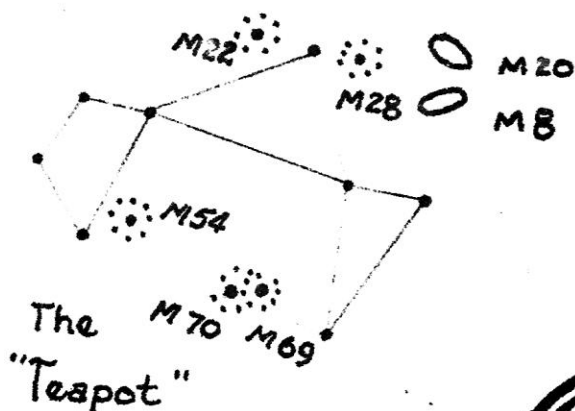


W. A. S. P.*



MARS



M-57



M-13

AUGUST '75 -

Messier o n t h



JUPITER



M-51



VENUS

* WARREN ASTRONOMICAL SOCIETIES' MONTHLY JOURNAL

THE COVER STORY

AUGUST -- MESSIER MONTH

There is no better time in the year than late August or early September to be out for an evening with a telescope. Darkness comes earlier than in mid-summer and twilight is shorter. The nights are apt to be clear and warm and one of the finest parts of the sky is well placed. The most brilliant section of the Milky Way stretches over-head on its way south to the center of our galactic system in Sagittarius.

There is an almost inexhaustible supply of magnificent low power fields to be found by sweeping the galaxy with no particular object in mind. At this season the Messier Catalogue presents a much wider variety of objects than in the past several months. In Sagittarius alone there are 15 of them and this is the time to find them. There are plenty of beautiful sights farther north in Cygnus, Lyra, and Aquila, but they can wait. They will still be well placed later in the fall -- but the region around Sagittarius is not available very long. It is a case of cover it now or wait until next year! A good plan will be to begin with the objects in Scutum and proceed south through Serpens into Sagittarius.

(Taken from the booklet OBSERVE, page 19)

The Warren Astronomical Society is a local, nonprofit organization of amateur astronomers. Membership is open to all interested persons. Annual dues are as follows: \$2.00 for Student (K through college) Membership, \$4.00 for General Membership, and \$5.00 for a Family Membership. Add \$6.00 for a one year subscription to Sky and Telescope magazine. General meetings are held on the third Thursday of every month at Macomb County Community College (South Campus on Twelve Mile Road near Schoenherr in Warren) in room 311 of "B" building, at 8 p.m.

The Warren Astronomical Society Paper (W.A.S.P.) is published monthly, by and for the members of the Warren Astronomical Society. Subscriptions are free to all Warren Astronomical Society members. Personal advertisements by Warren Astronomical Society members are also free. Non-member subscriptions and advertisements are available upon arrangement with any of the editors of the W.A.S.P. Contributions, literary or otherwise, are always welcome. Contributions to the W.A.S.P. should be submitted to either of the editors listed below.

EDITORS:	Kenneth Wilson	Carl Noble
	11157 Grenada	11508 Newbern
	Sterling Heights,	Warren,
	Michigan, 48077	Michigan, 48093
	268-9337	573-0937

The editors of the W.A.S.P. will exchange copies of this publication with other club publications on an even exchange basis. If your club would like to participate in such an exchange, please contact one of the above listed editors. The Warren Astronomical Society maintains correspondence, sometimes intermittent, with the following organizations:

THE ADAMS ASTRONOMICAL SOCIETY

THE ASTRONOMICAL LEAGUE

THE DETROIT ASTRONOMICAL SOCIETY

THE DETROIT OBSERVATIONAL AND ASTROPHOTOGRAPHIC ASSOCIATION

THE FORT WAYNE ASTRONOMICAL SOCIETY

THE GRAND RAPIDS AMATEUR ASTRONOMICAL ASSOCIATION

THE KALAMAZOO ASTRONOMICAL SOCIETY

THE MIAMI VALLEY ASTRONOMICAL SOCIETY

THE OLGELTHORPE ASTRONOMICAL SOCIETY

THE ORANGE COUNTY ASTRONOMERS

THE SUNSET ASTRONOMICAL SOCIETY

Other organizations are invited to join this list.

THIS MONTH'S COVER BY:

THIS MONTH'S STAFF INCLUDES: Raymond Bullock, Louis Faix, Larry Kalinowski, Linda Call, Carol Cheatham, Carl Noble.

August	Event
7	New Moon; Messier Club Meeting at 8 p.m., contact Frank McCullough (791-8752) for details.
13	Anders Angstrom born in 1814. Swedish physicist, measured the wavelengths of solar spectrum.
14	First Quarter Moon; Astrophotography Meeting at 8 p.m., contact Larry Kalinowski (776-9720) for details.
18	Pierre Janssen, French astronomer, observes helium lines in the sun's corona.
21	Full Moon; Warren Astronomical Society monthly general meeting at 8 p.m. at Macomb County Community College (South Campus on Twelve Mile Road near Schoenherr) in room B 311, contact Frank McCullough (791-8752) for details.
29	Last Quarter Moon.

CLUB NEWS

By

Kenneth Wilson

Many members, old and new, have never seen the club's Stargate Observatory, located at Camp Rotary, near Romeo, Michigan. The Observatory houses a 12.5 inch Cassegrain reflector mounted on a German Equatorial mount with a variable speed electric drive and a manual slow motion on the declination axis. The telescope is well suited for astrophotography with a camera bracket and prime focus-"T" adapter available at the observatory. Mounted on the main instrument is a 3-inch f/4 refractor that can be used as an excellent wide-field, deep sky astro-camera. Any member wishing to learn how to use the observatory equipment is asked to contact the observatory chairman, Pete Kwentus (771-3283).

*

Newly elected Warren Astronomical Society officers for 1975-76 are as follows: President: Frank McCullough, 34136 Clinton Plaza Dr.) Frazer, MI 48026, 791-8752. 1st Vice President: Carl Noble, 11508 Newbern, Warren, MI, 48093, 573-0937. 2nd Vice President: Louis Faix, 6088 Robin Hill Rd., Washington, MI, 48094, 781-3338. Treasurer: Jean Baldwin, 4047 Hillcrest, Warren, MI, 48092, 264-4082. Secretary: Diane Lee McCullough, 34136 Clinton Plaza Dr., Frazer, MI, 48026, 791-8752. Corresponding Secretary: Annette Sayad.

These are the people that you elected, they are working for you so let them know what you think!

*

The recent Apollo Rendezvous held in Dayton, Ohio was well attended by members of the Warren Astronomical Society. Several members including Pete Kwentus, Don Misson and Gary Morin received awards for telescopes and displays exhibited.

