

The W A S P

APOLLO MANNED MISSION EMBLEMS



JANUARY
1975

TWO YEARS
PASSING

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THIS MONTH'S COVER BY Frank McCullough

THIS MONTH'S STAFF INCLUDES: Lou Faix, Larry Kalinowski, Bev Bock,
and Pete Kwentus

The Warren Astronomical Society maintains correspondence, Sometimes intermittently, with the following organizations:

THE ASTRONOMICAL LEAGUE

THE KALAMAZOO ASTRONOMICAL SOCIETY

THE GRAND RAPIDS AMATEUR ASTRONOMICAL ASSOCIATION

THE DETROIT ASTRONOMICAL SOCIETY

THE DETROIT OBSERVATIONAL AND ASTROGRAPHIC ASSOCIATION

THE OLYMPIC ASTRONOMICAL SOCIETY

THE OLGELTHORPE ASTRONOMICAL SOCIETY

THE ORANGE COUNTY ASTRONOMICAL SOCIETY

THE FORT WAYNE ASTRONOMICAL SOCIETY

THE ADAMS ASTRONOMICAL SOCIETY

Others are invited to join this list. The editors will exchange, on an even exchange basis, the W.A.S.P. with any other society's monthly publications.

WARREN ASTRONOMICAL SOCIETY EDUCATIONAL PROGRAM

<u>SESSION</u>	<u>DATE</u>	<u>TELESCOPES</u>	<u>ASTRONOMY</u>
1	Nov. 29	Telescopes (Types and operation) L. Faix	Outline of Astronomy (Elements and Arrangements of Space) D. McCullough
2	Jan. 24	Mirror Grinding P. Kwentus	Solar System (Planet Types, Orbits) R. Civic
3	Feb. 28	Mirror Figuring G. Alyea	Stars (Composition, Action, Type) L. Faix
4	March 27	Telescope Accessories (Mounts, Eyepieces, Finder) D. Misson	Nebulas (Type, Composition, Action) D. Harrington
5	April 25	Star Charts (Celestial Coordinates and Circles) F. McCullough	Galaxies (Structure, Type, Size) P. Kwentus
6	March 23	Astrophotography (Methods and Equipment) L. Kalinowski	Comets and Meteors (Composition, Action) K. Wilson

St. Paul's United Church of Christ
31654 Mound Road - Warren
East Side of Mound between 12 Mile and Chicago Roads

Can You Spot One?

by

Kenneth Wilson

The hobby of amateur astronomy is not the most popular pastime in America, According to the most optimistic estimate, there are only about a million amateurs in the whole country. And, since he comes in all sizes, shapes and colors, location and identification of the amateur astronomer is difficult for another amateur and almost impossible for a non-amateur. The following guidelines should be of use to these people.

The amateur astronomer (or celestus fanaticus) is commonly a nocturnal creature. As a result, he is frequently found singly or in groups, in the middle of a country field, on a dark moonless night, peering through his telescope. If there is a flock of five or six present, strange noises may be heard, such as: "I think my nose is frozen to the eyepiece!"; "I found M91!"; "Did you see that -27 bolide?"; "Yeah, in the fourteen inch with what used to be my right eye!"; "Where's my Skelnate-Pleso?"; "You're standing on it!"; "Hey, Let's go spin Dave's setting circles!" and , " *%!# it, here come the \$%&*! Clouds!" But, such fields are likely to be remote and the amateur is easily spooked by a careless flashlight. So it might be easier to find an amateur during the daylight hours.

During the day, the amateur is usually well camouflaged as a normal human being. But, there are a few characteristics that may help. First, an amateur astronomer is prone to tripping over curbs, chuckholes and other objects as he stares into the sky looking for solar halos and daytime novae. If the amateur drives a car, this often results in frequent minor accidents.

