. No drive is required! For higher powers, devices may be made or purchased which will hold a camera above an eyepiece for the longer exposures required for high power pictures. Once the problem of a drive is solved, the next one is vibration. For all but very short exposures or very long ones(shorter than 1/30 of a second and longer than 30 seconds) the vibration of most shutters will distort all but very low power pictures. This problem is solved by holding a black card in front of the telescope while opening the shutter. Wait a few seconds for the vibration to damp out, then quickly but smoothly slide the card away, after the proper exposure time, slide it back in front of the objective opening. When I say slide, the card should not touch the telescope, in fact it should be held as far away as possible to prevent air currents from possibly causing minute vibration. Obviously there is a limit as to the speed the card may be moved. Thus exposures of under one second are about impossible. Actually most exposures will be longer than this and if they should be shorter, either use slower film or higher powers.

If the camera has a removable lens and a focal plane shutter, you are in good shape. Extension tubes and adapters may be purchased which will couple the camera so it will slide into the eyepiece holder. If no eyepiece is used, you are said to be working at prime focus. A 6" F8 will give about 24 power using this method. Put in a Barlow lens, but still no eyepiece, and the power will be increased several times. Just how much depends on the focal length of the Barlow and the distance from it to the film. For higher powere remove the Barlow and devise a method of holding an eyepiece in the extension tubes. By varying the eyepiece and the distance from the lens to the film, a wide range of powers becomes available. Again be sure and use the black card method of taking exposures.

There still remains the problem of corredt exposure. This may be calculated out by the use of various formulas but there are so many variables it can get very messy and I have found it is no more accurate than an educated guess. A general rule of thumb is that every time the power is doubled, the exposure should be increased by a factor of four. I am going to try and give some general exposure times assuming Plus-X film and an F8 telescope. The objective size is of no importance here, only the F ratio.

Prime Focus	1/250 second
Prime Focus and Barlow	1/30 to 1/60 of a second
10mm. eyepiece projected 3" to film	1 second
Same as above with Barlow	4-9 seconds

The above exposures are for the moon at about half full. Jupiter requires slightly longer exposures. Saturn needs 2-4 times the exposure, and Venus about $\frac{1}{4}$, but varies with the phase.

Because of the many variables involved, always bracket these exposures until you begin to feel sure of your judgement as to correct exposure. I have been photographing for more than six years and still bracket most of my exposures whenever possible. What I mean be bracketing the exposure, is that if the exposure believed to be correct is say 2 seconds, also take pictures at $\frac{1}{8}$,1,4, and 8 seconds. Each exposure should be two times the one before it. By all means record exactly what exposures were used so you can later compare this with the actual negatives to determine what was the correct exposure. You will find that the phase of the moon will greatly effect the exposure times. Also, the area of the moon being photographed will have some effect. The exposure table given is for the area near the terminator (night edge) at about half moon.

It is highly recommended that you develop your own pictures, especially of the moon. The automatic processors just are not made for the unique demands of astrophotography.

For the members with some darkroom experience, I am going to try and give a few pointers. The negatives should be developed for maximum contrast. This is best done by slightly underexposing and then overdeveloping the negative for about 25 per cent more time than normal. A compensating developer seems to be best as it will tend to even out the vast differences in brightness found on the moon and thus cut the amount of dodging required when printing the negative. Developers I have found or heard to be good are Acufine, UFG, and FG7. For star pictures, developers such as the above and also Diafine and D-19 are good. Negatives will greatly exceed the capacity of the paper's reproduction ability. A high contrast paper is often needed or polycontrast paper with about a number four filter.

I hope that this article has sparked an interest in astrophotography in those who have not as yet tried it and has been of help to those who have. Anyone who has other ideas on the subject should submit them to the editor of the newsletter for publication.

