

# THE WASP



THE JOURNAL  
OF THE WARREN  
ASTRONOMICAL  
SOCIETY

**SEPT 1979**



The Warren Astronomical Society  
P.O. Box 474  
East Detroit, Michigan 48021



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## SOCIETY INFORMATION

The Warren Astronomical Society (W.A.S.) is a local, nonprofit organization of amateur astronomers. The Society holds meetings on the first and third Thursdays of each month. The two meeting locations are listed below:

1 <sup>st</sup> Thurs.	Cranbrook Institute Of Science 500 Lone Pine Road Bloomfield Hills, MI	3 <sup>rd</sup> Thurs.	Macomb County Community College – South Campus K Building 14500 Twelve Mile Road Warren, MI
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Membership is open to those interested in astronomy and its related fields. Dues are as follows and includes a year subscription to Sky & Telescope Magazine:

Student - \$11.00	College - \$13.00	Senior Citizen - \$15.50
Individual - \$18.00	Family - \$23.00	

## STARGATE LECTURE SCHEDULE

Chairman- Frank McCullough-725-4736

Lectures are given at Stargate Observatory each weekend. The lecture will be either Friday or Saturday night, depending on the weather and the lecturers' personal schedules. If you cannot lecture on your scheduled weekend, please call the Chairman as early as possible so he may arrange for a replacement. Those wishing to use Stargate must call by 9:00 p.m. on the evening they plan to go out. The lecturers for the coming month are as follows:

Aug 31/Sept 1	.....Bob Dennington, 779-6345
Sept 7/8	.....Lou Faix, 1-781-3338
Sept 14/15	.....Dave Harrington, 879-6765
Sept 21/22	.....Pete Kwentus, 771-3283
Sept 28/29	.....Frank McCullough, 725-4736

# WAS Exchange

FOR SALE. . . Cave 12½" transportable mounting with: slow motion on dec. (dec. motor needs replacement). Price - \$400.

10" f/4.9 mirror (needs final figuring) with: diag. (Coulter), tube & homemade cell. Price - \$75.

6" f/10 finished mirror. Price - \$20.

Fork for equatorial mount, laminated birch plywood, some holes. Price - \$15. Call Rik Hill, day 517-799-9390, nite 517-35-5548; or write 4503 E. Patrick, Midland, MI 48640.

FOR SALE- 6" reflector RV-6 Dynascope complete with four lenses- 30, 18, 12.5, 7mm; 2x Barlow, 6x30 finder, drive and setting circles.

Also . . .Tasco 50mm refractor with sun filter, two lenses, diagonal, and tripod.

Price \$210.00

Call Dave Harrold, 391-0124, or write  
184 Hi-Hill Road  
Lake Orion, MI 48035

THE FOLLOWING ARE THE MINUTES OF THE JULY 19, 1979 MEETING OF THE  
WARREN ASTRONOMICAL SOCIETY:

Our president, Dave Harrington, called the meeting to order at 8:20 p.m. and welcomed all members and guests. He mentioned that the roster of members will be updated at the Cranbrook meeting. The mailing list will also be updated. Robin Bock informed us that rules and guide lines will be set-up for the Library which will be ready for the August meeting. These will be listed in the August issue of WASP.

The summer campout will be held this year at Camp Rotary on August 10, 11 and 12th. Doug Bock, chairman, said that two cabins will be rented at the cost of \$100. A Messier Contest and Perseid meteor watch will highlight the program. The cookout will be held on Saturday night. A soft ball game will again be one of the chief attractions.

Frank McCullough stood up and urged members to renew their interest in Messier observing and to go out for the Messier Certificate. In a lowered voice, he suggested that members report with scrub pails and brushes to the Observatory on August 11 for a belated Spring cleaning.

Rick Hill invited all to Midland for a meeting of his local Astronomical Society. This will feature a raffle of a 22-mm eyepiece. A strong plea was made by Jeff Stanek for articles for the WASP. (Present writer should be excepted for age and lack of talent.) Not, really, John:

Claude McEldery mentioned that he had information on Minor planets for anyone interested in observing them. This was especially directed to the Messier Observing Group. Ken Kelly announced that Comet Bradfield was discovered June 24. In early August, it will be visible here at magnitude 8 to 9. Approximate RA is 8 hours, declination plus 40 degrees. Bradfield, he said was an Australian.

Peter Kwentus regretfully recalled the untimely death of John Searles and passed the hat around for a bouquet of flowers. He announced the formation of a class in Astro-photography to be held at Cranbrook. He also exhibited and demonstrated a WWV radio.

Judy Strong, vice president, showed her slides of a visit to an historical astronomical auction held at Greenfield, Massachusetts. She exhibited a few of the antique instruments she brought back with her. Her slides included scenes of covered bridges, historical twice-sacked Deerfield and also, the Williams College Observatory.

Finally, but not least, was shown a video tape supplied by NASA entitled "The Final Frontier", which depicted life in our future in outer space.

Respectfully submitted,



JOHN RAPIN

Secretary Pro-tern

Dear Members of the Warren Astronomical Society:

I just received a copy of the August WASP and noticed the Editorial article by Jeff Stanek. The Editor made a mistake -- he forgot to include my name on the list. I have not done my share for the club for at least 2 years, and I feel very bad about that!

It wasn't so long ago that I was the Editor of the WASP, and I can remember how hopeless it was at times when I couldn't find members to participate in writing articles for our paper. I can even remember losing the co-editor because of this problem. It was tough then, and I'm sure it hasn't changed over the years.

Some of the members' names on the list were those who started the club, and have been the Club over the years. I'm sure our Editor had to put those names down--or should he play favorites? As a member of the W.A.S. I felt a bit squeamish when I read the article, and I'm sure it will not be good business when the other clubs we correspond see our problem. But do they not have the same problem? I ask you honestly -- since our Editor has taken on this job for our club haven't our papers been excellent? I can remember with shame that the papers I was in charge of were not that red hot! I feel that strong language in the form of this article was needed.

