



## Plan to upgrade Behlen Observatory catching eye of area astronomers

A \$100,000 upgrading of the Behlen Observatory at University of Nebraska-Lincoln's Field Laboratory at Mead will provide the University with one of the most powerful instruments of its kind in the region.

Dr. Edward Schmidt, professor of physics and astronomy and director of the observatory, said funding for the project was obtained from the National Science Foundation (NSF) last December as well as from other sources. NSF officials agreed to provide \$80,000 for UNL's project during the next two years.

According to Schmidt, the NSF grant will cover the cost of a charged-couple device, or CCD, which will be mounted on a movable probe inside a scientific instrument package. The probe and instrument package is being constructed in the Physics and Astronomy Department's machine shop.

In addition to the NSF grant, the chancellor's office provided \$13,400 for the purchase of a Micro VAX 1 computer and the University Research Council awarded \$7,175 to the project for a magnetic tape drive. The new computer is necessary to handle the more demanding control tasks of the new instrumentation as well as the larger volumes of data produced.

Schmidt, and Donald Taylor, professor of physics and astronomy, will direct installation of the new equipment and are also designing and building many of the system's components.

The CCD device, which is basically a solid-state television camera, will be operational by this summer, according to the two astronomers. However, completion of the automation of the observatory will take up to two years.



*Ed Schmidt holds CCD element*

"When the project is completed, the observatory will become the most fully automated facility of its kind in the country, and the observatory's present 30-inch reflector telescope will provide the power of the 200-inch Mount Palomar telescope," Schmidt said.

As a result of the upgrading, Behlen Observatory will draw researchers from throughout the Midwest. According to Anthony Starace, chairman of the physics and astronomy department, the observatory "has a good chance of becoming a Regional Astronomical Facility."

*Continued on Page 2*

The upgrading of the observatory is being done in cooperation with astronomers from universities in Kansas and Missouri who collaborated in developing the NSF proposal for the CCD camera. Also, the University of Kansas in Lawrence is developing an image processing laboratory which will be used to process data obtained at the observatory.

In addition to installation of the CCD camera, upgrading of the observatory will involve the installation of a cooling system as well as a control unit and computer equipment.

The heart of the upgrading is the CCD camera's photometric chip, which looks like an oversize, heavy duty photographic transparency. The chip is installed in the telescope and is the sensor through which data is obtained and transmitted electronically to the computer for display and analysis. Because of its sensitivity, the CCD is able to detect and measure the brightness of heavenly bodies to a degree now unavailable at the observatory.

The term used to measure the brightness of stars is magnitude.

"Now, if we really pushed it, we could detect bodies as faint as the 21st magnitude," Taylor said. "With the CCD in place, we should be able to work with stars of about the 23rd magnitude, which is roughly comparable to the magnitude attainable at Kitt Peak or Mount Palomar, without a CCD."

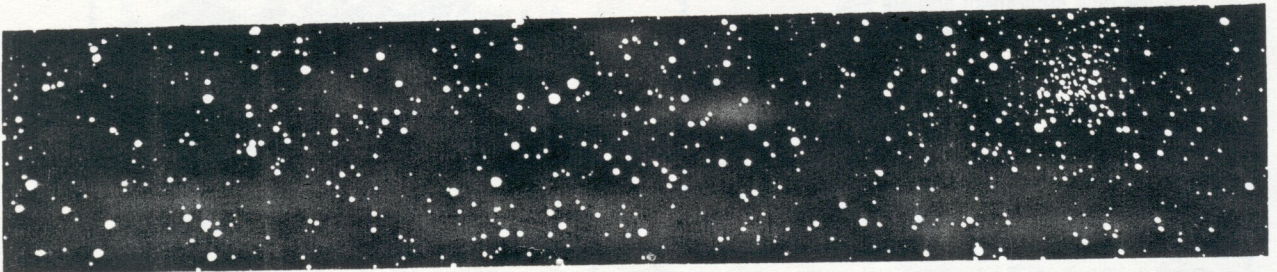
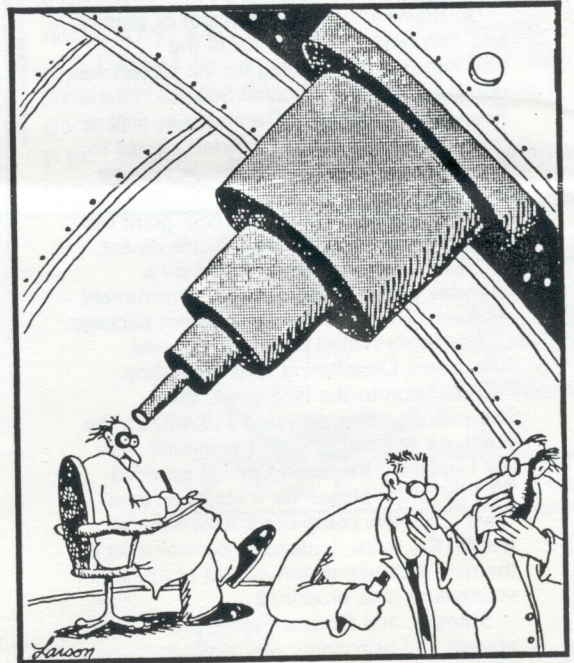
Together, the CCD and automated facilities will enable researchers to gather data from 300 stars per night, instead of the 30 or 40 that can be studied now. And, in the future, it will be possible to study fainter stars.