The annual convention of the Great Lakes Region of the Astronomical League was held in conjunction with this year's Rendezvous. The highlight of the business meeting was the awarding of the Hans Baldorf Award, in memoriam to the late William Schultz, Jr., a member of the Warren Astronomical Society.

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ASSOCIATION OF LUNAR AND PLANETARY OBSERVERS

Comets Section

July 14, 1975

NEW COMET KOBAYASHI-BERGER-MILON 1975h. This comet was first reported by Toru Kobayashi of Imadate, Fukui, Japan, who saw it on July 2nd, probably with a 6-inch RFT. Douglas Berger of Union City, Calif. found it on July 5 with an 8-inch reflector. Comets Recorder Dennis Milon discovered it at 2 a.m. July 7th while observing the globular cluster M2 in Aquarius. I had brought a 4-inch reflector to Yellowstone National Park and was set up in a parking area on Mount Washburn at 8752 feet. The comet was in the same low-power field as M2, but was much larger and more diffuse. Plotting on the Atlas Eclipticalis, I estimated the motion was about 6' per hour north.

UT Date	Observer	Total Mag.	Source	Coma Diameter
July 7.35	Milon	7.1	7x35	S.P., SAO 10'
8.27	Morris	6.9	8x52	20'
10.20	Simmons	6.3	14x100	AAVSO 12'
10.30	Milon	5.7	7x35	Yale 25'
10.91	Minton	5.8	7x50	Yale 15'

The observers are R.B. Minton, Tucson, Arizona; Charles Morris, West Lafayette, Indiana; and Karl Simmons, Jacksonville, Florida.

The comet might reach 4th magnitude this month, but it will be in the evening twilight by mid-August. The following ephemeris was supplied by Zdenek Sekanina, Smithsonian Observatory.

$$\left. \begin{array}{l} T = 1975 \text{ Sept. } 5.19 \text{ ET} \\ \omega = 117^\circ.36 \\ \Omega = 295.64 \\ q = 0.4210 \text{ AU} \\ i = 80.83 \end{array} \right\} 1950.0$$

0 ^h UT	R.A.	Dec.	Delta	r	From sun
July 16	20 ^h 33 ^m .6	+23° 24'			
17	20 21.0	+27 32	.278	1.214	130°
18	20 6.4	31 54			
19	19 49.4	36 22	.262	1.178	123
20	19 29.5	40 49			
21	19 06.4	45 04	.258	1.142	113
22	18 39.9	48 58			
23	18 09.9	52 20	.264	1.106	103
24	17 37.1	55 03			
25	17 02.6	57 01	.280	1.070	93
26	16 27.6	58 15			
27	15 53.9	58 50	.305	1.033	85
28	15 22.7	58 52			
29	14 54.6	58 29	.336	.996	77
30	14 30.0	57 50			
31	14 08.6	56 59	.372	.959	71
Aug 1	13 50.1	56 02			
2	13 34.1	55 02	.411	.921	65
3	13 20.3	54 02			
4	13 08.2	53 01	.453	.884	60
5	12 57.6	52 02			
6	12 48.2	51 05	.496	.847	56
7	12 39.9	50 10			
8	12 32.4	49 17	.540	.809	53
9	12 25.6	48 26			
10	12 19.4	47 38	.586	.772	49
11	12 13.7	46 51			
12	12 08.4	46 06	.631	.734	46
13	12 03.5	45 23			
14	11 58.9	44 41	.678	.698	43
15	11 54.5	44 00			
16	11 50.3	43 20	.724	.661	41
26	11 15.1	36 40	.957	.498	29

Visual magnitude estimates with binoculars and finders can be based on star magnitudes in the Arizona-Tonantzintla Catalogue (for 5th mag. and brighter), published in the July, 1965 Sky and Telescope, reprints 5¢ from Sky Pub. You can also use the Yale Catalogue of Bright Stars (to Mag. 6½) and the Skalnate Pleso Catalogue (to 6.2). Please send reports on the standard ALPO forms for visual observations. Observers are reminded to send the recorder self-addressed and stamped long envelopes, and foreign observers should also send IRC's for postage. Comet report forms can be duplicated from earlier mailings or obtained from me at \$2 for 50.

THE BEGINNER'S PAGE -

"THE UNIVERSE IS SINGING"

by Linda Call

"Then God said: 'Let there be lights in the dome of the sky, to separate day from night. Let them mark the fixed times, the days and the years, and serve as luminaries in the dome of the sky, to shed light upon the earth.' And so it happened. God made the two great lights, the greater one to govern the day, and the lesser one to govern the night; and God made the stars." (Genesis 1:14-16)

How beautiful the universe is! Ever since I was a child, I would look up at the heavens at night and wonder about all I could see. As I grew, so did my wonderment grow. I asked questions like... "What is out there?", "Is there life in this universe besides our own?", "Who could create such a spectacle for our eyes to behold?" "Will I ever have the opportunity to learn more about it?"

This is what led me to the Warren Astronomical Society. I do not have a very scientific mind, so I will work with what I do have and attempt to tell you my feelings about my interest in astronomy.

I own a 2" refractor. It may not be the best of scopes, or it may not be very expensive, but it has played an important part in arousing my interest more.

The first time I looked at the moon through it, I began to realize how big the moon really is. Then, looking at Jupiter and being able to see four of its satellites nearly blew my mind. The rings of Saturn were better yet. Then I began to understand just how vast and organized the universe really is.

Some may think I'm a nut (I know some of my neighbors do!) for sitting out at night in the cold or in the heat with the mosquitoes usually with my nose pointing upward, but I don't care. It is simply beautiful, it is a wonder that God created all of the heavens for us to look at, and to give Him the praise. When I look upward, I am content with my nose being in the air!

I am very grateful for finding out about the club. At first I was a little hesitant about joining because I didn't really know anything, but now I am so glad to be a part of it. I have found I didn't have to know much to join, because I can learn as I go on. I'd like to thank everyone in the club for being so friendly and making me feeling like I belong here. I am now thinking of someday building a larger telescope and maybe then I can contribute more to the club.

My enthusiasm is growing and I hope my mind grows with it. So you can see, to me the Universe is singing out to the God who created it, every time a star twinkles, or a meteor goes flying through the night sky!

FROM THE EDITOR:

The above article is the kind of contribution and effort being shown by such as Linda that we need to make our Club grow. Linda, you don't have to build a larger 'scope to make a contribution to the Club, just being in the club proves your effort. Thanks for the article!

