WEND

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ROAMING THE REGION

Besides his famous mathematical treatment of planetary motions, Johannes Kepler believed that each planet should make music. This was the origin of the expression "music of the spheres." This spring, the Yale Music School released a computerized recording of Kepler's "Harmony of the World." Several societies in the NCRAL have based meeting programs on this recording. (I would be interested in printing a review of the recording if anyone would care to submit one - J.)

A group of Racine AS members are starting an amateur telescope making project. They will grind and polish mirrors of various sizes at home and at the society observatory under the guidance of some of the more experienced members of the RAS.

Astro-Explorer Post 440, sponsored by Rockford Amateur Astronomers, dedicated its 12-1/2 inch, f/5, reflector on October 27th. The Explorers named the instrument the Sweger-Hand Telescope after two late RAA members, Paul Sweger and Carl Hand, whose combined craftsmanship originally produced the instrument.

ROAMING THE REGION

The Sheboygan AS will host the 1980 convention of the North Central Region on May 10th at the Sheboygan Center of the University of Wisconsin. Complete details and registration materials will be sent to regional societies in January.

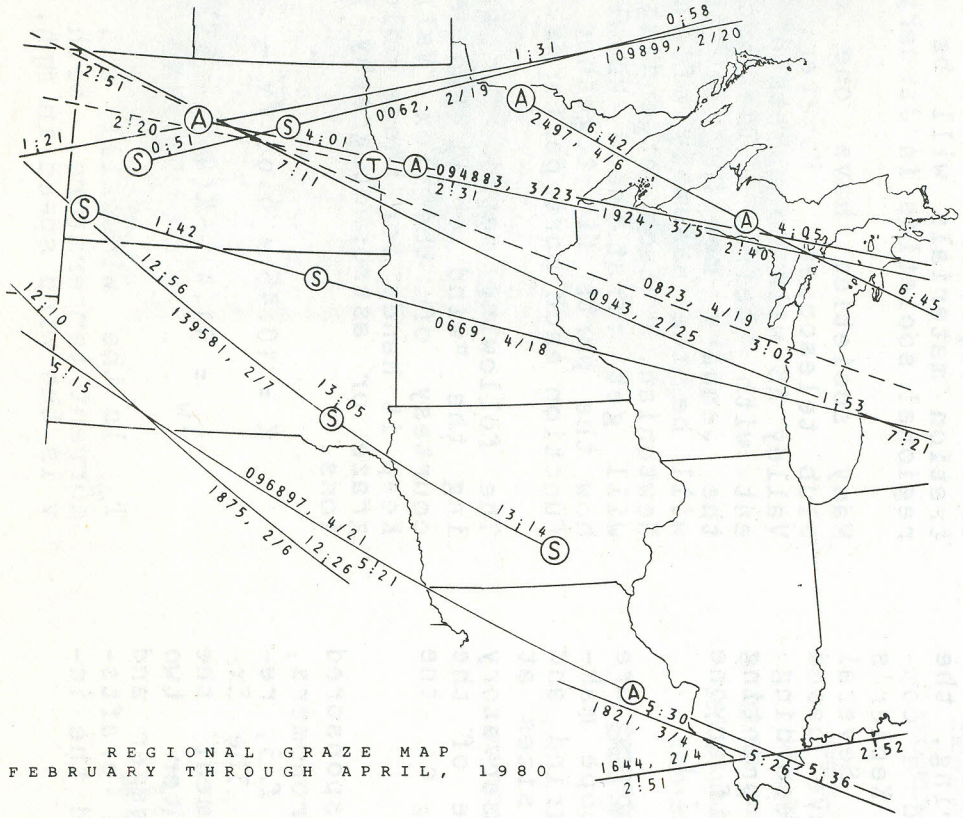
Many societies have one or more club telescopes. However, the Fox Valley AS will do something different with theirs. The program of the January meeting of the FVAS will be the assembly of their 10" Newtonian. Each attending member will get first hand knowledge of how the parts fit together and the function each part performs.

The following method for calculating the "wind chill factor" comes courtesy of the Fox Valley AS. Keep it handy for those cold winter graze or astrophotography expeditions.

$$K = 10.45 + 6.68\sqrt{v} - .447v$$

$$T_W = 91.4 - K(457 - 5T)/110$$

T_W is the windchill and T is the current temperature, both in ^{o}F. v is the wind speed in mph.



REGIONAL GRAZE MAP
FEBRUARY THROUGH APRIL, 1980

Map scale precludes its use to set up expeditions. If interested in a particular graze, contact H. F. DaBoll, 6 N 106 White Oak Lane, St. Charles, Ill. 60174 (phone 312/584-1162) for possible information on an expedition already in your area, or order predictions ($1.50 per set; give star number, date, and approximate longitude of proposed observation) from IOTA, P.O. Box 596, Tinley Park, Ill. 60477. To receive predictions on a regular basis, as well as other advantages, including *Occultation Newsletter*, join the International Occultation Timing Association, by sending your annual dues ($7.00) to the same address. Because of recent improvements in the computer programs, fewer graze predictions still can be improved by Yale catalog star position comparison; those that can, for the period covered by this map, are indicated in the notes. If you plan to observe, regardless of expedition size, you may request a comparison from John Phelps, Jr., 8621 W. 167th Place, Orland Park, IL 60462, at least two weeks in advance; enclose a self-addressed, stamped envelope.

