

WESTMINSTER ASTRONOMICAL SOCIETY
of Carroll County, Maryland

Newsletter for October 1985, Vol 2 No 10

October: 30th at WMC

Jim Trexler (see photograph, Sky & Telescope SEP-83, p. 250) shall discuss "Deep Sky Observing/Cluster Validation" at the October meeting. Mr. Trexler, a member of the National Capital Astronomers of Washington, has organized a program for verifying the existence of open star clusters that were classified as "non-existent" in the Revised New General Catalog of Nonstellar Astronomical Objects (Sulentic/Tifft, 1973). This type of program is perfectly suited for amateurs and their instruments. Walter Scott Houston describes Cluster Validation as "an interesting project, though one with little promise of fame" (Sky & Telescope Sep-85, p.290). This is not surprising as nearly all amateur activities are anonymous. Mr. Trexler works at the U.S. Naval Research Laboratory in Washington, D. C.

The meeting shall be Wednesday October 30. Dinner with the speaker begins at 6:15 p.m. at Fan's Chinese Restraunt. The meeting, in Room 111 Lewis Hall, Western Maryland College, begins at 7:30.

President's Message

October is the busiest month in the life of our group. The second weekend in October has two star parties as well as a tour of the Space Telescope Science Institute in Baltimore. Star party information and maps are enclosed. The Space Telescope tour is on Saturday, October 12. I feel sorry for anyone who ends up missing it!

The following Saturday is our Fall Astronomy Day. We hope that many of you can bring something to display. If not, at least come and help us meet the public. If you are too shy to meet people, then come for the exhibits. Just come!

For those who want to participate in an interesting observing project, come to the meeting October 30. Jim Trexler has been coordinating a search for star clusters that have been classified as "nonexistent". How can a cluster disappear? They don't -- some mistakes have been made and here is a chance to help correct them. I have seen a number of nonexistent clusters while participating in the NCA Cluster Validation Program myself.

If you can make both, please attend the dinner before the meeting as well as the meeting itself. It allows you the chance to talk informally with the speaker before the lecture. At the last dinner, those present heard a first hand story from the discoverer of a supernova. The speaker dinner is a truly unique opportunity to meet some interesting astronomers.

In other news our Observing Chairman is in Arizona. Mike Potter is observing from the National Observatory at Kitt Peak, Arizona. We look forward to his return and I am sure we are all interested in finding out what he has been up to out there!

Curtis W. Roelle

WAS Welcome Wagon

The two newest members of the Westminster Astronomical Society are Mike Scalion and Frank Filemyr. Both gentlemen are members of the Active Amateur Astronomers of Maryland, another active astronomy club in the area.

Observational Astronomy 3

Our other newsletter, Observational Astronomy is intended as a guide for active members who wish to be kept informed of events that may not be covered in the big amateur journals, and those who want to perform more meaningful observations. This month OA-3 is no exception.

Of special interest in OA-3 is a copy of Circular 4114 from the Central Bureau for Astronomical Telegrams, telling of the discovery of a new bright comet, **Hartley-Good**. This comet should be visible at both of the star parties this month. Observational Astronomy is written and distributed by our Observing Chairman Mike Potter, and is available free to members. If you have not received OA-3, please contact Mike Potter at (301)235-2017.

October Star Party

The monthly WAS star party shall be on Friday October 11 at the Reisterstown home of Dave Pessagno. Dave's address is 45 Franklin Valley Circle, and the phone number is 526-5128. A map is enclosed with this issue.

Dave's house is the second driveway on Franklin Valley Circle. To get to his observatory, wear old shoes, and cross the horse pasture and narrow creek. Dave has a 13.1" Coulter Odyssey, with a 17.5" Odyssey II on the way!

Twilight ends at 8:05 P.M. EDT. The new comet Hartley-Good should be magnitude 7.7 and culminates at 10:06, at an altitude of about 35 degrees. Comet Halley, fainter at about magnitude 11, rises at 10:49, and culminates at 5:49 a.m., only three minutes after twilight begins.

Space Telescope Science Institute Tour

After getting a few hours sleep after the star party it will be time to go to Baltimore. Saturday October 12 is the day of the WAS tour of the Space Telescope Institute. The schedule is as follows:

9:00 a.m.	Meet in parking lot of Lewis Hall, WMC Depart for Johns Hopkins University
10:00	Arrive at the Space Telescope Science Institute, tour begins
12:00 p.m.	Tour ends, leave for WMC
1:00	Arrive back in Westminster

For those who prefer to meet at the observatory, consult the map in the September Newsletter. Those who wish to carpool shall meet in the parking lot behind Lewis Hall. The tour shall be conducted by Mark Damashek, an astronomer at the Institute.

