



THE

Prairie Astronomer

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URANUS UPDATE . . .

1-86

This month's meeting is featuring a program you won't want to miss. Rick Johnson has been taping the broadcasts of Voyager 2's flyby of Uranus, and will present an edited video-taped version for the January program. The public has been specially invited to the meeting, so there should be an excellent turnout. To help orient you with the Uranus program, included here is the basic information that we had about the planet Uranus up until this flyby. Most of it was taken from a standard college textbook on astronomy, *Exploration Of the Universe* by George Abell, last edited in 1982. It should help give you a point of reference as to how much we are really discovering about that distant world.

Uranus was discovered on March 13, 1781 by the great astronomer William Herschel, who was making a routine telescopic survey of the sky in the constellation of Gemini. At first he believed it to be a comet, but after a preliminary solution for its orbit was calculated as a nearly circular one, the object was declared a planet. Looking back at star charts before 1781, it was noted that Uranus had been plotted as a star at least 20 previous times.

The orbit of Uranus lies more nearly in the plane of the ecliptic than that of any of the other planets, its inclination being only 46'. Being 2871 million km from the sun, its orbital speed is low (6.8 km/s) and its period is long (84 years). Uranus has 5 known satellites; the last to be discovered, and the faintest, was found by Kuiper in 1948. None of the satellites is probably much over 1000 km in diameter and their distances range from 123,000 to 586,000 km from the center of Uranus. They are thought to be icy bodies.

From the motions of its satellites the mass of Uranus is found to be 14 1/2 times the mass of earth. Its linear diameter is difficult to measure accurately but is about 51,000 km, and its mean density is calculated to be 1 1/3 times that of water. It is also known that Uranus surface gravity is about the same as is on earth, and its escape velocity is approx. 21 km/s.

Uranus has a high albedo (0.50), so probably it is surrounded by a cloud layer that reflects sunlight. The spectrum of the planet reveals a strong concentration of methane, and also a series of infrared absorption lines attributed to molecular hydrogen. The temperatures to be expected on Uranus are below 90 degrees Kelvin.

Uranus appears as a greenish disk when viewed through a telescope. A few observers report faint markings, but these are very indefinite. The rotation period, as measured using the Doppler shift, is between 10 to 25 hours. A unique feature about Uranus is that its axis of rotation lies almost in the plane of its orbit. At times we look almost directly at one or the other of its poles. The actual inclination of its equatorial plane to that of its orbit is 82 degrees, and its direction of rotation is the same as that of the revolution of its satellites, and both are in the reverse direction from the rotation of all the other planets except Venus.

Until 1977 only Saturn was thought to have rings, however a small ring system about Uranus was discovered. The particles in the rings of Uranus revolve about the planet in its equatorial plane, but they reflect too little sunlight to be seen directly; the first five were discovered when Uranus passed in front of a star on March 10, 1977. The rings are not solid and did not occult the star completely, but the star did dim somewhat as each portion of ring passed by.

And there you have it. Just about all we knew about Uranus until this historic flyby by good old Voyager. Please don't miss the great program Rick has planned!

President's Message

I've had two major Astronomical thrill this month. The first thrill was when I went to my first star party in 4 months. I had planned to take pictures of Halley's comet, but of course, once I got down to Hickman, I remembered all of the stuff I needed that I left in Lincoln. So, a friend of mine and I, instead of taking pictures, did some naked eye and binocular viewing while we wallowed through waves of little kids. Yes, Rick Johnson had brought his whole neighborhood to Earl Moser's house to see Halley's comet. There was a large number of people down there for at least an hour and it was a lot of fun. Shortly after all of Rick's neighbors left, my friend and I did too. To leave Rick Johnson, Dave Knisely, and Del Motycka to observe for I don't know how long into the night. When are you going to get out to your next star party?

My second thrill of the month was when I held a PAC officers meeting at my house. This was basically to plan ahead for this year's events, of which there are many, and I'm sure you'll be as excited about them as I am...