UNL researchers, for instance, will be able to survey a whole class of stars known as pulsating variable stars, following the variations of about 4,600 such stars over a period of several years.

Schmidt, who has been studying variable stars for 12 years, said there is much to be learned about such phenomena—the reasons why they vary in their intensity, how they originated and evolved, and the different classes of such stars.

Other researchers are planning studies of star clusters, measuring the properties of all the stars in a given cluster to a degree not presently possible.—By Bob Sheldon

re-printed from UNL's Bulletin Board



# President's Message

This month I've been spending a lot of time talking with the Omaha Astronomical Society, as well as the Des Moines Astronomical Society. Both of these clubs, and myself, thought it would be a good idea to visit Behlen Observatory, and since Behlen is now undergoing a \$100,000 upgrading (SEE COVER STORY -ED.), it's about time we got a first hand look at what's going on up there.

We have decided upon May 17th for the date of the excursion, and we're going to invite all of the clubs in the near vicinity to join us on this outing. We plan on having dinner at Behlen and then moving on to talks and tours of the observatory. More information about cost and the nights schedule will be in the next newsletter. It should be an exciting event!

One other thing, the Omaha club and the Des Moines club are planning a trip to Chicago in mid-June to visit the Science & Industry Museum and Adler Planetarium. I've heard that those two places are something you absolutely must see at least once in your life. This sounds like it would be fun, and I hope to receive more information about it in time for the meeting.

Both of the above are taking place a ways down the road, but it's good to know what's coming up. I'll see you at the meeting!

Andy Corkill

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## MAGAZINE SALE...

Andy Corkill will have the following Sky & Telescope Magazines at the February meeting. Any of them can be yours for a small donation to the club of 50 cents to \$1.00 per magazine. Andy has graciously donated the following issues...

1956 -- November	1962 -- all but Aug & Oct
1959 -- June	1963 -- all but Feb, Mr, Aug
1967 -- May, June	1964 -- all but Oct
1960 -- Jan, Feb, Apr, May, Sep, Nov, Dec	1965 -- all but Mr, Aug, Oct
1961 -- all but Jan & Aug	1966 -- all but Feb, Aug, Oct

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## The Right Stuff...

The day was miserable. A "slate gray" day I used to call them. The clouds were so thick and consistent you couldn't see a break in them from horizon to horizon. Rain, drizzle, on again, off again sleet.

I sat there at my desk and let my eyes and mind wander. After all Miss Peggy had left the room for the Principles office. It was a chance to unwind after that awful performance on a math test. God, a 63, blew that test. I noticed a blackboard eraser had fallen to the floor in a pool of chalk. Then I gazed up at what must have been a common fixture in every 8th grade classroom, a picture of our first President.

