

NEWSLETTER of the WESTMINSTER ASTRONOMICAL SOCIETY
August 1984, Vol 1 No 3

Meeting Facilities Obtained Beginning with the August meeting, WAS shall meet in the Lewis Science Hall, at Western Maryland State College, in Westminster. We owe thanks to William Achor of the Physics Department who has gone out of his way to help. There is a \$20 charge per meeting assessed by the college. However the Physics Department will cover us for August, and Mr. Achor hopes to get the charge waived in time for the September meeting. The college also owns three Celestron 8" telescopes. It is not clear at this time what access WAS will have with the instruments. Mr. Achor is receptive to the idea of WAS conducting public observing nights at the college at which the Celestrons would be used. Personal use of college property is uncertain at this time. Tom Prall deserves a pat on the back for his diligent efforts in getting us the best location in town.

Next Meeting August 29 at 7:30 p.m The meeting place is Room 111 of the Lewis Science Hall at Western Maryland State College. Mike Schaeffer of Fairchild Space Company will present a "Guide to Telescope Selection", discussing various telescope types, and the advantages, disadvantages, and uses of each type. Examples will be present for inspection. Mr. Schaeffer holds an astronomy degree from the University of Maryland, and the honor of being the first WAS guest speaker.

Halley Mission Schedule Threatened by Scrubbed Shuttle The aborted launch June 26 of the space shuttle Discovery on its maiden voyage will impact the launch of Spartan 1. The reusable Spartan 1 is designed for observing in the X-ray region of the spectrum. The spacecraft was to operate for 35 hours 80-100 miles from the orbiter. Spartan was to undergo modifications after the flight to prepare it for a Halley mission. The comet will be observed in the ultraviolet when its position with respect to the sun is unfavorable for other instruments. Spartan 1 was scheduled to be carried aloft by Discovery in August aboard flight 41-F which has been canceled.

The original June 25th launch of shuttle flight 41-D was scrubbed at T-9 minutes because of a failure in the backup computer. Five identical IBM computers are used onboard the shuttle. Four of these operate in a "majority vote" environment. Using identical software, each computer solves a given problem and "votes" on the solution. In case of a tie the fifth computer, or backup, with its unique software decides. When commanded to enter "ascent mode", the backup computer stubbornly refused simply replying "Serious Hardware Failure". The backup computer was replaced with one from the Challenger. Launch was rescheduled for the following day.

On June 26th the launch was aborted by the onboard computers when a failure was detected in one of the three main engines. The sequence calls for engines 3, 2, and 1 to ignite in that order before firing the solid rocket boosters. The fuel valve opened on engine 3 but the oxidizer valve remained closed and the engine did not fire. One Hundred and twenty milliseconds (0.120 sec) later engine 2 fired. Engine shutdown occurred 2.6 seconds later, 4 seconds before the solid rocket boosters were to be ignited.

Immediately after the abort a hydrogen fueled fire started at the base of the orbiter. The heat of the fire was less than the heat generated during launch, but the danger of an explosion from the buildup of propellant pressures in the main propulsion system prompted the test director to recommend considering a "Mode 1" astronaut evacuation. In a Mode 1 evacuation the crew would abandon ship, descend to the ground in slide wire gondolas, board an armored vehicle, and leave the launch area.

Although engine 1 was never powered, controllers received an indication that the engine was not only on but could not be turned off, threatening a runaway situation. Controllers transmitted urgent messages among themselves and Houston to determine if the engine was on. Relief came when Commander Hartsfield reported "We have a red light on engines two and three...not on one".

The probable cause of the valve failure is suspected to be loose insulation on a hydrogen fuel line that caused purging nitrogen gas to liquify. This cold fluid then dripped, freezing the valve's actuator. However tests failed to confirm this so the entire engine was replaced with one from Challenger. The replacement was Discovery's original engine 1 before installation in the other orbiter.

Primary cargo aboard 41-D were the Hughes/Navy Leaseat and the McDonnell Douglas continuous flow electrophoresis experiment. When Discovery is flown it will also include

two satellites from the cancelled 41-F mission, Satellite Business Systems SBS-D and Telstar 3-C. The second Leasesat satellite scheduled for 41-F may not be flown until 51-C in November, a mission that may include an attempted rescue of the Palapa/Westar satellite that failed to achieve orbit earlier this year when a rocket failed on the Payload Assist Module (PAM) used to boost the satellite from shuttle orbit into geosynchronous orbit. Currently Spartan 1 is scheduled for possible launch in October aboard flight 41-G.

NASA's director of shuttle management and operations is confident that its payload customers "are sophisticated enough to understand the growing pains of a new and exciting system". Flight 41-D liftoff is rescheduled for August 29 at 8:35 a.m. EDT. Landing will be September 4 at 9:31 a.m.