- (1) Hutchinson KS is calling the name of the PAC once again. The Dream Is Alive is now the main attraction showing on the giant dome of the Ominimax Theater, and who knows what else with Jack Dunn's wheeling and dealing. A weekend trip for one of the first two weekends in March is being planned. Come to the meeting if you are interested in going, and give your input as to when.

The Prairie Astronomer is published monthly by the Prairie Astronomy Club Inc., and is free to all club members. Membership expiration date is listed on the mailing label. Membership dues are: Junior Members and Newsletter Only \$8.00/yr, Regular Members...\$22.00/yr, Family Membership...\$25.00/yr. Address all membership renewals or questions to: THE PRAIRIE ASTRONOMY CLUB, INC., P.O. BOX 80553, LINCOLN, NE. 68501. For other club information contact one of the following: Andy Corkill (Pres) 488-1096, Norma Coufal (V.Pres) 483-5685, John Lortz (Sec) 390-9821 (Omaha), Lee Thomas (Treas) 493-5639, Dan Neville (Prog. Ch.) 476-7772. All articles should be sent to newsletter editor JOHN LORTZ 9255 CADY AVE #14, OMAHA, NE 68134, no later than six days before each club meeting.

OBSERVING CHAIRMAN'S REPORT

The next star party is scheduled for Friday Feb. 7th and should be a good date to observe anything except Halley's Comet! Lepus is an often ignored constellation, but it does contain one of the few globular star clusters in the winter sky, M79. Located almost four degrees south and just over one degree west of Beta Leporis, M79 needs a good unobscured southern sky and an eight inch telescope for any of its component stars to be visible. There is also a galaxy worth looking at in the area, namely NGC 1964, located about one degree south and 1.5 degrees east of Beta. It should appear as a faint elongated fuzzy patch with a brighter almost star-like center when observed with an eight inch.

In nearby Canis Major, M41 is an excellent open star cluster for the binocular or small telescope user. Look about four degrees south and one east of Sirius for a fairly large group of fairly bright stars. Larger instruments will show the color of many of the stars including several red and yellow giants. Another cluster of note is located around the star Tau Canis Majoris: NGC2362. Even small telescopes will show the many faint stars surrounding the fairly bright star Tau. Those of you with moderate sized instruments will want to look about 3.5 degrees east of Gamma to find the beautiful open cluster NGC2360. It is a nice circular group of moderate to faint stars that is fairly

by
David Knisley



compressed with a bright star lying just to the west of the cluster.

About five degrees east and one north of NGC2360 is a cluster of clusters containing two Messier objects and several others. The brightest one is M47 which is the most westerly cluster of the group. It is a nice group for the small telescope user. A degree north of M47 is the fainter NGC2423, a fairly large and roughly circular group of a few bright and many faint stars. About 1.5 degrees east of M47 is the beautiful cluster M46, a rich group of moderately faint stars with a faint planetary nebula NGC2438 near the north edge of the cluster. the planetary nebula is faint and similar in structure to the Ring Nebula in Lyra.

Up in Camelopardalis about one degree west of the faint star 51 is the bright galaxy NGC2403. It is visible in a pair of 10x50 binoculars as a very faint patch of light, and an eight or ten inch telescope should begin to show some faint patchy details in its outer haze. Its low surface brightness will make it difficult to see in small instruments unless very low power is used.

(2) When Halley's comet comes back around in the early morning skies of March it will be too close to the horizon to view from Hyde Observatory. It has been suggested to me by many people to have a special observing for the public given by PAC volunteers with their telescopes. The best dates for such an excursion would be between March 15th and 21st. The only problem with this idea is that we don't have an observing site picked out yet. This site MUST have an excellent southern and eastern horizon, and that's where you, the member, come into play. We need your ideas and suggestions for a place to hold this event. We need to find a place in enough time to have plenty of advertising in Lincoln and the surrounding area.

(3) And finally, Astronomy Day is coming up on April 19th of this year. Start to think about it, but not too hard. During the next two meetings I will be passing around sign-up sheets for the various functions that are needed for Astronomy Day.

