



# *The* **WASP**

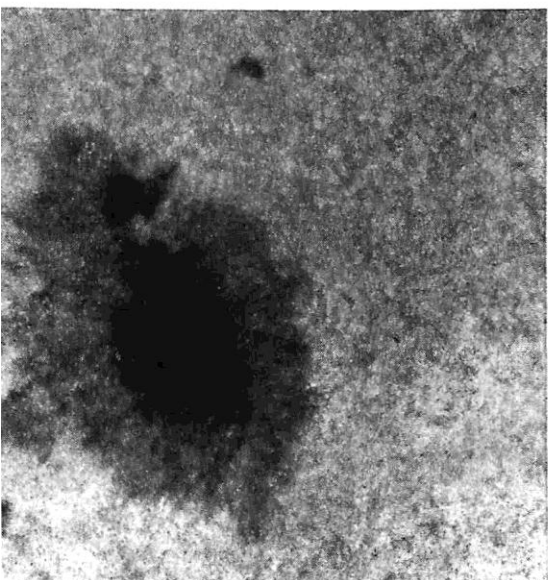


Journal of the Warren Astronomical Society

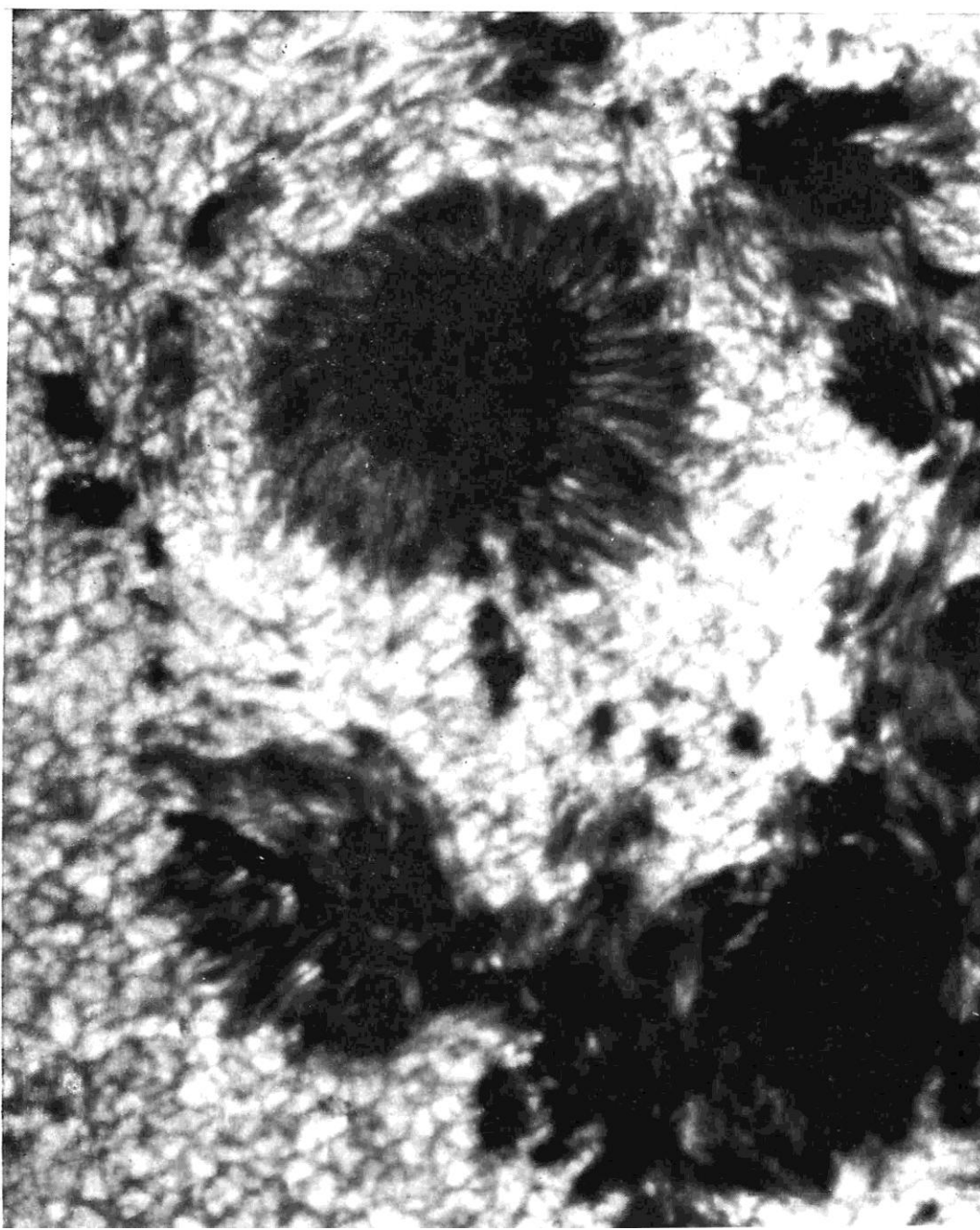
In the WASP this issue:

The History of Astronomy Resource Center  
NASA Special Report  
Improving the View from the Backyard  
1979-1980 Membership Roster  
and much more!

