

# *The Eldorado Star Party*

## *2020 Telescope Observing Club*

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*Houston Astronomical Society*

### **Purpose and Rules**

Welcome to the Annual ESP Telescope Club! The main purpose of this club is to give you an opportunity to observe some of the showpiece objects of the fall season under the pristine skies of Southwest Texas. We have also included a few items on the observing lists that may challenge you to observe some fainter and more obscure objects that present themselves at their very best under the dark skies of the Eldorado Star Party.

The rules are simple; just observe the required number of objects on the observing list while you are at the Eldorado Star Party to receive a club badge.

### **Flyin' High Over X Bar**

In early autumn, just after evening twilight, there are a number of winged creatures flying high in the skies of West Texas. Gliding along the glow of the Milky Way is both Aquila the eagle and Cygnus the swan. Just before midnight and directly overhead is the great winged horse Pegasus. Around midnight and looking to the south we can see a phoenix soaring across the southern horizon. So what better time and place to see what celestial gems these great winged creatures bring us as they fly high over the X Bar Ranch.

Given this great autumn opportunity, the Telescope Observing Club program for the 2020 Eldorado Star Party is **“Flyin’ High Over X Bar.”** The program is a list of 28 objects located in the four constellations mentioned above, Aquila, Cygnus, Pegasus and Phoenix. You only have to observe **23 of the 28** objects on the list with a telescope to qualify for the ESP Telescope Observing Club badge.

### **Previous ESP Observing Clubs**

Please note that all previous observing programs offered at ESP from 2004 onward are still available. Club badges from these earlier programs (*with the exception of 2009 - Texas Hash*) are also available and will be awarded to anyone completing them at ESP. Check the Eldorado Star Party website at [www.eldoradostarparty.org](http://www.eldoradostarparty.org) to select one (or more!) of these observing lists.

### **Club Badges**

Any size telescope or binocular can be used to complete the observing programs. Again, all observations must be made at the Eldorado Star Party in order to qualify for an ESP observing badge. To receive your badge, please turn in your observations to Bill Flanagan any time during ESP. I will try to be available on the observing field as well as in the Lodge prior to the meals and talks. If you finish the list on the last night of ESP, or I am not available to give you your badge, just mail a copy of your observations to me at 815 Azalea, Houston, TX 77018, and I will send you your badge.

Good Luck and Good Observing!