Rick Johnson

EIGHTEENTH ANNUAL CONVENTION
MID-STATES REGION - ASTRONOMICAL LEAGUE
(KANSAS - OKLAHOMA - ARKANSAS - MISSOURI)

THE DATES: JULY 19, 20 & 21, 1968. Early registration on Friday afternoon, July 19. Closes on Sunday, July 21 at noon.

THE PLACE: WESTMINSTER COLLEGE, FULTON, MISSOURI

CONVENTION THEME: "AMATEUR OBSERVING ENDEAVORS."

GUEST SPEAKER: WALTER SCOTT HOUSTON of "Deep Sky Wonders" fame. Mr. Houston is Science Editor for Scholastic Publications and an entertaining speaker. His subject will be announced later.

ACCOMODATIONS: College dormitories, $1.50 per night per person. Family accomodations will also be available.

Food for all six meals, beginning Friday evening through Sunday noon, will be at reasonable rates.

Motel accomodations along with other details will be announced later.

There will be a banquet, door prizes and exhibits.

We are issuing an early call for papers and exhibits. Please send the title of your paper and time required for presentation to Ed. Friton.

REGIONAL CHAIRMAN

Edwin E. Friton
508 Marshall Ave.
Webster Groves, Mo. 63119

Phone: Area Code 314 - WOodland 2-3369

Hamburg Iowa Meeting at
Lookout Mt - Sunday Mar - 17 -
Gateway Sky Show - Mar - 7th -

Here

Lookout Mt - Sign -

Hamburg Iowa
Direction To Meeting

Corral

Corral

S

Gravel Rd

N

Hospital.

Business District

Station

Hi way 275

Skelly Station

AMATEUR RADIO ASTRONOMY

Professional radio astronomers use very sophisticated receivers but it is possible to receive signals from space even with very simple equipment. Rick Johnsen (WAØCHY, claims to have picked up Jupiter at around 32 Mc. with an ordinary short-wave receiver (Rick has quite an antenna system), but most radio astronomy is done at far higher frequencies and with more specialized equipment.

For the past several months I have been working on the design of a radio telescope. First I thought of going to 21 cm., but this is 1420 Mc., and parts for a frequency that high are too expensive. Then I brought it down to somewhere between 470 and 890 Mc. This is the band alloted to U.H.F. (ultra-high frequency) television, and I figured that there would be no trouble finding parts available. But there also, the only amplifiers available are a few noisy tubes. Then I went down again to 220 Mc. This is an amateur radio band, although I'm not worried about competition from local hams. Since there are many readily available parts and circuits for reception on that frequency, I thought this would reduce the work involved.

At 220 Mc. there are many usable tubes and some transisters. There is no skip (although there is some trospheric refraction) and not too much absorption by the atmosphere.

As for circuit details, my main trouble has been finding a tube suitable for use as a mixer. I asked both Rick Johnsen and Roy Robertsen (WAØQBW) about it, and they both suggested using a nuvister tube. There will still be a fair amount of noise, but this is probably the best I can do.

From the mixer, the received signal will go through several stages of i.f. (intermediate frequency) amplification. At the end there will be a dipde bridge which will cause a voltage to register on a veltmeter. Resolution will be poor, and all I will be able to do is find the general area of the sky where high intensity radiation at 220 Mc. is emitted. Steve Kunkee wants to build an interferometer, but these can get pretty complicated. Eventually I may build one.

The only thing remaining is the antenna. I have not arrived at any conclusion yet reguarding this. 220 Mc. is 1.36 meters and that is almost too long for a parabolic disc, although I may still be able to work up something along this line. The only other idea I have had is an array of dipoles. There will be a lot of experimentation with antennas at first, but, then, if I knew everything about it, there would be no reason to build a radio telescope.

-Ed Woerner (WAØQCR)

Editor's Note: For those of you, like myself, who couldn't get past the second paragraph and understand it, don't feel bad. I'm sure Ed or Rick would be glad to explain some of the above proceedure at the meeting.

-Scott Coatsworth