**Dec. 1979**  
**Jan. 1980**



Sunspot Maximum



# THE WASP

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

Editor: Tim Skonieczny

Wyandotte Planetarium  
540 Eureka Ave.  
Wyandotte, MI 48192

675-0108 (home)  
284-3100 (planetarium)

## Society Information

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

1 <sup>st</sup> Thursday	Cranbrook Institute Of Science 500 Lone Pine Road Bloomfield Hills, MI	3 <sup>rd</sup> Thursday	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's Subscription to Sky & Telescope:

Student.....\$11.00	College.....\$13.00	Senior Citizen.....\$15.00
Individual.....\$18.00	Family.....\$23.00	

## Stargate Lecture Schedule

Lectures are given at Stargate Observatory each weekend. The lecture will be either Friday or Saturday night, depending on the weather and the lecturer's personal schedule. If you cannot lecture on your scheduled weekend, please call the Chairman as early as possible so he may arrange an alternative. Those wishing to use Stargate must call by 9:00 p.m. on the evening of the observing session. The lecturers for the two coming months are:

Nov. 30/Dec. 1 .....	Don Misson	Jan. 4/5 .....	Pete Kwentus
Dec. 7/8.....	Ray Bullock	Jan. 11/12.....	Paul & Judy Strong
Dec. 14/15.....	Bob Dennington	Jan. 18/19.....	Frank McCullough
Dec. 21/22.....	Louis Faix	Jan. 25/26.....	John Root
Dec. 28/29.....	Dave Harrington		

## Coming Attractions

"Does Anybody Really Know What Time it Is?" .....	Dave Harrington
"Historical Astronomy" .....	Paul Strong
"New Developments in Planetaria" .....	Tim Skonieczny

THE FOLLOWING ARE THE MINUTES OF THE OCTOBER 18, 1979 MEETING OF THE WARREN ASTRONOMICAL SOCIETY:

The meeting was opened at 8:22 p.m. by President David Harrington. Members learned of the absence of Dr. and Mrs. Paul Strong due to the death of his mother. A floral tribute and card will be sent on behalf of the Society. An attendance book was signed by all present.

The Christmas Banquet is set for Thursday, December 13 at Antonio's Restaurant in Harper Woods. Frank McCullough, chairman, told members of the plans for the evening, which will include cocktails at 7:30 and dinner at 8:15 p.m. There will be the usual prizes and this year will mark the first year for a major raffle. Volunteers will be needed and should contact Frank.

Tim Skonieczny is the new editor of the WASP. An excellent edition was turned out despite inconveniences with the changeover. It was then announced that the Cranbrook Members' Night was very successful with many of our members participating in this choice event. Alan Rothenberg, a new member, was called upon to give a report on the Cranbrook evening which included a tape from Cosmic Hotline, a group from Florida that will be acting as a clearing house for new sightings. Robin Bock described the present status of our Library and outlined procedures and guidelines. It was learned that Sky & Telescope will raise their rates by the first of the year. The grand raffle of the Christmas Banquet would be a Coulter 4½ inch telescope kit and as a second prize, a Subscription to Scientific American.

The discovery of Moon 14 circling Jupiter has been made known by NASA. Verification in a news article was passed around to members. Kim Dyer announced that the Toledo Astronomical Club will host an occultation watch of a 9th magnitude star. This will take place on October 26. Douglas Bock reminded all that there would a meeting of the Observing Group at Stargate this Saturday at Stargate. All are welcome to come.

As an added program interest for the future, it was suggested that the Livonia group and our Society exchange speakers. There will be more news concerning this in the coming months.

After intermission, the technical program began. The first part consisted of slide reports on the use of 12½ inch Cassegrain telescope at Stargate. Frank McCullough exhibited some his best shots and offered suitable light commentary.

"The Edge of the Abyss" was the title of a presentation by Louis Faix. He offered to entertain, inform and solicit cooperation in his pursuit of proving the existence of black holes. How his subject fitted into the cosmic evolution gave the audience many thoughtful guesses and opinions. A question and answer period followed with Mr. Faix trying to organize a group to scan a particular section of the sky for star occultations in the hopes of discovering a "black hole."

The meeting was closed at 11:00 p.m., by Mr. Harrington.

Respectfully submitted,

*Loretta D. Caulley*  
Loretta D. Caulley  
Secretary

## THE HISTORY OF ASTRONOMY RESOURCE CENTER

Paul Strong

This fall, a new astronomical organization called The History of Astronomy Resource Center was formed. The Center founded by Paul W. Luther of Bernardston, Massachusetts, seeks to "reserve by direct and indirect means the primary and secondary resources of the history of astronomy." It will concentrate on the history of astronomy in the United States, Canada, and other English speaking nations. The Center will include amateur and popular works as well as the major scholarly and technical materials. The long range goal of this organization is to become the definitive library of astronomical literature printed in the United States before the 20th century. It is hoped that this organization will make these resources more readily available to scholars, collectors, publishers, and to also increase public interest in, and knowledge of, the history of astronomy.

The Center offers a variety of services including a research and bibliographic directory, a reference library, a decentralized library, appraisals and assessments, a quarterly newsletter, book sales, a book search service, and a biographical and bibliographical reference work called Books and Astronomers Monthly. The following newsletter reprinted from Books and Astronomers Monthly, illustrates one of the reasons for the formation of the History of Astronomy Resource Center.

"Amateur Astronomy In America--  
A Story On The Verge Of Being  
Lost"\*

By Paul W. Luther

On March 29, 1940 Mr. Breeding G. Way gave an address to The Department of Astronomy of the Brooklyn Institute of Arts and Sciences previously known as The American Astronomical Society, the first amateur astronomical society in America. He concluded the address in part as follows:

"The secretary had kept a very careful record of all of our meetings. The press of both cities, especially the Brooklyn Eagle, had given account of every monthly meeting, and, where possible, the manuscripts of lectures were printed. The librarian of our department had kept scrap-books containing the articles from the news papers, and the entire manuscripts of many of the papers that had been presented. We therefore had a complete story of the society ... Some of the material was rescued and is now in this room. But the greatest part of it is gone."