AAAM invites WAS to an October Star Party

For the strong at heart, after a few more hours sleep following the Space Telescope tour it will be time for another star party. Saturday night October 12, the Active Amateur Astronomers of Maryland hold their monthly star party at the home of Mike Scalion. They invite interested WAS members to attend. Mike's address is 2201 Green Haven Way, Hampstead, telephone 239-3105. Observing begins at end-of-twilight, which is at 8:03. A map is enclosed with this newsletter.

Fall Astronomy Day Set For October 19

WAS' Fall Astronomy Day display will be October 19, at the Eldersburg Branch of the Carroll County Public Library, at the intersection of MD Rt. 26 & Hemlock Drive, across from the Carrolltowne Shopping Center. We still need volunteers to bring exhibits for display. An exhibit can be posters, maps, telescope, a binocular, photographs, sketches, models, video (VHS) cassettes, computers, and so on. A display should reflect your interest in astronomy. The displays shall be indoors, while telescopes shall be set up outside for solar (and perhaps lunar) observing, if weather permits.

We need volunteers to greet guests, hand out information, sell Halley Comet books, answer questions, and ensure the smooth operation of the exhibition. We shall set up our displays at 9:30 a.m. The exhibit begins at 10:00 a.m. and ends at 4:30 p.m. Please come even if you are not able to attend the whole day. Call Eugene Sterner, FAD Coordinator, 346-7725 for information.

WAS Halley Program in February

We are proud to announce that Dr. John Brandt, Chief of NASA's Laboratory for Astronomy and Solar Physics at Goddard shall speak at the February meeting. Dr. Brandt is one of the most renowned comet experts in this country and we are fortunate to have him speak to us. Recently he has published a book with Robert D. Chapman entitled The Comet Book: A guide for the return of Halley's Comet. Reviews for this book may be found in Sky and Telescope AUG-85, pp. 129-130, and Astronomy OCT-85, pp. 85-86. I like this book because contrary to the title, it speaks little of Halley in particular, and more of comets in general.

Dr. Brandt (Sky and Telescope SEP-85, p. 200) was involved in the recent ICE flyby of Comet P/Giacobini-Zinner as a comet scientist. He is also active in preparations for Halley's Comet. Dr. Brandt is one of the coordinators of the International Halley Watch (everyone who has Edberg's Halley Manual, turn to p. 1-4). Brandt is coordinator of Large Scale Phenomena which includes wide angle photography of the dust and plasma tails. Anyone who plans to submit photographs to the IHW can be assured that there is a good chance that Dr. Brandt shall look over your work.

This early warning is intended to enable members to plan

their schedules so that they will not miss the February 26 meeting. Comet Halley will have just passed perihelion on February 9, and will be coming out of conjunction with the sun, approaching its peak brightness. Dr. Brandt should be able to provide last minute predictions and observing suggestions.

ICE Encounters P/G-2

Without doubt everyone reading this has heard of the U.S. space mission that flew a probe through the tail of periodic comet Giacobini-Zinner on the morning of September 11. Dr. John Brandt, Chief of Nasa's Laboratory for Astronomy and Solar Physics at Goddard Space Flight Center (and scheduled speaker at February WAS meeting) describes the International Cometary Explorer mission:

"Our Single most important scientific objective is to penetrate the tail of the comet and to measure its magnetic field and plasma. The comet tail is divided by what we call an electric current sheet into a north and south magnetic side. We hope to find out whether that separation holds along the entire length of the tail, or if there really is an organized magnetic structure in the tail."

That is all we need to know about ICE for now. What was this spacecraft doing before being redirected to its encounter with the hairy star? This short article tells some of the unknown facts about the original mission.

A program was conceived in the late 60's to perform the first detailed study of the interaction between the Earth and the interplanetary medium. The agreement called for three spacecraft, built by NASA and the European Space Agency (ESA) to be launched. The satellites were named the International Sun-Earth Explorer (ISEE) mission. ISEE-1 and ISEE-2 would orbit the earth, while ISEE-3 would be placed between the Earth and Sun to monitor the solar wind. The spacecraft would observe responses and fluctuations in the magnetosphere, as well as exploring its structure and features. The magnetosphere is an area extending some 40,000 miles from earth to sun, and 800,000 to 16,600,000 miles in the opposite direction.

ISEE-1 and ISEE-2 were launched on October 22, 1977. They were respectively built by NASA and ESA. They were launched aboard the same Thor Delta rocket from the Cape Canaveral Air Force Station, in Florida. They were placed in highly elliptical orbits with apogees (farthest points) of 23 Earth radii (about 87,000 miles) and perigees ranging from 170 to 1,865 miles. During their orbits these spacecraft moved into and out of the geomagnetic tail of the earth.

