Sidereal Times

THE OFFICIAL NEWSLETTER OF THE ALBUQUERQUE ASTRONOMICAL SOCIETY
P.O. BOX 54072, ALBUQUERQUE, NEW MEXICO 87153

JULY 1992

UPCOMING EVENTS

JULY
7-11 Saturday: Monthly Meeting of the Society-7:00 p.m. at Career Enrichment Center
See article on July meeting below.
7-14 Tuesday: Full Moon
7-18 Saturday: Occultation of Theta Ophiuchi (mag 3.4)
7-22 Thursday: Board of Directors Meeting-7:00 p.m.
7-25 Saturday: Occultation of Neptune (mag 8)
7-28 Tuesday: Public Star Party-George J. Maloof Memorial Air Park-See "Public Star Party" article in this newsletter for details.

AUGUST
8-1 Saturday: Delta Aquarid meteor shower
8-8 Wednesday: Star Party at Twinning Observatory site
8-14 Wednesday: First Quarter Moon
8-15 Saturday: Dedication of The General Nathan Twinning Observatory!!
8-16 Saturday: Perseid Meteor shower-full moon spoils shower
8-22 Thursday: New Moon
8-28 Friday: Delta Aquarid meteor shower
8-29 Saturday: Dark Sky night at Gran Quivira

TWINING OBSERVATORY TO BE DEDICATED; APOLLO 17 ASTRONAUT IS KEYNOTE SPEAKER

The Albuquerque Astronomical Society will host a dedication ceremony for the General Nathan Twinning Observatory, a research and educational facility, on Saturday, August 8, 1992, at 1:00 p.m. Dr. Harrison H. Schmitt, Apollo 17 astronaut who traveled to the moon and did pioneering geological research there in 1972, and a former U.S. Senator, will be keynote speaker for the event. The ceremony will be held at the observatory, southwest of Belen, eleven miles from I-25's Sosimo Padilla exit.

Dedication of the General Nathan Twinning Observatory culminates a two-and-a-half-year construction effort and more than four years of planning and fundraising. The Albuquerque Astronomical Society broke ground for the facility on 31 March, 1990, and construction has continued since then. The building, complete with a rotating observatory dome, was constructed with volunteer labor from members and friends of the Society.

The project got its start in 1988, when discussions began with two key donors. Nathan Twinning, son of the late Air Force general and chairman of the Joint Chiefs of Staff, offered to donate land for the observatory, and Bill Isengard, a retired Air Force Lieutenant Colonel and longtime member of the Society, offered a research-grade telescope. Those donations were formally accepted in January of 1989, when the Society began actively seeking funds for the building effort.

Donations for the building came in the form of cash, building materials, professional services, and the use of equipment. Donors included local stores and businesses, numerous area residents, members of the Society, and the V.M. Slipher Fund of the National Academy of Sciences.

The completed observatory will be used for research, teaching and public education. Astronomical research projects will be carried out by Society members as well as high school and university astronomy students. In addition, the observatory will provide a new facility for The Albuquerque Astronomical Society's educational programs which reach thousands of schoolchildren and members of the public every year. Through the educational programs of the Society, the General Nathan Twinning Observatory will be open frequently to school and youth groups and the general public.

Dave Finley, Past President
THE JUNE MEETING

Have you had the pleasure of seeing the latest H.S.T (Hubble Space Telescope) photo? If you have, I bet you gazed at it in awe. I'll also bet you thought, "Boy...what I wouldn't give for an hour of observing with that thing."

Suppose you learned that you could do as much, if not more science with a ground based telescope than you could with the H.S.T....and that the pretty pictures, surrounded by all the media hype were just that...pretty pictures and not much more.

If you missed Dr. Bell Campbell's presentation, you missed the definitive critique of "science" with the H.S.T.

Until recently, Dr. Campbell was working at the H.S.T. Institute in Baltimore, Maryland. What she was able to accomplish there (or unable to accomplish) made for a spell-binding program.

I'm sure those of us who were there that night will never be able to look at another "Hubble Photo" press release in the same way again.

Although it is not always pleasant to hear the truth...it is encouraging to know that true science is based on integrity and not the almighty dollar.

Thank you, Dr. Campbell. Thank you for sharing the truth with us.

THE JULY MEETING

On July 11th, our regular meeting will not be held at Regener Hall. Instead, we will tour the stars under the dome! The Heffron planetarium dome that is.

Fellow member and science teacher, Mark Piccione will be our featured guest speaker. Or should I say we will be his guests at the Career Enrichment Center.