Mr. Way himself died on June 30, 1940 shortly after he presented this paper which was a summary of the history of the society as he remembered it. Many very prominent astronomers spoke at the meetings of the Brooklyn Institute and the history of astronomy in the U.S. would be incomplete without a retelling of its history and the history of other pioneer amateur societies. All that is known to remain of the history of this society is contained in two scrap-books. One is in the library of the Hayden Planetarium about which Trudy Bell has written a most informative article in the Griffith Observer of April 1978. The other is in my private possession.

Where would a scholar go to begin to gather the documents and information necessary to write a history of amateur astronomy in America? What published and unpublished records would be needed? What value would such an undertaking have for the history of astronomy in America? Let me attempt to tackle these questions in reverse order. In the history of science there is probably no episode which was affected so significantly by amateur and popular involvement as the development of astronomy in America. Major institutions were founded on public subscriptions, major contributions were made by amateurs, many very important professional astronomers were first drawn into the field as self educated amateurs, and societies have played a major part in stimulating continued public interest and involvement. This tradition is carried on most actively by groups such as the AAVSO and ALPO but they would be hard pressed to function without the "feeder," societies that dot the countryside and seem to pass in and out of existence like some of the unstable rarer elements. Why do some societies continue and some fail? Some answers to such a question may seem obvious but I think there is more meat in the issue than meets the eye.

\*Reprinted from BOOKS AND ASTRONOMERS MONTHLY,  
Vol. 1, No.6, with the author's permission.

The published records can be identified easily enough but there are very few places in which all can be found. How many libraries (including observatory libraries) have complete runs of *The Sky*, *The Telescope*, *Sky and Telescope*, *Popular Astronomy*, *The Strolling Astronomer*, *The Chicago Astronomer*, *The Sidereal Messenger* (original), and a considerable number of other periodicals both long and short lived? Of course besides the periodicals you would need access to the literature of the popularizers of astronomy such as Mitchel, Flammarion, Proctor, Serviss, and others. Although such a library could be put together I know of none presently in existence with all of the above mentioned material (or even most). I suspect that the Harvard College Library and the library of the U.S.N.O. come closest to having all of those items in one place. Although I have a vague notion that some of the records of the larger societies exist and some are even brought together in one place I don't think they are in a form that could be efficiently made use of by a serious historian of amateur astronomy. If such repositories exist their nature and location is not well publicized. The answer then to the first question is that there is no one, or even well identified number of places, to which a scholar could go to study the documents of the history of amateur astronomy and worst of all many of these records may have already fallen prey to the same fate as the records of the Brooklyn Institute. If the record is to be preserved a well planned and well advertised program needs to be started as soon as possible. By the year 2000 most of the people who could remember the early days will be dead and their record lost forever and professional historians will probably not take much interest in this matter until it becomes clearer that it has some value and more importantly that the task of securing the records is not totally hopeless. Magazines such as *Sky and Telescope* or *Astronomy* could find ways to encourage investigations into this area. Perhaps some of the major planetariums in NYC, Chicago, Boston, and LA could form a consortium to finance such a program of record rescue. Perhaps some of the national organizations of amateurs could play a role. What is needed is a single place or group of places to which a scholar could go and reasonably expect to find the documents necessary for piecing together the history of amateur astronomy in America and that won't happen by accident or for free. I have no intention to spear head such a program but I think it would be a terrible loss if this unique episode in the history of science was forever relegated to a minor footnote because no one thought enough of the records to preserve and order them. As a person whose full time effort is devoted to the rescue of the old and almost lost I know how hard it is to try to find what could have been so easily preserved by some forethought on the part of the original owner. The task of rebuilding the lost history of amateur astronomy in America should not become the grist for the antiquarian book trade when it could be so easily saved now.

# NASA Report

## VOYAGER PICTURES REVEAL NEW MOON OF JUPITER

A new moon of Jupiter has been discovered in pictures taken by NASA's Voyager2 spacecraft July 8 during its excursion through the Jovian system.

While studying pictures of Jupiter's thin ring of particles taken by Voyager 2 cameras less than 24 hours prior to the spacecraft's close approach to the planet, two researchers at the California Institute of Technology—graduate student David Jewitt and scientist G. Edward Danielson, a member of the Voyager Imaging Science team—determined that a star-like object in the ring plane was a moon.

Temporarily designated 1979J1, the new satellite is the 14th known to be circling the giant planet. (Another possible moon, farther out from Jupiter and awaiting confirmation, may have been seen in Earth-based photographs several years ago by Charles T. Kowal of Caltech, discoverer of Jupiter's 13<sup>th</sup> satellite.)

The new moon adds to the list of newly-found Jovian phenomena first observed by Voyager 1 in March 1979 and expanded upon by Voyager 2 four months later. Among these firsts are the ring itself, extensive volcanic activity on the satellite Io, and tremendous bolts of lightning in Jupiter's atmosphere.

1979J1 is the closest moon to Jupiter, orbiting the planet at the outer edge of the ring about 57,800 kilometers (36,000 miles) from the cloud tops. It is estimated to be only 30 to 40 kilometers (18 to 25 miles) in diameter, smaller than seven of Jupiter's other moons but larger than six.

The satellite's orbital period is 7 hours 8 minutes and moves in its orbit at a velocity of 30 kps (67,000mph). This is the fastest moving satellite in the solar system and it has the shortest orbital period.

First hint that the apparent star-trace photographed by Voyager was a Jovian satellite came when Jewitt and Danielson, after an exhaustive search, found no star in the vicinity.

This led to examination of another Voyager 2 photo of higher resolution showing the same portion of the ring, the same curious object and some trails of known stars. Verification that the object was indeed a satellite of Jupiter was based on the differing angles and lengths of the star trails and the trail left by the target object. From the two pictures, an orbit was calculated independently by Jewitt and Dr. Stephen Synott, optical navigation engineer at the JPL.