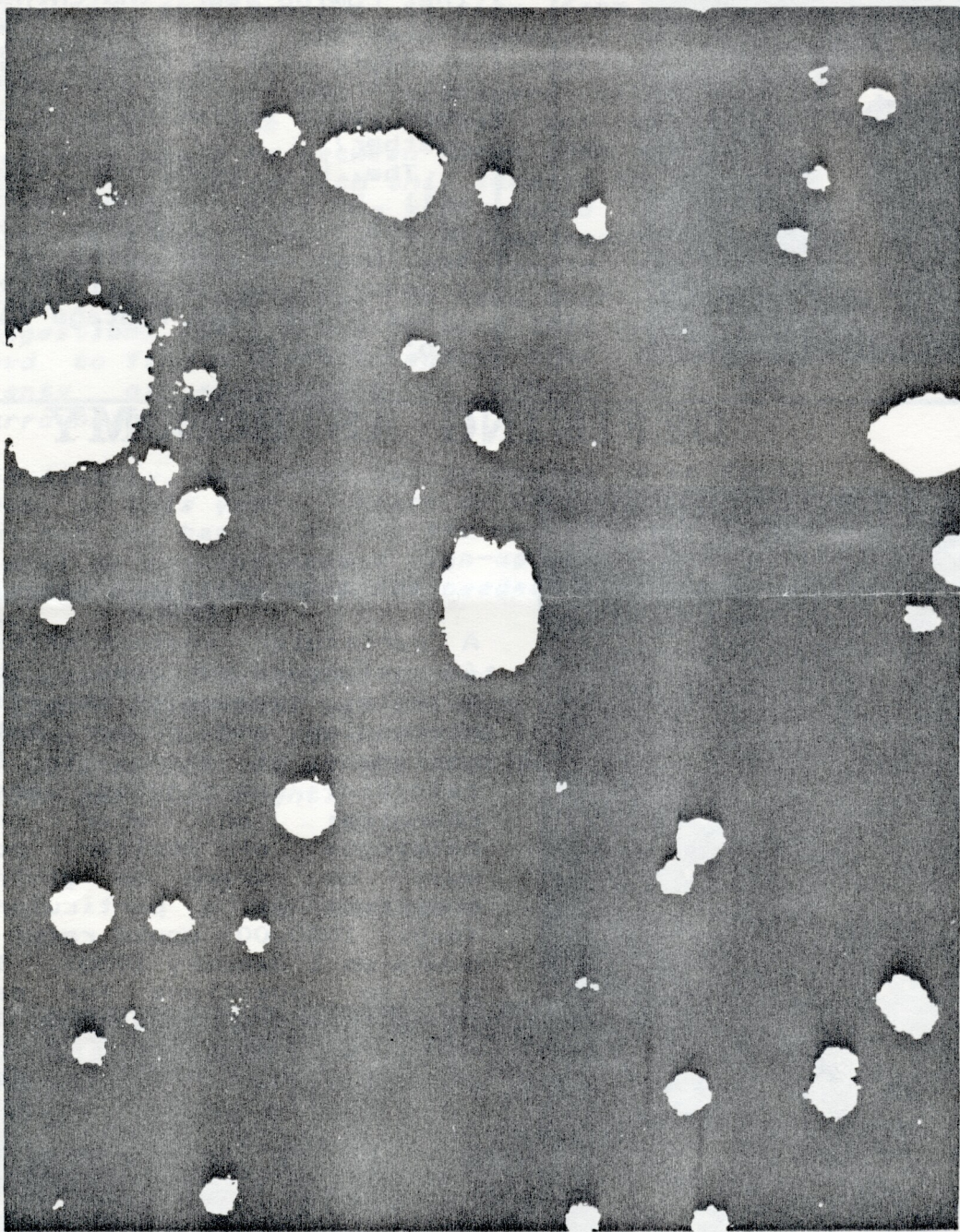
This sounds like an action packed spring if you ask me. I hope you didn't think this was too long a president's message, but I figured the more I say here the less I have to say at the meeting. So I'll see you at the next meeting, and if not there, the next star party... right?

