

Skylights

Newsletter of the Astronomical Society of Northern New England



FEB 2020



Member of NASA's
Night Sky Network



Astronomical League

ASNNE MISSION

ASNNE is an incorporated, non-profit, scientific and educational organization with three primary goals:

- 1) To have fun sharing our knowledge and interest with others.
- 2) To provide basic education in astronomy and related sciences to all who are interested.
- 3) To promote the science of Astronomy.

What's Up In February

By Bernie Reim

The month of February is named for after the Roman festival Februa, which are rites of purification. The second day of this month, Groundhog Day, marks the half way point of our winter season. There are several interesting highlights this month that will make it well worth it to brave the season's coldest temperatures to see them for yourself.

These include all 5 of our brightest planets crossing through the ecliptic plane of our solar system, three planets close together in the morning sky, several nice conjunctions with the moon and bright planets, a brightening comet in Perseus the Hero, and an occultation of Mars by the moon just after sunrise on Tuesday morning the 18th.

Venus continues to climb higher into our evening sky each night as it is rapidly catching up with Earth in its faster and tighter orbit around the sun. Venus orbits at 22 miles per second, which is 78,340 mph, and Earth orbits at 18.6 miles per second, which is 67,000 mph. So not only does Venus orbit faster, it also has less distance to travel around the sun. One year on Venus is 225 days and the radius of its orbit is only 70% of our radius, which is 93,000, 000 miles, or one astronomical unit. Venus spins so slowly that it is the only planet in our solar system whose day is longer than its year. Venus takes 243 days to make one rotation and it spins at only 4 miles per hour, compared to Earth at 1,000 mph near the equator.

By the end of this month it will set nearly 4 hours after the sun, gaining nearly half an hour this month. Sometimes called our sister planet because it is the same size as Earth, Venus is still continuing to get brighter each evening even as it is getting less illuminated by the sun. It will be only 63 % lit by the sun by the end of this month and look similar to a waning gibbous moon. Venus will be at its ascending node as it crosses through our ecliptic plane on the 15th.

Mercury makes a nice evening appearance below Venus in our sky during the first half of

this month. Our first planet will reach greatest eastern elongation from the sun on the 10th. Mercury orbits at 31 miles per second and its year lasts only 88 earth days and its day is 59 earth days. It also rotates slowly, at about 7 mph.

It is the only planet whose entire elliptical orbit precesses a little as it orbits. It is only 1.5 degrees per century, but it was noticed hundreds of years ago and could not be correctly explained until Einstein's General Relativity. That is a testament to the enormous gravitational energy of the sun as it warps the very fabric of space-time around it, causing this slight precession of Mercury's orbit. Classical Newtonian physics could never explain this effect, so they thought there had to be another planet near the sun that caused this deflection. They named that imaginary planet Vulcan and many scientists even thought they had seen this other planet during total solar eclipses, but they never did because it does not exist nor does it need to exist to explain this 200-year-old mystery. Mercury will be on its ascending node on the 7th.

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What's Up "Continued from page 1"

The other 3 bright planets are all visible in the morning sky now. Mars is the highest, rising around 4 am, then Jupiter rising around 5 am, followed by Saturn about half an hour later. All 3 are in the constellation of Sagittarius now. All 3 planets are moving in their normal, prograde motion now and each one is getting a little higher and larger in our sky each morning.

Mars is at its descending node on the first of this month, Jupiter will be there on the 26th, and Saturn on the 13th. All 3 of our morning planets will reach their descending nodes this month, while our two evening planets reach their ascending nodes. We would get many more eclipses and transits and occultations if all the moons and planets orbited exactly in the plane of our solar system, but none of them do. They all cross that plane moving upwards or downwards in their own rhythms and cycles.

However, we will get a fairly rare occultation of Mars by the waning crescent moon on Tuesday morning the 18th just after sunrise. That means you will need a telescope to see it since Mars will have faded out by then. If you do see it, also try to photograph this event. Notice that Mars will fade out gradually as the moon covers it and then reappear gradually. When the moon occults a star, it blinks out instantly.