* * * * *

FROM A FELLOW AMATEUR:

Along with the theme of Linda Call's article, the following is written by a fellow Amateur Astronomer, Diane Bradley from California:

"COMING OF AGE"

*One day I will walk around the sun,
and turn and touch Orion's belt
with more than hands;*

*I will survey the splendors
of Andromeda,
understanding all I see;*

*then Alpha Centauri will beckon me,
and I will surely go.*

*For the hand that builds
In light years has rested,
torn and bloody, upon me.*

-Diane Bradley

CAVEAT EMPTOR

or

A CONSUMER'S GUIDE TO TELESCOPE BUYING INFORMATION

Every year thousands of people purchase new telescopes, from small toys to research-grade instruments. Unfortunately, many are disappointed because the telescopes were either shoddily made and/or not suited to their needs and experience. Often, such unhappiness is caused by a lack of sufficient information about telescope buying. Most sources of information on telescope buying are biased to some extent. The only way to minimize the effects of such biasing is to consult as many sources as possible. In doing so, one can glean the common truths and isolate the biased or improperly emphasized truths. Listed below are some of these sources that should be consulted before a telescope purchase is made.

MAGAZINE ADS. Advertisements in such periodicals as Sky and Telescope (available in most local libraries) and Astronomy usually provide very little useful information about a telescope. However, they will contain the address of the telescope manufacturer where more information can be obtained in the form of a catalog or brochure. Examination of back issues of Sky and Telescope will also reveal how long a particular company has been in business and what the price history of his telescopes has been.

CATALOGS AND BROCHURES. These can usually be obtained free of charge from the company involved. They will give the buyer the vital statistics about a telescope, needed for comparison shopping. If the manufacturer doesn't give complete specification to an instrument, it usually means that he's hiding something. Beware also of accompanying photographs; often they show features not included in the purchase price. Never rely on catalogs for information on telescopes in general. They are the most biased source of such information. After all, you wouldn't ask a new car salesman what kind of car is best!

LOCAL ASTRONOMY GROUPS. Most cities and large towns have amateur astronomy clubs nearby. You will find these people eager to advise you about the various telescopes on the commercial market. Often someone in the group has purchased the very instrument that you are considering and will allow you to examine it. After you have purchased a telescope, the same amateur group will be happy to show you how to use, maintain and get the most out of your instrument. The name and location of the nearest astronomy club can be obtained by writing to: The Astronomical League, c/o 4 Klopfer Street, Pittsburgh, PA, 15209.

BOOKS AND MAGAZINE ARTICLES. The following list makes no attempt at completeness, but does encompass some of the best written sources. Most of these should be available at your local library.

- Barbera, Raymond Francis. How to Buy a Telescope. Oakland, Calif., 1974. Much good, detailed advice on telescopes in general. Low bias, but this booklet does seem to emphasize the good features available on Optica telescopes. So, watch out! Available only through Optica b/c, 4100 MacArthur Blvd., Oakland, California, 94619.
- Brown, Sam. All About Telescopes. Barrington, New Jersey, 1967. One good section of general advice on telescope buying. Heavily biased towards Edmund equipment and reflectors.
- Keene, George T. Star Gazing with Telescope and Camera. New York, 1967. Brief section of good information on telescope selection.
- Mayall, Margret W., R. Newton Mayall, and Jerome Wyckoff. The Sky Observer's Guide. New York, 1965. Good information on telescopes in general and excellent "how to use" information for the beginner.

(OVER)

Moore, Patrick. *The Amateur Astronomer*. New York, 1964. Brief chapter on telescopes in general with some good buying hints.

A Handbook of Practical Amateur Astronomy. New York, 1963. Has one chapter on the selection of telescopic equipment. More detailed than *The Amateur Astronomer*.

Muirden, James. *The Amateur Astronomer's Handbook*. New York, 1969. Brief section on telescope selection, biased slightly towards refractors.

Stars and Planets. New York, 1964. Brief section of general advice on telescope buying. Prices quoted are in British pounds and out of date anyway.

Paul, Henry E. *Binoculars and All-Purpose Telescopes*. New York, 1964. Excellent information on selecting binoculars with a chapter on all-purpose telescopes.

Telescopes for Skygazing. New York, 1965. Highly recommended, one of the best! Contains much detailed information about selecting telescopic equipment and accessories. Prices and list of companies is quickly growing outdated, so check one of the above listed magazines for current information.

Sidgwick, J. B. *Amateur Astronomer's Handbook*. New York, 1955. Excellent discussion of telescope functions with a good section on equipment selection.

"Telescopes," *Consumer Reports*, XXXII (Oct., 1967), 607-14. Highly recommended, virtually zero bias. Objective, extensive evaluations of 22 small and medium size telescopes on the market. Excellent detailed information on telescopes in general. The only fault of the article is that it fails to include telescopes larger than six inches in aperture. This article was also printed in the 1967 Buying Guide tissue of *Consumer Report*.

"Telescopes," *Consumer Reports*, XXXVIII (Oct., 1973), 700-9. Follow-up article to the 1967 one. Includes some new models and updates some of the findings on previously tested ones.

The best advice that I can give the would-be telescope buyer is to consult as many of the above sources as possible before deciding on a telescope. The more you know, the less likely you are to be stung. Good luck and good observing.

-Kenneth Wilson

THE DUTIES OF THE CLUB OFFICERS

The Executive Committee met July 6th to review and approve the following detailed descriptions of responsibilities and authorities of each office. It is intended that these descriptions will supplement those found in the By Laws which are relatively vague. In most matters these items only formalize what has become established practice. It has been noted that there has been some reluctance to accept nominations for office partly because our members are not aware of the job responsibilities. It is hoped that these descriptions will eliminate that problem and improve the current administrations ability to serve the interests of the membership. The duties are flexible and may be altered to changing future needs.

The President

1. The President shall preside over all meetings of the Executive Board. He shall convene such meetings at least at three (3) month intervals or as frequently as he deems necessary and appropriate. One meeting shall be held within thirty days of the annual election of new officers.
2. The President shall preside over ten of the monthly general meetings. He shall delegate the responsibility for at least one general meeting a year to the first and second vice-presidents. Such delegation will be given with thirty days notice and will include reasonability for all phases of the meeting. The vice-presidents shall review the meeting plans with the President at least one week prior to the general meeting.
3. The President shall be a voting member of all committees.
4. The President shall approve or deny all expenditures greater than Twenty (\$20.00) Dollars.
5. The President shall appoint an Editor for the club newsletter within fifteen days following the election of officers.
6. The President may appoint special or standing committees at his discretion. Such committees shall serve only for the duration of the appointing Presidents term.
7. The president shall preview the delegation of authority proposed by any other officer and may approve or deny such delegation.
8. The President shall assume responsibility the program of the general meeting unless he specifically delegates such responsibility.
9. The President shall be responsible for maintaining and executing all communications required with the national office of the Astronomical League and its Great Lakes Region.
10. The President shall be responsible to propose such matters of policy as are necessary to perpetuate the well being and growth of the club.
11. The president shall arrange for and preside over an annual banquet.
12. The President shall recommend to the Executive Board the removal from office or discontinuance of membership of individuals whenever he feels such action is required to preserve the well being of the club.