In closing, I personally am sorry that I haven't sent in articles in the past 2 years. My name should have been on that list also (even though I am the Editor's brother-in-law). I will do my best in the future here from St. Louis, Mo. to still support the W.A.S. Won't you do the same? Support the Editor of the WASP -- but even more support the President, and all of the "staff". They can only do a job if we as an entire club are behind them.

Thank you for the chance to "sound-off".

Hope to see you all soon!

Sincerely,

A handwritten signature in cursive script that reads "Carl". The signature is written in dark ink and has a long, horizontal flourish extending to the right.

Carl L. Noble

# THE MESSIER CATALOGUE

CHARLES MESSIER's catalogue came from his comet searching nearly 200 years ago. Clusters and nebulae new to him would be plotted on his atlas, and eventually lists of them were published. The entire catalogue can be divided by object number, as follows:

1-45 First list from the *Histoire de l'Académie Royale des Sciences* for 1771;

46-68 Additional objects first published in the *Connaissance des Temps* for 1781;

69-103 Additional objects first published in the *Connaissance des Temps* for 1784;

104-109 Objects reported by Messier's colleague Pierre Méchain in the *Berliner Astronomisches Jahrbuch* for 1786.

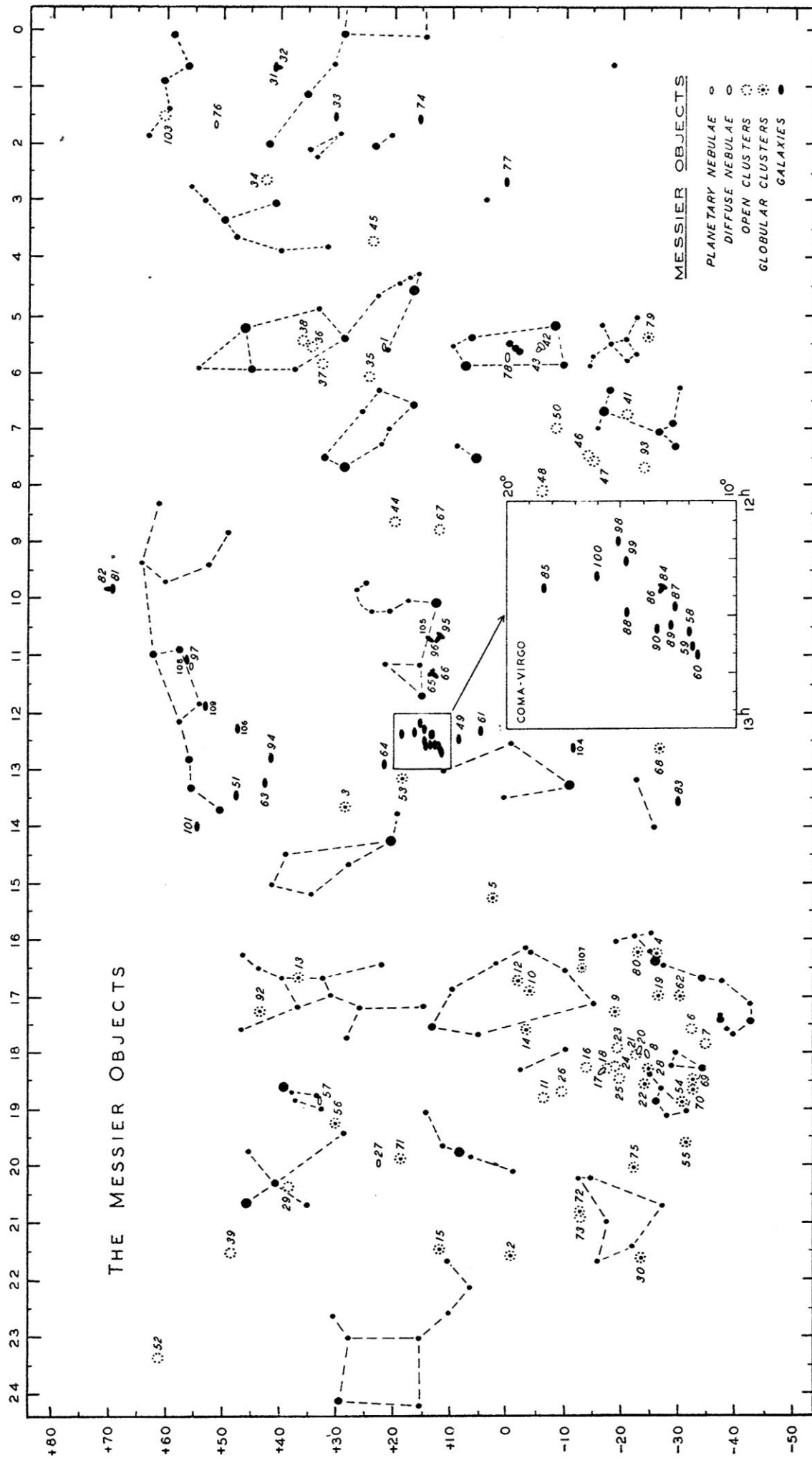
Three of the 109 objects are keyed by asterisks. These do not exist, being mistakes by Messier. M40 is a double star; M91 is unexplained; M102 is an accidental repetition of M101. M73 consists of only four stars.

Most of the remaining 105 nebulae, clusters, and galaxies can be seen easily in a 3-inch refractor, and many of the brighter ones in binoculars. With 6-inch reflectors, quite a few amateurs have managed to find every object in the Messier catalogue.