Even if you don't see this occultation, this is a good time to think about returning to the moon with humans and visiting Mars for the first time in person. NASA plans to go back to the moon by 2024, but it will probably be at least 10 years before we send humans to Mars. It is important to do that for several reasons. If we found any evidence of life on Mars, we would know that life could arise on at least two planets separately and that means many more planets in thousands of other solar systems would be much more likely to also have life in some forms. We also need to establish a human colony on a place other than Earth to insure the survival of our species in case of a major disaster like an asteroid hitting the earth.

You can also look for a comet in Perseus for the rest of this winter right into spring. Comet PanSTARRS (C/2017 T2) was discovered by the PanSTARRS 1 telescope in Hawaii on October 2, 2017. It is now in Perseus just one degree above the famous double cluster in Perseus. At magnitude 9.5 you

would need a small telescope to see it. Then it will brighten 8.8 magnitude by the end of the month and then it will continue to brighten until it reaches perihelion nearest the sun on May 4. It may reach 5th magnitude by then and become visible without any optical aid.

You have probably already heard that Betelgeuse, the red supergiant star in Orion and in the middle of the Winter Hexagon is now at its dimmest in recorded history at 1.5 magnitude. By itself, that is not too dramatic since Betelgeuse is already a variable star and it will probably get brighter again. However, at the middle of last month a burst of gravitational waves was also detected from that area of the sky by the LIGO and VIRGO detectors. That doesn't mean that Betelgeuse is about to blow up as a supernova, but it does make the whole story far more interesting. That detection hasn't been confirmed and it was not followed up with a burst of neutrinos, so it was probably just a coincidence. Keep your eye on this star and if nothing else photograph it to see how much dimmer it will get.

Feb. 1. First quarter moon is at 8:43 p.m. EST.

Feb.4. Clyde Tombaugh was born on this day in 1906. He would discover Pluto just 24 years later on Feb.18, 1930.

Feb.8. Jules Verne was born on this day in 1828.

Feb.9. Full moon is at 2:34 a.m. This is also known as the Snow, Hunger, or Storm Moon.

Feb.10. Mercury reaches greatest eastern elongation from the sun this evening and is visible just below Venus.

Feb. 15. Galileo was born on this day in 1564. Last quarter moon is at 5:18 p.m.

Feb. 18. The waning crescent moon will occult Mars for us this morning right after sunrise.

Feb.19. Nicholas Copernicus was born on this day in 1473. The moon will pass near Jupiter this morning.

Feb. 20. The moon will pass near Saturn this morning. John Glenn became the first American to go into orbit on this day in 1962. The first human to accomplish this was the Russian Yuri Gagarin on April 12 of 1961.

Feb. 23. New moon is at 10:33 a.m. Supernova 1987A was discovered on this day in the Tarantula nebula in the Large Magellanic Cloud by Ian Shelton on this day in 1987. Pioneer 11 left our solar system on this day in 1990.

Feb. 27. The waxing crescent moon will pass within 5 degrees of Venus this evening after sunset.

Moon Phases

Feb 1
First Quarter

Feb 9
Full

Feb 15
Last Quarter

Feb 23
New

Moon Data

Feb 10
Moon at perigee

Feb 18
Mars 0.8° south
of Moon

Feb 19
Jupiter 0.9° north
of Moon

Feb 20
Pluto 0.7° north
of Moon

Saturn 1.7° north
of Moon

Feb 26
Moon at apogee

Feb 27
Venus 6° north
of Moon

Feb 28
Uranus 4° north
of Moon

[Editor: I'm using Glenn's January 2020 Observer's Challenge for February]

