CAPE FEAR Skies

The Monthly Newsletter of the Cape Fear Astronomical Society

Volume 4 No. 8 | **Wilmington, NC** | **August 1989**

August Meeting Announcement

Sunday
August 6, 1989
7:00 PM
Bryan Auditorium
Morton Hall
UNCW Campus

The next meeting of the Cape Fear Astronomical Society will be held on August 6, 1989 in the Bryan Auditorium of Morton Hall on the UNCW Campus. The Business meeting will begin at 7:00 PM EST.

Bob Melvin will be returning as a guest speaker for this months the general meeting. Mr. Melvin was the program for our January 1988 meeting. Bob will be returning to update the Cape Fear Astronomical Society on the continuing research he has been doing at the Kitt Peak National Observatory located in Arizona. The general meeting will begin at 8:00 PM.

Please don't miss this meeting

Meeting Minutes from July

The vice president, Paul Petty, presiding, the president being absent, called the regular meeting of the Cape Fear Astronomical Society to order at 7:01 p.m. July 9, 1989 in Bryan Auditorium, Morton Hall, UNCW. Reading of the minutes from June's meeting was dispensed with, the secretary arriving late. Paul Petty called the roll; twelve members and four visitors were present. The treasurer, Ronnie Hawes, reported that the checking account balance was $51.24, and June's expenditures totaled $0.00. The observatory fund contained $80.68.

Paul Petty said Ronnie Hawes has candy available for sale. Paul announced a trip to the Chapel Hill planetarium and observatory for a Friday in September. During discussion Tom Jacobs suggested the 15th because it is near the new moon, and it was tentatively set. Paul iterated that we plan to have county officials and others present at the September 3 regular meeting for discussion of the observatory project.

Paul Petty mentioned the total lunar eclipse August 16 and 17 and the need for members to help with its public viewing. He noted Apollo 11's twentieth anniversary; the Arts & Entertainment network, resident on Vision Cable of Wilmington channel 31, will commemorate it with several specials. He said Martin Best has

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information on Foucault focuser for astrophotography.

Alan Hilburn reported that UNCW's Dr. Brian Davis might prepare apparatus to view NASA's satellite feeds during Voyager 2's August encounter with Neptune. He conveyed that Doug Gegen of the Roper Mountain Science Center in South Carolina has invited the society to an August 12 public viewing. Alan is getting together a trip to the mountains for the Perseids meteor shower in August. He has a stack of the *Sky & Telescope 1989 Guide to the Heavens* which Sky Publishing sent him. He also told about the combined 1989 Georgia Star Party and Astronomical League southeast region business meeting hosted by the Astronomical Society of the Atlantic in late September.

Paul Petty iterated that he brings a red notebook each month holding about thirty newsletters from other astronomical societies.

Tom Jacobs noted the recent discovery of another Neptunian moon. He had information on handouts regarding NASA's 6/14/89 updated mixed fleet manifest and astronomer William Forrest's June 15 announcement of the discovery of at least four probable brown dwarfs in the Taurus star forming complex.

Martin Best, Observatory Committee chairman, reported that the society might decide to build an interim structure in the next year or two for its own use, possibly on the current Hampstead site. He asked those interested to contact him about a meeting before July's end. Paul Petty added that for the large project, grants on the state and federal levels are needed, and tax-exempt status is a year or so away.

Doug Green related two of his visits of Morehead Planetarium at Chapel Hill and recommended Friday as the best day of the week to really experience its capabilities.

The business meeting adjourned at 7:39.

After the break, Ronnie Hawes reminisced in "Where Were You July 20, 1969?" He recalled the "goose bumps" during those fateful events. Waxing poetic, he likened the astronauts to early explorers venturing through a "sea of space" in "ships of metal, fiberglass". He added that the Arts & Entertainment network is airing *Space Flight* Mondays at 9 p.m. and repeating it four hours later.

Continuing the evening's program was the videotape *NASA The 25th Year* , a detailed history of NASA.

Paul Petty mentioned that he is planning to go see the space shuttle launch on October 12 or 13. He has a time sharing condominium at Daytona near that date that can accommodate five others.

Alan Hilburn noted that he observed part of Saturn's recent occultation with a star until clouds moved in.

-Paul D. Walker

Total Eclipse of the Moon

A Public Viewing Session - Wednesday August 16, 1989

On the night of Wednesday August 16th and 17th there will be a total eclipse of the Moon. This entire event be visible from the Wilmington area. In fact it will be well placed in the sky for viewing from Southeastern North Carolina.