First Vice-President

The First Vice-President shall:

1. Assume all the duties, responsibilities and authorities of the President in the absence or disability of the President.
2. Be responsible for planning, organizing and implementing observing programs for the general membership.
3. Be responsible for initiating, planning and executing programs conducted for the general public or intended to promote membership.
4. Preside over at least one general meeting annually as designated by the President.
5. Implement, at the direction of the Executive Board, a recognition or award program for members who have achieved excellence in some phase of amateur astronomy or served the interests of the club in an extraordinary manner. Such acknowledgements shall be made after the President reviews the recommendations of the First Vice-President.
6. Delegate his responsibilities as is necessary but only with the approval of the President.

Second Vice-President

The Second Vice-President shall:

1. Assume the duties, responsibilities and authority of the President or First Vice-President in their absence or disability.
2. Be Chairman of an Observatory Committee. He shall be responsible for the upkeep, maintenance, improvements and staffing of the Observatory. He shall assure the fulfillment of all agreements with the Observatory landlords and shall arrange an instructional program to qualify new members for the operation of the Observatory equipment.
3. Aid new members in acquiring any assistance they request to develop their astronomical interests.
4. Delegate his responsibilities as is necessary but only with the Presidents approval.

Treasurer

The Treasurer shall:

1. Maintain the financial ledger of the clubs monetary resources and report on such at the monthly general meeting.
2. Collect all dues and advise members at least one month in advance of their membership expiration.
3. Arrange for the subscription of "Sky and Telescope" for those members electing to purchase the magazine as a part of their membership.
4. Issue a dated membership card to all members in good standing upon the receipt of annual dues.
5. Propose to the President and Executive Committee means of raising funds.
6. Maintain in a secure bank the clubs monetary resources and maintain a petty cash account not to exceed Thirty (\$30.00) Dollars.
7. Make all disbursements of funds as are directed and approved by the President, Vice-Presidents or other authorized persons.

The Recording Secretary

The Recording Secretary shall:

1. Transcribe and report the minutes of all general and Executive Committee meetings.

2. Maintain a chronological record of major events transpiring within the club noting the event and roles to principle persons.
3. Maintain an archive of all club records and publications.
4. Establish and maintain in a current status a membership roster and assure its semi-annual publication.
5. Advise and remind all members of the Executive Committee of committee meetings with as much advance notice as is practical.
6. Communicate with new members in such a way as to encourage their continued interest in the Club.

The Corresponding Secretary

The Corresponding Secretary shall:

1. Annually advise the national and regional officers of the Astronomical League of the clubs officers and membership roles.
2. Upon request of the President or Vice-Presidents, prepare and execute public announcements or advertising programs.
3. Issue monthly notices in the public media of the general meeting.
4. Prepare, print and disperse to interested persons a pamphlet describing the organization, functions, facilities and programs of the Warren Astronomical Society.

“HOUSEKEEPING FOR A.T.M.s”

Anyone with a telescope can tell you that if the optics are not working properly, the telescope is worthless. This is especially true with a reflector type telescope. The mirror is the largest optical surface to keep clean, and it is the light-gatherer of the unit. The eyepieces are just as important, but this article will deal with the mirror and the diagonal.

Of course, the aluminized and overcoated coating is the most delicate part of the mirror, and with care it should last up to ten years. The atmosphere, etc. however, can affect the life span of the coating. Following are some general hints in care of the mirror itself:

- a.) Don't touch the mirror with hands or any other object except for cleaning (a safe way of cleaning).
- b.) If the mirror is dusty try to remove by gently brushing with a camelhair brush (Make sure the hair ends are not cut, but are of a natural taper. Use of the cut hair produces fine streaks on coating).
- c.) Keep your telescope capped when not in use, and store the tube in a horizontal position to prevent settling of particles on the surface of the mirror.
- d.) When the mirror becomes excessively dirty, try the cleaning method as follows: (Note: don't use laundered towels or cloths for wiping; do not use lens cleaners. Both of these methods will produce residual spots that is impossible to remove without recoating.)

Materials Needed:

1 pound of surgical or engravers cotton. (Engravers cotton is cheaper!)

1 quart Isopropyl alcohol, Tide or Basic H detergent.

PROCEDURE:

With the mirror resting face up on a towel in the sink, turn on the cold water and play a stream of water on its face. This will loosen some of the particles and wash off unattached dust. Dip a wad of cotton in a mild solution of detergent. (1/2 teaspoon to 1 pint of water) Then gently swab the entire surface. Keep the water going while doing this so all the detergent solution gets washed off.

VERY IMPORTANT: Do not let the surface dry or bead up, two things happen, water marks will form and you will lose your mind! Therefore, keep the stream of water going.

After swabbing the surface with detergent solution the mirror is now covered with a stream of water. Make ready three wads of cotton for the following steps:

- a.) Dip one half of the cotton swab into Isopropyl Alcohol.
- b.) At the time you place the swab on the surface of the mirror, turn off the water.

- c.) Now swab the entire surface with this swab (CAUTION: do not turn the swab over or dissolved skin oils will deposit on the mirror).
- d.) Right away, take a dry swab and wipe gently. Keep changing cotton swabs until the surface is totally dry.

This method when used over a period of many years has shown itself to be the best. This method was tried and tested by the COULTER OPTICAL COMPANY.

There are many different methods available, but I have found this to be rather easy and safe. The mirror is too important of an investment, and of the instrument to become ruined by improper cleaning.

CARL L. NOBLE

14 July , 1975

Soviets step up space activity

2nd ship sent to Venus

MOSCOW — (UPI) — The Soviet Union launched an unmanned spacecraft Saturday to follow a sister ship blasted into space last Sunday in the first twin probe of cloud-shrouded Venus, earth's nearest planetary neighbor.

The spaceships are scheduled to complete the journey of 30 million miles and reach Venus next October.

"The flight will make it possible to obtain more complete data about Venus as well as about physical processes occurring in space," said Tass, the official Soviet news agency.

The ships are Venus 9, launched last Sunday, and Venus 10, which began its flight to Venus

from an intermediate earth orbit Saturday morning.