OBSERVER'S CHALLENGE* –February, 2020

by Glenn Chaple

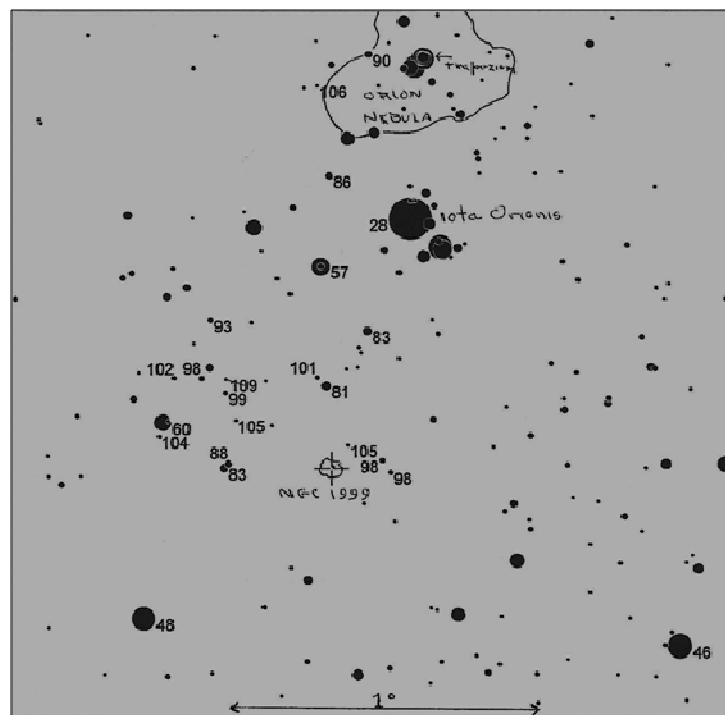
NGC 1999 – Reflection Nebula in Orion (Mag: 9.5; Size: 2' X 2')

This month's Observer's Challenge takes us to a nebula in Orion – not *the* Orion Nebula (M42), but one located a little over a degree further south. This "other Orion Nebula" is NGC 1999. Unlike M42, which is an emission nebula that produces its own light, NGC 1999 is a reflection nebula whose light source is the embedded variable star V380 Orionis.

NGC 1999 was discovered by William Herschel in 1785. He categorized it as a Class IV object (Planetary Nebulae) and assigned it the Herschel Catalog designation H.IV-33. What makes NGC 1999 so remarkable is a dark area just west of V380 Orionis. It's not an obscuring patch of unilluminated gas and dust, but an actual hole in the nebula. The mechanism for this anomaly is unknown but may be a result of outward-pushing radiation from V380 Orionis.

When viewed with my 4.5-inch f/7.9 reflector at 88X, NGC 1999 looked like a fuzzy star. A switch to a 10-inch f/5 reflector and boost to a magnification of 250X failed to reveal the hole, but I was able to detect a very faint surrounding nebulosity that spanned several arc-minutes.

At a distance of some 1500 light years, NGC 1999 is about 0.3 light years in diameter.



(Above) NGC 1999 finder chart, adapted by Glenn Chaple from AAVSO Variable Star Plotter (VSP). Numbers indicate star magnitudes (decimals omitted). North is up.

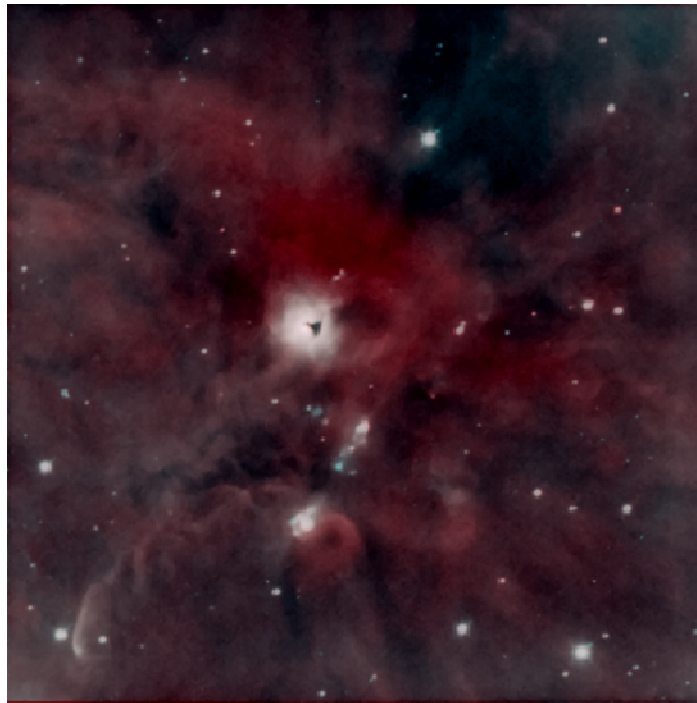
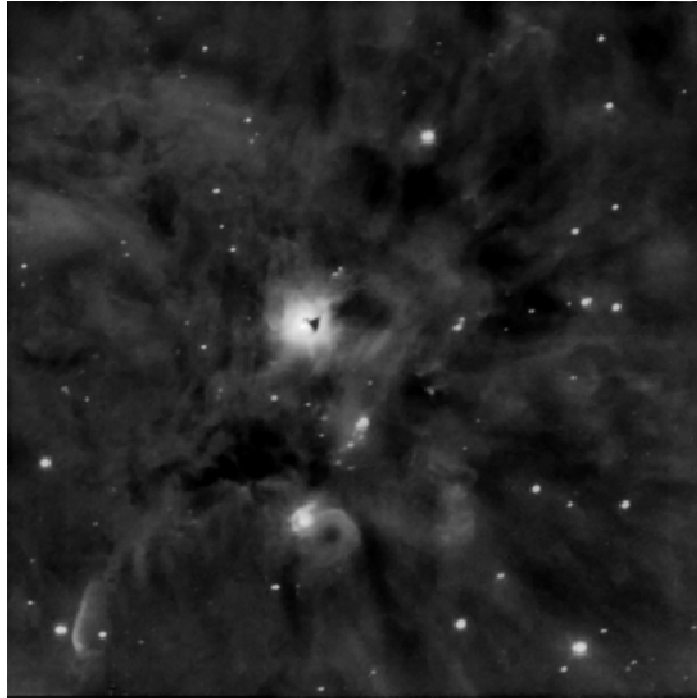
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(Below) Image of same field (www.astroton.com)