If you happen to spot a likely amateur, follow him to his habitat to confirm your identification. His neighborhood is likely to be marked by numerous smashed streetlights. His garage will have two occupants; his dented car and his telescope. Inside, you will find on the coffee table, along with a copy of "Reader's Digest" or "Playboy", the current issue of "Sky and Telescope". If this habitat belongs to a Michigan amateur, the closet will be full of heavy winter clothing.

The personality of the amateur astronomer is usually a bit eccentric. For example, a married amateur is often heard telling his wife "Wait for a cloudy night, or one near the full moon!" If he has any children, they will find their father is often tired and grouchy after a long clear night. His neighbors will find that the amateur reacts violently when any new street lights are erected nearby (often giving the impression that he is a sex fiend or some other kind of criminal).

New that you know how to identify the general amateur astronomer, here are some sub-species to look for:

The Amateur Telescope Maker or ATM (pyrexus grindus)- distinguished by the red rouge stains under his fingernails.

The Astrophotographer (camerus fanaticus)- usually found with a copy of the LFK exposure guides glued to one arm. Often found lurking in camera stores. Their homes are usually filled with the odors of fixer and Glacial acetic. Deep Sky Astrophotographers (Guidus Longus) are distinguished by the neurotic mumblings of “reciprocity, reciprocity, reciprocity,...” and “grain, grain, grain...”.

The W.A.S.P. writer (journalisticus amateurus)- Perhaps the most unusual sub-species, he writes articles like this one.

..... COMING ATTRACTIONS

By

Kenneth Wilson

JAN.

- 1 Giuseppe Piazzi discovered Ceres in 1801.
- 2 Messier Club meeting, contact Frank McCullough 791-8752.
- 9 Astrophotography Meeting, contact Larry Kalinowski 776-9720.
- 13 Werner VonBraun speaks in Ann Arbor, contact Ken Wilson, 268-9337 for details.
- 16 W.A.S. General Meeting at 8:00 p.m., contact Frank McCullough 791-8752.
- 20 Gene Roddenberry speaks in Ann Arbor, contact Ken Ken Wilson, 268-9337 for details.
- 23 Introductory astronomy course meets, contact Lou Faix, 781-3338 for details.

TWINKLE, TWINKLE LITTLE ROCK

OR

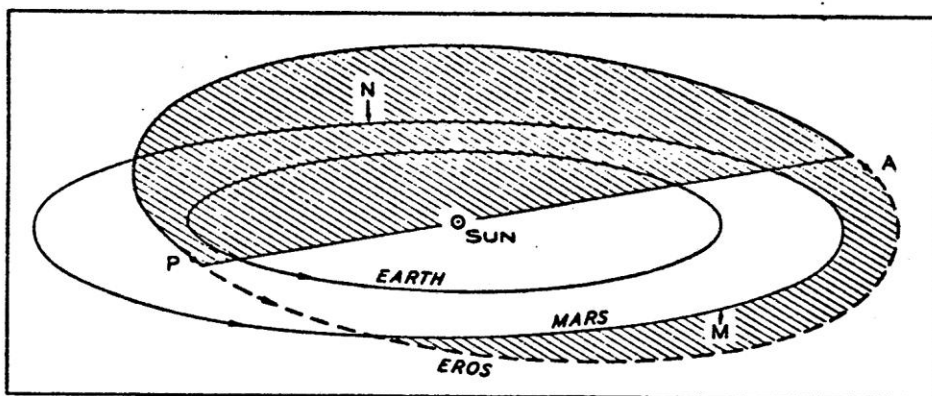
Rendezvous with Eros

Eros, a mongrel hunk of rock and rebel asteroid, is providing a delightful show in the evening sky. Amateur observers in southern Michigan are particularly fortunate as they will have an opportunity to aid celestial scientists in establishing an exact orbit for this strange space voyager. Every thirty years or so, Eros bounds gymnastically through the winter sky as it makes its closest approach to our planet. This year the asteroid will be easily visible in even the most modest telescope as its highly eccentric and steeply tilted orbit bring it within a scant fourteen million miles of Earth.