A special analysis of pictures taken four months earlier by Voyager 1 is being conducted in an effort to locate the same satellite.

Voyager scientists believe 1919J1, because of its location at the outer edge of Jupiter's ring, may directly influence the composition of the ring either by sweeping out or supplying ring particles.

Voyagers 1 and 2 obtained more than 32,000 pictures and millions of other scientific measurements of Jupiter, its satellites and environment from January to August, 1979. Both spacecraft are en route to Saturn with Voyager 1 scheduled to arrive there in November 1980 and Voyager 2 in August 1981.

## IMPROVING THE VIEW FROM THE BACKYARD

My desire to observe the wonders of the Sagittarius/Scutum region in the teeth of blazing light pollution from Detroit and southern Warren from my backyard at 13 Mile and Ryan, made nebula filters sound like the answer to a dream.

My only problem was my telescope is an  $f/15$ , 2.4" refractor—too slow and small to be effective on emission nebula and planetaries with a light pollution filter:

"... never get spectacular results [in a small refractor] because the field is dark to begin with." --

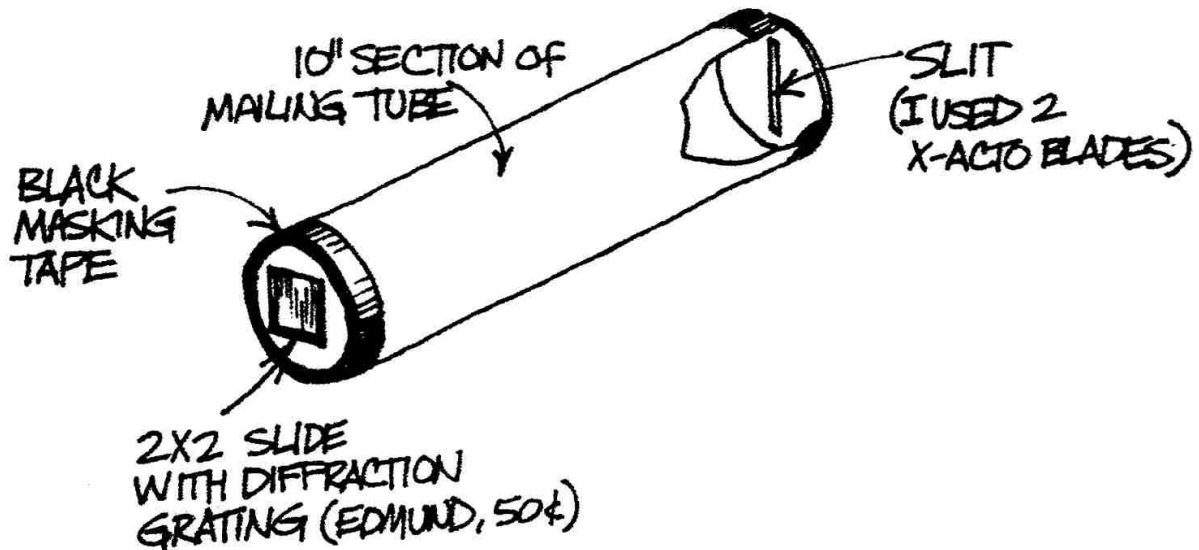
March, 1979, Astronomy.

"... in a small refractor the exit pupil is always too small unless extremely low power is used." --

August, 1979, Astronomy.

Though I felt discouraged by such comments, I took the suggestion of Dennis DiCicco in March, 1979, Sky & Telescope and made an unscientific survey of the light pollution in my area to see if it is the type nebula filters are designed for.

I put together the simple spectroscope shown below.





and compared the spectrum of street lights seen through it to the photos shown in the March, 1979 Sky & Telescope. Despite sometimes feeling like a weirdo standing on street corners and in parking lots staring at lights through a cardboard tube, the survey was colorful, fun, and showed the lights south of 13 Mile to be:

1. Clear mercury vapor (majority)
2. Deluxe mercury vapor (next most--strong at long wavelengths)
3. High pressure sodium (the pink colored ones--not many)
4. Incandescent (the fewest--emit light across all wavelengths)

These lights are exactly the type nebula filters work on.

So, despite all warnings, my emotions got the best of me, and I bought a Daystar model 300 nebula filter for (choke) \$65.

Taking Dennis DiCicco's advice to "use a magnifying power about equal to the focal length in inches," (In my case 900mm = 35X), I put the filter on a wide field 24mm eyepiece and took a look.

On only a fair night Sagittarius/Scutum was, contrary to Astronomy magazine, spectacular. With Detroit lights obliterating everything to the south, M-17 was big and bright with a strong zigzag shape. M-20 was almost invisible without the filter, but was easy with it. The view of M-8 was tremendous.

With my mouth still open, I looked high overhead at the faint planetary, M-97. Impossible without the filter, it immediately popped into view with it. This one experience alone was worth the price of the filter.

Conclusions? If you live fairly close to, or in, the city and have a telescope that's 2.4" or bigger, I think you won't be disappointed if you invest in a nebula filter. For me, it's brought priceless new wonders of the heavens to my backyard.

--Bob Wilson--

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## WAS Exchange

**FOR SALE:** Jaegers 3¼" diameter x 36" focal length objective with mounting cell and aluminum tube. Cost \$119.50. Sell or trade for 7x50 or 10x50 binoculars. Bob Shannon, 194 Moran, Grosse Point Farms, MI 46236, or call 685-4283

**FOR SALE:** 6ft reflector RV-6 Dynascope, complete with four lenses; 30, 18, 12.5 and 7mm, 2x Barlow, 6x30 finder, drive & setting circles. Tasco 50 mm refractor with sun filter, two lenses, diagonal and tripod. Price: \$210.00. Call Dave Harrold at 391-0124 or write 184 Hi-Hill Road, Lake Orion, MI 48035

**ADVERTISE IT FREE IN THE WAS EXCHANGE! ! !**

# NIGHT WATCH

Because of my occupation, optician, I get a lot of questions concerning optical astronomical instruments. One of the most frequent questions is: "What kind of instrument should I start out with?" Almost always they would like to spend about \$100. So I usually say binoculars. My favorite has been the 20 x 70's offered by Jaegers Optics 691 Merrick Rd., Lynbrook, N.Y. 11563 as a good compromise between cost and aperture. There are some other reasons for this selection.