## *Flyin' High Over X Bar*

Primary ID	Alternate ID	Type	Con	RA 2000	Dec 2000	Mag	Size	Distance	Date	Time
V Aql	HR 7220	Var	Aql	19h04m24s	-05°41'06"	6.6 - 8.4		1,200 ly		
NGC 6755	Collinder 397	Open	Aql	19h07m49s	+04°16'00"	8.6	14.0'	4,600 ly		
NGC 6756	OCL 99	Open	Aql	19h08m42s	+04°42'18"	10.6	4.0'	4,900 ly		
NGC 6760		Glob	Aql	19h11m12s	+01°01'54"	9.0	9.6'	31,000 ly		
NGC 6781	PN G041.8-02.9	PNe	Aql	19h18m28s	+06°32'19"	11.8	1.9'	2,500 ly		
Albireo	Beta Cyg	MStar	Cyg	19h30m43s	+27°57'35"	3.1		390 ly		
NGC 6804	PN G045.7-04.5	PNe	Aql	19h31m35s	+09°13'32"	12.4	1.1'	4,800 ly		
Campbell's Hydrogen Star	He 2-438	PNe	Cyg	19h34m45s	+30°30'59"	9.6	35"	5,500 ly		
B 143	Barnard's E	Dark	Aql	19h40m42s	+10°57'00"	6.0	30.0'	2,000 ly		
NGC 6824	MCG 9-32-12	Gal	Cyg	19h43m40s	+56°06'34"	13.0	1.9'x 1.4'	160 Mly		
Blinking Planetary	NGC 6826	PNe	Cyg	19h44m48s	+50°31'30"	8.8	27"	3,600 ly		
HD 189751	SAO 69238	MStar	Cyg	20h00m12s	+36°24'51"	7.0		530 ly		
NGC 6857	PK 070+1.2	Neb	Cyg	20h01m50s	+33°32'24"	11.4	38"	27,000 ly		
IC 4996	Collinder 418	Open	Cyg	20h16m30s	+37°38'00"	7.1	6.0'	5,600 ly		
Collinder 419	OCL 177	Open	Cyg	20h18m07s	+40°43'55"	5.4	4.0'	2,500 ly		
Berkeley 86	OCL 167	Open	Cyg	20h20m24s	+38°42'00"	7.9	6.0'	3,600 ly		
NGC 6910	Collinder 420	Open	Cyg	20h23m12s	+40°46'42"	7.3	10.0'	3,700 ly		
M 29	NGC 6913	Open	Cyg	20h23m57s	+38°30'30"	7.5	10.0'	3,700 ly		
V Cyg	HIP 102082	Var	Cyg	20h41m18s	+48°08'29"	7.7 - 13.9		880 ly		
B 352		Dark	Cyg	20h57m12s	+45°53'00"	6.0	22.0'	1,900 ly		
NGC 7008	PN G093.4+05.4	PNe	Cyg	21h00m33s	+54°32'36"	12.0	1.4'	2,800 ly		
NGC 7013	MCG 5-49-1	Gal	Cyg	21h03m34s	+29°53'50"	12.4	4.2'x 1.4'	40 Mly		
The Cheeseburger	NGC 7026	PNe	Cyg	21h06m18s	+47°51'05"	12.0	25"	4,500 ly		
NGC 7027	PN G084.9-03.4	PNe	Cyg	21h07m02s	+42°14'10"	9.6	18"	2,600 ly		
NGC 7062	Collinder 434	Open	Cyg	21h23m27s	+46°22'42"	8.3	5.0'	4,800 ly		
NGC 7177	MCG 3-56-3	Gal	Peg	22h00m41s	+17°44'17"	11.9	2.9'x 2.0'	56 Mly		
NGC 7479	MCG 2-58-60	Gal	Peg	23h04m57s	+12°19'22"	11.7	3.7'x 2.8'	110 Mly		
NGC 625	MCG -7-4-17	Gal	Phe	01h35m05s	-41°26'14"	11.7	6.5'x 2.0'	13 Mly		

## *Flyin' High Over X Bar – Observing List Notes*

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**V Aquilae** A carbon-Mira variable star located about 1,200 light years away in Aquila. It varies in brightness from magnitudes 6.6 to 8.4 with a period of 353 days. It should be around magnitude 7.5 during ESP 2020. See if you can estimate its brightness when you observe it. V Aquilae usually shines with a nice red to red-orange color. Compare its color and brightness to the other carbon star, V Cygni, which is also on the observing list.

**NGC 6755** A loose collection of about 100 stars varying in brightness from magnitudes 9 to 13. The outer stars appear to frame the cluster in a square of about 15' in size. A second inner-square of stars frames a center group of about 25 stars. There is a second group of stars on the northwest edge of the cluster. Both of these groups give NGC 6755 the appearance of being a small Double Cluster. The distance to NGC 6755 is estimated at 4,600 light years.

**NGC 6756** Located in Aquila about 4,900 light years distance, NGC 6756 is not your typical open cluster. At first glance it shows as an irregular shaped smudge about 4' in size. Averted vision in a 14" scoped resolves some of its stars and gives it a grainy appearance. The cluster appears to consist of about 50 stars ranging from magnitude 9 to magnitude 13.

**NGC 6760** Located in the constellation Aquila, the globular cluster NGC 6760 is a moderately dim globular that first shows as a glow about 4' in diameter. In a 14" scope, with averted vision, it begins to have a grainy appearance at 180x and shows some extensions out to 8' in diameter. If the sky is dark and the seeing is good try using high power to see if you can clearly resolve the stars in this globular. The published distances to NGC 6760 range between 24,000 and 31,000 light years (7.4 kpc to 9.5 kpc). This range of estimated distance is probably due to the uncertain amount of intervening dust of our galaxy.