ISEE-3 was launched from the same site on August 12, 1978. On November 20, 1978 ISEE-3 was placed in a "halo-orbit" around the L1 Libration point of Earth. At this point, located 900,000 miles from earth in the direction of the sun, the gravitational forces of the two bodies are in equilibrium, as shown in Fig 1. From this point ISEE-3 could observe the solar wind approximately one hour before it reached the Earth's magnetosphere, where ISEE-1 and ISEE-2 orbited. ISEE-3 was an early warning sensor that allowed the other two satellites to prepare for analysis of the dynamic processes during the magnetosphere's response to inter-

planetary conditions detected by ISEE-3.

The United States has no space mission to Halley's Comet, unlike the Japanese, Soviets, and Europeans. Each proposed comet mission had met the budget cutting axe. These included (1) Halley Rendezvous Mission, using a new technology ion drive, (2) International Comet Mission, a two-for-one comet mission to P/Halley and P/Tempel-2, and finally (3) Halley Intercept Mission which met its budgetary death in 1981.

With most of the ISEE-3 objectives having been completed, Dr. Robert W. Farquhar, a Goddard aerospace engineer, came up with a low budget plan to send ISEE-3 to an encounter with G-2. Low budget is \$2-3 Million, compared to the hundreds of millions it would have cost to develop a new mission for a flyby of P/Halley. Farquhar computed a flight path using gravitational assistance from the Earth and Moon, as well as firings from small thrusters. How much assistance was needed? Five close encounters with the moon.

On June 10, 1982 ISEE-3 was nudged out of its halo orbit toward earth. Here is where the second mission of ISEE-3 began, the study of the geomagnetic tail. The probe crossed the magnetic tail collecting data in October 1982, January-March 1983, and May-September, 1983.

The Lunar flybys occurred as shown:

Flyby	Date	Height	Figure
S1	March 30, 1983	12,000 Miles	Fig 2, 3
S2	April 23, 1983	12,000 Miles	Fig 3
S3	September 27, 1983	12,000 Miles	Fig 3, 4
S4	October 21, 1983	12,000 Miles	Fig 4
S5	December 22, 1983	75 Miles	Fig 4

During the 19 month journey, ISEE-3 traveled 15 million miles. Following the last lunar encounter, a scant 75 miles high on December 22, 1983, ISEE-3 was renamed the International Cometary Explorer (ICE). From the time the spacecraft left the L1 halo orbit until it reached G-2, it had traveled over one billion miles. This marked the beginning of the third mission of the five year old spacecraft. But you know the rest of this story.

Let us end with a few more interesting notes. ICE (ISEE-3) was built here in Maryland, by Fairchild Space Company in Germantown. Dr. Farquhar expects ICE to travel another 15.8 billion miles, when it shall once again encounter the Earth-Moon system in July 2012. He hopes to once again employ the assistance of lunar gravity to put ICE in an earth-orbit. By that time the U.S. space station should be in orbit, and it is conceivable that an Orbital Transfer Vehicle (WAS Newsletter NOV-84 p. 3) would be sent to fetch ICE and bring it to the station, which can be reached by the space shuttle. The space shuttle would return ICE to earth where it could be studied after being exposed to the space environment for nearly 34 years. Eventually it would be placed on display at the Smithsonian Air and Space Museum.

The editor wishes to thank Darlene Ahalt of the Office of Public Affairs, Goddard Space Flight Center, for providing all information used in preparing this feature.