Then I heard Miss Peggy as she marched down the old hallway to class. She was almost at a walk/run pace. Very unusual for this 64 year old teacher. Then she whisked herself into the room. Went to her desk, closed her books, looked up and right through us and made one statement before turning on her heels. "The President has just been shot". You could have thrown a bowling ball into my stomach and I couldn't have felt any worse.

I always wondered, when I was young, what series of events need to happen for an event to be a truly "memorable" one for life.

November 22, 1963 was my first one. July 20, 1969 was my second one. January 28, 1986, decades from now, will be my third.

Some say out of all negative situations, positive points can be made. To me personally this applies here.

Never again will I believe that a space launch is or should be mundane, routine, or normal as I have since 1981. Never again will I view the men and women who climb aboard merely as geologists, chemists, biologists, or teachers. They are all truly astronauts.

They have the most dangerous, exciting, deadly, stimulating, heroic job in the history of mankind. Nowhere to you strap yourself to a bomb and shake it like a rag in a dog's mouth for 10 minutes, only to leave that hostile environment behind for the even more hostile environment of space.

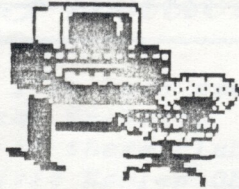
No, Senator Garn, it is not safer to ride a shuttle launch than ride a commercial jet or drive down a Washington turnpike. But I understand why you try to grope for self-justification of this event.

Let's not take away from them their true place. Astronauts were, are, and always will be space pioneers.

They always try to "push the envelope". This time they pushed through, and touched the face of God.

Challenger Crew, you truly had the "Right Stuff".

## FROM THE EDITOR



The PAC hopes to have a good turn out at the Midstates Convention this year. It will be held in Columbia, Missouri on June 6th, 7th and 8th. As of this printing the application forms had not yet been received, but members can expect to get one with thier next newsletter.

The forms for paper submissions to the session were received by Earl Moser, and if anyone is interested in submitting a paper they can get a copy of the form from Earl Moser or from John Lortz.

Many of you were contacted this past week by PAC members conducting a survey concerning the proposed PAC Observatory. The Observatory Committee has been working hard the last month examining ideas and ways that the club can have its very own observing site somewhere close to Lincoln. To help them get an idea of how the club feels in general, a survey was created for members to respond to. Just about everyone was contacted and a preliminary glance at the responses shows a strong positive feeling toward the project.

Results of the survey will be published in the March Newsletter, but in the meantime, Bryan Schaff and everyone on the Observatory Committee would like to thank all who participated for their valuable time.

## PUBLIC NIGHT

March 15th and 16th have been set as the PAC's observing session with the public. We will be setting up at the rest area south of Lincoln located at Hickman Road & Highway 77. Viewing time will be from 4am until dawn. The club is sending out press releases to area radio and tv stations as well as newspapers, so we are expecting a fairly large crowd (even at 4am!). We will need all the telescopes and binoculars we can get, along with as many members who can make it these two mornings!

One related item... the Omaha club has been offering the public a nice certificate (see below) that they sell for about a dollar. It gives people something to take home in remembrance and gives the club some needed extra funds. We are considering this idea for our club.

*\*the\**

**OMAHA ASTRONOMICAL SOCIETY**

certifies that  
observed **Halley's Comet**

from: 41 degrees 20 minutes North Latitude  
96 degrees 10 minutes West Longitude

ON 1981

ALAN W. HARTZEL  
President

A diagram of Halley's Comet in the sky, showing its long tail and several stars. A circular seal of the Omaha Astronomical Society is visible in the bottom left corner of the certificate area.

# OBSERVING CHAIRMAN'S REPORT

This month's star party is scheduled for Friday, March 7. Also remember that Comet Halley will be at its best from about March 9th to the 21st early in the morning about 5:00 a.m. As winter turns into spring, the focus of deep sky observing turns from clusters and nebulae to galaxies. Start the month out right with the bright galaxies M31 and M82, located about two degrees east and a bit south of the faint star  $\delta$  Ursa Majoris. Both galaxies are visible in a pair of 10 x 50 binoculars and a good 2.4 inch refractor will show them together in the same field of view. M31 shows as a fuzzy oval with hazy edges and M82 shows as a cigar shaped fuzzy patch when viewed in small instruments. An eight or ten inch Newtonian will begin to show faint indications of M31's spiral structure as well as the numerous dark spots along the body of M82.