Mark has offered to donate his professional services to the members of the society for this event.

The Career Enrichment Center is located at 807 Mountain Rd NE. So remember, our July meeting will be held there and not at Regener Hall.

The meeting will begin at 7 p.m. and will continue until we have all had a chance to see the Show. As usual, bring your friends and family...the children will especially enjoy this one.

PS. Don't forget to bring the cookies.

George Pellegrino, President

PUBLIC STAR PARTY

They say: "If at first you don't succeed...try, try again." So, once again we'll try out luck at an in-town star party.

After being clouded out (or worse yet, rained on) in April, May and June, spirits are undaunted. So, weather permitting, we will "try, try again." The date: July 18, 1992; The time: If you are bringing a scope, get there around 7-7:30 p.m.; The place; George J. Maloof Memorial Air Park; Driving instructions: From Coors and Montano on the West side of town–go west on Montano from Coors up the hill all the way to Unser. At Unser, turn right (north) past Petroglyph Park on the right. Proceed through the canyon and up the hill. As you get to the top of the hill, the pavement turns to the left (south). Stay on the pavement and follow it until it ends and becomes a dirt road at the water tank on the right. Continue on the dirt road past the "horse complex" on the right all the way to the flying field. The gate is on the right. What should you bring? If it's clear, bring any optical equipment you want to try out or have someone show you how to use. Bring "stuff" to drink, snacks, warmer clothes to put on after dark and above all, bring all your friends, neighbors and family.

Remember, if the sky is covered with clouds...we'll just have to "try, try again" next month!

George Pellegrino, President

SUMMARY OF THE THURSDAY, JUNE 18, 1992 BOARD MEETING

After the meeting was called to order at 7:20 p.m. by President George Pellegrino, the treasury and secretory reports were given by Bob Stetz and Bruce Levin. The observatory and general funds have $4293.81 and $35.69, respectively.

George Pellegrino concentrated on the urgent task of planning the Observatory Dedication Ceremony presently planned for Saturday, August 8th. George presented information that Dave Finley sent regarding ceremony activities, news releases, speakers, and logistics. Preliminary plans were made for members to provide support in the way of food, canopies, traffic control, communication, water and ice, set up and take down, etc. George Dulleck reported on the remaining miscellaneous work that needs to be done to put finishing touches on the observatory. A major cleanup will be required just prior to the dedication.

Bruce Levin presented information about the TOPS (Teacher Opportunities to Promote Science) program on Astronomy to be given to teachers by members of the Society. George Pellegrino read a letter submitted by Science Fair winner Akiel Ameko soliciting help with Photometry and Variable Star work for the EUVE project sponsored by the AAVSO.

George Pellegrino moved that all expenses of the than operating funds that will be made out of the general
The Albuquerque Astronomical Society cordially invites you to a

Dedication Ceremony For
The General Nathan Twining Observatory

KEYNOTE SPEAKER: Dr. Harrison H. Schmitt, Apollo 17 astronaut who traveled to the moon and did pioneering geological research there in 1972, and a former U.S. Senator.

WHEN: Saturday, 8 August, 1992, at 1:00 p.m.

WHERE: The observatory site, southwest of Belen, eleven miles from I-25's Sosimo Padilla exit. See map on reverse side of this invitation.
fund must be pre-approved by the board. The motion was seconded by Bruce Levin and was unanimously passed by the board.

Finally, newsletter articles were assigned and the meeting adjourned at 9:38 p.m.

**AMATEUR OBSERVATION WITH EUVE**

NASA's Extreme UltraViolet Explorer (EUV) was made to carry out the first all-sky survey in the extreme ultraviolet (EUV) range (70 to 760 Angstroms). It will make the first deep sky survey in this wavelength region. EUVE contains four telescopes, each 40 centimeters across, and a spectrometer that covers three EUV wavelengths.

The EUVE mission is made up of two phases: the all-sky survey and the spectroscopic, or pointed phase.

In the first six months, the satellite will survey the whole sky at some wavelength bands, ranging from 70 to 100 A. The sky will be mapped with a sensitivity to celestial sources at a factor of several hundred times fainter than the brightest known EUV star.

For the remainder of the mission (two years), EUVE will perform medium resolution spectroscopy of brighter sources discovered in the survey phase.

The American Association of Variable Star Observers (AAVSO) will be coordinating amateurs all over the world. They will distribute charts and collect our observations. I need some people who are willing to participate in this mission which will be filled with new findings that will effect astronomy as we know it today.