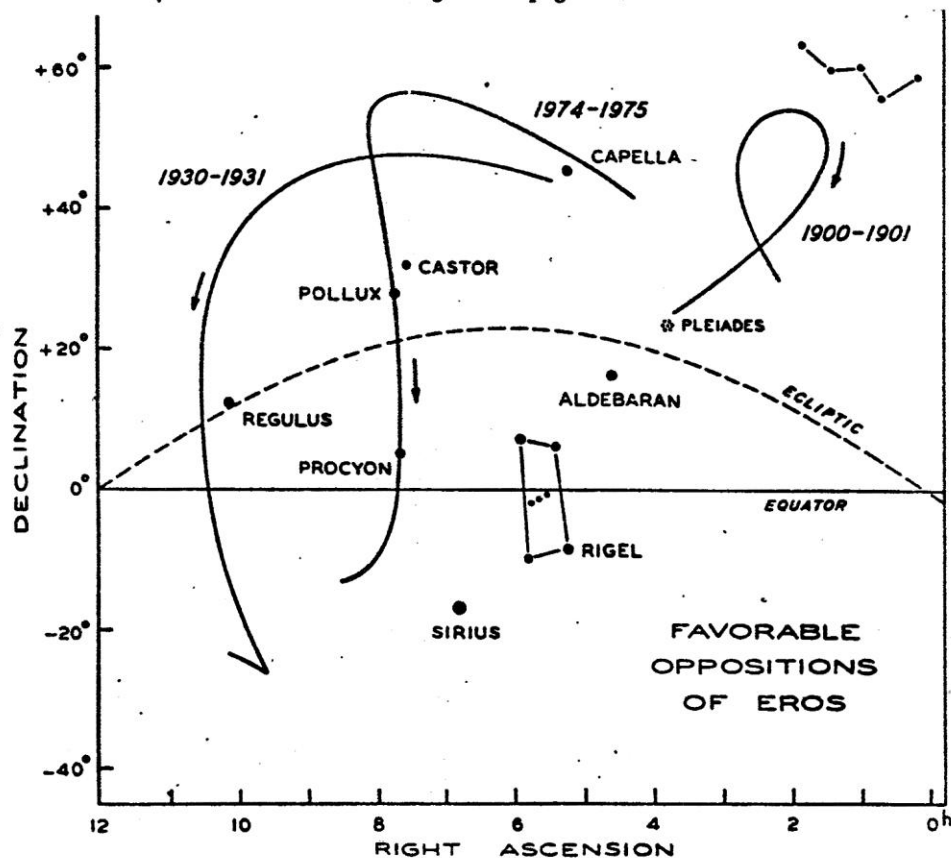
Eros is often described as a potato shaped object approximately eight miles wide and fifteen miles long, approximately the size of Manhattan Island. It tumbles about a poorly defined axis producing a fluctuation in apparent brightness over a five hour period. Amateur observations of the "variable star" effect can assist in refining our knowledge of the asteroid's true size, surface structure and axis.

Of major importance to W.A.S. members is that we live along a line where Eros will occultate the 3.5 magnitude star Kappa Geminorum. The eclipse of the star by the much dimmer asteroid will occur on the early evening of January 23, 1975. Exact determination of the time and place of occultation will greatly improve our knowledge of the asteroid's orbits. The location of the path, which is only about ten miles wide, is currently known only to an accuracy of ± 90 miles.

Teams of observers and photographers are being formed to observe the occultation and photograph the passage. W.A.S. members and friends are invited to join the team effort. Two preparatory and training sessions are planned in advance of the event. Observatory Chairman Peter Kwentus, assisted by Gary Boyd and Lou Faix, is coordinating planning and preparation.



The orbit of Eros seen from 15 degrees above the ecliptic plane. *P* and *A* mark its perihelion and aphelion, respectively. At *M* and *N*, Mars is closest to the orbit of Eros (see diagram on page 221).