Image by Doug Paul (ATMoB) Stock Canon 80D, 400mm f/2.8 lens,
ISO200,104 subs X 15 sec = 26 min FOV: 25.5X20.4 arcmin. North is up.

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Images by Mario Motta, MD (ATMoB) Taken with 32-inch f/6 scope and 1001E SBIG camera, 166 minutes of H alpha, Sulfur, and O3 filters. Processed in PixInsight. North is up.

**The purpose of the Observer's Challenge is to encourage the pursuit of visual observing and is open to everyone who is interested. Contributed notes, drawings, or photographs will be published in a monthly summary. Submit them to Roger Ivester (rogerivester@me.com). To access past reports, log on to rogerivester.com/category/observers-challenge-reports-complete.*

Principal Meteor Showers in 2020

January 4
Quadrantids

April 22
Lyrids

May 6
Eta Aquarids

July 30
Delta Aquarids

August 12
Perseids

October 9
Draconid

October 21
Orionids

November 9
Taurids

November 18
Leonids

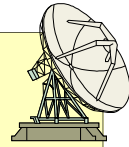
November 26
Andromedids

December 14
Geminids

December 22
Ursids

*Note: Dates are
for maximum*

Got any News?
Skylights Welcomes Your Input.



Here are some suggestions:

*Book reviews -- Items for sale -- New equipment --
Ramblings -- Star parties -- Observing -- Photos.*

Our Club has Merchandise for Sale at: www.cafepress.com/asne



*ALL money raised goes to our operating fund.
Any design can be put on any item.*

Contact David Bianchi dadsnorlax@yahoo.com for further details.

RED ALERT – Downward Pointing Lasers

NASA is planning to use (or is already using) downward pointing lasers which are mounted on their spacecrafts. For those of us who look at the night sky through a telescope, or a pair of binoculars, this is a potential hazard. If a laser beam enters our instrument at the very time we are viewing, eye injury or blindness could occur. Contact physicist, Dr. Jennifer Inman, jennifer.a.inman@nasa.gov and tell her your concerns about this perilous issue. Why should we have to live in fear each time we look into a telescope or a pair of binoculars? This is unacceptable!



This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

Betelgeuse and the Crab Nebula: Stellar Death and Rebirth

By David Prosper

What happens when a star dies? Stargazers are paying close attention to the red giant star **Betelgeuse** since it recently dimmed in brightness, causing speculation that it may soon end in a brilliant supernova. While it likely won't explode quite yet, we can preview its fate by observing the nearby **Crab Nebula**.

Betelgeuse, despite its recent dimming, is still easy to find as the red-hued shoulder star of Orion. A known variable star, Betelgeuse usually competes for the position of the brightest star in Orion with brilliant blue-white Rigel, but recently its brightness has faded to below that of nearby Aldebaran, in Taurus. Betelgeuse is a young star, estimated to be a few million years old, but due to its giant size it leads a fast and furious life. This massive star, known as a supergiant, exhausted the hydrogen fuel in its core and began to fuse helium instead, which caused the outer layers of the star to cool and swell dramatically in size. Betelgeuse is one of the only stars for which we have any kind of detailed surface observations due to its huge size – somewhere between the diameter of the orbits of Mars and Jupiter - and relatively close distance of about 642 light-years. Betelgeuse is also a “runaway star,” with its remarkable speed possibly triggered by merging with a smaller companion star. If that is the case, Betelgeuse may actually have millions of years left! So, Betelgeuse may not explode soon after all; or it might explode tomorrow! We have much more to learn about this intriguing star.