For those of you who like edge-on spiral galaxies, try NGC 2683, located about a degree north of  $\sigma$ -1 Cancri. It should be easy in any instrument larger than four inches and shows as a thin fuzzy needle of light. While in the area take a look at Iota Cancri, a close but pretty double star that resembles Alberio. It should be resolvable in fairly small instruments.

In Leo, the bright spiral NGC 2903 is a good target for most telescopes. Located 1.5 degrees south of  $\lambda$  Leonis, the galaxy should be visible in a three inch telescope as a hazy elliptical patch with a brighter center. A ten inch reveals extensive mottling and vague indications of the



by  
David Knisley

spiral structure of the galaxy. Those of you with eight inch or larger apertures may want to try the faint trio of galaxies NGC 3187, 3190, and 3193, all located about 1.5 degrees south of  $\xi$  Leonis. NGC 3190 is a faint elongated fuzzy patch and the other two objects are faint fuzzy ovals in my eight inch Newtonian.

Hant a break from galaxies? Take a look at NGC 3242, also known among observers in our club as "Rick Johnson's Favorite Planetary Nebula". It is fairly bright and stands high magnification well, appearing as a bluish-green disk with a highly elliptical inner shell and brighter central condensation when viewed with at least a six inch telescope. It can be found by looking two degrees south and lightly west of  $\mu$  Hydrae.

Back in Leo, set your sights on the trio of galaxies M65, M66, and NGC 3628, all located about half way between Theta and Iota Leonis. The two Messier objects are visible in a three inch aperture with an eight inch showing detail in M66. A four inch may also show NGC 3628 as an extremely faint narrow streak to the north of the Messier objects. this galaxy also has a narrow dark lane that can be glimpsed in an eight inch aperture.



## THIS MONTH'S PROGRAM



People who are going on the Hutchinson trip will receive confirmation of their hotel reservations, as well as who you will be riding down to Hutchinson with.

Astronomy Day will be held at the Gateway Mall Saturday April 26th. Sign up sheets will be available at the meeting for the times you will be available to help out on the 26th, as well as what displays (including tele-

scopes, videotapes, computer programs, posters, your current astronomy project, etc.) you could bring to enrich Astronomy Day for everyone who visits our display. Bring your other ideas to the meeting as well.

This month's program will be presented by Allen Thompson who among other things will show us some of his excellent Halley Comet photographs.

## DEFINING ASTRONOMY

### FOUCAULT'S PENDULUM

A freely swinging pendulum mounted in such a way as to reduce its physical contact with the Earth to an absolute minimum. An ideal pendulum of this type would, if set swinging in a particular plane at one of the Earth's poles, continue to swing in that same plane relative to the 'fixed stars', and the Earth would rotate underneath it. To the observer on the Earth's surface, the pendulum would be seen to rotate its plane of swing through 360 degrees each day. The period of rotation of the plane of the pendulum increases with decreasing latitude on the Earth's surface; no rotation is observed for a pendulum at the equator. Observation on the behavior of such a pendulum is direct evidence of the fact that the Earth rotates on its axis. This type of pendulum is named after the French physicist, Leon Foucault (1819 - 1868).



(from Dictionary Of Astronomy by Iain Nicolson)

## AT THE LAST MEETING.....

First on the agenda was setting a date for the Hutchenson Ks. trip. Members decided the best date would be March 1st and 2nd. Andy went on to discuss Astronomy Day observances for this year. He announced that Gateway had been reserved for the 26th of April, and then passed around a preliminary sign-up sheet asking who could work and what you could bring.

A special PAC sponsored public observing of Halley's Comet was set for March 15th and 16th. Because of horizon problems at Hyde, it was decided to set up at the state reset area near Hickman. Public awareness of the event would be obtained through use of radio, tv, and newspaper public service announcements.

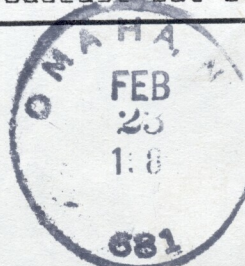
Next, Norma pass along information concerning the time capsule which will be sealed at 4pm on April 11th. Ideas for having the public sign a list for the capsule (for a small fee) were entertained.