The author shows how the apparent paths of Eros on the sky differed at three very favorable oppositions. In 1900-01, the asteroid described a loop well north of the ecliptic; in 1931 its track had a sharp cusp; and in 1975 Eros will cross the ecliptic almost perpendicularly. From the table at right Eros' path can be plotted on a large-scale star chart.

1974-75	R.A.	Dec.	<i>r</i>	Δ	Mag.
	h m	°	a.u.	a.u.	
Sep. 30	4 39.0	+44 52	1.389	0.682	12.3
Oct. 10	5 07.2	+47 48	1.357	0.606	12.0
20	5 36.7	+50 31	1.325	0.536	11.6
30	6 07.1	+52 54	1.293	0.472	11.3
Nov. 9	6 37.5	+54 50	1.263	0.413	10.9
19	7 06.6	+56 09	1.235	0.359	10.6
29	7 32.1	+56 39	1.209	0.310	10.2
Dec. 1	7 36.5	+56 38	1.204	0.301	10.1
3	7 40.7	+56 35	1.199	0.292	10.0
5	7 44.6	+56 28	1.195	0.283	9.9
7	7 48.2	+56 19	1.190	0.275	9.8
9	7 51.5	+56 06	1.186	0.266	9.7
11	7 54.4	+55 50	1.182	0.258	9.7
13	7 56.9	+55 30	1.178	0.250	9.6
15	7 59.1	+55 06	1.174	0.242	9.5
17	8 00.8	+54 38	1.170	0.234	9.4
19	8 02.2	+54 04	1.167	0.227	9.3
21	8 03.1	+53 25	1.163	0.219	9.2
23	8 03.7	+52 41	1.160	0.212	9.1
25	8 03.9	+51 51	1.157	0.206	9.0
27	8 03.8	+50 54	1.154	0.199	8.9
29	8 03.3	+49 50	1.151	0.193	8.8
31	8 02.5	+48 39	1.149	0.187	8.7
Jan. 2	8 01.4	+47 20	1.146	0.182	8.6
4	8 00.0	+45 53	1.144	0.177	8.5
6	7 58.4	+44 18	1.142	0.172	8.4
8	7 56.6	+42 35	1.140	0.168	8.3
10	7 54.7	+40 43	1.139	0.164	8.2
12	7 52.7	+38 43	1.137	0.160	8.1
14	7 50.6	+36 35	1.136	0.157	8.0
16	7 48.6	+34 20	1.135	0.155	7.9
18	7 46.6	+31 59	1.134	0.153	7.8
20	7 44.7	+29 33	1.134	0.152	7.8
22	7 43.0	+27 04	1.133	0.151	7.8
24	7 41.4	+24 33	1.133	0.151	7.8
26	7 40.0	+22 01	1.133	0.152	7.8
28	7 38.8	+19 30	1.134	0.153	7.9
30	7 37.8	+17 02	1.134	0.154	7.9
Feb. 1	7 37.1	+14 38	1.135	0.157	8.0
3	7 36.5	+12 19	1.135	0.159	8.1
5	7 36.2	+10 05	1.137	0.163	8.2
7	7 36.2	+7 59	1.138	0.166	8.3
9	7 36.3	+6 00	1.139	0.170	8.4
11	7 36.7	+4 08	1.141	0.175	8.5
13	7 37.4	+2 24	1.143	0.180	8.6
15	7 38.3	+0 47	1.145	0.186	8.7
17	7 39.4	-0 43	1.147	0.191	8.8
19	7 40.7	-2 05	1.149	0.197	8.9
21	7 42.3	-3 21	1.152	0.204	9.0
23	7 44.0	-4 30	1.155	0.211	9.1
25	7 46.0	-5 33	1.158	0.218	9.2
27	7 48.1	-6 31	1.161	0.225	9.3

THE ASTROPHOTOGRAPHERS CORNER

by
Larry F. Kalinowski

PART I - CORRECTING FOR ATMOSPHERIC EXTINCTION

Quite often the astrophotographer becomes faced with the trying task of photographing an astronomical event that is taking place near or close to the horizon. Nearly all photographers realize that the line of sight along the ground to the horizon passes through a greater quantity of atmosphere than the line of sight that extends upwards. A person's ability to see the setting Sun without protection as compared to viewing the Sun when it is directly overhead attests to atmospheric extinction.