Tass said equipment on both probes is functioning normally and Venus 10's flight path is close to predetermined calculations.

The launch comes at a time of heightened Soviet space activity. Two Russian cosmonauts Saturday completed three weeks aboard the earth-orbiting Salyut 4 and scientists have recently launched a barrage of weather and communications satellites.

Tass also said Saturday that cosmonauts are beginning "comprehensive training sessions" for the scheduled July link-up of a Soviet Soyuz spacecraft and an American Apollo.

THE
ASTROPHOTOGRAPHERS CORNER

by
Larry F. Kalinowski

EXPOSURE VALUES FOR ANY FILM SPEED AND ANY "F" RATIO

Occasionally the instrumentation we've just finished building doesn't turn out exactly the way we planned it. Some modification might be required to make it suitable for an upcoming eclipse or in order to get the required image size, some additional lenses in the system might be required. In any event, the f ratio of your system doesn't always turn out to be the neat f8 or f11 that writers like me are always quoting. What do you do when your system is something like f7.2 or f5.1? As far as I can tell, there isn't any list of exposure values that include f7.2 or 5.1.

How about the other side of the coin? I've got an extremely slow, contrasty film that's marked .05 ASA. Who publishes exposure values for that kind of stuff? Chances are, no one does.

If you're one of those guys who aren't satisfied with published information because it doesn't fit your instrumentation, then I've got a formula that you'll find a bit interesting. It's been around for awhile in one form or another in the Grand Rapids publication, one Canadian publication and a well known West coast mag. I'm surprised that it hasn't been used more often around this area. Maybe it will be now that I'm bringing it out into the open again.

Here it is.

$$T = \frac{EFR^2}{ASA \times b}$$

Where:

T is the time required for exposure in seconds,

EFR is the effective f ratio,

ASA is the film speed rating and

b is the brightness factor of the subject to be photographed.

The beauty of using the above formula for exposure determination is the brightness factor b. That value is directly proportional to the subject's actual brightness. The brighter the image, the larger the value b becomes. Suppose you wanted to use a yellow filter to photograph Jupiter. If the filter is rated 2x (usually written on the side of the filter) then divide the brightness factor by two before you use it in the formula. Divide by three for a 3x filter, etc.

Neutral density filter users will find it just as easy. Each neutral density absorbs light by a factor of ten. A number two ND filter has a 100x factor, ND3 a 1000x factor. Simply determine your filter factor and divide that value into the brightness factor. In fact, if you can determine just how many times your subject has been dimmed, by a filter or a cloud, this formula will give you the new exposure value.

ASTROPHOTGRAPHERS CORNER (cont'd)

The following is a list of values for b. If you wish to determine what the value of b should be for yourself, simply thumb through some old issues of Sky And Telescope and write down the exposure values given in the caption of the picture of the subject you are interested in. Then use this formula:

$$b = \frac{EFR^2}{ASA \times T}$$

First Quarter Moon	15.36
Full Moon	64
Totally Eclipsed Moon	0.016
Earthshine.....	0.032
Sun (with ND4 filter)	1024
Venus (during greatest brilliancy)	1024
Mars (during closest approach)	15.36
Jupiter.....	128
The Jovian Satellites.....	0.128
Saturn.....	7.68
Titan	0.064
Uranus.....	0.032
Diamond Ring (just before or after totality)	256
Prominences (during eclipse)	512
Corona (inner-during eclipse)	32

NOTE: The following values of b are valid only for variable f ratio cameras with a maximum clear aperture of approximately one inch...i.e. the thirty-five millimeter type. To find the proper exposure for lenses or mirrors of larger aperture, determine the exposure for an f2 camera lens. Then calculate how much larger in area your mirror or objective lens is compared to a one inch diameter lens. Divide your exposure time for a one inch lens by how many times larger your objective is.

1st magnitude star	0.122
2nd " "	0.048
3rd " "	0.019
4th " "	0.007
5th " "	0.003
6th " "	0.001
7th " "	0.0005
8th " "	0.0002
9th " "	0.00008
10th " "	0.00003
11th " "	0.00001
12th " "	0.000005
13th " "	0.000002
14th " "	0.0000008
15th " "	0.0000003
16th " "	0.0000001

"One Lousy Night"

or

Another Page From The Apprentice Astronomers Notebook

By
Louis J. Faix

What a lousy night! Thin highly scattered clouds; fairly heavy high altitude haze puts a large halo around the moon. Scattered moonlight is so bright I can't see more than second magnitude. And I wanted to test the CdS cell on starlight again and finish that roll of Fuji on M51. (Expletive deleted) moon! Well, I'll get the scope out anyway and fix that clutch. Nothing else to do.

Hmm; Venus is pretty tonight -- just about a half illumination. Take a few pics at $f/32$, $1/250$, $1/125$ and $1/60$. What the (deleted!). Finished the roll on the moon since the cameras all set away. $f/22$, $1/400$, $1/200$, $1/100$.

Gee that's odd! For the three quarter moon, the glare on the ground glass isn't too bad and craters seem quite sharp. I'll stick in an eyepiece. Now that is strange -- the whole surface is well defined and it isn't hurting my eyes at $f/5.6$ -- haze must really be obscuring. Sky is unusually steady, moon is sitting there steady as a rock (bad pun). Terminator must be about -62° east longitude. Never really looked at that terminator before. Sure is a lot of detail in the south. I'll take a closer look (12mm eyepiece).

Son-of-a-gun! There's a neat pair of craters. Book says the big one is "Gassendi" (-41°E , -17°S). Wonder who he was? I know he can't be an Arab they'd have named a star for him -- yuk. The little crater isn't named. They form a miniature figure eight with the rims just tangent. Gassendi seems odd -- perfect -- too perfect -- too perfectly round. Also looks shallow but floor is too coarse to be lava filled. Central peak seems strange too; Try the Barlow and 12mm eyepiece. Hey, it's a double peak. The little crater must be younger. It's torn down the north edge of Gassendi's wall. It's cleaner, fresher looking. Seems deeper and more bowl shaped.

Well, let's shove it up to the south pole and then do a slow declination traverse down the terminator.

Man that is tough looking real estate up there. Craters everywhere. You sure get a feeling that they're just stacked on top of each other. Area between -40° to -60°E longitude and -40° to -80°S longitude is really battered. Judging from the overlaps, I can see at least four generations of craters. All very jagged and very rough rims. No mare at all up here. Not many central cones. There's another odd pair overlapped. Let's see -- the name is "Hainzel". Looks like a big footprint! That's the one the kids were giggling about at Stargate last night. One of these days I'm going to get that Peter Kwentus! He skips town and leaves me with "just a few scouts -- a special group", 247 wild brownie scouts! "A few-- some day, Peter -- some day."