It is useless to use an instrument that puts out a beam of light that has a larger diameter than the diameter of the pupil. It should be obvious that some of the light would fall outside the pupil and hence outside the viewing area of the eye and you would be using only part of the objective of the instrument. This applies to all instruments telescopes, binoculars and microscopes. Since the objective is the most expensive part of any instrument and since you will obviously want to make use of all of it you should endeavor to make as close a match between the diameter exit pupil and your pupil as you can or at least err on the side of your eye so that all of the exit beam fits in your pupil.

The accepted maximum pupil diameter of the average human eye is about 7.5mm. The max. on record I believe is 9mm, nevertheless yours will likely be the former in a room totally dark if you are between the ages of five and twenty five (different authors disagree on the age limitations.) If you are older than this it is not likely that your pupil will reach this diameter unless you happen to exercise it often by working in subdued light and the like. The older you are the less your pupil will open in the dark. A person about 60 yrs. Old is often likely to only have a dark adapted pupil diameter of only 4mm or 3mm. If you are even in subdued light your pupil will be less than the 7.5mm max. Commonly for the urban and suburban amateur astronomer a pupil diameter of 5mm is used in observation. Rarely, very rarely will the amateur astronomer be in the type of conditions and be of the age that afford him the 7 to 7.5mm pupil. Other things can affect the diameter of the pupil also, such as; caffeine, nicotine, carotene etc. All these things that affect your observing conditions should be taken into consideration when you purchase a pair of binoculars. You should assess your usual observing conditions. Too often I hear the excuse "Well I bought the 7.5mm exit type for that night when I have the conditions..." but the rest of the time that amateur astronomer is wasting much of his money and objective. It's like buying a 450hp automobile because one day you might have to go 150mph! H. Dall has some methods by which you can determine the condition of your eye during observing at your favorite spot on page 579 of the ATM series, Book II.

Now, how do you determine the exit pupil of your binoculars? That's easy because we have a quick rule of thumb to help us here. Binoculars are known by their magnification and objective diameter. 7 x 50's are binoculars with a magnification of 7 times and an objective diameter of 50mm. 20 x 70's have a magnification of 20 times and an objective diameter of 70mm. To find the exit beam diameter divide the objective diameter by the magnification. 7 x 50's therefore have an exit beam of about 7.5mm and the 20 x 70's about 3.5mm. 7 x 35 binocs are another very common size with a magnification of 7 times, and objective diameter of 35mm and an exit of 5mm.

So which ones should you buy? Well let's run through an evaluation. In 1968 I bought the Jaegers 20 x 70's, I did it without going through any systematic evaluation. However if I were to evaluate my observing conditions now I would still choose 20 x 70's or 20 x 80's and we can detect 6.2 magnitude on most clear

moonless nights. Here's why, we have been unable to detect the difference in faintest stars visible in 7 x 50's and 7 x 35's. Only the contrasts change so it would seem that 5mm is about the practical maximum pupil exit for our area. This ruled out the 10 x 70 and 11 x 80 binocs because we would never use all of the objectives from our usual observing site. 14 x 70 would be the lowest practical magnification for 70mm objective and 16 x for the 80mm. Since neither come in such an odd magnification I would decide to go for the smaller exit beam diameter or the next higher magnification which would be 20x for both. True, you will not be using the maximum of your pupil, but on the nights when the moon is up you will still be using most or all of your objectives. Also the increased magnification results in a darker sky background and often that can be the deciding factor in whether you see that faint star or nebula or not. I know for a fact that on any given night I am using virtually all of the 70mm I paid for.

What this has resulted in practice is quite satisfying. I have been able, on most nights, to hit 10.5 mag. in several areas of Cygnus. We were able to trace the tail of Comet West for some 15° at its greatest extent. And I have been able to see almost all of the Messier objects with them excepting several planetaries. Neptune and Uranus are easily within the grasp of these big eyes as are many asteroids that Dolores has been tracking

So if it's an instrument that will give you great pleasure in astronomical viewing for about \$100 or less, make it binoculars.





# PLANETARIUMS OF MICHIGAN

Abrams Planetarium  
Science Road  
Michigan State University  
East Lansing, MI 48823

November 23rd-December 23rd: "Star of Wonder" Traditional Christmas show tracing events leading to the birth of Christ and possible explanations of the star of Bethlehem

December 28th-February 16th: "The Universe Game A funny, free-wheeling response to many of the most frequently asked questions (and misconceptions) about astronomy.

Friday and Saturday ..... 8:00 p.m. and 10:00 p.m.  
Sunday ..... 2:00 p.m. and 4:00 p.m.  
Adults ..... \$1.50  
Children over 5 ..... \$ .50

McMath Planetarium  
Cranbrook Institute of Science  
500 Lone Pine Road  
Bloomfield Hills, MI 48013 in  
645-3225

December: "Holiday Skies and Christmas Star" This program, performed in one form or another all across the country, discusses the difficulty determining the date of the birth of Jesus, demonstrates many astronomical phenomena which can appear and tries to determine just what the Christmas star might have been.