The problem with atmospheric extinction is that it varies with the altitude above the horizon. The exposure for an astronomical event happening two degrees above the horizon will not be the same as the exposure for the same event if it happened ten degrees above the horizon.

The amount of extinction can be calculated from the following:

$$\text{EXT} = \frac{\frac{1}{\cos (90-\text{alt})}}{8.7}$$

Where: EXT is the extinction in magnitudes; Cos is the Cosine; and alt is the altitude of the object above the horizon.

Knowing the extinction, the A.S.A. correction factor can be calculated:

$$\text{CF} = \frac{1}{2.5^{\text{EXT}}}$$

This equation raises 2.5 to the extinction power. Multiply the A.S.A. rating of the film in your camera by this correction factor and the result will be your effective A.S.A. You can then use the effective A.S.A. to determine your exposure from The L.F.K. Astronomical Exposure Guides. A table of altitudes, extinctions and correction factors are included on the next page for those who wish to do it the easy way.

CORRECTING FOR ATMOSPHERIC EXTINCTION

ALTITUDE (Deg.)	EXTINCTION (Mag.)	ASA CORRECTION FACTOR
0.75	8.76	.00032
1.0	6.58	.0024
1.25	5.26	.0081
1.5	4.39	.018
1.75	3.76	.031
2.0	3.29	.049
2.25	2.92	.068
2.5	2.64	.089
2.75	2.39	.111
3.0	2.20	.133
3.25	2.02	.157
3.5	1.88	.178
3.75	1.75	.201
4.0	1.65	.220
4.25	1.55	.242
4.5	1.46	.262
4.75	1.38	.282
5.0	1.32	.298
6.0	1.10	.364
7.0	0.94	.423
8.0	0.83	.467
9.0	0.73	.512
10.0	0.66	.546
11.0	0.60	.578
12.0	0.55	.606
13.0	0.51	.628
14.0	0.47	.653
15.0	0.44	.671
16.0	0.41	.689
17.0	0.39	.704
18.0	0.37	.714
19.0	0.35	.729
20.0	0.33	.739

Precise Telescope Alignment

Lou Faix

For the observer who wants to use setting circles to find sky objects or do guided astrophotography, precise alignment of the telescope with the earth's axis is essential. There are several methods of aligning a telescope, but I have found this method to be reliable and much more precise than just sighting on Polaris which isn't really at the pole at all.

The first step is to properly collimate the mirror to be sure the optical or sighting axis is straight through the middle of the tube. The easiest method is described in Sam Brown's book "All About Telescopes" on page 150.

The second important step is to check the squareness of the telescope axis to the declination shaft. An easy way to do this is shown in Figure 1 on the next page. Set the telescope so that the tube is directly over the polar shaft and lock the polar axis. Put the tube parallel to the polar shaft and measure the distance between the tube and polar shaft. Swing the telescope tube 180° around the declination shaft and measure again. The dimensions must be the same. If they're not, shim the declination flange or the tube on the end which is the closest. An inside measuring tape measure is useful. This adjustment is critical for using setting circles.

Now set the telescope up in the field and get the polar axis pointing close to Polaris, the almost north star. You'll need an inexpensive 12" carpenter's level and adjustable angle for the next step. If you travel about (more than ten miles) north or south of home, a state map to determine your local latitude is also useful. Adjust the angle to match the latitude of your position. (Stargate is 42°41') With the tube straight above the polar axis, set the angle on the tube as shown in Figure 1 and lay the carpenter's level on top. Adjust the mount pivot or the legs until the bubble is in the middle of the glass tube.