If an encircled A or S (moon or sun altitude, respectively) is shown within a limit, increasingly larger telescopes are needed from there to the same symbol ending the limit, while "IMBSW" (it might be seen with) refers to the better part, on the other side of the intra-limit symbol. Time ticks on the south side of a limit indicate a northern limit graze, and vice versa. A dashed limit indicates central graze at the bright limb; an encircled T means just at the cusp.

1980 DATE	STAR NUMBER	MAG	MOON	MOON ALT	SUN ALT	CUSP ANGLE	IMBSW	NOTES
2/4	1644	4.1	91%-	9,10	-41,-42	4N,4N	60 mm	A,1,2,3,4
2/6	1875	6.5	76%-	39,39	-22,-19	6S,6S	6"	B,1,2,5
2/7	139581	7.4	67%-	34,32	-15,-1	6S,4S	6"	6
2/19	0062	7.5	10%+	24,18	-6,-13	5S,4S	4"	C
2/20	109899	8.0	18%+	32,25	-10,-18	5S,3S	5"	
2/25	0943	6.2	73%+	31,17	-51,-52	5N,6N	4"	D,4,7,8
3/4	1821	2.9	95%-	39,41	-57,-58	11S,11S	2"	E,1,2,3,4,5
3/5	1924	5.8	90%-	4,15	-34,-43	4S,7S	6"	F,4
3/23	094883	7.9	45%+	55,43	-11,-27	-1.4N,+1.5N	6"	4
4/6	2497	6.6	72%-	5,10	-35,-36	11S,11S	6"	G,4,6
4/18	0669	4.0	12%+	31,18	0,-13	4S,3S	7×50's	H,4,7,8
4/19	0823	6.6	20%+	31,17	-9,-23	-1.4N,-0.2N	60 mm	J,4,7
4/21	096897	7.7	40%+	25,10	-30,-40	2N,2N	4"	K,1,2,3,4,5

Four-digit star numbers specify stars in the Zodiacal Catalog; six-digit numbers are for non-Z.C. stars in the S.A.O. catalog. Universal times and dates are used. Moon altitude, sun altitude, and cusp angle, in degrees, are given for the western and eastern intersections of each limit with the boundary of the NCR, and for the end of any limit which falls within the Region. Cusp angle is the separation of central graze from the northern or southern cusp, with negative values indicating central graze on the bright limb. Under MOON, "+" means waxing, "-" means waning.

NOTES:

A. Shang Tseang, σ Leonis.
B. 48 Virginis. Double: 7.1 and 7.4; 0".9 at 201°. Primary immersed about 0".9 deeper than secondary, which might be seen with an 8".
C. 11 Ceti.
D. 19 B. (Geminorum) Orionis.
E. Porrima, γ Virginis. Double: 3.4 and 3.5; 3".7 at 0°. Secondary immersed about 3".3 deeper than primary. Either might be observable with a two-inch telescope.
F. 66 Virginis.
G. 166 B. Ophiuchi. Double: 7.8 and 7.8; 1".3 at 105°. "Primary" immersed about 0".04 deeper than "secondary", which might be seen with an eight-inch telescope.
H. θ^1 Tauri. Double: 4.0 and 7.8; 0".08 at 212°. Primary immersed about 0".06 deeper than secondary, which might be seen with a 4".
J. Double: 6.6 and 10.1; 3".4 at 133°. Secondary immersed about 2".3 deeper than primary. Disappearance of the secondary might be seen with a ten-inch telescope.
K. Triple: 7.7, 8.7, and 9.2; 60".8 at 97°, and 19".9 at 320°. Primary immersed about 4".1 deeper than secondary, which might be seen with a six-inch; and 12".6 deeper than tertiary, which might be seen with an eight-inch.

1. Poss. Sandy (Kansas City, MO) exp.
2. Poss. Senne (Rolla, MO) exped.
3. Poss. Clark (St. Louis, MO) exped.
4. Poss. Northeastern Illinois exped.
5. Poss. Stotz (Topeka, KS) exped.
6. If an expedition is planned for 139581 or 2497, a Yale position comparison should be requested.
7. Poss. Twin Cities of Minn. exped.
8. Poss. Zit (Milwaukee, WI) exped.