INTERNATIONAL
COMETARY
EXPLORER

TRANSFER FROM L1 HALO ORBIT TO GEOMAGNETIC TAIL

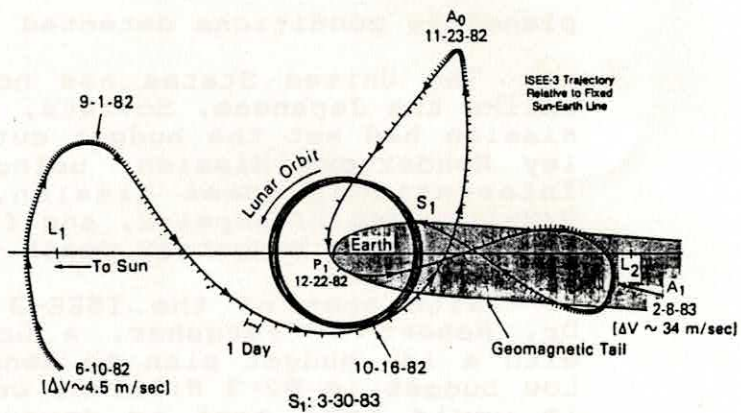


Figure 2

HALO ORBIT AROUND SUN-EARTH
LIBRATION POINT

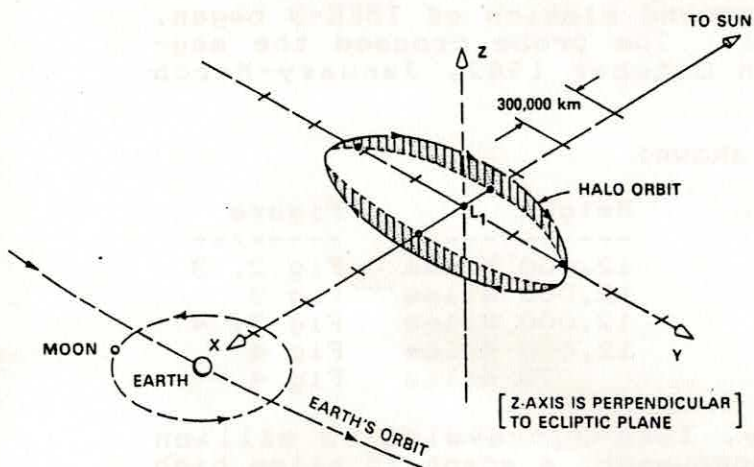


Figure 1

ISEE-3 ESCAPE TRAJECTORY

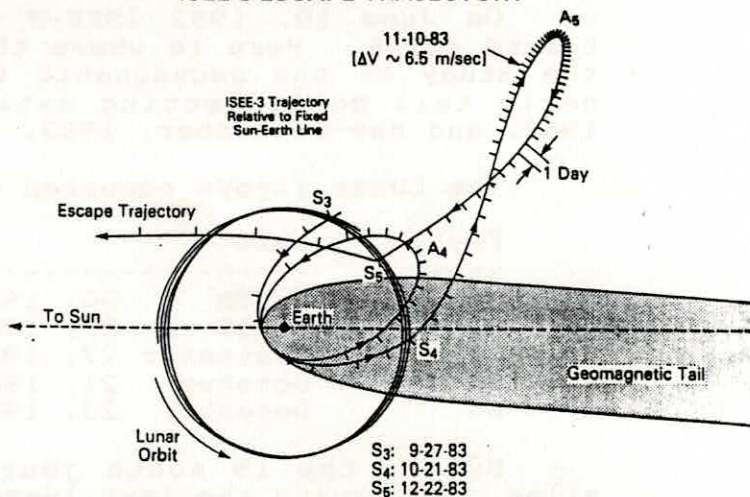


Figure 3

FIVE-MONTH GEOTAIL EXCURSION

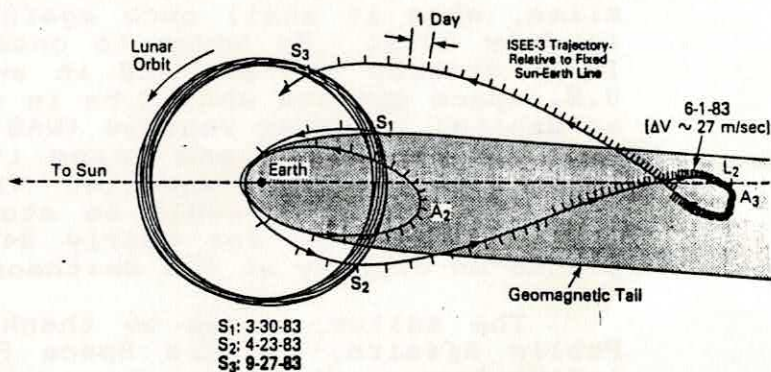
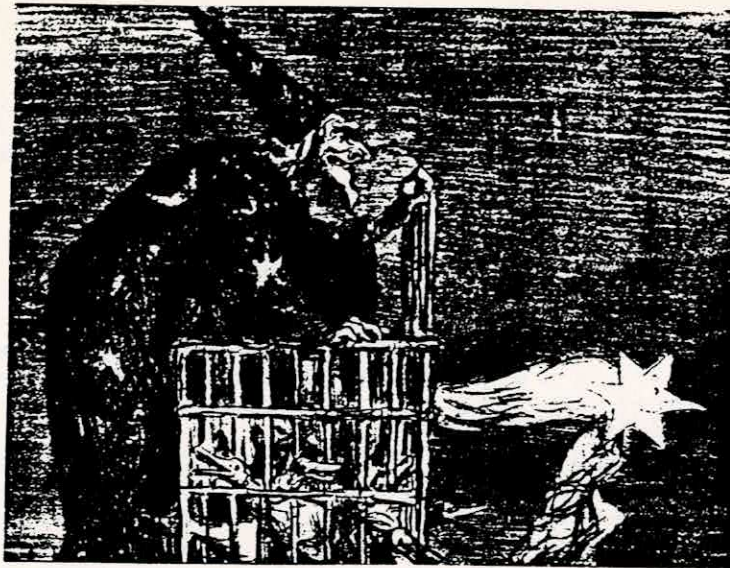


Figure 4



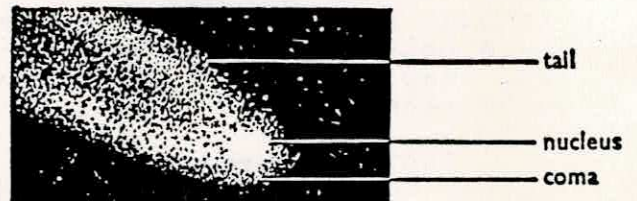
WHERE DO COMETS COME FROM?