Andy Corkill



CERRO TOLOLO, Chile — A rare "hamburger-shaped" object discovered by astronomers at the National Optical Astronomy Observatories (NOAO) facility at Cerro Tololo, Chile, stands out as a bright, bun-like blur among normal-looking, spherical stars. Officially called "Object Gómez," for its discoverer, Arturo Gómez, the find lies in a region of the sky near the center of the Milky Way galaxy, an area rich in stars, but poor in such unstarlike objects as Gómez, which appears to be the only one of its kind in this galactic neighborhood. NOAO astronomers and their University of Chile colleagues believe Object Gómez is a star with an equatorial ring of dust thick enough to hide part of the star from view, creating its bun-like appearance, and undergoing a rapid evolutionary phase that will eventually transform it into a planetary nebula — the seeds of material that finally grow into new stars, planetary systems, and the chemical ingredients of life. Object Gómez was first detected in May 1985, and studied in subsequent observations by other astronomers at Cerro Tololo Inter-American Observatory.

NOAO Photo #4117. Please credit: National Optical Astronomy Observatories.





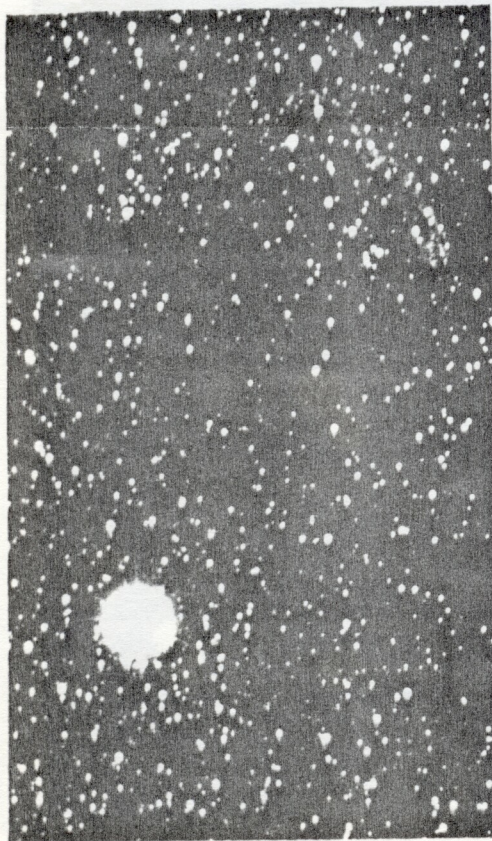
THIS
MONTH'S
PROGRAM



This month's meeting will be at 7:30pm at Hyde Observatory on Tuesday January 28th. Andy will be filling us in on what is planned for the coming year (Hutchinson trip, Astronomy Day, Etc.) and will probably let us know how great his ski trips to Colorado were while we were here suffering with 50 degree weather!

The big event for the meeting will be Rick Johnson's presentation of the Voyager 2 Uranus flyby. Rick has been eavesdropping on the JPL transmissions and will have lots of great video tape footage to show us. Don't miss it!

DEFINING ASTRONOMY



EPOCH

A particular instant of time used for reference purposes. Thus, for example, because of the effects of precession and proper motion the positions of stars (in terms of celestial coordinates) are slowly changing; any star chart or catalogue of stellar positions must be drawn up giving the positions at a particular epoch (e.g. 1950.00 would refer to zero hours on 1 January 1950). To obtain precise positions for particular times thereafter, allowance must be made for the changes in position since the epoch of the catalogue.

(from Dictionary Of Astronomy by Iain Nicolson)

AT THE LAST MEETING.....

Vice-President Norma filled in for the vacationing President Andy and opened up the meeting asking for reports from the various PAC committees. The Observatory Committee did not have a meeting this month and plans their next meeting in February. The Telescope Making Committee reported that the expected date of completion for the new club scope would be in March (OF THIS YEAR!) and that they would "really get going on it REAL soon!".