Moon Astronauts Recall Experiences On the night of July 20, 1969 man first set foot on the moon. Fifteen years later four astronauts who have been there including one who walked on that historic night, commemorated the event at the Smithsonian Air and Space Museum on July 20. The four astronauts were Alan Bean, Lunar Module pilot of Apollo 12 and a member of the second Skylab mission, Alfred Worden, Command Module pilot of Apollo 15, Former U.S. Senator Harrison Schmitt, Lunar Module pilot of Apollo 17 and last human to set foot on the surface, and Edwin (Buzz) Aldrin, Lunar Module pilot of Apollo 11. The evening's moderator was Walter Sullivan, author and Science editor for the New York Times. Following the panel discussion the NASA film "Hail Columbia" was shown on the Langley Theater's 50-foot tall screen.

July Meeting Highlights The July meeting was used to iron out a constitution, or charter. Several positive changes were made to the preliminary version. An elected office has been added. The "Director at Large" is a member in good standing that serves on the Executive Committee. To keep mundane matters out of the regular monthly meetings, the January meeting will be devoted to club business. Officers will be elected at the January meeting as well. Updated copies may be obtained at the August meeting.

Clear skies followed the meeting allowing observation of several "deep-sky" objects. The nearest of the observed objects is M27, the "Dumbbell" nebula, 3,400 light-years (20,000,000,000,000 or twenty thousand million million miles) distant. The farthest is a pair of galaxies called M51/NGC5195, the "Whirlpool", 7 million light-years away, over 2000 times farther than M27. Closer to home, a number of meteors of the Delta Aquarid shower were seen.

Copies of a five-page WAS guide "The Most Common Types of Astronomical Objects" were distributed. Additional copies may be obtained at the August meeting.

Talking Science WAS members are keeping the public informed in various ways. Kathy Titus hosts a radio program for the home-bound that features an hour of science news. Don't start twisting your dials though; a special receiver is needed to pick up the special broadcast. Tom Prall has a reporter for the Carroll County Evening Sun in the family. We will therefore receive press coverage of our activities. If anyone has friends that may be interested in astronomy invite them to a WAS meeting. Speakers are being reserved for future meetings so be prepared for possible new members.

Pseudo Club Library Being newly formed, our society has yet to accumulate a library. Libraries are usually assembled by donation and scouring public library sales. Unfortunately, in both cases none but the oldest volumes are usually discarded, or "donated".

I have some astronomy books, most of which are current and some of which have never been read. This newsletter contains a list of "Astronomical Book Selections". These books may be requested either at a meeting or by calling me (848-6384). The book will be delivered to you at the next meeting for example, and may be kept until the following meeting at which time it is due. The book may be rechecked unless someone else has reserved it.

The other side of the sheet has an "Astronomical Reference List". These are used often by yours truly and would be missed if loaned out for a month. They are listed because most are standard guides for any well-equipped star voyager.

Summer Triangle Guide This month's newsletter includes a finder's guide for three constellations. To use the guide go outside on a clear night around the time indicated, and hold the chart over your head with the top pointing north. Look first for the brightest stars, the triangle. When you think you have it try looking for the fainter stars. Sketching the area is a good exercise. Using a pencil, indicate star brightness by dot size and lightly shade in the area covered by the Milky Way.