Although a single answer to the question of where comets come from has not been accepted by all astronomers, a majority agree that comets are "dirty snowballs" composed of frozen gasses mixed with dust. Comets are believed to orbit the sun in a large shell known as the Oort Cloud located some 50,000 times farther from the sun than the earth. There are estimated to be over 100 billion comets in the Oort cloud, with a combined mass equivalent to that of the earth.

At such a distance from the sun, a comet may be perturbed by distant stars as they pass by, over a course of thousands of years, altering the orbit and causing the comet to plunge toward the sun. Most comets spend thousands of years on the sunward journey, only to swing around the sun and be flung, as if by a sling-shot, back out into space never to return again. Sometimes a comet will pass near a planet such as Jupiter or Saturn, whose gravitational force alters the comet's orbit. The comet may then be "captured" by the sun, and will orbit it like a planet. Halley is such a comet. It orbits the sun in a very elliptical orbit once every 76 years.

WHAT ARE COMETS MADE OF?

Comets are relatively small, the nucleus being only a few miles across. As the comet approaches the inner solar system, volatile materials such as water sublime to form a coma or "hair" around the nucleus. As the comet approaches the sun, the pressure of the solar radiation or "solar wind" causes the tail to form. Comet tails have been known to reach 100 million miles in length, more than the distance that separates the earth from the sun. This is remarkable considering the tiny size of the nucleus.



September Meeting

Although those who attended had expected to see Tom Appler's new 10" Newtonian, a change in Tom's plans gave members and guests an unexpected speaker. (Had they known, attendance may have been lower!)

Several years ago Curt Roelle became interested in Calendars. Roelle defines a calendar as an instrument that

- (1) is based on some predictable event, astronomical or human
- (2) models its base accurately (e.g. predicts equinoxes)
- (3) may be used to measure past as well as future events, and
- (4) is easy enough to be used by the common man.

Some basic calendars, solar and lunar were discussed as well as the Julian Calendar reform. By the 16th century the Christian holiday of Easter was occurring earlier because errors in the Julian Calendar had allowed the date of the Vernal Equinox to slip to around March 11. Pope Gregory XIII realized that if use of the Julian Calendar continued, then one day Easter and Christmas would be celebrated on the same day. The calendar we use today is the Gregorian Calendar, named for the Pope, and first established in 1582. The Gregorian Calendar is a modified Julian Calendar. The changes proposed by Luigi Lilio to the Pope were to:

- (1) Drop 10 days between October 4 and 15, 1582
- (2) Skip 3 leap years every 400 years (97 instead of 100)
- (3) Move Leap Day, which had been inserted between Feb 24/25 to the day following February 28.

The idea of removing 10 days met with resistance as it meant lost wages, and "first-of-the-month" bills becoming due sooner, not to mention the fear of loss of 10 days of ones life. The British empire did not adopt the Gregorian Calendar until the mid 18th century, and because of their delay the number of days to be removed had reached 11. Ugly mobs marched through London shouting the slogan "Give us back our 11 days!".