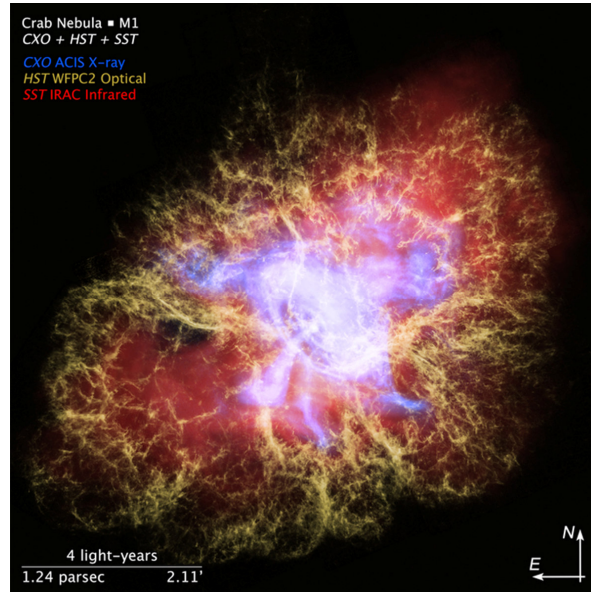
“Continued on page 8”

The **Crab Nebula** (M1) is relatively close to Betelgeuse in the sky, in the nearby constellation of Taurus. Its ghostly, spidery gas clouds result from a massive explosion; a supernova observed by astronomers in 1054! A backyard telescope allows you to see some details, but only advanced telescopes reveal the rapidly spinning neutron star found in its center: the last stellar remnant from that cataclysmic event. These gas clouds were created during the giant star's violent demise and expand ever outward to enrich the universe with heavy elements like silicon, iron, and nickel. These element-rich clouds are like a cosmic fertilizer, making rocky planets like our own Earth possible. Supernova also send out powerful shock waves that help trigger star formation. In fact, if it wasn't for a long-ago supernova, our solar system - along with all of us - wouldn't exist! You can learn much more about the Crab Nebula and its neutron star in a new video from NASA's Universe of Learning, created from observations by the Great Observatories of Hubble, Chandra, and Spitzer: bit.ly/CrabNebulaVisual

Our last three articles covered the life cycle of stars from observing two neighboring constellations: Orion and Taurus! Our stargazing took us to the "baby stars" found in the stellar nursery of the Orion Nebula, onwards to the teenage stars of the Pleiades and young adult stars of the Hyades, and ended with dying Betelgeuse and the stellar corpse of the Crab Nebula. Want to know more about the life cycle of stars? Explore stellar evolution with "The Lives of Stars" activity and handout: bit.ly/starlifeanddeath .

Check out NASA's most up to date observations of supernova and their remains at nasa.gov

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This image of the Crab Nebula combines X-ray observations from Chandra, optical observations from Hubble, and infrared observations from Spitzer to reveal intricate detail. Notice how the violent energy radiates out from the rapidly spinning neutron star in the center of the nebula (also known as a pulsar) and heats up the surrounding gas. More about this incredible “pulsar wind nebula” can be found at bit.ly/Crab3D. Credit: NASA, ESA, F. Summers, J. Olmsted, L. Hustak, J. DePasquale and G. Bacon (STScI), N. Wolk (CfA), and R. Hurt (Caltech/IPAC)



Spot Betelgeuse and the Crab Nebula after sunset! A telescope is needed to spot the ghostly Crab.