January: "Celestial Preview of 1980" Predicting the weather or outcome of the Presidential election is sheer guesswork. Since the motions of the planets and positions of the stars are so well known, it is very easy to determine just what will be visible throughout the year, although there are occasional surprises from the unpredictable.

Wednesday ..... 4:00 p.m.  
Saturday ..... 2, 3, and 7:30p.m.  
Sunday ..... 2, 3 and 4:00 p.m.  
Daily shows December 26 through 28 at 2, 3:00 p.m.  
Planetarium is included with museum admission;  
\$2-50 adult, \$1.50 student age 5-21.  
Museum closed December 24, 25 and 31.

Wyandotte Planetarium  
Roosevelt High School  
540 Eureka Ave.  
Wyandotte, MI 48192  
284-3100

November 7—January 30<sup>th</sup>: "Footsteps"  
Commemorates the 10th anniversary of the Apollo moon landing. Traces the evolution of the moon and historical interest in the moon.

Wednesday ..... 7:30 p.m.  
Other Showings by special arrangement.  
Adults ..... \$1.00  
Students over 5 and senior citizens ..... \$ .50  
WAS members admitted free with membership card.

# SKY CALENDAR DECEMBER 1979

Information for helping teachers and students observe the sky

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>Evening (mid-twilight):</p> <p>Pleiades</p> <p>Aldebaran to be occulted Tues at 6:32 am from Anchorage, AK.</p> <p>Sunday Dec 9, morning: Mars and Jupiter 2.3° apart, high in SSW.</p> <p>Monday Dec 10, morning: Mars and Jupiter 2.1° apart.</p> <p>Morning: Moon Use binoculars to see head of Scorpius.</p> <p>Mercury</p> <p>Morning: Mars now 2.6° from Jupiter and 15° from Saturn (see diagram below). Use scale before Jan 1 on next month's calendar to measure angular distances between stars and planets on these diagrams.</p> <p>Evening: What unusual event has just occurred? See Dec 27-29.</p> <p>Pleiades</p> <p>Aldebaran</p>	<p>Evening:</p> <p>Pleiades</p> <p>Aldebaran</p> <p>Full Moon</p> <p>Mars</p> <p>Regulus</p> <p>Jupiter</p> <p>Moon</p> <p>Morning: Although Antares is shown, it won't be visible until the weekend or early next week.</p> <p>Head of Scorpius</p> <p>Mercury</p> <p>Antares</p> <p>Morning: This week, Antares replaces Mercury as the bright object low in the southeastern predawn sky.</p> <p>Antares</p> <p>Mercury</p> <p>Morning: Mars now 4.2° from Jupiter and 13° from Saturn (diagram at right). In January Mars will stop 12° short of Saturn, turn west, and begin to approach Jupiter and Regulus. See November 18 and December 15.</p>	<p>Morning: Jupiter, brightest "star" in morning sky, is very high, just W of due S, in mid-twilight. Look for Mars 3.6° and Regulus 10° to west of Jupiter, and Saturn 17° to its east, as shown in today's diagram below December 26.</p> <p>Tues Dec 11, morning: Mars and Jupiter 2.0° apart.</p> <p>Wednesday Dec 12, morning: Mars and Jupiter 1.8° apart.</p> <p>Moon</p> <p>Morning: Try to see very old moon, only 21 hours before New from East Coast, and 18 hours before New from West.</p> <p>Head of Scorpius</p> <p>Mercury</p> <p>Antares</p> <p>First Quarter (evening half moon). As sky darkens, note moon's position among the stars. It is within 5° of the <i>Vernal equinox</i>, the point the sun will reach on March 20, 1980, the first day of spring. Moon nearly 90° E of sun.</p> <p>PLANETS: VENUS, brightest "star" in early eve sky, sets in WSW 1½-2½ hrs after sunset. MORNING: JUPITER rises 11:30 pm local time Dec 1, 9:30 pm Jan 1. After rising until fading from view high in S to SW at dawn, Jupiter is brightest "star" up. MARS is within 5° of Jupiter all month; SATURN is 17° E of Jupiter. Diagrams for Dec 9-12 and at right show them in morn twil.</p>	<p>Four hours after sunset:</p> <p>*Castor</p> <p>*Pollux</p> <p>Moon</p> <p>Wednesday Dec 5</p> <p>Thursday Dec 6</p> <p>Procyon</p> <p>Mars</p> <p>Regulus</p> <p>Jupiter</p> <p>Moon at Last Quarter</p> <p>Mars</p> <p>Regulus</p> <p>Jupiter</p> <p>Mars</p> <p>Regulus</p> <p>Jupiter</p> <p>New Moon..... 3:23 a.m. EST (12:23 a.m. PST). Morning: Mars just 1.9° from Jupiter (see diagram below). Saturn is now midway between Regulus and Spica, 27° from each star.</p> <p>Jupiter reaches stationary point, 10.7° east of Regulus. As it retrogrades 10° in next 4 months, watch Jupiter move to only 1.0° north-east of Regulus at its next stationary point on April 26, 1980.</p>	<p>Betelgeuse</p> <p>Orion's belt</p> <p>Rigel</p> <p>Sirius rises here shortly.</p> <p>Morning:</p> <p>Saturn</p> <p>Moon high in SSE</p> <p>*Spica</p> <p>Evening: It's very easy to see moon, 38 hours old from East Coast, 41 hours from West.</p> <p>*Venus</p> <p>Young moon</p> <p>On Sun Dec 30, north cusp of moon will graze Aldebaran along line from Oklahoma Panhandle, at 4:17 pm CST in daylight, to Chicago at 4:23 pm, shortly before sunset. Grazeline extends across lower Mich after sunset and passes ½ mi S of Allegan at 5:24 pm EST, and 1½ mi S of Bad Axe at 5:27 pm. In Lansing, star will be hidden for several minutes, as graze occurs 24 miles to the north. Within a couple of miles of graze line, Aldebaran may disappear and reappear several times as it goes behind mountains on the moon's edge. South and east of graze line, Aldebaran is occulted: Atlanta GA 4:50-5:34 pm, in daylight. In Northeast, event occurs in dark sky: Boston 5:08-5:51 pm. Because of daylight or star being close to nearly full moon, use telescope &amp; medium power eyepiece.</p>	<p>Fri Dec 7</p> <p>Mercury reaches favorable gr elongation, 21° W of sun. Look 10° up, 30° S of E in middle of morning twilight (about 48 min before sunup).</p> <p>Morning: High SSE</p> <p>Moon</p> <p>See also below. *Spica</p> <p>Morning: Use binoculars to see 8 Scorpii 0.7° S of Mercury.</p> <p>ESE</p> <p>SE</p> <p>Evening:</p> <p>Moon</p> <p>*Venus</p> <p>Winter Solstice.</p> <p>Can you see Antares yet? Look 7° to right of Mercury.</p> <p>Mercury</p> <p>Antares</p>	<p>Geminid meteor shower reaches maximum activity next week. Highest meteor count (50 per hour) will be between 11 pm and 5 am Thurs and Fri nights. Meteors can appear anywhere in sky, but trails extended backward radiate from Gemini.</p> <p>Morning sky: Mars 1.6° N of Jupiter (diagram below). This is opening event of triple conjunction between these planets, the first since 1836-37. Mars' 11 pass Jupiter again Feb 27 &amp; May 5, 1980. This morning, Regulus 10½° W of pair, Saturn 16½° E.</p>
<p>Magnitudes of the Planets: Venus -3.3 to -3.4; Jupiter -1.7 to -1.9; Mercury Dec 1-24, +0.2 to +0.4; Mars +0.8 to +0.2; Saturn +1.3 to +1.1. Positions in December: Venus goes 38° eastward, crossing from Sagittarius into Capricornus Dec 21. Venus appears 1° from 3rd mag A Sag Dec 2 &amp; 3; 2° N of 2nd mag 8 Sag Dec 7; 6.4° S of 3rd mag 8 Cap Dec 25. Mars, going 9° east, passes 2.2° N of 4th mag 9 Leo Dec 4 and 1.6° N of Jupiter Dec 15; see Dec 15. Jupiter goes 1.0° east Dec 1-26; see Dec 26. Saturn goes 1.2° east in Virgo and remains 17° E of Jupiter.</p>						