There's something neat -- a long ridge line just at the terminator -- or is it a mountain chain? Neither; the chart says it's a biig crater. "Schickard" a walled plain, 134 miles across. That is a big hole. I just can't conceive what the devastation would be like when those things were formed. Can you imagine a blast that would produce a crater from here to Cleveland? The western wall looks extremely irregular and very high in spots judging from spotty brightness.

Boy, here is a whole mess of little craters. Sort of looks like salt and pepper right around -30°S - -60°E . Wonder how small they are? I'll try to measure them. Get out the 12mm eyepiece with the graduated reticule. Hmm, .010" division is too large. Put an extension behind the reticule. That's better -- I'd say about .002" is the smallest crater I can resolve. Now the slip stick and ruler. Focal plane extension is 5.59". Wow: That's 485 power! And the image is still good. Quickly computing: assume lunar distance is 238,000 miles, resolution equals 1.76 arc seconds. That "little" crater is 2.14 mile across. I'd hate to try to do it on my hands and knees. Wonder how much power this thing will take tonight. The air is very steady. Pop in the old 6mm eyepiece. That figures to 1050 power. I got an image -- not too bad either. Colors are odd and contrast is soft. Bright areas appear a yellow grey and just blend into the dark zones which are murky brown-grey. Can still make the crater profiles though. Ken Wilson's going to tell me it can't be done. You can't get 1000X on a 10" objective.

What's that? It wasn't there before. A dull glow just east of that Schickard rim. I wonder if that's the floor just starting to catch the sun. Keep an eye on that.

Sure ain't much going on down here in Oceanus Procellarum. There's something different here. It's not the same as the other seas. It's too smooth; no ripples or flow marks in the lava floor. Over in Mare Imbrium you can see lots of graduations in the lava floor and even hints of crater rims buried beneath it. Procellarum is much smoother and almost no little craters. Wonder if that means if this lava was hotter and less vicious when it flowed? Maybe it's deeper. The absence of craters suggests it could be younger too. Have to look into that!

Just take a side trip and swing over to Copernicus (-20°E , $+10^{\circ}\text{N}$). Not too impressive at this sun angle. Secondary cratering is obvious -- more so to the east. Tiers in the inner rim are obscure. Stuff in the middle doesn't really look like a cone, just a bunch of rubble. It's broken into five groupings that I can see. Let's get back to the terminator where there's better resolution.

So that's the crater Herodatus. Well, whoopee. I'm surprised it made the chart.

Sinus Roris -- anyone for pool? That's smoother than Procellarum. I wonder if this sun angle conceals irregularities in the lava flows?

The Jura mountains look soft, not as jagged as the Appenines. Seem to be formed like folds -- three of them irregular but parallel. Heraclides Prominence. Seen that lots of times. Some folks think they see a woman's face profiled there. Some people are luny too.

A quick peek back up at Schickard. Hey, that was the floor starting to light up. It's much clearer now. In fact, I can see two long shadows reaching across it. The tips along the east rim are just starting to catch the light. Those shadows are right behind where I thought the high spots on the west rim were. The darkness is like a tide that slowly recedes to give up the land.

We'll finish up down in the north now. The moon's libration must have the North Pole tipped towards earth tonight. I can see structure at the pole that's not on the map. The poles look much alike, heavy multilayered craters.

What's happening? It's getting dark and there's no clouds! Whoops, the moon's going behind the tree. My gosh, it's 2:30 in the morning already.

For a lousy night this wasn't too bad. Ya know, for an old hunk of rock, you ain't too bad.

"OBSERVATION PAGE"

The following is taken from a talk given by Carol Cheatham at our last Messier Meeting.

M 81 -- 8th magnitude object -- Catalog Number 3031
09h 51m +69° 18'

M 82 -- 9th magnitude object -- Catalog Number 3034
09h 52m +69° 56'

The distance of M81 and M82 is approximately 10,000,000 light years from our planet. Usually both M81 and M82 can be fitted into the same low power field of view.

M 81 is an oval galaxy with a bright center with the edges fading off. The nucleus is a collection of population II stars and the inner spirals are lanes of dust. Farther out the arms are highlighted by bright nebulae and luminous blue stars. M81 is an example of a spiral galaxy seen about 45° from full face on.

M 82 is an irregular galaxy which is also a strong radio source. It is an elongated patch of light and sometimes a dark band can be seen running through it. Long exposure photos show an enormous jet apparently being ejected at a very high velocity. The structure indicated that an explosion took place in its nucleus about 1 1/2 million light years before our present view of it.

Carol Cheatham

Giant sky telescope reports on sun's energy secrets

CAPE CANAVERAL, Fla. — (UPI) — A one-ton space telescope designed to unravel secrets of the sun's energy producing cycle was fired into a "perfect" orbit 343 miles above the earth Saturday and began transmitting scientific

data almost immediately.

The huge drum-shaped Orbiting Solar Observatory 8 (OSO) lifted off the launching pad at the Kennedy Space Center a day behind schedule because of problems in the electrical relay system of the Delta rocket.

But the rocket and its payload functioned perfectly Saturday, National Aeronautics and Space Administration officials said.

"Everything went just by the book," said John Neilo, director of unmanned launch opera-

Hong, "The circular orbit is perfect."

"All experiments are in good working order and we are looking forward to a very exciting mission," said Dr. Adriene Timothy, OSO program scientist.

Three of the eight separate instrument packages aboard the solar-powered spacecraft were activated within an hour after liftoff, and the remaining five were to be turned on within the next four days.

Although it had been ex-

pected it would take two weeks of testing before reliable data was returned by the satellite, NASA scientists said it now appeared that information from the instruments will be usable as soon as they begin transmitting.

'Double-talk'

Space mission to be bilingual

By EDWIN G. PIPP
News-Aerospace Writer

While the world watches via television, the three American astronauts will speak Russian and the two Soviet cosmonauts will speak English when they meet next month in earth orbit.

The historic meeting, 137 miles above earth, is scheduled for July 17, according to plans announced by the National Aeronautics and Space Administration (NASA).

The space agency said the Americans will speak Russian, with the Soviets replying in English, in what NASA said is an attempt to minimize mutual confusion.

The American crew has spent 700 hours learning to speak Russian and has used the language in many simulated missions with the Soviet crew.

"They will speak slower than if they were using their native language, and it will be easier for them to understand each other," a NASA spokesman said.

Interpreters will relay what the spacemen are saying during several TV broadcasts spanning the two days the American Apollo and Russian Soyuz spacecraft are linked.