Point and Shoot Camera Astroimaging

Canon Powershot SX50 HS

Image & write-up submitted by Paul Kursewicz

M1 (Crab Nebula)

Specs: JPEG, f/3.5, FL 2400mm (100x digital), ISO 1600, 14 x 2 min, 1-20-20



The **Crab Nebula (M1)** is a supernova remnant in the constellation of Taurus. The Nebula was first identified in 1731 and independently rediscovered in 1758 by [Charles Messier](#) as he was observing a bright [comet](#). Messier catalogued it as the first entry in his [catalogue](#) of comet-like objects. The name is due to William Parsons, 3rd Earl of Rosse, who observed the object in 1840 using a 36-inch telescope and produced a drawing that looked somewhat like a crab. M1 has an apparent magnitude of 8.4 so it cannot be seen with the naked-eye. But can be made out using binoculars under favorable conditions. The nebula lies at a distance of 6,500 ly from Earth and has a diameter of 11 ly. At the center of the nebula lies the [Crab Pulsar](#), a [neutron star](#) 17–19 miles across with a spin rate of 30.2 times per second.

Club Meeting & Star Party Dates

Date	Subject	Location
<u>Feb 7</u>	<p><u>ASNNE Club Meeting:</u></p> <p>Business Meeting 6:30 PM Beginners Class 7:00 - 7:30 PM (TBD) Regular Meeting 7:30-9:30 PM</p> <p>Guest speaker/topic - TBD Bernie Reim - What's UP Astro Shorts: (news, stories, reports, questions, photos)</p>	<u>The New School, Kennebunk, Me.</u>
<u>Last Month</u>	<p>At our meeting last month Ian Durham gave us a talk about his top five biggest stories of the year in physics. But before doing that, Ian talked about some of the great works that did not make his list. For details on the above go to https://fqxi.org/community/podcast/2019.12.29 . Here you will find Part 1 & 2 of “2019: Year in Physics Review.”</p>	
<u>TBD</u>	Club/Public Star Party: TBD	Talmage Observatory at Starfield West Kennebunk, Me.

Directions to ASNNE event locations

Directions to The New School in Kennebunk [38 York Street (Rt1) Kennebunk, ME]

For directions to The New School you can use this link to the ASNNE NSN page and then click on "get directions" from the meeting location. Enter your starting location to generate a road map with complete directions. It works great. http://nightsky.jpl.nasa.gov/club-view.cfm?Club_ID=137

Directions to Talmage Observatory at Starfield [Alewife Road, Kennebunk, ME]

From North:

Get off turnpike at exit 32, (Biddeford) turn right on Rt 111. Go 5 miles and turn left on Rt 35. Go 2 miles on Rt 35 over Kennebunk River to very sharp 90 degree left turn. The entrance to the Starfield Observatory site is at the telephone pole at the beginning of the large field on the left. Look for the ASNNE sign on the pole.

From South:

Get off the turnpike at exit 25 in Kennebunk. After toll both turn right on Rt 35. Go up over the turnpike and immediately turn right on Rt 35. About 4 miles along you will crest a hill and see a large field on your right. Continue until you reach the end of the field. Turn right into the Starfield Observatory site at the last telephone pole along the field. Look for the ASNNE sign on the pole. If you come to a very sharp 90 degree right turn you have just passed the field.

To join **ASNNE**, please fill out the below membership form. *Checks should be made payable to: Astronomical Society of Northern New England (A.S.N.N.E).* For more details, please visit our website: <http://www.asnne.org>



Astronomical Society of Northern New England
 P.O. Box 1338
 Kennebunk, ME 04043-1338

2020 Membership Registration Form

(Print, fill out and mail to address above)

Name(s for family): _____

Address: _____

City/State: _____ Zip code: _____

Telephone # _____

E-mail: _____

Membership (check one):

Individual \$35 _____ Family \$ 40 _____ Student under 21 years of age \$10 _____ Donation _____

Total Enclosed _____

Tell us about yourself:

1. Experience level: Beginner _____ Some Experience _____ Advanced _____

2. Do you own any equipment? (Y/N) And if so, what types?

3. Do you have any special interests in Astronomy?

4. What do you hope to gain by joining ASNNE?

5. How could ASNNE best help you pursue your interest in Astronomy?

6. ASNNE's principal mission is public education. We hold many star parties for schools and the general public for which we need volunteers for a variety of tasks, from operating telescopes to registering guests to parking cars. Would you be interested in helping?

Yes _____ No _____

7. ASNNE maintains a members-only section of its web site for names, addresses and interests of members as a way for members to contact each other. Your information will not be used for any other purpose. Can we add your information to that portion of our web site?

Yes _____ No _____