We also need a photometer to study some of the sources. Below is a summary of what our Society can do to help (the level starts from beginning to advanced):

During the ALL-SKY SURVEY phase: Report on optical brightnesses of variable star sources at the time of EUVE observations.

During the SPECTROSCOPY phase: Spot “targets of opportunity” for EUVE to study.

Expected Sources: Dwarf novae in outburst Flare stars.


E-Mail sources

Please call me, Abeli Ameko, at 864-0738 for more information.

**OBSERVATORY CONSTRUCTION**

Construction work during the month of June has been minimal because we are nearing the finish (fewer tasks left to do) and are presently waiting for tasks or materials which need to come from suppliers.

We did get the dome rotation motor assembly working at the end of May, but need some additional modifications to the roller construction in order to reduce the pressure the roller applies to the dome u-channel. A second rubber coated roller was tried and appears to do the job, but we need to do the final assembly and improve the motor control electronics.

We have also done additional work on sealing the dome from the weather. Final details remain.

We still need to complete generator installation, lay floor anti-vibration material (waiting for donation of material), install the telescope and clean up the site.

If you can help with any of the tasks please contact George Dulleck or Bob Stetz.

George Dulleck, Vice President

**OBSERVER’S NOTEBOOK**

**Partial Lunar Eclipse**

A partial lunar eclipse occurred on June 14th between 8:50 p.m. and 1:45 a.m. MDT with 69 percent of the Moon eclipsed.

Three Society members, George Dulleck, Mike Fisk and Wilfred Pedroncelli met on Paseo Del Vulcan [road to Double Eagle Airport] and set up the observing site about 6.8 miles north of I40 Exit 149.

Mike photographed the eclipse with a Yashica 35mm camera using a 28mm f/2.8 lens and a 400mm f/6.3 lens with a 2X teleconverter. George videotaped the eclipse with his VCR camcorder. Wilfred used a Minolta 35mm camera with a 28mm f/2.8 lens.

The shadow was unusually dark. *Sky & Telescope* and *Astronomy* magazines had indicated that the shadow might appear darker than usual, due to the sulfuric acid mist and fine particles of volcanic ash blown into our stratosphere during the eruption of Mount Pinatubo in the Philippines a year ago. No earthshine nor reddish light (sunlight refracted through the earth’s atmosphere) were visible on the shadow on the Moon’s face. The volcanic aerosols may have blocked this effect.

The weather cooperated during this expedition and Mike got some good prints for his efforts. The other prints may be ready by the next general meeting. This event was worth watching the eclipsing moon over the city lights.

Wilfred Pedroncelli

**STELLAR OR VISUAL APPARENT MAGNITUDE—WHAT IS IT?**

The ancient Greek astronomer Hipparchus originated or perfected almost all classical astronomical measurements. In 134 B.C., he discovered a new star. Since this event is very rare, especially in ancient times when observations were only made with the naked eye and non-light gathering and non-magnifying equipment, Hipparchus drew up a list of stars visible to the naked eye. His catalog included 1,080 stars, their positions, and brightnesses listed on a scale of 1 being the brightest stars through 6 being the faintest stars visible. He could reference this catalog to see if another star was new or not. He compared his observations with previous stellar catalogs compiled by Eratosthenes and by Aristyllus and Timocharis. He noted that the Right Ascension measurements of his observations were a degree off from the measurements made by Eratosthenes 70 years earlier, and two degrees off in the same direction from the catalog that was 150 years old at the time. This phenomenon that Hipparchus recognized is called the precession of the equinoxes. Hipparchus' catalog of stellar positions and magnitude was included about two and a half centuries later in Claudius Ptolemy's work titled *Almagest*.

This magnitude scale compares the relative or apparent brightness of
stars and is a direct indication of how our eyes sense brightness levels of point sources of light. The eye's response to light (like the ear's response to sound) is not linear, but logarithmic. It was shown on the stellar magnitude scale that a 1st magnitude star was about 100 times brighter than a 6th magnitude star. About 1850, an arbitrary decision was made by astronomers to make the difference of five magnitudes correspond exactly to a luminosity ratio of 100 to 1. This magnitude difference \( \Delta m \) can be represented mathematically comparing luminosities as:

\[
\frac{l_1}{l_2} = \left( \frac{100}{5} \right)^{\Delta m} = (2.512)^{\Delta m}
\]

\[
\frac{l_1}{l_2} = 10^{\frac{\Delta m}{5}} = 10^{\frac{2\Delta m}{5}} = 10^{\frac{0.4\Delta m}{5}} = 10^{\Delta m/2.5}
\]

\[\Delta m = 2.5 \log_{10} \left( \frac{l_1}{l_2} \right)\]

where \( l \) = luminosity

If we are looking at a magnitude difference of 1 between two stars then the brighter star is about 2.5 times brighter than the fainter star. A magnitude difference of 2 would yield a luminosity ratio of 6.31 or 2.512 x 2.512. Below is a table showing magnitude difference vs. luminosity difference:

**The Magnitude Scale**

<table>
<thead>
<tr>
<th>Difference in magnitudes</th>
<th>Factor in brightness</th>
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<tbody>
<tr>
<td>1 mag</td>
<td>2.512 times</td>
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<tr>
<td>2 mag</td>
<td>6.31 times</td>
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<tr>
<td>3 mag</td>
<td>15.85 times</td>
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<tr>
<td>4 mag</td>
<td>39.81 times</td>
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<tr>
<td>5 mag</td>
<td>100 times</td>
</tr>
<tr>
<td>6 mag</td>
<td>251 times</td>
</tr>
<tr>
<td>7 mag</td>
<td>631 times</td>
</tr>
<tr>
<td>8 mag</td>
<td>1585 times</td>
</tr>
<tr>
<td>9 mag</td>
<td>3981 times</td>
</tr>
<tr>
<td>10 mag</td>
<td>10,000 times</td>
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<tr>
<td>15 mag</td>
<td>1,000,000 times</td>
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Variable stars and eclipsing binary stars yield magnitudes that change over time. Supernovas erupt in galaxies. These objects can be observed through telescopes visually or using an instrument attached to a telescope called a photometer. A photometer accurately measures stellar magnitude and luminosity when properly calibrated. One can visually make magnitude comparisons of stars by using reference stars which do not change in luminosity. AAVSO (American Association of Variable Star Observers) provides star charts that show variable stars to be monitored along with reference comparison stars in the same starfield. Magnitude changes in stars are reported to the AAVSO. Unique changes in an otherwise steady star or rapid or non-scheduled changes in magnitude of a variable star are then reported to various observatories for research by professional astronomers. Amateur astronomers can become members of the AAVSO to help with variable star research by writing to:

AAVSO/0 Janet Mattei
25 Birch Street
Cambridge, MA 02138

or telephone: (617) 354-0484

Extended objects like galaxies, nebulae, comets, and globular clusters also have apparent magnitudes. The apparent magnitudes of these objects are based on the total luminosity or light energy that is spread out over the area that the object takes up in the sky being compressed to an effective point of light. Consequently, these objects appear fainter than their apparent magnitudes would lead one to believe. One could defocus a star of the same apparent magnitude to the same effective area as the extended object to give a similar brightness as the extended object! This is a clever method to use to determine extended object apparent magnitudes.

Apparent star magnitudes on star charts are expressed using numbers without decimal points to avoid the confusion of a point being a star. For example the apparent magnitude of a 4.3 mag star would be expressed as 43 printed adjacent to the star on the star chart. The table on the right is a list of various familiar stars, deep sky objects, and the full moon at the average distance away from the earth.

<table>
<thead>
<tr>
<th>Visual Magnitudes Of Some Familiar Objects</th>
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<tr>
<td>Object</td>
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<td>-----------------------</td>
</tr>
<tr>
<td>Polaris</td>
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<td>Rigel</td>
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<td>Sirius</td>
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<td>Regulus</td>
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<td>Alberio</td>
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<td>Moon</td>
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<td>Sun</td>
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<td>M-1 Crab Nebula</td>
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<td>M-17 Omega Nebula</td>
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<td>M-13 Hercules Globular Cluster</td>
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<td>M-27 Dumbell Nebula</td>
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<td>M-31 Andromeda Galaxy</td>
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<td>M-45 Pleiades Open Star Cluster</td>
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<td>M-44 Bee Hive (Praesepe) Cluster</td>
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<td>M-51 Whirlpool Galaxy</td>
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<td>M-57 Ring Nebula</td>
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<td>M-104 Sombrero Galaxy</td>
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Bruce L. Levin

References:


**ASTRONOMICAL CLASSIFIEDS**

**ASTEROID/COMET SAFETY NETWORK** forms to address issues including increasing the discovery rate, expanding the amateur role, interception/deflection concepts, emergency planning, impact effects analysis, etc. Contact Andy Smith/ASTROSAFNET/P.O.B 9123, Albuquerque, N.M. 87119; 505-260-2333.