NASA said the success of the mission depends to a far greater extent on the American crew and equipment than on what the Russians do.

All the rendezvous and docking maneuvers are done by the Americans because the Soyuz does not have the necessary controls and equipment. And there will be American equipment aboard the Soviet craft to help the U.S. spacemen in their difficult tasks.

Astronauts Thomas P. Stafford, Vance Brand and Donald K. Slayton will spend nearly two days maneuvering their ship in earth orbit to rendezvous and dock with Soyuz.

Under plans developed over three years, Cosmonauts Aleksey Leonov and Valeriy Kubasov are scheduled to blast off from the Soviet Cosmodrome at Baykonur at 8:20 a.m. July 15.

They are to make one maneuver to place their spaceship into orbit as a target for Apollo.

The American crew is to blast off from Cape Canaveral 7½ hours after the Soviet launch, at 3:50 p.m., after assurance that the Russian ship is in the correct orbit.

Apollo, which will carry an airlock so that the crews can move from one ship to the other in orbit, will make 10 maneuvers before docking with Soyuz.

The American and Soviet crews are scheduled to visit each other's spacecraft and to conduct jointly a number of scientific experiments.

Details of what the Russians will be doing have not yet been disclosed.

Under agreements reached by the two



nations, the Soviets were to have distributed specifics of their experiments and activities last week. A NASA spokesman said the agency does not know when the Russians will comply with this agreement.

The two ships are to separate July 19, with Soyuz landing in Russia two days later; Apollo is to remain in orbit until July 24, with the crew conducting scientific experiments before it splashes down in the Pacific, 345 miles west of Honolulu.

Primary objective of this first international manned spaceflight is to test rendezvous and docking techniques for future joint space missions and space rescue.

Planning for the mission began May 24, 1972, under an agreement reached by former President Nixon and Soviet Premier Alexei Kosygin.

Soviet and American space experts, including the flight crews, have made numerous trips to each other's countries to develop the necessary complex communications system and the many other details of the mission.

The communications network will use both American and Soviet ground stations, plus an American communication satellite, to provide continuing live reports of the flight which are to be distributed to the news media at control centers in Houston and Moscow.

The mission will cost America \$250 million, according to NASA, with Russia spending an equal amount.

This is the last scheduled American manned space shot until 1979, when the first flight of the space shuttle is scheduled.

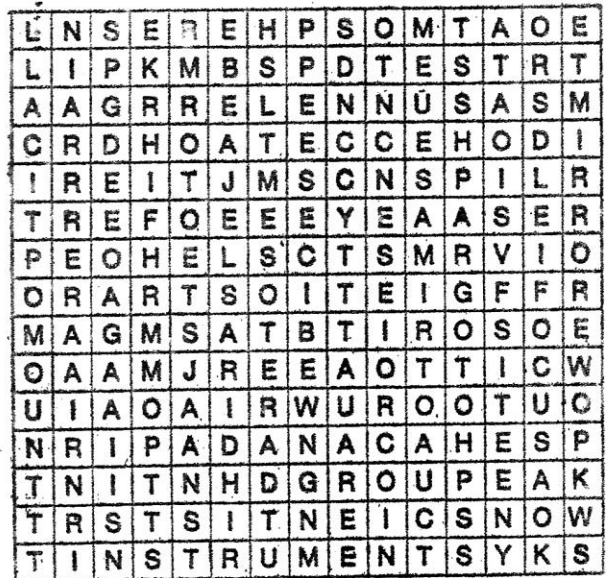
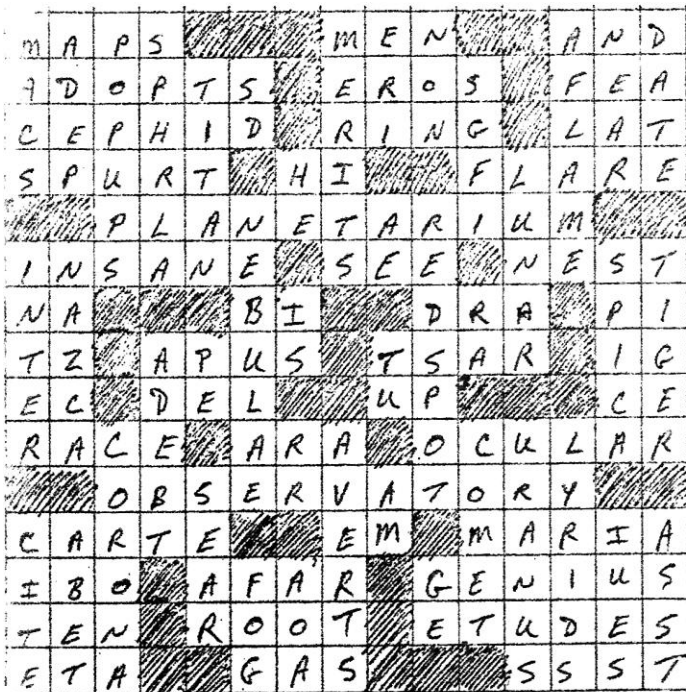
The space shuttle is designed to blast off like today's spacecraft, spend up to two weeks in earth orbit and then land at conventional airports so that it can be used many times and thus reduce the cost of manned space flight.

About the size of a DC9 airliner, the new spacecraft will have a cargo bay big enough to carry unmanned satellites into orbit.

Wonderword

All the words listed below appear in the puzzle — horizontally, vertically, diagonally, even backward. Find them and circle their letters. The leftover letters spell the Wonderword.

THE MAUNA KEA TELESCOPE Solution: 11 letters



CLUES

A-Agreement, Atmosphere; C-Canada; D-Diameter; F-Field, Focus, France; G-Ground, Group; H-Hawaii; I-Instruments; J-Joint; L-Light; M-Main, Marks, Mirror, Mount; O-Optical; P-Paraboloidal, Peak, Photographs, Platform, Post, Power, Project; R-Rain; S-Scientists, Share, Site, Sky, Smart, Snow, Spend, Success, System; T-Team, Test, Tint, Tripartite; W-Weather

The solution to last month's crossword puzzle by R. Bullock

The answer to the Wonderword puzzle will appear in next month's W.A.S.P.