Finally, put a cross hair eyepiece in and locate a star near the celestial equator and near the meridian. Rotate the eyepiece until the cross hairs are set north to south and east to west. This is accomplished when the star moves parallel to a hair while moving the telescope around only one axis. Now figure out which side of the eyepiece is north. Put the star at the cross hair and move the telescope toward the North Star (up) using only the declination axis. The star will move toward the south edge of the eyepiece. Remember which side is north and which side is south.

Put the star back on the cross hair and lock the declination shaft. Wait five minutes and look again. If the star has moved to the south, the polar axis is pointed too far to the east and must be adjusted a little to the west. If the star has moved to the north, the polar axis is too far to the west and must be aimed a little to the east. Usually only minor adjustments are necessary, and after some practice you can be right on after only two tries. Figure 2 illustrates the star motion.

The whole procedure can usually be done in fifteen to twenty minutes. You can start even before darkness is complete and lose no valuable observing time.

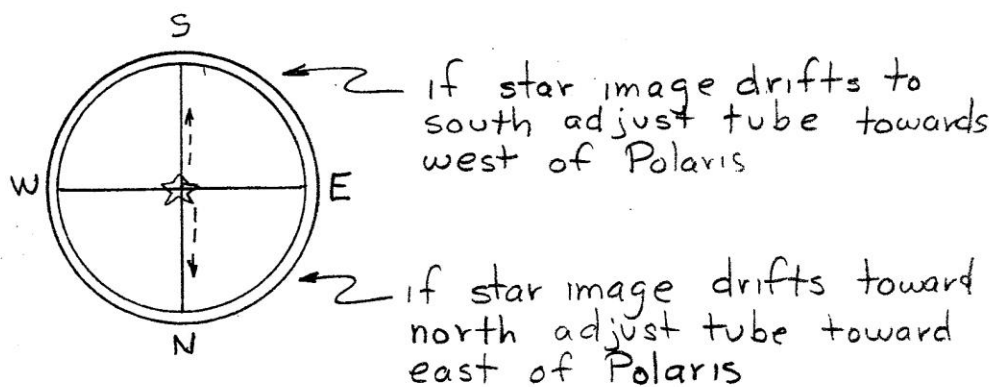
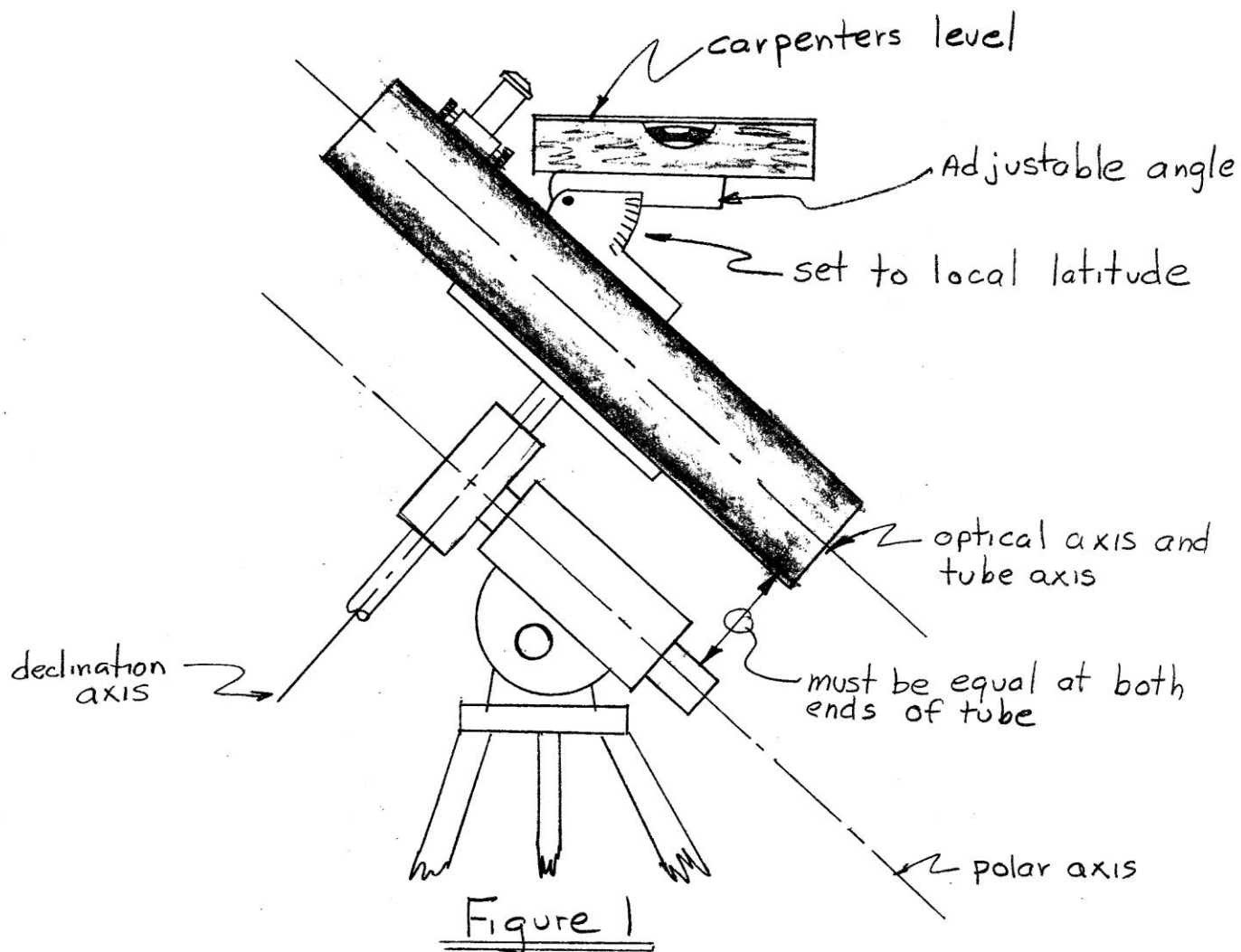