Andy asked (again) for a volunteer for the public relations officer position, but there were no takers.

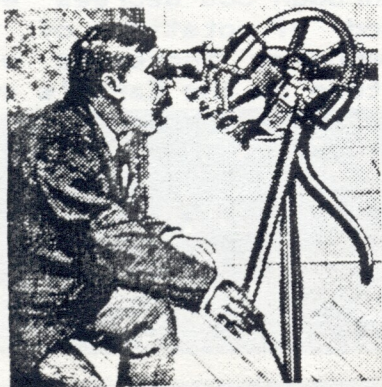
Lee mentioned that one check issued to Sky & Tel for member subscriptions was never cashed at the bank, causing some of the membership to not receive their recent issues. He vowed to quickly resolve the problem.

Finally, the program was presented by Rick Johnson who displayed the recent video pictures of the Uranus encounter being broadcast out by JPL.

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with clock drive, 2" eyepiece  
holder, Meade research grade 3"  
refractor guide scope. Asking  
\$1500.00. Call 488-1652 for info.



# PAC MARCH CALENDER

1. 1966: Soviet Venus III becomes first artificial object to impact on another planet (Venus).  
1982: Soviet Venus 13 soft lands on Venus and returns information for two hours and seven minutes.
2. 1840: Heinrich Olbers, discoverer of comets and asteroids and proposer of "Olber' Paradox," dies.
3. LAST QUARTER MOON 7:17AM  
1703: Robert Hooke, scientific genius in many fields, dies in London.  
1969: US Apollo 9, which later docks with lunar module, is launched.
4. 1675: John Flamsteed is appointed first Astronomer Royal of Great Britainy Charles II.  
1979: US Voyager I photographs reveal that Jupiter has a ring.
5. 1616: DE REVOLUTIONIBUS by Nicolaus Copernicus, is placed on the Roman Catholic Church's Index of Forbidden Books.  
1979: Voyager I arrives at closest approach to Jupiter.
6. 1787: Joseph Fraunhofer, discoverer of solar absorption lines, is born.
7. PAC STAR PARTY AT EARL MOSERS  
1792: John Herschel, son of William Herschel, is born in Slough, England.  
1962: US Orbiting Solar Observatory, the first space observatory, is launched.  
1973: Comet Kohoutek is discovered by Lubos Kohoutek at the Haaburg Observatory.
8. 1934: Edwin Hubble achieves goal of photograph showing as many galaxies as Milky Way stars.  
1939: George Reed, astronomy writer and cartoonist, is born.  
1976: Largest observed falling single stony meteorite occurs in Jiling, China.
9. 1497: Nicolaus Copernicus makes first recorded astronomical observation, a timing of an occultation of Aldebaran by the moon (11 p.m.).  
1979: First extraterrestrial volcano is discovered on Jupiter's satellite Io.
10. NEW MOON 9:52AM  
1977: The rings of Uranus are discovered during occultation of SAO 158687.
11. 1811: Urbain Jean Joseph Leverrier, codiscoverer of Neptune, is born.
12. 1737: Galileo Galilei's body is moved to Church of Santa Croce in Florence, Italy.
13. 1781: William Herschel sees "comet" that becomes first telescopically discovered planet, Uranus.  
1855: Percival Lowell, founder of Lowell Observatory to study Mars and search for trans-Neptunian planet, born.  
1930: Clyde Tombaugh announces the discovery of Pluto at Lowell Observatory.
14. 1835: Giovanni Schiaparelli, discoverer of "canals" on Mars, is born.  
1879: Albert Einstein, author of relativity theory, is born in Germany.
15. HALLEY'S COMET PUBLIC OBSERVING ...4AM
16. HALLEY'S COMET PUBLIC OBSERVING ...4AM  
1750: Caroline Herchel, first modern woman astronomer, is born in Hanover, Germany.  
1926: Robert Goddard launches first liquid fuel rocket 184 feet.  
1966: US Gemini 8 makes first docking of manned vehicle with unmanned vehicle.  
1975: US Mariner 10 makes third and last fly-by of Mercury.
17. 1846: F.W. Bessel, measurer of distance to 61 Cygni, dies.
18. FIRST QUARTER MOON 11:39AM  
1965: Soviet cosmonaut Lt. Col. Aleksei A. Leonov, makes first space walk (20 minutes) from Voskhod II.
- 19.
20. 1727: Sir Isaac Newton dies in London at age 84.
21. 1965: US Ranger 9 is launched to return 5,814 pictures before lunar impact in Alphonsus Crater.
22. 1799: F.W.A. Argelander, cataloguer and charter of positions of 324,000 stars, dies.  
1982: Space shuttle Columbia is launched for third time.
23. 1912: Rocket expert Wernher von Braun is born in Mirsitz, Germany.  
1965: Virgil Grisson and John Young complete America's first two-man space flight aboard Gemini 3 (three revolutions in four hours 53 minutes).
24. 1965: US Ranger 9 strikes moon 10 miles northeast of crater Alphonsus.
25. PAC MEETING 7:30pm HYDE OBSERVATORY  
FULL MOON 10:02PM  
1655: Christiaan Huygens discovers Titan, largest satellite of Saturn.  
1951: E. Purcell and E.M. Ewen detect 21-cm radiation at Harvard physics lab.
- 26.
- 27.
28. 1802: Heinrich Olbers discovers second asteroid, later called Pallas.  
1807: Heinrich Olbers discovers fourth asteroid, later called Vesta.
29. 1974: US Mariner 10 passes within 21,700 miles of Mercury and photographs surface.
30. 1961: P.J. Melotte, discoverer of Jupiter's eighth satellite Pasiphae in 1908, dies.
31. 1966: Soviet Union launches Luna 10, first spacecraft to orbit the moon.