## COMMON NAMES OF MESSIER OBJECTS

- M1 — Crab nebula
- M8 — Lagoon nebula
- M13 — Hercules cluster
- M17 — Omega or Horseshoe nebula
- M20 — Trifid nebula
- M27 — Dumbbell nebula
- M31 — Andromeda nebula
- M42 — Great Nebula in Orion
- M43 — (Northeast wing of Great Nebula)
- M44 — Praesepe or Beehive
- M45 — Pleiades
- M51 — Whirlpool nebula
- M57 — Ring nebula
- M64 — Blackeye nebula
- M97 — Owl nebula
- M104 — Sombrero nebula

M	NGC	R.A. h m	Dec. °	Const.	Size	Mag. Type	M	NGC	R.A. h m	Dec. °	Const.	Size	Mag. Type
1	1952	05 31.5	+21 59	Tau	6 x 4	9 Di	56	6779	19 14.6	+30 05	Lyr	5	9 Gb
2	7089	21 30.9	-01 03	Aqr	12	7 Gb	57	6720	18 51.8	+32 58	Lyr	1 x 1	9 Pl
3	5272	13 39.9	+28 38	CVn	19	7 Gb	58	4579	12 35.1	+12 05	Vir	4 x 3	10 Sp
4	6121	16 20.6	-26 24	Scor	23	6 Gb	59	4621	12 39.5	+11 55	Vir	3 x 2	10 El
5	5904	15 16.0	+02 16	Ser	20	6 Gb	60	4649	12 41.1	+11 49	Vir	4 x 3	10 El
6	6405	17 36.7	-32 11	Scor	26	6 Cl	61	4303	12 19.4	+04 45	Vir	6 x 6	10 Sp
7	6475	17 50.6	-34 48	Scor	50	5 Cl	62	6266	16 58.1	-30 03	Oph	6	7 Gb
8	6523	18 00.7	-24 23	Sgr	90 x 40	6 Di	63	5055	13 13.5	+42 17	CVn	8 x 3	9 Sp
9	6333	17 16.2	-18 28	Oph	6	8 Gb	64	4826	12 54.3	+21 57	Com	8 x 4	8 Sp
10	6254	16 54.5	-04 02	Oph	12	7 Gb	65	3623	11 16.3	+13 23	Leo	8 x 2	10 Sp
11	6705	18 48.4	-06 20	Set	12	6 Cl	66	3627	11 17.6	+13 17	Leo	8 x 2	9 Sp
12	6218	16 44.6	-01 52	Oph	12	7 Gb	67	2682	08 48.5	+12 00	Cnc	18	7 Cl
13	6205	16 39.9	+36 33	Her	23	6 Gb	68	4590	12 36.8	-26 29	Hya	9	9 Gb
14	6402	17 35.0	-03 13	Oph	7	9 Gb	69	6637	18 28.1	-32 23	Sgr	4	8 Gb
15	7078	21 27.6	+11 57	Peg	12	7 Gb	70	6681	18 40.0	-32 21	Sgr	4	8 Gb
16	6611	18 16.0	-13 48	Ser	8	7 Cl	71	6838	19 51.5	+18 39	Sge	6	8 Gb
17	6618	18 17.9	-16 12	Sgr	46 x 37	Di	72	6981	20 50.7	-12 44	Aqr	5	9 Gb
18	6613	18 17.0	-17 09	Sgr	7	7 Cl	73	6994	20 56.2	-12 50	Aqr		
19	6273	16 59.5	-26 11	Oph	5	8 Gb	74	628	01 34.0	+15 32	Psc	8 x 8	10 Sp
20	6514	17 59.6	-23 02	Sgr	29 x 27	Di	75	6864	20 03.2	-22 04	Sgr	5	9 Gb
21	6531	18 01.6	-22 30	Sgr	12	7 Cl	76	650-1	01 39.1	+51 19	Per	2 x 1	11 Pl
22	6656	18 33.3	-23 58	Sgr	17	6 Gb	77	1068	02 40.1	-00 14	Cet	2 x 2	10 Sp
23	6494	17 53.9	-19 01	Sgr	27	7 Cl	78	2068	05 44.2	+00 02	Ori	8 x 6	8 Di
24	IC 4725	18 14.0	-18 30	Sgr	90	5 MW	79	1904	05 22.2	-24 34	Lep	8	8 Gb
25	IC 4725	18 28.8	-19 17	Sgr	35	6 Cl	80	6093	16 14.1	-22 52	Scor	5	8 Gb
26	6694	18 42.5	-09 27	Set	9	8 Cl	81	3031	09 51.5	+69 18	UMa	16 x 10	7 Sp
27	6853	19 57.5	+22 35	Vul	8 x 4	8 Pl	82	3034	09 51.9	+69 56	UMa	7 x 2	9 Ir
28	6626	18 21.5	-24 54	Sgr	15	8 Gb	83	5236	13 34.3	-29 37	Hya	10 x 8	8 Sp
29	6913	20 22.1	+38 22	Cyg	7	7 Cl	84	4374	12 22.6	+13 10	Vir	3 x 3	10 El
30	7099	21 37.5	-23 25	Cap	9	8 Gb	85	4382	12 22.8	+18 28	Com	4 x 2	10 El
31	224	00 40.0	+41 00	And	160 x 40	4 Sp	86	4406	12 23.7	+13 13	Vir	4 x 3	10 El
32	221	00 40.0	+40 36	And	3 x 2	9 El	87	4486	12 28.3	+12 40	Vir	3 x 3	10 El
33	598	01 31.1	+30 24	Tri	60 x 40	6 Sp	88	4501	12 29.5	+14 42	Com	4 x 4	10 Sp
34	1039	02 38.8	+42 34	Per	30	6 Cl	89	4552	12 33.1	+12 50	Vir	2 x 2	11 El
35	2168	06 05.8	+24 21	Gem	29	6 Cl	90	4569	12 34.3	+13 26	Vir	6 x 3	10 Sp
36	1960	05 32.8	+34 06	Aur	16	6 Cl	91*						
37	2099	05 49.1	+32 32	Aur	24	6 Cl	92	6341	17 15.6	+43 12	Her	12	7 Gb
38	1912	05 25.3	+35 48	Aur	18	7 Cl	93	2447	07 42.5	-23 45	Pup	18	6 Cl
39	7092	21 30.4	+48 13	Cyg	32	5 Cl	94	4736	12 48.6	+41 23	CVn	5 x 4	9 Sp
40*							95	3351	10 41.3	+11 58	Leo	3 x 3	10 Sp
41	2287	06 44.9	-20 41	CMa	32	6 Cl	96	3368	10 44.2	+12 05	Leo	7 x 4	10 Sp
42	1976	05 32.9	-05 25	Ori	66 x 60	Di	97	3587	11 11.9	+55 18	UMa	3 x 3	11 Pl
43	1982	05 33.1	-05 18	Ori		Di	98	4192	12 11.3	+15 11	Com	8 x 2	10 Sp
44	2632	08 37.2	+20 10	Cnc	90	4 Cl	99	4254	12 16.3	+14 42	Com	4 x 4	10 Sp
45		03 44.5	+23 57	Tau	120	7 Cl	100	4321	12 20.4	+16 06	Com	5 x 5	10 Sp
46	2437	07 39.6	-14 42	Pup	27	7 Cl	101	5457	14 01.4	+54 35	UMa	22 x 22	8 Sp
47	2422	07 34.3	-14 22	Pup	25	5 Cl	102*						
48	2548	08 11.3	-05 38	Hya	30	6 Cl	103	581	01 29.9	+60 26	Cas	6	7 Cl
49	4472	12 27.3	+08 16	Vir	4 x 4	9 El							
50	2323	07 00.6	-08 16	Mon	16	6 Cl							
51	5194-5	13 27.8	+47 27	CVn	12 x 6	9 Sp	104	4594	12 37.3	-11 21	Vir	7 x 2	8 Sp
52	7654	23 22.0	+61 19	Cas	13	8 Cl	105	3379	10 45.2	+12 51	Leo	2 x 2	10 El
53	5024	13 10.5	+18 26	Com	14	8 Gb	106	4258	12 16.5	+47 35	CVn	20 x 6	9 Sp
54	6715	18 52.0	-30 32	Sgr	6	8 Gb	107	6171	16 29.7	-12 57	Oph	8	9 Gb
55	6809	19 36.9	-31 03	Sgr	15	6 Gb	108	3556	11 08.7	+55 57	UMa	8 x 2	10 Sp
							109	3992	11 55.0	+53 39	UMa	7	10 Sp