Figure 2

WARREN ASTRONOMICAL SOCIETY (WAS)

Activity for December, 1974:

December 19th – General meeting at South Campus, MCCC:

- (1) Slide presentation and NASA narration of Pioneer II trip to Jupiter
- (2) Movie – Part II “The Violent Universe”
- (3) Amateur Astronomer, Louis Faix, lecture on “Ways of Observing and Photographing the Asteroid Eros”
- (4) Christmas slide show presentation with music

December 20th – Annual Christmas Banquet

To be held at Paradise Villa at Long Lake Road and Livernois Road. Dinner and special slide presentation by Frank McCullough called “The Winter Astronomers”. For information call 491-8752. Frank McCullough is President of the Warren Astronomical Society and he and his wife, Diane, were two of the members who sailed aboard the Canberra to the Coast of Africa to view through their telescopes and to photograph the longest Solar Eclipse of the Century in 1973. Others who will be attending the banquet and who also sailed aboard the Canberra are: Ginny McCullough, Jerry Persha, Dave Harrington, Pete Kwentus, Gary Korin, Mark Christensen, Bill Whitney and his wife, Sandy and Tim Skonieczny. Dr. David Harrington transported his 14 inch Newtonian telescope aboard the Canberra to view and photograph the eclipse. Many slides and movie shots were made of the scene aboard the deck of the Canberra showing the many telescopes set up to record the eclipse. Diane McCullough did some outstanding photography of the eclipse, obtaining a record seven diamond rings—an exceptional performance! The comet Kohoutec was photographed by many who are attending the banquet from October 1973 to February 1974.

WARREN ASTRONOMICAL SOCIETY (WAS)

A Sky-observing, Telescope-making club open to the public which was begun in 1960 and met at the Warren Lincoln High Building in Warren, Michigan. It is now a member of the Inter-Club Council at Macomb County Community College in Warren, Michigan.