The Cape Fear Astronomical Society is planning to hold a public viewing session for this event at the Fort Fisher Museum. The schedule for the eclipse is as follows.

Event	Local Time	UT
Moonrise	7:50 pm	16^d 23:50
Moon enters penumbra	8:23 pm	17^d 00:23
Moon enters umbra	9:21 pm	17^d 01:21
Moon enters totality	10:20 pm	17^d 02:20
Middle of the eclipse	11:08 pm	17^d 03:08
Moon leaves totality	11:56 pm	17^d 03:56
Moon leaves umbra	12:56 am	17^d 04:56
Moon leaves penumbra	1:53 am	17^d 05:53

The Moon will be about 25° above the horizon when it encounters the umbra during this eclipse. Having the eclipse this far off the horizon should make this eclipse one of the best you are likely to see. Let us hope that the weather will be on our side for this event.

Please plan to help the group in presenting this event to the public. There will be further planning for this event during the August business meeting.

(Voyager 2 Encounters Neptune (from page 4)

ward out of the solar system. Through major upgrades of the ground based receiving station, radio contact with both spacecraft is expected to last well into the 21th century. The end for both Voyagers 1 and 2 will occur sometime about the year 2020 when the electrical power supply will be exhausted.

Voyager 2 Encounters Neptune

Last Stop On the Grand Tour of the Gas Giant Planets.

You are most likely aware that the Voyager 2 spacecraft will make it's closest approach to the planet Neptune on the 25th of this month. This will be the fourth and final planetary encounter for the Voyager 2 spacecraft; and will complete Voyager 2's grand tour of the outer gas giant planets.

The Planet Neptune

Neptune is a pale green planet with a diameter about 4 times that of the Earth. This green hue is the result of methane (natural gas) in the atmosphere. The methane absorbs red light. This lack of red light results in Neptune appearing greenish in color.

Due to it's great distance from the Earth (and from the Sun) Neptune can never be seen from Earth with the naked eye. The largest Earth based telescopes are able to see only the broadest of features on the planets disk.

Neptune orbits 29 astronomical units from the Sun (or nearly 3 billion miles). Currently Neptune is the farthest planet from the Sun. It will remain the farthest planet until 1998; when Pluto's elliptical orbit will again carry it out beyond the orbit of Neptune.

Neptune was discovered in 1846 at the Berlin Observatory by Johann Gottfried Galle. A prediction for the location of Neptune had been calculated by Jean Joseph Urbain Le Verrier. Using Le Verrier's calculations Galle found an unidentified disk on his first night of observing. At the second nights observing session the unidentified disk had moved; the eighth planet had been found. This makes Neptune the first planet to be discovered based on mathematical predictions.

Neptune rotates on it's axis. It's "day" is between 17 and 18 hours long. The axis of rotation is tilted about 29° to the plane of the planets orbit around the Sun.

Neptune Moons

Neptune has two known satellites Trition and Nereid. [*Editor's Note:* Voyager 2 discovered a third moon (1989N1) on the 6th or 7th of July 1989. This moon has not yet been named. (Please no comments about being out of date before making it to press!)]

Both Triton and Nereid orbit at large angle to the equator of Neptune.

Triton, the larger of the two moons, has an orbit that is tilted about 20° from the equator of Neptune. Triton is about the size of Earth's Moon; and always keeps the same face directed at Neptune. Unlike Earth's Moon Triton does have an atmosphere This atmosphere is believed to consist of methane and possible nitrogen.

Neried's orbit is tilted by 30° from the equator. The size of this moon is between 200 and 700 miles in diameter. It orbits Neptune in a very elliptical orbit that varies between 1 and 6 million miles.

Neptune Rings?

Does Neptune have rings like Saturn or Uranus? This is one of the questions that Voyager 2 may answer. Earth based observations of Neptune occulting background stars has been confusing as to the existence of "Rings of Neptune". Our current understanding of Neptune calls for "Ring Arcs" of matter to orbit the planet at it's equator. Ring Arcs are similar to the rings around Saturn or Uranus except that the ring arcs do not go completely around the planet.