**THE MESSIER OBJECTS:** Constellation and star names have been omitted from this chart for simplicity. Messier objects range in declination from 70° north to 35° south. At least a score can be seen at any time of year. Galaxies are placed best in spring skies, globular clusters in the summer, and galactic clusters in the fall and winter skies of the Northern Hemisphere. Most of the galaxies are rather inconspicuous, and a dark night is needed to find them. Diffuse and planetary nebulae have details that can be seen in amateur telescopes. Three "missing" Messier objects are not plotted here.

**ABOUT THIS CATALOGUE:** On the reverse side of this card is Owen Gingerich's summary of the Messier catalogue. The right ascensions and declinations are for epoch 1950; constellations are according to boundaries adopted by the International Astronomical Union. Sizes have been rounded to the nearest minute of arc, and the visual magnitudes are approximate. Different authorities for sizes and magnitudes often disagree, and the numbers listed here are compromises.

The types of objects are abbreviated in the table by: Cl, open star cluster; Di, diffuse nebula; El, elliptical

galaxy; Gb, globular star cluster; Ir, irregular galaxy; MW, star cloud; Pl, planetary nebula; Sp, spiral galaxy.

A star atlas is needed for locating the less conspicuous Messier objects. Norton's *Star Atlas* shows all of them, and stars to magnitude 6½. For use at the telescope, the Field Edition of the Skalnate Pleso *Atlas of the Heavens* is especially convenient, as it contains all stars brighter than magnitude 7¾.

Similar information for many hundreds of somewhat fainter star clusters, nebulae, and galaxies can be found in the Skalnate Pleso *Atlas Catalogue*.

By: Brian Vorndam

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY							
<p>South Iota Aquarii meteor shower maximum (Some may be seen from July 15 - August 25)</p> <p>Alpha Capricornid meteors visible until August 10</p> <p>21:39.8 <math>\pm</math> 6.1mg.</p> <p>ZC277 D/PA 82°</p> <p>21:48.5 <math>\pm</math> 6.3mg.</p> <p>ZC2774(173 Sagittarii) D <math>\neq</math> PA 49°</p>	<p>5 L.P.V. U Cygni at max. mg. 7.2</p> <p>00:33.3 <math>\pm</math> 5.4mg.</p> <p>ZC2791(190 Sagittarii) D <math>\neq</math> PA 111°</p>	<p>6 U Cephei at min-am 23:21 Full Moon</p>	<p>7 Eta Aquilae at max-am</p> <p>Mercury visible this morning thru Sept. 7 (See diagram below)</p> <p>100°</p> <p>50°</p> <p>ALT. <math>\uparrow</math> 23</p> <p>70°</p> <p>80°</p> <p>AZ 110°</p>	<p>8 L.P.V. R Ursae Majoris at max. mg. 7.5</p> <p>U Cephei at min-midday</p> <p>Kappa Cygnid meteors seen today thru October 6 (peak on August 18)</p> <p>(diagram for 40 minutes before sunrise on the dates shown)</p>	<p>9 May be last day to see Saturn until about Sept. 24 (morn) 21:30 Saturn at Alt. 4.4°; Az. 277°</p> <p>23:32.1 <math>\pm</math> 6.3mg.</p> <p>ZC12(4 Piscium) R/PA 187° minus 336°</p> <p>23:55.98 <math>\pm</math> 6.3mg.</p> <p>ZC13(5 Piscium) R/PA 206° minus 336°</p>	<p>10 NOTE: observers are urgently needed for the grazes occurring next week. If anyone is interested in helping out please contact me at (517) 332-0799</p>	<p>11 Pallas at opposition in Equillus (9.2mg.) 02:30 - 07:00 (Algol brightens)</p> <p>U Cephei at min-am</p>	<p>12 Perseid meteor shower maximum (50 per hour)</p> <p>North Delta Aquarii meteor shower maximum. (Some may be seen from July 14 thru August 25)</p> <p>U Cephei at min-am</p>	<p>13 03:30 (approx.) <math>\pm</math> 6.6mg. (double star) ZC303 grazed. The northern limit crosses 85° long. &amp; 41.3° lat. to 82° long. &amp; 42.9° lat.</p> <p>05:00 Jupiter in conjunction with Sun</p> <p>19:52 Mars .0033° S. of SAO 78176</p>	<p>14 04:00 Mars &amp; 6.3mg. SAO 78176 at Alt. 11.5°; Az 68°</p> <p>U Cephei at min-am 15:02 Last Quarter Beta Lyrae at min-pm</p> <p>Delta Cephei at max-pm</p>	<p>15 Eta Aquilae at max-am 23:00 Moon .2° S. of Aldebaran. The pair can be seen very close together tomorrow morning at moonrise (01:45)</p>	<p>16 Pallas at opposition 02:30 - 07:00 (Algol brightens)</p> <p>U Cephei at min-am</p>	<p>17 03:00 Mars 5°N. of Moon which rises at 03:08 04:14 (approx) 7.8mg. ZC1002 grazed. Northern limit crosses 85° long. &amp; 40.921° lat. to 88° long. &amp; 41.628 lat. Kappa Cygnid meteor shower max (seen Aug 9 - Oct 2)</p> <p>Venus in superior conjunction Delta Cephei at max-pm</p>