Astronomical Book Selections

- Abell, George O., **Exploration of the Universe**, 1982
- Bok, Bart J. and Priscilla F., **The Milky Way**, 1981
The classic guide to the wonders of our galaxy.
- Brown, Peter Lancaster, **Star & Planet Spotting**, 1974
Guide to planets and constellations for the new amateur.
- Calder, Nigel, **Einstein's Universe**, 1979
Capsulizes the life and work of Albert Einstein.
- Calder, Nigel, **The Comet Is Coming**, 1980
The history of the famed comet and comet research in general.
- Davies, Paul, **The Edge of Infinity**, 1981
Stretches the mind through abstract thought journeys.
- Dixon, Don, **Universe**, 1981
A beginner's guide, featuring the author's art.
- Ferris, **Galaxies**
Outstanding pictorial guide of our neighboring "Island Universes".
- Harrison, Edward R., **Cosmology: The Science of the Universe**, 1981
Introduction to the study of the beginning and end of the universe.
- Hartmann, William K., **Astronomy: The Cosmic Journey**, 1978
Undergraduate college level introduction to astronomy.
- Hubble, Edwin P., **The Realm of the Nebulae**, 1982/1936
A great classic. Describes the discovery of the expanding universe.
- Ingalls, Albert, **Amateur Telescope Making - Book One**, 1980
One of three volumes of a standard guide for telescope builders.
- Islam, Jamal N., **The Ultimate Fate of the Universe**, 1983
The decay and death of the universe according to modern theory.
- Kraus, John, **Our Cosmic Universe**, 1980
Broad history of modern discoveries by one of the discoverers.
- Moore, Patrick, **Amateur Astronomy**, 1968
An easy to read introduction to astronomy.
- Murdin, Paul, **Catalog of the Universe**, 1979
Contains over 300 color and black and white photographs.
- Noyes, Robert W., **The Sun Our Star**, 1982
Describes composition, cycles, history, and future of the sun.
- Paul, Dr. Henry E., **Outer Space Photography For the Amateur**, 1967
Photographing various objects with and without a telescope.
- Peek, Bertrand M., **The Planet Jupiter: The Observer's Handbook**, 1981
The classic guide to the giant planet.
- Pickering, James S., **The Stars Are Yours**, 1948
A beginner's guide to amateur astronomy.
- Ronan, Colin, **Encyclopedia of Astronomy**
A good intermediate level text covering a broad range.
- Sherrod, P. Clay, **A Complete Manual of Amateur Astronomy**, 1981
Guide for many areas of amateur astronomy including astrophotography.
- Shipman, Harry L., **Black Holes, Quasars, and the Universe**, 1980
Layman's introduction to the strangest known objects in space.
- Shu, Frank H., **The Physical Universe: An Introduction to Astronomy**, 1982
College level text requiring some calculus and physics.
- Sutton, Felix, and Maurer, Alvin, **Conquest of the Moon**, 1969
Excellent elementary level text describing the lunar landing program.
- Taylor, Stuart Ross, **Planetary Science: A Lunar Perspective**, 1982
A lunar scientist summarizes current view of solar system.

Astronomical Reference List

DICTIONARIES:

Moore, Patrick, **The A-Z of Astronomy**, 1976

Wallenquist, Ake, **Dictionary of Astronomical Terms**, 1966

OBSERVING GUIDES:

Burnham, Robert, **Burnham's Celestial Handbook, Vol. 1**, 1978
Covers objects in constellations Andromeda through Cetus.

Burnham, Robert, **Burnham's Celestial Handbook, Vol. 2**, 1978
Covers objects in constellations Chamaeleon through Orion.

Burnham, Robert, **Burnham's Celestial Handbook, Vol. 3**, 1978
Covers objects in constellations Pavo through Vulpecula.

Guzman, Lydel and Brenda, **Observe the Herschel Objects**, 1980
Lists 400 of the 2477 objects discovered by the 18th century astronomer.

Holyoke, Edward A. **A Guide to the Messier Objects**, 1966
Together with an atlas makes a perfect guide to all 100+ objects.

Johnson, Arnold R., **Observe and Understand the Stars**, 1969
Teaches different star types with examples visible in small telescopes.

Sulentic, Jack W., and Tifft, William G., **The Revised New General Catalog of Nonstellar Astronomical Objects**, 1973
Lists nearly 8,000 deep sky objects covering the entire sky.

Webb Society, **Deep-Sky Observer's Handbook, Vol. 2**, 1979
Describes and lists interesting Planetary and Gaseous Nebulae.

Webb Society, **Deep-Sky Observer's Handbook, Vol. 3**, 1980
Describes and lists interesting Open and Globular Star Clusters.

Webb Society, **Deep-Sky Observer's Handbook, Vol. 4**, 1981
Describes interesting galaxies visible in amateur instruments.

Webb Society, **Deep-Sky Observer's Handbook, Vol. 5**, 1982
Describes and lists interesting Clusters of Galaxies.

Yeomans, Donald K., **The Comet Halley Handbook: An Observer's Guide**, 1981
Contains ephemeris and brightness estimates. Prepared by IHW.

ATLANTES:

Becvar, Antonin, **Atlas of the Heavens**, 1962
Czechoslovakian; original name "Atlas Coeli 1950.0". Color charts.

Norton, Arthur P., **Norton's Star Atlas and Telescopic Handbook**, 1969
The standard atlas for the beginning astronomer. Epoch 1950.0

Tirion, Wil, **Sky Atlas 2000.0, Deluxe Edition**, 1981
First amateur atlas for epoch 2000.0. Color charts.

Tirion, Wil, **Sky Atlas 2000.0, Field Edition**, 1981
Features stiff charts with white stars on black background.

OTHER REFERENCES:

Lang, Kenneth R., **Astrophysical Formulae**, 1980
Physical equations, theories, constants, and methods used in astronomy.