## MAGAZINE BIBLIOGRAPHY

This is a listing of articles which may be of interest to Prairie Astronomy members. Most of them are astronomy related, some deal with photography topics which may be worth reading. Included here are references to many of the popular magazines seen on the magazine rack.

### SCIENCE 86

- Jan/Feb...p60 "The Ungentle Death Of a Giant Star" by Ellen Fried  
--astronomers study their remains to predict our galaxy's next stellar explosion.
- March ..p20 "Waiting for Decay" by Charles Mann & Robert Crease  
--is matter falling apart?

### SCIENCE DIGEST

- February...p28 "Volcano's In the Solar System" by Jay Pasachoff  
--astronomers photographic tour of interplanetary hot spots.
- p60 "The Space Station Takes Shape" by Andrew Revkin  
--NASA's ultimate design will be everything to everybody.
- p64 "The Bubbling Univers" by Marcia Bartusiak  
--new sky survey questions universe structure.
- p19 "Cosmos Digest"  
--Voyager 2 at Uranus
- p70 "Astronomy"
- March....p26 "Mission To Mars" by Michael Lemonick  
--Technology is ready to go.
- p19 "Cosmos Digest"  
--Sun's missing neutrino's.
- p70 "Astronomy"

### SCIENTIFIC AMERICAN

- February..p106 "William Herschel and the Making of Modern Astr."  
by Michael Hoskin
- March.....p40 "The Earth's Magnetotail" by Edward W. Hones

### SCIENCE NEWS

- Feb. 1.....p68 "The Last, Tragic Mission of Challenger"  
p69 "Traces of the oldest meteorite impact"  
p72 "Voyager 2's Uranus"  
p75 "Extinction Wars" Debate over Dinosaurs Extinct.
- Feb. 8.....p85 "Shuttle loss sets back space program"
- Feb. 15....p101 "In tragedy's wake, NASA budget uncertain"

### Popular Photography

- February...p11 "Shooting Stars" by Dennis di Cicco  
--simple equipment lets you capture the glories of the night sky.
- p40 "New Fugichrome P1600" by Bob Schwalberg  
--high speed slide film review.

### MODERN PHOTOGRAPHY

- Februray...p40 "Konica 1600: Best Super-speed Print Film?"

### PHOTOGRAPHIC

- March.....p12 "Scotch Brand Film" 3M's New amateur films.
- p84 "Finding Ektachrome Processing"