# THE AMATEUR OBSERVER'S CALENDAR AUGUST 26 - SEPTEMBER 15 1979 (EDT)

By: Brian Vorndam

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>Kappa Cygnid meteors visible until Oct. 6</p> <p>Mercury visible in morning sky until Sept. 7</p> <p>4.0 minutes before sunrise</p>	<p>U Cephei at min-am Beta Lyra at min-pm</p> <p>20:46.6 <math>\neq</math> 6.6mg. ZC2020(94 Virginis) D <math>\neq</math> PA 530</p> <p>21:15.3 <math>\neq</math> 5.5mg. ZC2022(95 Virginis) D <math>\neq</math> PA 1490</p>	<p>23:00 Uranus 50S. of Moon</p>	<p>Eta Aquilae at max-midday U Cephei at min- midday</p>	<p>04:09 First Quarter 07:00 Mercury .70N. of Jupiter (conj.) The pair can be found at 06:15 at Alt. 60; Az. 760</p> <p>21:54.0 <math>\neq</math> 5.0 mg. ZC2399 D <math>\neq</math> PA 1020</p>	<p>South Piscid met- eors can be seen today thru Nov. 2 (peak on Sept 20)</p> <p>21:16.5 <math>\neq</math> 7.3 mg. ZC2531 D <math>\neq</math> PA 720</p> <p>Delta Cephei at max-pm</p>	<p>U Cephei at min-e</p> <p>21:02.5 <math>\neq</math> 7.2 mg ZC2699 (110 Sagi tarit) D <math>\neq</math> PA 470</p>
<p>01:06.5 <math>\neq</math> 6.5mg. ZC2715(89 Sagitt- tarit) D <math>\neq</math> PA 860</p> <p>*01:42.5 <math>\neq</math> 6.7mg. ZC2718(92 Sagitt- tarit) D <math>\neq</math> PA 1020</p> <p>*02:50 - 07:20 (Algol dms) 07:00 Mercury 1. N. of Regulus The pair can be found at 06:15 at Alt. 4.50; Az. 760 (see Monday)</p>	<p>21:16.7(Sunday) 6.1mg. ZC2863(266 Sagittarit) D <math>\neq</math> PA 1400</p> <p>L.P.V. T Sagittar at max. mg. 8.0</p> <p>U Cephei at min- midday</p>	<p>NOTE: observers are needed for the grazes of ZC677 &amp; ZC692(Aldebaran) on Sept. 12. The north limit of 677 crosses Michigan at 860long. &amp; 43.970 lat. to 84.50long. &amp; 44.59lat. The N. limit of 692 crosses at 860long. &amp; 450 lat. to 84.250long. &amp; 45.22lat. For more info. contact me at (517) 332-0799</p>	<p>23:40(Tu.) - 04:10 (Algol dms) 04:10 - Sunrise (Algol brightens Delta Cephei at max-midday</p> <p>Eta Aquilae at max-pm</p>	<p>TOTAL LUNAR ECLIPSE 05:18 moon enters umbra 06:31 totality begins 06:54 mid-eclipse 06:59 Full Moon 07:11 moon sets 07:17 totality ends (not visible in Mich.)</p> <p>U Cephei at min-am</p>	<p>01:00 - 05:30 (Algol brightens)</p> <p>U Cephei at min- midday</p>	
<p>02:34.5 <math>\neq</math> 4.7 mg. ZC249(Nu Piscium) R <math>\neq</math> PA 2110 - 3370</p> <p>08:38 II OR</p> <p>Beta Lyrae at min- -pm</p>	<p>09:00 Saturn in conjunction with Sun</p> <p>23:59.6 <math>\neq</math> 6.2 mg. ZC498 R <math>\neq</math> PA 2470</p> <p>00:39.9(Tu.) 4.3mg ZC508(5 Tauri) D <math>\neq</math> PA 940</p> <p>01:37.5(Tu.) ZC508 R <math>\neq</math> PA 2280 - 344</p>	<p>U Cephei at min-am 23:00 - 06:00(Wed.) Hyades occulted by Moon (reappearance correction factor is - 3500)Wed.-am</p> <p>02:06.0 <math>\neq</math> 4.6 mg. ZC661(71 Tauri) R <math>\neq</math> PA 2440 - 3500</p> <p>02:17.3 <math>\neq</math> 3.6 mg. ZC671(Thefa Tauri) D <math>\neq</math> PA 640</p> <p>02:22.85 <math>\neq</math> 4.0 mg. ZC669(Thefa Tauri) R <math>\neq</math> PA 2910</p>	<p>03:18.5 ZC669</p> <p>03:23.03 ZC671 R <math>\neq</math> PA 2640</p> <p>03:45.6 <math>\neq</math> 5.5 mg. ZC678(81 Tauri) R <math>\neq</math> PA 1840</p> <p>04:12 <math>\neq</math> 4.8mg. ZC 677 R(midgraze) 31</p> <p>04:59.9 <math>\neq</math> 6.0 mg. ZC682(85 Tauri) R <math>\neq</math> PA 2100</p> <p>06:25.3 <math>\neq</math> 6.5 mg. ZC685(185 Tauri) R <math>\neq</math> PA 2910</p>	<p>Eta Aquilae at max-am</p> <p>04:11.8 <math>\neq</math> 5.1 mg. ZC806(111 Tauri) R <math>\neq</math> PA 2360 - 3550</p> <p>08:32 IV Te</p> <p>U Cephei at min-midday</p>	<p>02:38.8 <math>\neq</math> 5.7 mg. ZC994(124 Orionis) R <math>\neq</math> PA 2450 - 10</p>	<p>08:44 I Si</p> <p>21:00 - 23:00 Public Open Hou at MSU Observat.</p>