The Voyager Spacecraft

Voyager 2 is the second of two identical spacecraft built by NASA's Jet Propulsion Laboratory (JPL). The mission of the Voyager spacecraft was to take advantage of a once every 175 year alignment of the outer planets. This alignment would allow a spacecraft to swing from one planet to the next with out using an onboard propulsion systems for each leg of the trip. The gravity of each planet "bends" the orbit of the spacecraft on to the next planet.

Voyager 1 was launched from the Kennedy Space Center on September 5, 1977. The shorter trajectory used by the Voyager 1 spacecraft allowed it to reach Jupiter before Voyager 2 which had been launched on August 20, 1977.

When Voyager 1 arrived at Jupiter on March 5, 1979 it provided the first close-up pictures of the Jovian system. It's encounter with Jupiter changed the spacecrafts orbit; directing the spacecraft on to Saturn.

Voyager 1 reached Saturn on November 12, 1980. It's trajectory was designed to allow the spacecraft to pass very close to the moon Titan. Making the close approach to Titan caused Voyager 1 to be deflected northward out of the solar system.

Voyager 1's planetary encounters were then over. It continues to explore interplanetary space as it searches for the edge of the solar system.

Voyager 2 encountered Jupiter July 9, 1979 and Saturn on August 25, 1981. Saturn's gravity was used to propel Voyager 2 on to Uranus instead of out of the solar system.

On January 24, 1986 Voyager 2 made it's closest approach to the planet Uranus. As the first spacecraft to encounter Uranus Voyager 2 radioed back to Earth our only detailed photographs of this planet. The spacecraft

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COMET BRORSEN-METCALF RECOVERED

Astronomer Eleanor Helin at Palomar Observatory has recovered periodic comet P/Brorsen-Metcalf (1989o). This periodic comet has been predicted as the best observers comet for 1989.

The comet was recovered photographically on plates taken July 3. The comet was a 10th magnitude object located near the eastern edge of the Great Square of Pegasus upon recovery. It should now be an 8th magnitude object located in Perseus. This comet is currently moving over 2.5° per day.

Comet P/Brorsen-Metcalf will pass perihelion on September 11th. It is expected to have brighten to about magnitude 5.7 at this time.

The original date of perihelion passage was predicted as September 28th. This date was based on the last appearance of the comet in 1919. It is believed that outgassing of material has produced this two week change in the comet's orbit.

The ephemeris below comes from the Center for Astronomical Telegrams.

Epoch = 1989 Oct. 1.0 ET

1989 ET	R.A. (1950)	Decl.	Delta	r	ml
July 28	2 30.54	+31 45.8			
August 2	3 20.34	+36 42.0	0.640	1.026	8.0
7	4 21.01	+40 24.8			
12	5 28.06	+41 56.5	0.633	0.855	7.1
17	6 33.00	+41 00.2			
22	7 29.08	+38 08.8	0.726	0.688	6.4
27	8 14.79	+34 10.8			
Sept. 1	8 52.01	+29 40.7	0.898	0.547	5.8
6	9 23.40	+24 55.3			
11	9 51.11	+20 03.0	1.118	0.479	5.7
16	10 16.37	+15 12.1			
21	10 39.62	+10 32.6	1.342	0.527	6.5

Voyager 2 Encounters Neptune (from page 3)

also radioed back information about Uranus': rings; moons; and magnetic field.

Voyagers Experiments

The Voyager spacecraft carries instruments for 10 scientific experiments. Also the radio signal used by the spacecraft to communicate with Earth can also be used for experiments.

Four optical instruments are mounted on a movable platform. These four instruments include: two imaging cameras; an infrared spectrometer and radiometer; an ultraviolet spectrometer; and a photopolarimeter.

The first imaging camera is a wide-angle camera. It uses a 200-mm f/3.5 refracting telescope as it's lens. The second imaging camera is a telephoto camera using a 1500-mm f/8.5 reflecting telescope as it's lens. The image is converted into electrical signals using a vidicon for transmission back to Earth. Both cameras produce black and white images. Color pictures are created on Earth by combining images taken through different filters.

The infrared spectrometer and radiometer is used measure the temperatures of planets and satellites.

The ultraviolet spectrometer is used to study the chemical composition of atmospheres by measuring how ultraviolet light from the Sun is absorbed or scattered after it enters the atmosphere of a satellite or planet. While the spacecraft is cruising between planetary encounters this instrument can be used to study the ultraviolet light coming from distance stars.