TRW Defense and Space Systems Group, **TRW SPACE LOG**, 1980
Lists every manned/unmanned space launch by any country up to 1980.

THE SUMMER TRIANGLE:

ALTAIR, DENEBO, AND VEGA

During summer months the Milky Way soars directly overhead severing the sky with its light. Three 1st magnitude stars are engulfed in the delicate mist of stars. Collectively they are called the Summer Triangle for obvious reasons. Each is a gemstone, showpieces of their respective constellations, prominent enough to be called by name. Altair of Aquila, Deneb of Cygnus, and Vega of Lyra.

The chart below is shown with north at the top. The Summer Triangle region is exactly overhead at the given times for the following dates:

July 1	2:30 a.m. EDT
August 1	12:30 a.m. EDT
September 1	10:30 p.m. EDT
October 1	8:30 p.m. EDT

AQUILA In mythology Aquilla was a bird, an eagle to the Greeks that carried nectar to Zeus while concealed in a cave in Crete. According to the Romans, Aquila bore Jupiter's thunder bolts. The constellation was an eagle in Babylonia in 1200 B.C.

Altair is a white star 1.5 times larger than the sun and 9 times as bright. It is the 12th brightest star we see and only 16 light years away making it one of our nearer neighbors. Two other stars flanking Altair are Tarazed to the northwest and Alschain to the southeast as shown in the chart.

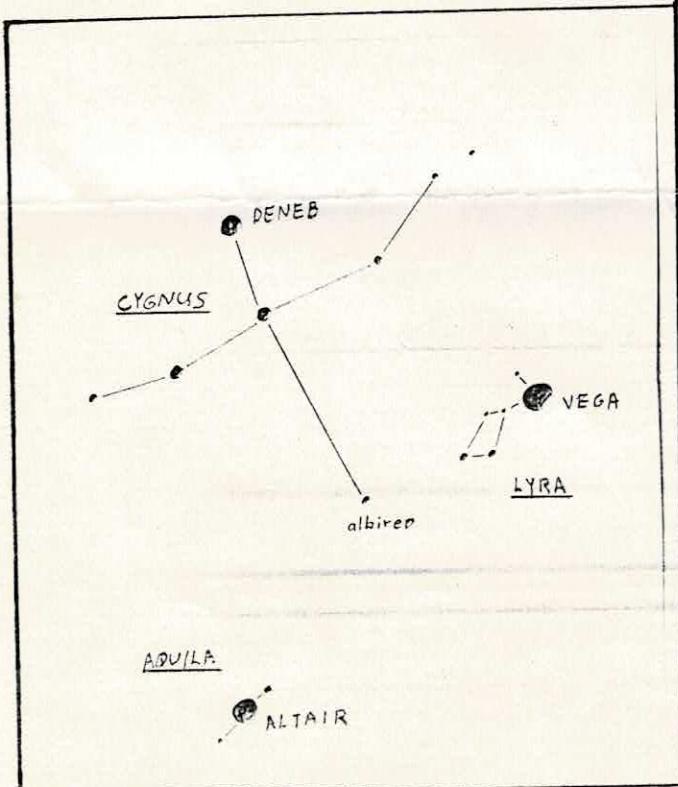
CYGNUS Cygnus is two constellations in one. It can be the Northern Cross, or a long necked swan flying south. The Milky Way regions in Cygnus are extremely rich and slight optical aid will reveal legions of stars.

Although the faintest of the Summer Triangle trio, Deneb has a luminosity of 1600 suns and a mass 25 times as great. The faintness of this great supergiant is due to Deneb's distance of 1600 light years.

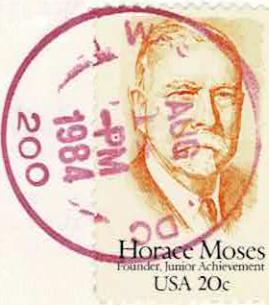
The head of the swan is the star Albireo, a beautiful double star. A telescope with low power will split the pair, one yellow star and one blue.

LYRA Lyra is the 7-stringed harp invented by Hermes and given to his half-brother Apollo. A small and basically ordinary constellation except for one star.

Vega is a brilliant star 58 times as bright as the sun and 27 light years away. The diameter alone is estimated to be 2.7 million miles (the solar diameter is 0.8 million miles) and the mass is triple the sun's. Twelve thousand years ago when the poles of the earth were aligned differently, Vega would have been the north star. Vega was the first star to be photographed on July 16-17, 1850. More recently the Infrared Astronomy Satellite (IRAS) discovered the possibility that a solar system of planets may be forming around Vega thus becoming the first known solar system besides our own. Unfortunately such large stars have a life expectancy only in the millions of years so it is doubtful that life could ever evolve.



WAS



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