## MONTANA ECLIPSE

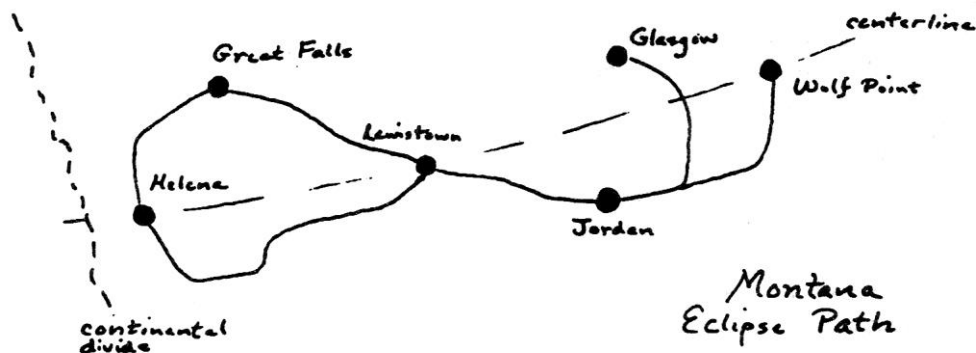
by Dick Suiter

An article in EROS has already described the trip to Manitoba of Doug Wereb and Mitch Luman. Another expedition went to Montana and was comprised of John Kerns and Dick Suiter. Thus, as far as we know, four members of the OSUAC experienced totality. This means that roughly 20% of the club went to the eclipse, a pretty good showing considering the distance. If we assume we are not unusual (more likely below average), there were a tremendous number of amateurs along the path of totality.

We left on the Thursday before the eclipse, since we had roughly 2000 miles to go and wanted to have one safety day. The Montana site was chosen because John has relatives there (Helena). We were aware that the weather prospects were poor for Montana but were willing to chance it; after all, only one year before it had been cloudy in Winnipeg and clear in Lewistown. Our pre-eclipse plans included the possibility of a last-minute journey to the east, possibly to Lewistown, two hundred miles from Helena.

Our traversal of mid-America was about what you would expect in the middle of February. Snow and more snow, flat land and the radio playing a Kenny Rogers song about a gambler over and over (or so it seemed). We hit all the big towns: Peoria, Moline, Des Moines, and discovered that once you cross the Mississippi River the towns go dead after 6 PM. It's not as if we were looking for action after driving all day; we were hunting for a place to stay and an open restaurant. You expect to find these things before nine o'clock.

We arrived in Helena late Saturday. The next day we went to the airport to talk to the weather bureau people. The head forecaster told us that he expected something called a chinook shield to form over the mountains and block the eclipse at Helena. He said that if he had come as far as we had he would be a couple hundred miles east by morning and still moving if it wasn't clear at daybreak. That evening we heard the same thing at a huge meeting of eclipse travelers at the local college. To an audience of about three hundred, the weatherman told us of Helena's chances and mentioned several possibilities.



It was two hundred miles to Lewistown, a location which he most highly recommended to those unwilling to drive all night. Another hundred would bring you to Jordan, which we had been considering since that afternoon's conversation with him. Wolf Point was about four hundred miles from Helena. The weather chances improved as you moved away from the continental divide.

As soon as the weather was outlined, a few fanatics climbed over the bodies and bolted out of there. We remained at the meeting and listened to interesting reports by some people that they had to use nine layers of aluminized Mylar and that a #15 welding filter was safe. One of the local eclipse organizers detailed the sad tale that an elementary school teacher had told her students that it was safe to look through a pinhole when it is actually to be used only in front of a white card. She was spending the night hunting them all down. After the meeting, we packed up to leave.

Wolf Point was really too far to go, and Lewistown was too close for comfort, so we decided on Jordan. This was not a firm decision; eclipse chasing depends on events as they come, and you have to be flexible. We got the impression that most of the Helena crowd went to Lewistown, because it had been designated as one of the three official observation sites (with Brandon, Manitoba, and Goldendale, Washington), and because there were very few in Jordan, which was about as far as it was practical to go.

We left Helena at a very dark 9:00 PM and headed North. The sky cleared at Great Falls and never clouded again as we moved East. We hit Lewistown at about 2 AM and went to the "all night" eclipse center advertised in the literature we had received prior to the eclipse. We planned to stop if the weather prospects had improved, but the "all night" center was closed. It was West of the Mississippi. The prospects had improved, we found out later. Lewistown saw the eclipse under somewhat less good-skies than we did at Jordan. As we drove on toward Jordan we saw Scorpius rise a little too low in the sky for eyes used to Ohio. During that last trip in the middle of nowhere all of our radio came in by skip from Oklahoma and Utah. We heard a report late that night that chances had increased to 50% in Montana. We were under clear skies and our chances were improving -- for the first time in two days we had some hope of seeing the eclipse after all.

We arrived in tiny Jordan at about 5 AM. With the roads a little tricky we would not have made it to Wolf Point in time for first contact, and we would have gotten no rest. We stopped at the Jordan VFW hall, where one of the observing sites had been advertised in a small, hastily lettered sign outside of town. The sun rose into a sky marred by high cirrus, but it was only objectionable when illuminated from the side, and as the sun moved up it seemed to disappear, even though it really didn't. It was the kind of sky you look at and say "it's not bad enough to make me move, but I bet everyone else has better." We met another group from Michigan who had made the incredible optical blunder of choosing a fast, simple refractor for photography. I didn't say anything at the time for fear that they would be offended -- after all, they had to live with it. I hope they got acceptable images anyway; if they'd brought an f/15 to begin with they would have done much better.