Abrams Planetarium's 24-hr-per-day CURRENT SKY INFORMATION SERVICE (60-second recording): Call (517) - 332 - STAR  
 7:30 a.m./Sunset East Lansing: Dec 1 7:48 a.m./5:05 p.m.; Dec 16 8:02 a.m./5:16 p.m.; Dec 31 8:08 a.m./5:16 p.m. EST.

# SKY CALENDAR JANUARY 1980

Information for helping teachers and students observe the sky

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<p>Diagrams labeled Morning or Evening show sky during mid-twilight, 45-48 min before sunrise or 45-48 min after sunset, respectively, from latitude 40° N. Other diagrams for Jan 3-5, 6, 22, 25, 28, 31 are for times later in evening, as noted.</p> <p>Morning (see box above):</p> <p>Jan 6, late evening: See below.</p> <p>5 hrs after sunset:</p> <p>Evening:</p> <p>Evening:</p>	<p>Use this scale to measure angular distances between objects on diagrams.</p> <p>Morning: Saturn begins retrograde; moves 7° closer to Regulus by May 22.</p> <p>Morning:</p> <p>Tomorrow about 3 hrs after sunset: Jupiter rises 13° N of E just before Venus sets 13° S of W. Try to see Jupiter before Venus sets. On what date will you first succeed?</p> <p>Four hours after sunset:</p> <p>Evening:</p>	<p>Evening Tuesday Jan 1 and Wednesday Jan 2 (see box at far left):</p> <p>Morning: Moon occults Saturn as seen from Hawaii. See Jan Sky and Telescope.</p> <p>Morning:</p> <p>Four hours after sunset:</p> <p>Evening:</p>	<p>Wed Jan 9, morning:</p> <p>Thurs Jan 10, morning:</p> <p>Morning: Look for old moon, about 34 hours before New from East Coast, 31 hours before New from West Coast.</p> <p>Morning:</p> <p>* Saturn won't be this far apart again until late May.</p> <p>* Castor</p> <p>Evening: Note Castor &amp; Pollux much higher than on Jan 1.</p>	<p>Two hours after 3 sunset:</p> <p>* Castor</p> <p>* Pollux</p> <p>Moon rising farther south each night</p> <p>Q Moon</p> <p>* Saturn in SW</p> <p>Evening: Look 1° S of Venus for 3rd mag 6 Cap.</p> <p>New Moon.... 4:19 p.m. EST (1:19 p.m. PST). Mars, now 16° E of Regulus and 12° W of Saturn, begins retrograde (westward) motion. Watch Mars approach Regulus next 5 weeks and pass 3½° north of it March 12.</p> <p>First Quarter (evening half moon). Evening: Look 1.1° N of Venus for 4th mag star <math>\lambda</math> Aquarii.</p> <p>Three hours after sunset:</p> <p>Full Moon Jan 31</p> <p>* Regulus</p> <p>* Jupiter</p> <p>Mars</p>	<p>* Castor</p> <p>* Pollux</p> <p>Procyon *</p> <p>Waning gibbous moon</p> <p>Morning:</p> <p>Moon in south</p> <p>* Venus</p> <p>Evening: Look for young moon, 25 hours after New from East Coast, 28 hours after New from West.</p> <p>Four hours after sunset:</p> <p>Mars *</p> <p>PLANETS: VENUS is the brilliant evening "star" setting south of west 2½-3 hours after sun. JUPITER, next brightest planet, rises north of east within 5 hrs after sunset Jan 1, and 2 hrs after sunset by Feb 1. Red MARS is 4.3° to 6.5° east of Jupiter and rises about ½ hr after it. Yellow SATURN is 17°-18° E of Jupiter and rises about 1½ hours after it. Mars and Saturn follow Jupiter across the sky during the rest of the night. As dawn brightens, the three planets and the star Regulus are in SE to W. See Jan 6-8, 23.</p>	<p>Five hours after sunset:</p> <p>Regulus * Moon</p> <p>Jupiter</p> <p>Mars *</p> <p>E</p> <p>Tomorrow the star Pollux is at opposition, 180° from the sun and visible all night. Mars and Jupiter will reach opposition on night of Feb 24, and Saturn on Mar 13. Watch planets rise earlier each evening until those dates.</p> <p>* Venus</p> <p>Moon</p> <p>Evening: Note earthshine on moon's dark side.</p> <p>Evening:</p> <p>Pleiades</p> <p>Moon in Aldebaran *</p> <p>Moon occults Aldebaran and stars in Hyades; see Jan Sky &amp; Telescope.</p>