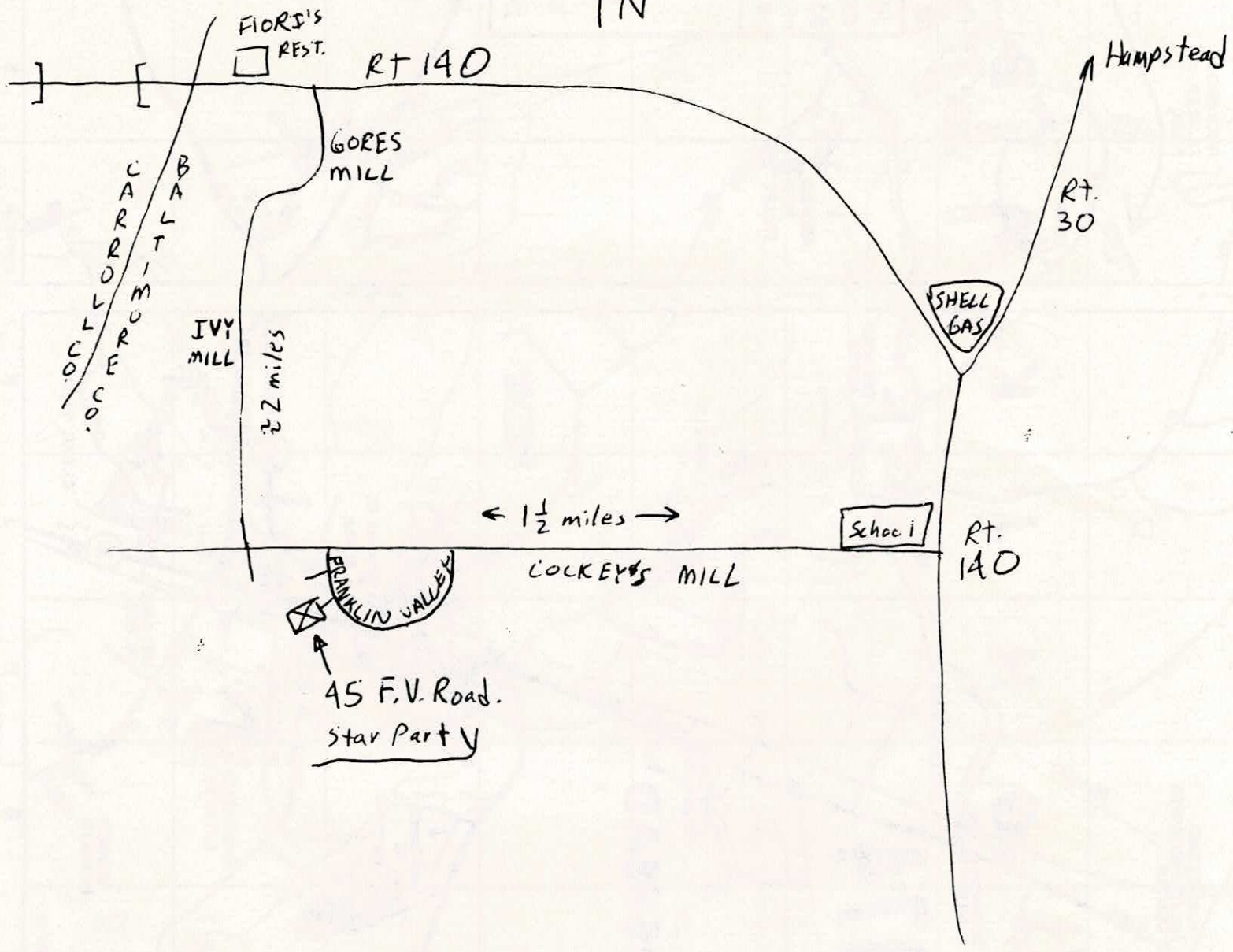
Roelle then turned to the use of perpetual calendars. For the amateur astronomer who wishes to plan in advance observing sessions near the period of the new moon, two new/full moon predictors were described and passed out. These may be found in the JUN-74 and FEB-80 issues of Sky and Telescope magazine. The former is very awkward, while the latter appears to give better results, and calculations can be performed in the head. Both give the new/full moon dates to within one day.