We hooked up the telescope and the drives worked fine. The telescope was John's 10" Cave, an f/6 Newtonian. The other end of the scale was covered by a 400mm lens. An Olympus OM-1 specially modified for astrophotography was used on the Cave, and the 400mm was attached to a Canon FTb. Aluminized Mylar was fitted to them for partial phases.

First contact came at 8:22 and we were off at last. We took a series of partial as the moon gradually covered the sun. Between exposures we watched the progression through the cameras. More and more people gathered and got more excited as darkness came. Finally, the great shadow ripped across the site. It came so quickly that it was like a light snapping off. It didn't get very dark in Jordan -- maybe like late twilight. The prominences popped out a very bright red and the corona was white tinged with orange. We took exposures for two-and-a-half minutes. I gaped and gawked and didn't think what I was doing, so most of my exposures were ruined. John didn't do too much looking and took a good exposure sequence. We were both kicking ourselves later, me for rotten photography and John for too little looking. It was over all too quickly. At the end a beautiful diamond ring came out and totality was over.

There was a lot of hand shaking and back slapping after it was over. We took partials on the way out but we didn't pay much attention to it. The nice people of Jordan had set up a coffee and cakes stand inside the VFW and someone bought us some coffee. There was a much more relaxed atmosphere after totality. We'd come there and we'd seen it. Partial phases are OK but the difference between 99% and 100% of totality is so great that they might as well be called different phenomena. As one writer puts it, 99% is "like kissing your sister; there's no thrill in it".

At our site we had noticed a temperature drop but made no attempt to measure it. No shadow bands were seen, but I must admit I didn't look too hard. The last few minutes before totality found me holding small children up to the telescope to watch the crescent sun (at the same time asking myself, "What am I doing? I have to get ready."). The few minutes after totality found me too exalted over the last few. If bands had been there, they would have been pretty obvious on snow, and no one saw any. We got one report of animal behavior. One man who was not overly impressed with the eclipse itself was surprised to find his cattle coming in for their evening feeding (no doubt they were disappointed when daytime made a miracle comeback). One last note: Helena, like many other places along the path that were clouded in, had the clouds open up just long enough for totality. I think this is due to darkness interfering with cloud formation. Clouds are dynamic, not static, and are continuously created and destroyed. Extra cooling might dissipate them. In any case, I liked the odds under clear skies better. We would have gone crazy waiting for a break in Helena.

The trip home was easier than expected in winter. It was tempered even more by the eclipse success. I find it difficult to imagine what the long trip home would have been like had we failed. We did a little sightseeing, and discovered that all the big tourist attractions are empty in winter. It's strange to go to famous places and find you are the only one there. The best place on the trip was the greatest spectacle in nature, the solar eclipse, and I now see how people can become addicted to them.

See you in Mexico in '91.





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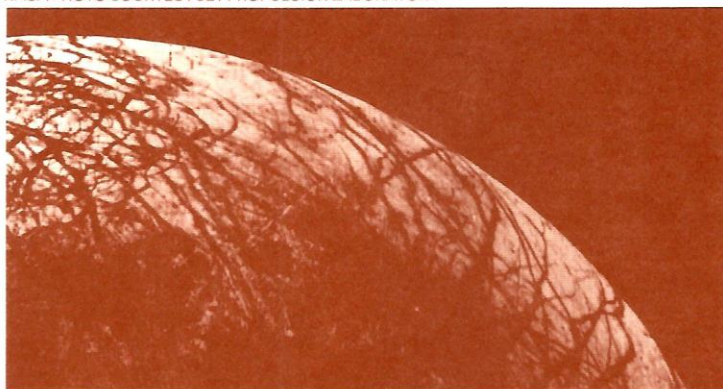
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NASA PHOTO COURTESY JET PROPULSION LABORATORY



*This photograph of Europa, a moon of Jupiter, was acquired by Voyager 2 during its close encounter on July 9, 1979.*

Mr. Loudon spent most of the past year at the NASA centers where these missions were flown, watching the avalanche of new data come in and learning first-hand from his fellow scientists what it means. Now he has returned to Michigan, to share the excitement of the new discoveries in a multi-media lecture series illustrated with spectacular slides, films, and tapes. About ninety percent of the material is new — that is, it was not known at the times of his previous lectures at the Institute — although the programs will be fully understandable even if you have not attended any of his earlier offerings.

Mr. Loudon is a lecturer, teacher, and commentator on space and astronomy for National Public Radio and the Canadian Broadcasting Corporation. He has astronomy degrees from the Universities of Pennsylvania and Michigan, and is staff astronomer for the University of Michigan's Exhibit Museum. He is a dynamic speaker with a rare gift for putting technologically abstract concepts into tangibly human terms.

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ANNOUNCING the Return of  
\* The Economical ATM \*

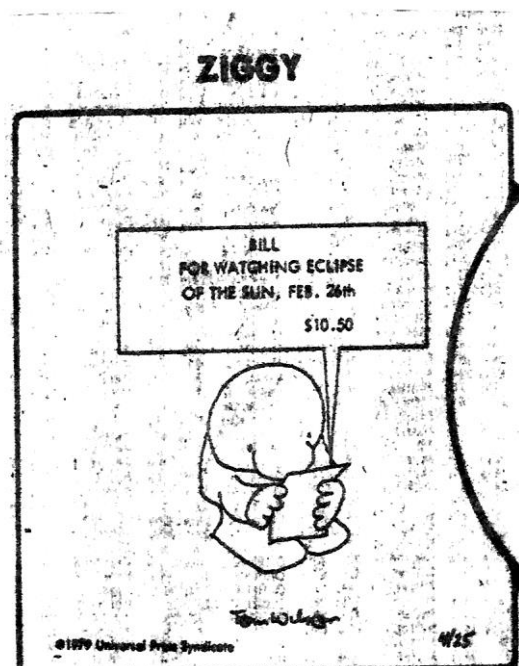
by Brad Vincent

A monumental change has occurred in my life. Starting at the end of this month, I leave the real world (working full time and complaining about it constantly) and enter the college world (working part time while going to school and complaining about it). This opens up some time during the week to partake in some of those activities which I miss from one year ago. One of them is working on my dust-covered mirror. I believe it's somewhere in the basement. This will bring about the long-awaited, anxiously foreseen, return of The Economical ATM Series!!! (thrilling, isn't it?)