OBSERVING THE SUN

by Arthur L. Koster

(reprinted from the Madison Astronomical Society Bi-Monthly Newsletter)

The study of the Sun has fascinated me for many years. I first started to observe the Sun in order to count sunspots. This can be done with a small telescope using either eyepiece projection or and objective filter. I use a 5" Celestron telescope equipped with an Amici prism so that the west limb of the Sun appears on the right and north is at the top. To determine the east and west direction on the Sun, you need a crosshair, spine or reticle in your eyepiece. I have an eyepiece equipped with a reticle that I use for this purpose.

My method is to center the crossed lines of the reticle on a sunspot. Then I allow the spot to drift to the left. After a few seconds, I rotate the eyepiece and its attached reticle so that one line of the reticle again bisects the spot. This line must lie along the east and west drift line of the Sun. I then consult an Ephemeris to determine the angle that the Sun's axis makes with the north and south direction and then rotate the eyepiece this number of degrees. The eyepiece has a degree scale which allows me to do this.

On a piece of paper, I draw a circle representing the Sun and show the north, south, east and west directions. On this paper I indicate the position of the sunspots and the number in each group. I also indicate the time of observation, the date and the degree of cloudiness. The sharpness of the image is indicated by the letters P, F, G and E. If the sky was 50% covered with clouds and the seeing was good, I would show this as G5.

Since the Sun's axis is not only tilted to the east and west, but also to the north and south, one has to have a Stomhurst disk in order to locate the latitude lines. These are numbered from 0° to 7° and show the true position of the latitude and longitude lines on the Sun. The number of spots in both the northern and southern hemispheres can then be determined and also the sunspot number for the day of observation. The sunspot number is given by the formula:

$$R = K(10g + f)$$

where f is the total number of spots, g is the total number of groups seen in a single observation, and K is a uniforming factor determined for each telescope-observer combination to homogenize observations by all contributers. The highest recorded daily R numbers are around 360 recorded in October and December, 1957.

A sunspot cannot really be considered as an isolated entity, but must be studied as a member of a group. Groups are classified according to their magnetic field polarities. If all the spots in a group have the same polarity, the group is known as unipolar (alpha type). The most common configuration, however, is the bipolar group (beta type), the simplest of which consists of two spots of opposite polarity. Usually, however, there are several spots with those at the eastern end of the group having opposite polarity from those at the western end. Finally, a small percentage of the spots are complex (gamma type) with spots of different polarities distributed irregularly.

A "QUICKIE" POLAR ALIGNMENT

by Udo Schlegel

(reprinted from the Rockford Amateur Astronomers Newsletter)

Here is a fast and simple way for aligning your portable telescope's polar axis to within at least 1/4 degree of the true celestial north pole, in 10 minutes of time or less. Setting circles are nice, but not essential for this method, since it requires only your finder and three reference stars.

First, make sure that your finder cross-hairs are lined up parallel with the main telescope. Then level the telescope as best you can.

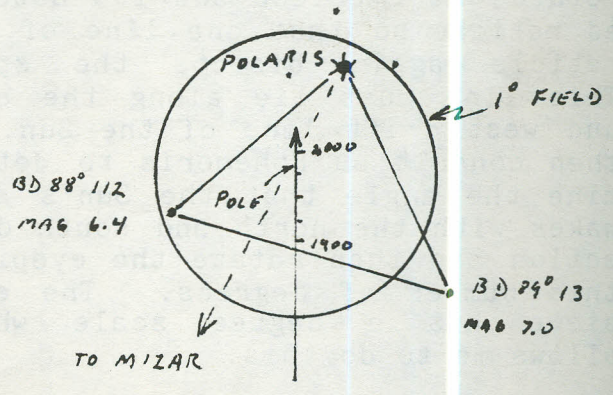
If you have a Newtonian or a refractor, align the main tube and the declination counterweight so they both point northward. Next, adjust the polar axis so that Polaris is approximately centered in the finder. While looking through the finder, you will notice three conspicuous stars near Polaris. One is very close to Polaris, while the other two form a triangle with Polaris.

Keep your declination axis clamped and only adjust the polar axis and azimuth so that your finder cross-hairs are roughly centered in the triangle and slightly toward the base formed by Polaris and 6.4 magnitude BD 88° 112. See the diagram shown here. (For a more detailed map and alignment, refer to page 280 of the September, 1979, issue of Sky and Telescope.)

That's all there is to it. It is really quite simple once you have done it a few times. It is the fastest method I've found yet for a really nice alignment and has worked well for me, requiring only minor declination adjustments about once every 10 minutes

I thought my idea was original, but I discovered that Louis Bell explained the same idea 57 years earlier on page 234 of his book, The Telescope, now long out of print. The finder chart was copied and slightly modified from that book.

One final note. There is a "false triangle" of fainter stars on the other side of Polaris which can really play havoc with your supposedly perfect alignment. To avoid this, just remember to point your finder cross-hairs toward Polaris from its fainter companion star.



FEBRUARY 29 IS DEADLINE FOR MARCH ISSUE