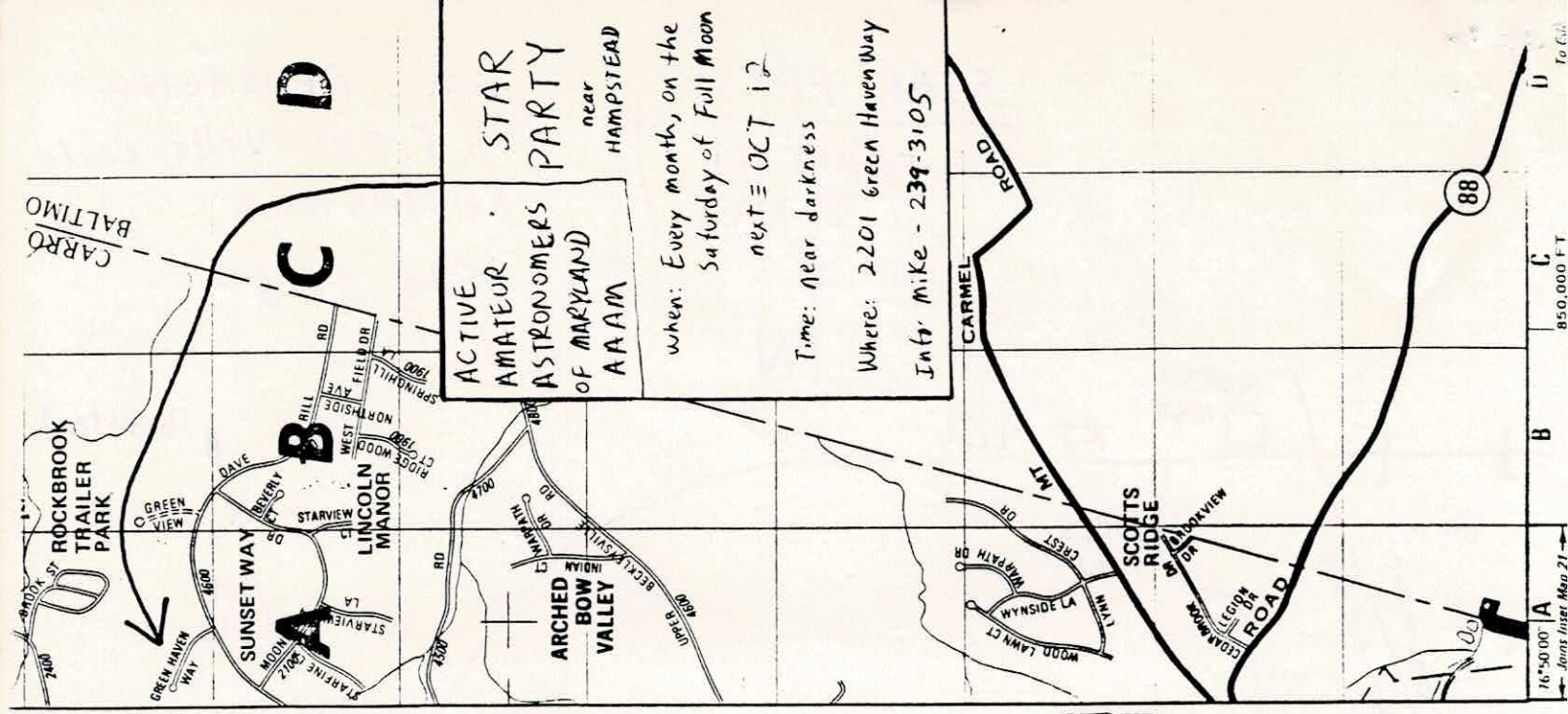
A Gregorian Sliderule Calendar designed by Roelle and described as the "calendar to end all calendars" was distributed to those at the meeting. The design has been registered for patent (though it is unlikely to ever be pursued). The Gregorian sliderule calendar is portable and may be used for dates from October 15, 1582 until that day thousands of years in the future when our Gregorian Calendar is in turn reformed.