For Sale: Astrophysics 706 equatorial mount. Massive tapered polar bearing. Motorized guiding on both axes. Polar alignment scope included. Field tripod. Will easily handle 11" SCT or large refractor. $1300 or best offer. Call Art @ 344-4985.
### August 1992 Lunar Almanac

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<tr>
<th>Sunday</th>
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**Albuquerque, NM**  
Time Zone: MDT  
Latitude: 35.08  
Longitude: 106.65

- **MR** = Moonrise, upper limb on horizon  
- **TR** = Transit, moon is due south and also highest in the sky  
- **MS** = Moonset, upper limb on horizon  
- **RA** = Azimuth of rising moon  
- **TA** = Altitude of moon at transit  
- **SA** = Azimuth of setting moon  
- Altitudes and azimuths are in degrees.

Moon phase is shown each day at 12:00 noon in the time zone indicated.

Calendar by Ray Sterner  
Johns Hopkins Applied Physics Lab.  
Laurel, MD 20707

### August 1992 Solar Almanac

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<th>Sunday</th>
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**Albuquerque, NM**  
Time Zone: MDT  
Latitude: 35.08  
Longitude: 106.65

- **MA** = Morning astronomical twilight, sun is at –18 degrees altitude.  
- **MN** = Morning nautical twilight, sun is at –12 degrees altitude.  
- **MC** = Morning civil twilight, sun is at –6 degrees altitude.  
- **SR** = Sunrise, upper limb on horizon.  
- **TR** = Transit, sun is due south and also highest in the sky.  
- **SS** = Sunset, upper limb on horizon.  
- **EC** = Evening civil twilight, sun is at –6 degrees altitude.  
- **EN** = Evening nautical twilight, sun is at –12 degrees altitude.  
- **EA** = Evening astronomical twilight, sun is at –18 degrees altitude.  
- Times are rounded to nearest minute.

- **RA** = Azimuth of rising sun  
- **SA** = Azimuth of setting sun  
- Altitudes and azimuths are in degrees.

Calendar by Ray Sterner  
Johns Hopkins Applied Physics Lab.  
Laurel, MD 20707
DUES: Please note the expiration date on your mailing label. If you are due for membership renewal, you may send your dues by mail to our newsletter return address with your check written out to The Albuquerque Astronomical Society or give your check to the Treasurer at the next meeting. Please include the membership application that is sent with your newsletter when it is time to renew. Discount subscriptions to Sky and Telescope ($18/12 issues), Astronomy ($16/12 issues) and Odyssey ($16.95/12 issues) magazines, and books through Sky Publishing Corporation are available at a reduced cost when purchased by The Albuquerque Astronomical Society members through our Society. Include any of the above magazine renewal mailers and subscription payment as part of your renewal check. Membership dues are $20.00 per year and $3.00 per additional family member. Membership Packets cost $1.75 each for new members or renewing members without the Packet. Contact the Treasurer for more information.

SOCIETY COMPUTER BULLETIN BOARD SERVICE: An Astronomy BBS is available for The Albuquerque Astronomical Society members for discussion, announcements, and transfer of files and newsletter articles in our software library. The BBS is available 24 hours a day at 255-3623. Set your computer’s modem to 8 N 1 (8 data bits, no parity, and 1 stop bit). Contact the Software Coordinator for more information.

NEWSLETTER ARTICLES: Personal astronomical classified advertisements and articles can be submitted within 5 days after the latest Society meeting in order to make it into the next newsletter. Business card size advertisements for businesses related to astronomy are accepted with the same deadline as articles and personal classified advertisements. Rates for business card size ads are $10/ad per issue of the Sidereal Times, $7/ad per issue for six continuous issues, and $5/ad per issue for twelve continuous issues. The Newsletter Editor reserves the right to include and/or edit any article or personal classified or business card size advertisement. Computer files in ASCII format are preferred. Contact the Newsletter Editor for more information.

Since August, 1989, the Sidereal Times has been typeset on an Atari Mega ST4 and an Atari SLMB04 postscript-compatible laser printer, using Pagestream and UltraScript.

CHANGE OF ADDRESS: Note that the Sidereal Times is mailed out at non-profit bulk rate. The newsletter will not be forwarded to your new address if you move! Please provide the Secretary with your new mailing address to insure that you receive your newsletter.

The Albuquerque Astronomical Society

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