Text and diagrams by Robert C. Victor.  
Thanks to Randy Gillett for assisting with calculations.

Subscription: \$2.00 per year, from Abrams Planetarium, Michigan State University, East Lansing, Michigan 48824

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Abrams Planetarium's 24-hr-per-day CURRENT SKY INFORMATION SERVICE (60-second recording): Call (517) 333-3333 (p.m.) Jan 11 11:04 a.m./10:49 p.m. info.  
Sunset/Sunrise East Lansing: Jan 4 5:05 a.m./5:11 p.m.; Jan 16 8:06 a.m./5:11 p.m.

# APPARENT POSITIONS OF THE SUN AND PLANETS, 1980

By representing numerical values from this table as points on an appropriate star chart, one obtains the apparent positions of the sun and planets relative to background stars as observed from Earth. Positions can conveniently be plotted on any celestial globe or star map on which the ecliptic is marked off in degrees of longitude. Two examples of such star maps are THE NIGHT SKY (a rotating planisphere which can be adjusted to show the visible sky for any selected date and time), and SCI CONSTELLATION CHART - EQUATORIAL REGION. These charts are available from Sky Publishing Corporation, 49 Bay State Road, Cambridge, MA 02138. Write for their free catalog of publications, Scanning the Skies.

This table gives, for the 1<sup>ST</sup> and 16<sup>TH</sup> of each month, apparent geocentric positions of the sun and naked eye planets. Each position in the table is expressed as a pair of numbers in the ecliptic system of coordinates. The first number in each pair is the longitude, measured eastward along the ecliptic beginning at the Vernal Equinox; the second number is the latitude, measured perpendicularly north (+) or south (-) of the ecliptic. All values are stated to the nearest degree.

<u>Date</u>	<u>Sun</u>	<u>Mercury</u>	<u>Venus</u>	<u>Mars</u>	<u>Jupiter</u>	<u>Saturn</u>
1980 Jan 1	280, 0	268, -1	311, -2	164, +3	160, +1	177, +2
16	295, 0	292, -2	330, -2	165, +4	160, +1	177, +2
Feb 1	311, 0	319, -2	349, -1	164, +4	158, +1	176, +2
16	326, 0	344, 0	7, 0	160, +4	156, +1	176, +2
Mar 1	341, 0	350, +3	23, +1	154, +4	155, +1	175, +2
, +216	356, 0	338, +2	40, +2	149, +4	153, +1	173, +2
Apr 1	11, 0	344, -1	57, +3	146, +3	151, +1	172, +2
16	26, 0	2, -3	72, +4	146, +3	150, +1	171, +2
May 1	41, 0	27, -2	83, +4	149, +2	150, +1	171, +2
16	55, 0	58, +1	91, +4	154, +2	151, +1	170, +2
Jun 1	71, 0	90, +2	92, +2	160, +1	152, +1	170, +2
16	85, 0	109, +1	84, -1	167, +1	154, +1	171, +2
Jul 1	99, 0	115, -3	77, -4	175, +1	156, +1	171, +2
16	114, 0	107, -5	78, -5	183, 0	159, +1	173, +2
Aug 1	129, 0	109, -2	86, -5	192, 0	162, +1	174, +2
16	143, 0	132, +1	98, -4	202, 0	165, +1	176, +2
Sep 1	159, 0	164, +2	113, -2	212, 0	168, +1	177, +2
16	173, 0	190, 0	129, -1	222, -1	171, +1	179, +2
Oct 1	188, 0	211, -2	145, 0	232, -1	175, +1	181, +2
16	203, 0	227, -3	163, +1	243, -1	178, +1	183, +2
Nov 1	219, 0	224, -1	182, +2	254, -1	182, +1	185, +2
16	234, 0	215, +2	200, +2	265, -1	184, +1	186, +2
Dec 1	249, 0	233, +1	219, +2	277, -1	186, +1	188, +2
16	264, 0	256, 0	237, +1	288, -1	188, +1	189, +2
1981 Jan 1	280, 0	281, -2	257, +1	301, -1	190, +1	190, +2
Positions of		<u>Aldebaran</u>	<u>Pollux</u>	<u>Regulus</u>	<u>Spica</u>	<u>Antares</u>
Bright Stars		70, -5	113, +7	150, 0	204, -2	249, -5

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Data compiled by Brian K. Vorndam, for Abrams Planetarium, Michigan State University.



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