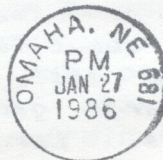
Having finished with the committees Norma asked for a volunteer for the newly created office of Public Relations

Officer. It was explained that the PR officer would handle contacting the newspapers and various radio/tv stations in the area concerning PAC events and news. There were no takers to Normas request, so it was assumed that President Corkill would use his power and appoint someone at a latter date.

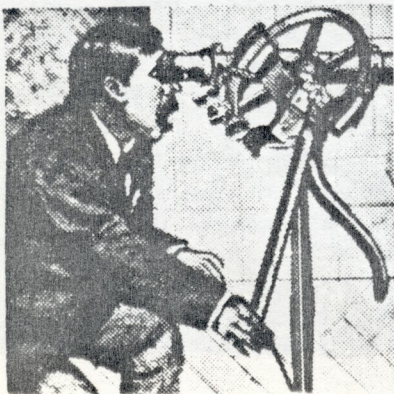
Norma then gave two book reports... one on Monsters in the Sky, and the second on The New York Times Halleys Comet Book.

The program was presented by John Lortz and dealt with how to use your tripod and a camera with high speed film to photograph a comet without a clock drive. Refreshments were served after the meeting.

THE PRAIRIE ASTRONOMER
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P.O. Box 80553
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FIRST CLASS MAIL



EARL MOSER
HICKMAN NE 68372
86/09 R

PAC FEBRUARY CALENDER

1. 1783: William Herschel announces star Lambda Herculis as the apex of local solar motion.
- 2.
3. 1966: Soviet Luna 9 is first spacecraft to soft-land an instrument package on the moon (Oceanus Procellarum).
4. 1600: Tycho Brahe and Johannes Kepler meet for first time outside of Prague.
1906: Clyde Tombaugh, discoverer of Pluto is born.
5. 1963: Maarten Schmidt discovers enormous red shifts in the spectra of quasars.
1971: US Apollo 14, third manned expedition to moon, lands near Fra Mauro.
1974: US Mariner 10 returns first close-up photos of Venus's cloud structure.
- 6.
7. PAC STAR PARTY AT EARL MOSER'S
1824: William Higgins, discoverer of nature of spiral "nebulae," is born.
1889: Astronomical Society of the Pacific holds first meeting in San Francisco.
8. NEW MOON 7:55
1672: Isaac Newton reads his first optics paper before Royal Society in London.
1969: Meteorite weighing over one ton is recovered in Chihuahua, Mexico.
9. 1811: Nevill Maskelyne, fifth Astronomer Royal of England and establisher of the NAUTICAL ALMANAC, dies.
10. 1720: Edmund Halley is appointed second Astronomer Royal of England.
11. 1575: King Frederick of Denmark offers island of Hveen to Tycho Brahe.
1650: Rene Descartes, proposer of first evolutionary cosmological theory, dies.
1868: Leon Foucault, discoverer of first physical proof of earth's rotation, dies in France.
1970: Japan becomes the fourth nation to put a satellite (Osumi) in earth orbit.
12. 1947: A daytime fireball and meteorite fall is seen in eastern Siberia.
13. 1678: Tycho Brahe first sketches "Tychonic system" idea of solar system.
14. 1950: Karl Jansky, discoverer of cosmic radio sources, dies.
15. 1564: Galileo Galilei is born in Pisa, Italy.
1845: William Parsons, the Earl of Rosse, uses 72-inch reflector for the first time.
16. 1600: Giordano Bruno, advocate of the Copernican theory and the plurality of worlds, is burned at the stake by the Inquisition in Rome.
17. 1723: Tobias Mayer, developer of the "method of lunars" for longitude determination, is born in Wurtttemberg, Germany.
1965: US Ranger 8, which later transmits 7,137 pictures before impacting on the moon's Mare Tranquillitatis, is launched.
18. 1930: Clyde Tombaugh discovers Pluto on photographic plates.
1957: Henry Norris Russell, American co-author of the temperature-luminosity graph, dies.
19. 1473: Nicholas Copernicus is born in Torun, Poland.
20. 1962: John Glenn completes America's first manned orbital space flight.
21. 1938: George Ellery Hale, the astronomer most responsible for the 200-inch Palomar Telescope, dies.
22. 1966: Soviets launch Cosmos 110 with Veterok and Ugolek, first two-dog space crew.
- 23.
24. FULL MOON 10:02
1968: Radio astronomers in Cambridge, England, announce discovery of the first pulsar (constellation Velpecula).
25. PAC MEETING --- 7:30PM, HYDE OBSERVATORY
1723: Sir Christopher Wren, English astronomer and architect, dies.
26. 1616: Inquisition delivers an injunction to Galileo against teaching of the Copernican theory.
1842: Camille Flammarion, Mars researcher and popularizer of astronomy, is born.
- 27.
- 28.
29. 1504: Christopher Columbus uses a lunar eclipse to frighten hostile Jamaican Indians.