The moon predictor and Gregorian calendars may be used together to determine the dates of WAS monthly star parties. Those interested in copies of the calendars should contact Curt Roelle.

STAR PARTY
October 11
7:30 PM

DAVE PESSAGNO
45 Franklin Valley Circle
Reisters town
526-5128





ACTIVE AMATEUR ASTRONOMERS OF MARYLAND AAAM

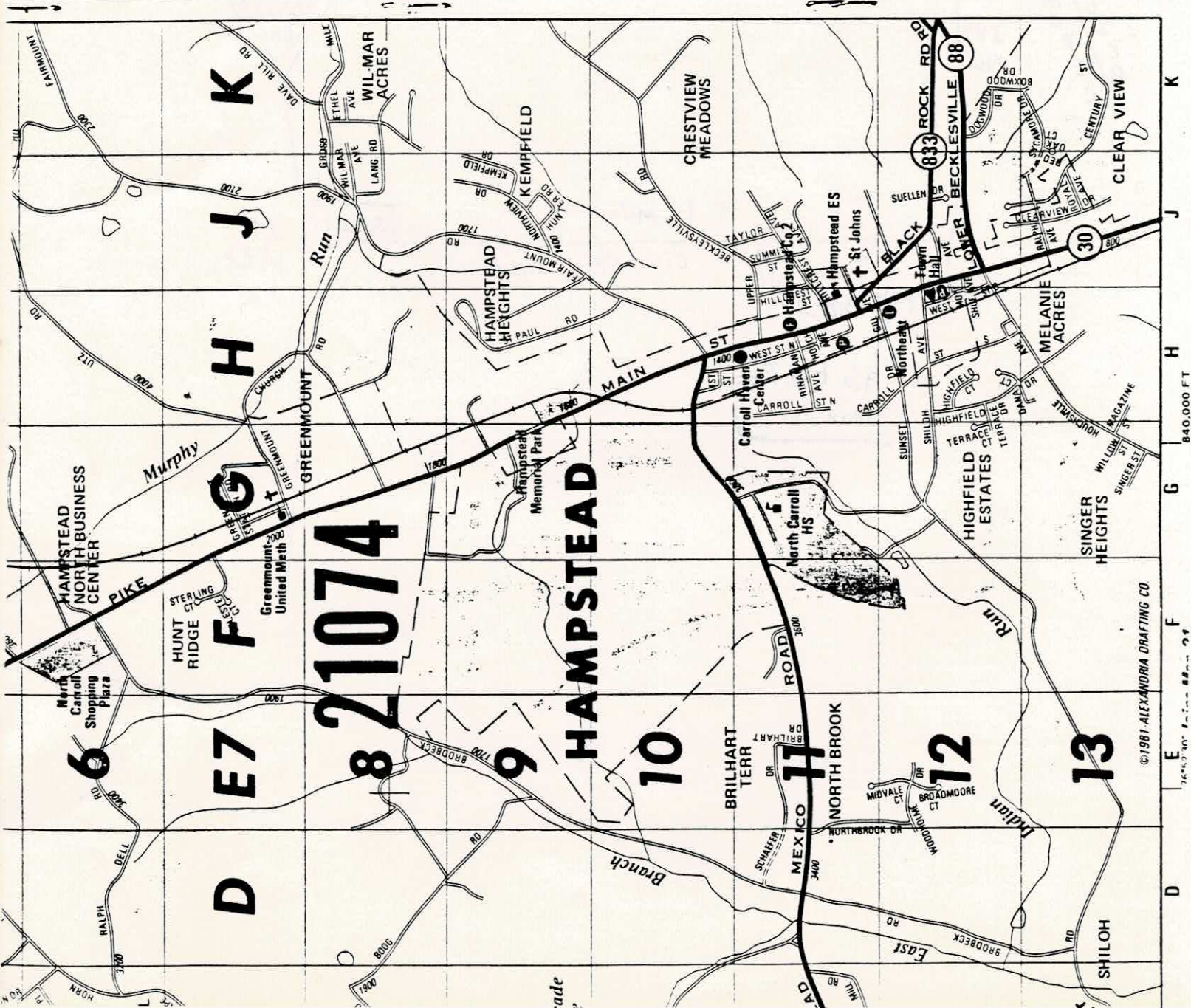
STAR PARTY near HAMPSTEAD

when: Every month, on the Saturday of Full Moon
next = OCT 12

Time: Near darkness

Where: 2201 Green Haven Way

Info: Mike - 239-3105



821074

HAMPSTEAD

Westminster Astronomical Society Membership List

* Tom & John Appler [F]	737 Lees Mill Rd, Hampstead 21074	239-8070
* Todd Bonner [S]	518 Geneva Dr, Westminster 21157	848-7839
Russell A. Dick [S]	22 Middlegrove Ct West, Westminster	848-9054
Frank Filemyr [S]	2112 Woodview Rd, Finksburg 21084	876-1924
Kenneth Flynn Jr. [S]	503 David Ct, Mt. Airy 21771	829-0582
Bernie Fortenbaugh [F]	2430 Braddock Rd, Mt. Airy 21771	635-6397
Lyndon Gibbs [S]	318 Royer Rd, Westminster 21157	876-7549
Dennis Mishler [S]	606 Roundtree Ct, Sykesville 21784	795-6330
Joe Pekala [F]	3300 Hooper Rd, New Windsor 21176	635-2601
Dave Passagno [S]	45 Franklin Valley Cir, Reisterstown 21136	526-5128
* Mike Potter [S]	2809 St. Paul St, Baltimore 21218	(301)235-2017
Tom Prall [S]	440 Lees Mill Rd, Hampstead 21074	374-6503
Steve Rice [S]	8328 A Walter Martz Rd., Frederick 21701	(301)663-6054
* Clifton A. Richards [F]	398 Leyton Rd, Reisterstown 21136	833-8247
Walter Richards [S]	2645 Robert Arthur Rd, Westminster	346-7596
* Blaine & Frank Roelke [F]	6700 Keysville Road, Keyser 21757	756-2886
* Curt & Cheryl Roelle [F]	3481 Salem Bottom Rd, Westminster	848-6384
Mike Scallion [S]	2201 Green Haven Way, Hampstead	239-3105
Robert Sier Jr. [S]	10219 Liberty-Daysville Rd Walkerville 21793	(301)898-5949
W. Eugene Sterner [S]	4625 Old Hanover Rd, Westminster	346-7725

* charter members whose membership expires in November. Next month renewal notices shall be sent.

Planetarium Billboard

Two small planetariums in the area are offering public shows in October and November. We assume the shows are free.

Catonsville Community College Planetarium has "Halley's Comet" at 1:00 p.m. October 20, and a Halloween special at 11:00 a.m. October 26. For more information call 455-4560.

Frederick Co. Planetarium is located at the South Frederick Elementary School, 102 Madison St. The entrance is in the rear of the building. The same program (name not known) shall be shown through November and December, Wednesday nights at 7:30 p.m. The doors open at 7:00. The program is presented by the Earth & Space Science Lab of Frederick County. Call 694-1462 for information.

WAS CALENDAR

October 11	Star Party, Dave Pessano -- Reisterstown
12	9:00 a.m. Space Telescope Institute Tour 1:00 p.m. (Meet at WMC)
October 12	Star Party, Mike Scalion -- Hampstead
October 15	8:00 p.m. Astronomy Lab at WMC Lewis Science Hall
October 22	8:00 p.m. Astronomy Lab at WMC Lewis Science Hall
October 29	8:00 p.m. Astronomy Lab at WMC Lewis Science Hall
October 30	6:15 p.m. Dinner with speaker -- Fan's Restraunt 30 7:30 p.m. Meeting/Lecture -- WMC Lewis Hall
November 5	8:00 p.m. Astronomy Lab at WMC Lewis Science Hall
12	8:00 p.m. Astronomy Lab at WMC Lewis Science Hall

Westminster Astronomical Society

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Westminster, Maryland 21157