Meetings are held four times a month—(1) The Messier Group, (2) The Astrophotography Group, (3) The General Meeting held at the College, (4) The Telescope-Making Group.

Extra-curricular activities members have participated in are:

Other astronomical clubs' meetings, conferences, special lectures and telescope fairs throughout Michigan and Ohio.

Planetarium visits throughout Michigan and Ohio.

Regional conventions and National Astronomical League conventions held yearly in various parts of the country.

Observation of the 1970 Solar Eclipse at Perry, Florida and Greenville, North Carolina.

Observation of the Apollo 16 Launch at Cape Kennedy in 1971 and of the Apollo 17 Launch in 1972.

Observation of the 1972 Solar Eclipse at Cap Chat in Canada and at Prince Edward Island.

Observation of the 1973 Mercury Transit of the Sun at Greensboro, North Carolina, Utica and Warren, Michigan.

Observation of the 1973 Solar Eclipse aboard the ship Canberra off the coast of Africa.

The WARREN ASTRONOMICAL SOCIETY sponsored the National Convention of The Astronomical League in August 1974 at Michigan State University, East Lansing, Michigan. During that week, lectures were given by amateur astronomers and by professionals; NASA exhibits were viewed and a Moon Rock from NASA was on display. The 24 inch computerized telescope was visited at MSU and also Abrams Planetarium on campus. The 85 foot Radio telescope at the University of Michigan in Ann Arbor was visited as was their 52 inch telescope. People from all over the United States attended this convention. The 1975 Astronomical League Convention will be held in Atlanta, Georgia in August which members will also attend.

Members will be attending the Apollo Soyuz launch at Cape Kennedy in June or July of 1975.

Astrophotography is done continually by members and slides are shown of their work at each meeting.

WARREN ASTRONOMICAL SOCIETY (WAS)

Members who worked on the National Convention held at Michigan State University in August of 1974:

Frank McCullough, Chairman
Louis Faix, Program Chairman
Diane McCullough, Food Services Chairman
Pete Kwentus, Displays Chairman
Don Misson, Transportation Chairman
Beverly Bock, Hospitality-Housing Chairman
Larry Kalinowski, Registration Chairman and Treasurer
Registration assistants: Diane McCullough
Beverly Bock

Ken Wilson, Audio Visual Chairman

SPECIAL SLIDE PRESENTATIONS:

Roger Civic
Jerry Persha
Mark Christensen
Gary Ross
Jack Schmansky
Gary Morin

PRESENT CLUB OFFICERS, CHAIRMEN AND ASSISTANTS:

Frank McCullough, President – 791-8752
Louis Faix, 1st Vice President – 781-3338
Larry Kalinowski, 2nd Vice President – 776-9720
Diane McCullough, Recording Secretary – 791-8752
Angie Bommarito, Corresponding Secretary – 884-0528
Jean Baldwin, Treasurer – Co4-4082
Beverly Bock, Publicity Chairman - 781-5286
Ken Wilson, Editorial Chairman – 268-9337
Frank McCullough, Editorial Chairman – 791-8752
Public Relations Committee:

Roger Civic – 775-6634
David Harrington -
Louis Faix – 781-3338
Pete Kwentus – 771-3283

Stargate Observatory Roster:

Pete Kwentus – Chairman – 771-3283
Larry Kalinowski – 776-9720
Louis Faix – 781-3338
Frank McCullough – 791-8752
Diane McCullough – 791-8752
Roger Civic – 775-6634
Dave Harrington –
Don Misson – 776-0424
Beverly Bock – 781-5286
Kim Dyer –

The Observatory houses a 12 inch Cassegrainian telescope and is available for use to Scouts at Camp Rotary, New Haven, Michigan and to members for use in photography upon request. Messier contests are held periodically at the observatory by members using their own telescopes.