B. C. by Johnny Hart



SKY CALENDAR AUGUST 1975

Information for helping teachers and students observe the sky

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>Evening Planets: Brilliant <u>Venus</u> sets in W 1 hr after sun Aug 1, but gets lower each night and disappears by midmonth. Passing close to us as it swings between earth and sun, Venus shows its crescent phase even in 7X binoculars.</p>	<p>Bright <u>Jupiter</u> rises in E about 3 hrs after sunset Aug 1 and within 2 hrs after on Aug 31. It is high in S during morning twilight. Morning Planets: <u>Mars</u> rises near midnight local daylight time and is high in SE at dawn.</p>	<p>Mars appears as brightest star in Taurus, well to east of Jupiter (see <u>Jupiter</u>). <u>Saturn</u> emerges from sun's glare. Look 7 to 8 1/2° lower right of Pollux in ENE. By month's end Saturn rises 3 hrs before sunrise.</p>	<p><u>Milky Way</u> is best in a dark country sky August 1-12 and 26-31, when moonlight doesn't interfere. With binoculars, follow its course thru Perseus, Cassiopeia, Cepheus, Cygnus, Aquila, Sagittarius, and Scorpius.</p>	<p>NOTE: The diagrams and descriptions in the date blocks are computed for latitude 40° N, and moon positions are plotted as seen from longitude 90° W, but this info is fairly accurate for the original 48 states.</p>	<p>1 hr before sunrise 1 (face ESE):</p> <p>Mars</p> <p>Aldebaran</p>	<p>Major sky events of this month: Disappearance of Venus as "evening star"; Jupiter rises earlier; Perseid meteor shower; Mars passes Pleiades and Aldebaran; Saturn becomes visible in morning sky.</p>
<p>3</p> <p>As sun sets this evening, look for Venus 29° to left of sun and 11° above horizon. With binoculars it appears like a tiny crescent moon.</p>	<p>4</p> <p>Venus appears a little lower at sunset each evening. On what date will you last see it with the naked eye? On what date with binoculars?</p>	<p>5</p> <p>1 hr before sunrise (face ENE):</p> <p>• Castor</p> <p>• Pollux</p> <p>• Saturn</p>	<p>6</p> <p>45 min before sunrise (face ENE):</p> <p>• Castor</p> <p>• Pollux</p> <p>• Saturn</p> <p>Moon</p>	<p>7</p> <p>New Moon, not visible. Mornings: Watch Mars pass 5° S of Pleiades one week from today. Saturn, 7° lower right of Pollux, now rises 1 1/2 hrs before sun and is easily visible.</p>	<p>8</p> <p>Venus now sets only 1/2 hr after sunset. At sunset look for it 26° to left of sun and 8° above horizon. Using binoculars look for crescent Venus, and crescent moon 3-4° to lower right of Venus.</p>	<p>9</p> <p>2 1/2-day-old crescent moon, setting an hour after the sun, is much easier to see than last night. Immediately after sunset look for Venus about 10° lower right of moon. Use binoculars.</p>
<p>10</p> <p>Next 5 nights are best for viewing the annual Perseid meteor shower. Greatest number of meteors occurs 2-4 hrs before sunrise. Expect about 50 meteors per hour at maximum Tuesday and Wednesday mornings.</p>	<p>11</p> <p>1 hr after sunset:</p> <p>Spica</p>	<p>12</p> <p>This is best night for viewing Perseids, 2-4 hrs before sunrise tomorrow. Shower members may be anywhere in sky, but seem to move away from Perseus-Cassiopeia region, in the northeast.</p>	<p>13</p> <p>At sunset tonight, the First Quarter moon is 90° to left of sun and 30° above horizon. At the same time, Venus is 20° to left of sun and only 4° above horizon. Use binoculars.</p>	<p>14</p> <p>1 hr after sunset (face S to SSW):</p> <p>Antares</p>	<p>15</p> <p>1 hr after sunset:</p> <p>Antares</p>	<p>16</p> <p>Venus sets only a few minutes after sunset tonight. At sunset look for it 17° to left of sun and only 1° above horizon.</p>
<p>PATH OF MARS</p> <p>Pleiades</p> <p>Aug. 15</p> <p>20</p> <p>25</p> <p>30</p> <p>Hyades</p> <p>Aldebaran</p>	<p>The diagram at left shows the position of Mars among the stars of Taurus on dates indicated. This week and next, Mars passes between Hyades and Pleiades, passing 4 1/2° N of Aldebaran Aug 30.</p>	<p>19</p> <p>For the past several nights the moon has interfered with Milky Way viewing, but by a week from now the moon will rise after twilight ends. Resume your search for deep-sky objects Aug 26 (see map).</p>	<p>20</p> <p>Look for Spica each clear evening (see map). On what date will you last see it before it disappears? Find out by observation. (It should disappear by mid-September.)</p>	<p>21</p> <p>At sunset tonight, Full Moon is just above horizon in opposite direction. Moon above horizon all night and sets in W just after sunrise. Moon at opposition to sun.</p>	<p>22</p> <p>For several consecutive nights at this time of year, the moon after full rises less than 1/2 hr later each night, hence it rises before twilight ends. This is known as the Harvest Moon effect, though the actual Harvest Moon is next month.</p>	<p>23</p> <p>Note that the rising moon is farther north along the horizon each night. In Feb-Mar-Apr the moon after full rises farther south each night and the daily moonrise delay is more than an hour.</p>
<p>25</p> <p>3 hrs after sunset (face east):</p> <p>Jupiter</p>	<p>26</p> <p>3 hrs after sunset:</p> <p>Jupiter</p>	<p>27</p> <p>From Gulf Coast states and the Southwest, Mercury now sets an hour after the sun and should be visible to naked eye. Tonight look 27° lower right of Spica.</p>	<p>28</p> <p>Jupiter now rises 2 hrs after sunset, and Mars 4 hrs after sunset. Both are prominent in morning sky. By mid-Oct Jupiter will rise as the sun sets, and by mid-Dec Mars will rise at sunset (opposition).</p>	<p>29</p> <p>Last Quarter Moon rises a little more than 4 hrs after sunset tonight. As it rises, the planet Mars appears very close by.</p>	<p>30</p> <p>1 hr before sunrise (face SE):</p> <p>Mars</p> <p>Aldebaran</p>	

Magnitudes of the Planets at midmonth: Jupiter -2.2; Saturn +0.4; Mars +0.4, Venus -4.1; Aug 5 -4.1; Aug 10 -3.9; Aug 15 -3.7. Mercury (Aug 27) 0.0. Notations: Mars 19° eastward in Taurus; Jupiter stationary in Pices; Saturn 3.7° eastward Gemini into Cancer. This month is a good time to start a photographic series showing retrograde loop of Mars. See August Sky and Telescope.

East Lansing Sunrise: Aug 1 6:28 a.m.; Aug 16 6:45 a.m.; Aug 31 7:01 a.m. EDT
 Sunset: Aug 1 9:00 p.m.; Aug 16 8:40 p.m.; Aug 31 8:15 p.m. EDT.