The photopolarimeter measures the way light is scattered from particles in an atmosphere or from a surface. The size and shape of a particle will affect the way reflected light is polarized.

The remaining instruments are used to measure: the strength of magnetic fields that the spacecraft passes through; the composition and energy of charged particles that pass by the spacecraft; and the strength of both cosmic rays and radio emissions.

Voyager Beyond Neptune

After Neptune, Voyager 2 will be deflected south-

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Sky Calendar for August 1989

(All times are Given in UT to convert to EDT subtract 4 hours.)

Tuesday; 1st
16:06 New Moon. Lunation number 824

Wednesday; 2ed
16h Mars passes 0.7° north of Regulus
------ Alpha Capricornids Meteors. Radiant is right ascension 20:36; declination -10°; ZHR = 6 to 9; Slow 25 km/sec; yellow in color and bright with many fireballs.

Thursday; 3ed
2h Mercury passes 1.6° north of the Moon
7h Regulus passes 0.9° north of the Moon. Occultation.
8h Mars passes 1.6° north of the Moon.

Friday; 4th
13h Venus passes 3° north of the Moon.
16h Mercury passes 0.8° north of Regulus
------ Islamic New Year

Saturday; 5th
22h Mercury passes 0.1° north of Mars.

Monday; 7th
15h Moon at apogee. Distance from the Earth is 63.4 Earth-radii.
19h Vesta stationary in right ascension; resumes direct motion.
------ Iota Aquarids Meteors has three streams. The first has a radiant of right ascension 22:00; declination -6°. Second has a radiant of right ascension 22:30; declination -15°. Third has a radiant of right ascension 22:40; declination -30°; ZHR = 5.

Tuesday; 8th
------ Upsilon Pegasids Meteors. Radiant is right ascension 23:20; declination 19°; ZHR = 4 to 13; Medium speed 50 km/sec; yellow-white in color.

Wednesday; 9th
17:28 Moon at first quarter.

Friday; 11th
14h Antares passes 0.6° north of the Moon.

Saturday; 12th
------ The first atmospheric flight test of the orbiter Enterprise occurs on this date in 1977.
------ Perseids Meteors. Radiant is right ascension 3:04; declination 58°; ZHR = 68; Fast 60 km/sec; mostly yellow in color some fireballs.
------ Echo 1 is place in orbit on this date in 1960 becoming the first passive communications satellite.

Sunday; 13th
7h Uranus passes 4 ° north of the Moon.
18h Saturn passes 4° north of the Moon.
22h Neptune passes 5° north of the Moon.

Monday; 14th
18:14 Mercury at descending node.

Thursday; 17th
3:07 Full Moon called the "green corn" or "grain" Moon.
3:08 Total Eclipse of the Moon. This Eclipse will be visible from the Wilmington area.

Friday; 18th
3h Pallas is stationary in right ascension; begins retrograde motion.

Saturday; 19th
12h Moon at perigee. Distance from the Earth is 57.0 Earth-radii.
------ Comet P/Pons-Winnecke at perihelion 1.3 au from the Sun.

Sunday; 20th
------ Kappa Cygnids Meteors. Radiant is right ascension 19:20; declination 55°; ZHR = 3 to 5; Slow 25 km/sec.

Wednesday; 23th
18:40 Moon at last quarter.

Friday; 25th
5h Voyager 2 makes it's closest approach the the planet Neptune.
------ Mercury at aphelion. Magnitude 0.2; distance from Earth 1.0 au.

Saturday; 26th
7h Jupiter passes 4° south of the moon

Tuesday; 29th
10h Mercury at it's greatest eastern elongation of 27°.

Wednesday; 30th
------ Mission specialist Guy Bluford becomes the first black American in space.

Thursday; 31th
5:44 New Moon. Lunation number 825
6:30 Partial Eclipse of the Sun. (Not visible from the Wilmington area.)

Upcoming Events in August 1989

Group Viewing Session
Saturday August 5, 1989; Sunset until "?" - Hampstead Site

Monthly Meeting of the Cape Fear Astronomical Society
Sunday August 6, 1989; 7:00 PM - Bryan Auditorium; Morton Hall; UNCW

Public Viewing Session - Total Eclipse of the Moon
Wednesday August 16, 1989; 8:00 PM - Fort Fisher Museum

Deadline for the September Newsletter
August 18, 1989

Group Viewing Session
Saturday August 26, 1989; Dusk until "?" - Hampstead Site

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