(Courtesy of Compuserve's Naked Eye Astronomy section)

MEMBER GALAXIES OF THE LOCAL GROUP

| NAME | EPOCH 1983 | | B t | TYPE | DISTANCE (kpc) |
|--------------------|------------|---------|--------|-----------|-------------------|
| | R.A. | DEC. | | | |
| M31 = NGC 224 | 00h41.8m | +41d11m | 4.38 | SbI-II | 730 |
| Milky Way | ----- | ----- | --- | Sb/c | --- |
| M33 = NGC 598 | 01h32.9m | +30d34m | 6.26 | Sc II-III | 900 |
| L Magellanic Cloud | 05h23.8m | -69d46m | 0.63 | SBm III | 50 |
| S Magellanic Cloud | 00h52.2m | -72d55m | 2.79 | Im IV-V | 60 |
| NGC 6822 | 19h44.0m | -14d51m | 9.35 | Im IV-V | 520 |
| IC 1613 | 01h03.9m | +02d02m | 10.00 | Im V | 740 |
| M110 = NGC 205 | 00h39.5m | +41d36m | 8.83 | S0/E5 pec | 730 |
| M32 = NGC 221 | 00h41.8m | +40d46m | 9.01 | E2 | 730 |
| NGC 185 | 00h38.0m | +48d15m | 10.13 | dE3 pec | 730 |
| NGC 147 | 00h32.3m | +48d25m | 10.36 | dE5 | 730 |
| Fornax | 02h39.2m | -34d36m | 9.1 | dE | 130 |
| Sculptor | 00h59.0m | -33d47m | 10.5 | dE | 85 |
| Leo I | 11h07.6m | +12d24m | 11.27 | dE | 230 |
| Leo II | 11h12.6m | +22d15m | 12.85 | dE | 230 |
| Draco | 17h19.8m | +57d56m | N/A | dE | 80 |
| Ursa Minor | 15h08.6m | +67d16m | N/A | dE | 75 |
| Carina | 06h47.2m | -50d59m | N/A | dE | 170 |
| Andromeda I | 00h44.6m | +37d57m | 13.5 | dE | 730 |
| Andromeda II | 01h15.5m | +33d21m | 13.5 | dE | 730 |
| Andromeda III | 00h34.5m | +36d25m | 13.5 | dE | 730 |
| LGS 3 | 01h02.9m | +21d48m | N/A | dE | 730 |

These galaxies are known members of the "Local Group", a gravitationally bound system. Our Milky Way is a member of this system along with a few bright, well known objects. These include the Andromeda Galaxy (M31), the "Pinwheel" Galaxy in Triangulum (M33) and the Large and Small Magellanic clouds. Note that about half of the objects on the list are small, low-luminosity dwarf elliptical galaxies that would be quite beyond detection were they not in our "neighborhood".

This information was taken from the "Revised Shapley-Ames Catalog" and published in "Observers Handbook 1986" from the Royal Astronomical Society of Canada.

Information in the table is in the following order: Name and/or designation of object; it's coordinates (R.A. and DEC.); total blue magnitude (actual visual magnitudes will be lower); type of system (see standard references for nomenclature) and estimated distance in thousands of Parsecs (1 Parsec=3.261631 LY).

(courtesy Compuserve Space Science Forum)