No actual grinding has taken place yet. The basement must first be reconverted to a high-precision optical technicians shop. So, once the cobwebs are cleared away and the dust is swept up, the old barrel will once again be brought out of hiding.

During my absence from the grits, I have done my usual amount of research into my project. I've gone through a year's subscription to the Telescope Making magazine put out by the publishers of Astronomy. From what I've seen, it has surpassed my expectations as well as the publishers! I really recommend this magazine as a source of different tricks-of-the-trade in telescope making. I plan on using some tips dealing with the polishing state when I get there.

I don't know if the first installment will appear in next month's WASP or not. It all depends on how soon I can get myself in gear to begin pushing that glass again. Hopefully, that won't be too long.



SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>Morning and evening diagrams are for mid-twilight, about 43 min before sunup or 43 min after sunset, respectively, from lat 40°N. JUPITER on Sept 1 rises only 1.2 hrs before sun. Getting higher and very prominent, it rises 3 hrs before sun by Sept 30. On all diagrams showing Jupiter, symbols for stars &amp; planets are smaller to show changes in Jupiter-Regulus configuration Sept 24-29. MARS is 39° upper right of Jupiter Sept 1, decreasing to 27° by Sept 30. MERCURY disappears; see Sept 1-3; SATURN emerges; see Sept 24-29.</p> <p>Morning: Using 2 binoculars, look for Mercury 4.8° lower left of Jupiter. Dim Regulus, 1.2° S of Mercury, is too difficult to see.</p> <p>ENE * J M. R.</p>	<p>On what morning 3 will you first see Regulus? This morning it is 4.9° lower left of Jupiter and 2° upper right of Mercury. Use binoculars.</p> <p>ENE * J M. R.</p>	<p>Regulus is nearly 4 1° higher each morning. By end of this week, it will be visible with naked eye. This morning look 4.7° lower left of Jupiter.</p> <p>ENE * J R.</p>	<p>Morning: 4 4½° apart. ENE * J R.</p> <p>Full Moon rises ½-hour before sunset tonight. LUNAR ECLIPSE late tonight. See September 6.</p>	<p>Morning: E-ESE. 13 Castor * Pollux * Mars 5.9° S of Pollux. See Sept 15-17. Procyon *</p>	<p>Morning: 14 2.6° apart. * Jupiter * Regulus E</p>	<p>Morning: 15 Castor * Pollux * Mars Moon Procyon *</p>
<p>Morning: Regulus 9 3.6° east of Jupiter. Watch Jupiter move 0.2° closer to Regulus each day.</p> <p>* Jupiter Regulus E</p>	<p>Sun passes Saturn. 10 That planet is now in conjunction with sun and cannot be seen until late this month; see Sept 24-29. On Sept 16, the sun, moving 1° eastward per day, will cross from the constellation Leo into Virgo.</p>	<p>Night of Sept 11-12 (Tues night-Wed morning): Moon rises 1½ hrs after sunset. As moon clears horizon haze, look for Aldebaran a few degrees to its lower left. Binoculars &amp; telescopes show several stars of the Hyades close to moon. During the night, moon moves through this cluster, covering and uncovering stars. Aldebaran will seem to graze N limb of moon Wed morning along a track from Point Arguello CA at 3:13 am PDT, across ten states, (continued in box above September 4)</p>	<p>Morning: Jupiter- 19 Regulus 1.6° apart. Jupiter * * Regulus Moon</p>	<p>Morning: Jupiter- 20 Regulus 1.4° apart. Jupiter * * Regulus Very old moon, 21-24hr before New in U.S., rising 7° N of E. See Sept 21. Moon</p>	<p>Note time you first and last see moon Thurs Sept 20. Moon New today at 5:47 am EDT (2:47 am PDT). Calculate time interval between your last sight of moon until New.</p>	<p>Evening: Moon, 22 age 38-41 hrs in U.S., sets during twilight. Begin looking around sunset, about 10° upper left of its mid-twilight position shown here. MSW Moon</p>
<p>Castor 16 * Pollux * Mars Moon Procyon *</p>	<p>See planets move! 17 This week watch changing alignment of Castor-Pollux-Mars. What morning will they lie in a straight line? Next week watch Jupiter pass Regulus (see diagrams). Not until Sept 10, 1991 will Jupiter pass Regulus again.</p>	<p>Morning: 18 Moon Jupiter * * Regulus Jupiter-Regulus 1.8° apart. E</p>	<p>Morning: 25 J * R Morning: R 0.3° lower right of J. Saturn with naked eye?</p>	<p>Morning: 26 J * R Moon 26 Antares (evening)</p>	<p>Morning: Jupiter and 27 Regulus closest. Regulus 0.3° to right of Jupiter.</p>	<p>Morning: Regulus 0.4° 28 upper right of Jupiter. Saturn should now be easily seen with naked eye. Saturn *</p>
<p>Equinox: Sun sets 23 due west today. Evening: Moon higher and easier to see than last night. It will reach first quarter MSW Fri. W</p>	<p>Morning: 24 J * R Regulus 0.6° lower right of Jupiter. Binoculars may show Saturn 20° lower left of Jupiter.</p>	<p>Morning: 25 J * R Regulus 0.4° lower right of Jupiter. On what date will you first see Saturn with naked eye?</p>	<p>Morning: 26 J * R Moon 26 Antares (evening)</p>	<p>Morning: Jupiter and 27 Regulus closest. Regulus 0.3° to right of Jupiter.</p>	<p>Morning: Regulus 0.4° 28 upper right of Jupiter. Saturn should now be easily seen with naked eye. Saturn *</p>	<p>Morning: Regulus 0.6° 29 upper right of Jupiter.</p>