**NGC 6781** Planetary nebula NGC 6781 is located in the constellation Aquila about 2,500 light years from us. It shows in a 14" telescope as a mostly round glow about 2' in diameter. The northern edge is dimmer and seems to be less distinct than the southern edge. Averted vision also shows slight changes in surface brightness across the surface of the nebula with a slight darkening toward the center. No real central star is visible in a 14" telescope although something does pop in occasionally slightly off the center of the nebula.

**Albireo** Wow... We have been doing observing programs here at ESP since 2003 and we have never included Albireo, one of the most beautiful double stars in the sky! So this year let's pay our respects to Albireo and spend some time admiring this beautiful, colorful double star in Cygnus. Located some 390 light years away, the bright amber component shines at magnitude 3.1 and the dimmer blueish component shines at magnitude 5.1. They are separated by 34", making the pair easy to split. The bright component is also a multiple star having one or possibly two companions. The separation of these companions is less the 0.5" making them virtually impossible to

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detect visually in any size telescope. Try observing Albireo at different powers to see which power gives the most pleasing view.

**NGC 6804** Planetary nebula NGC 6804 is located in Aquila about 4,800 light years distant. It is about 1' in size and not quite round in shape. It seems to be a little extended in the north-to-south direction. The central star is visible in a 14" telescope but a competing foreground or background star is also visible on the northeastern edge of the nebula and is slightly brighter than the central star. In a 14" telescope NGC 6804 seems best at 300x.

**Campbell's Hydrogen Star** An interesting planetary nebula located 5,500 light years away in Cygnus. This one may be a little hard to find at first even though it is relatively bright. It looks stellar, but on close examination at high power you should be able to detect a faint circular glow surrounding the star. A UHC or OIII filter can be used to dim the central star and reveal more of the nebulosity. When hunting down this object at lower powers, look for a star in the field of view with an orange tint and then increase the magnification to show the surrounding nebula.

**B 143** Barnard 143 is a dark nebula in Aquila. It shows as a curved dark patch about 30' in size against the background of the Milky Way. It looks like a big letter 'C' in a Newtonian telescope or a backwards letter 'C' in a Cassegrain or refractor telescope with a mirror diagonal. If you use an eyepiece in your telescope that provides a field of view that is greater than 1 degree, you should also be able to make out B 142 which is about 30' to the southwest of B 143. The two of them together in the same field of view will look like a large letter 'E' or as some observers affectionately call it "Barnard's E".

**NGC 6824** A galaxy in Cygnus about 160 million light years from Earth. In a 14" telescope it shows as a small round glow about 1.2' in dia. The core of NGC 6824 appears concentrated and seems to go stellar sometimes with averted vision. Just 3.5' to the north of NGC 6824 is an interesting little double star with a ruddy magnitude 9 primary. There is also a dim little magnitude 13 star just 0.5' to the south of the core.

**NGC 6826** The "Blinking Planetary" is a relatively bright planetary nebula in Cygnus with an apparent diameter of 25". It is about 3,600 light years from us and likes to play games with our observing skills. If you stare at the object at medium powers, the nebula fades out and all you see is the bright, magnitude 10.4, central star. Look away from the object and the nebula pops back into view with your averted vision. Alternating between direct vision and averted vision will make the nebula "blink" on and off. Try different magnifications to see which power shows the best detail in the nebula and which power brings out the blinking effect the best.

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**HD 189751** A double star listed in the Henry Draper catalog, HD 189751 shines at magnitude 7 in the constellation Cygnus. It is a pretty double star with some color contrast. The bright magnitude 7.0 component is yellow and its dimmer, magnitude 10.4, companion glows with a blueish tint. They are separated by 11" and should be easy to split in any telescope. HD 189751 is located about 530 light years from us.

**NGC 6857** Located in Cygnus and about 28,000 light years from Earth. NGC 6857 was originally discovered in 1784 by William Herschel and later classified as a planetary nebula, hence its alternate designation of PK 070+1.2. However in the 1970s it was determined that NGC 6857 was simply a bright HII region of a larger fainter emission nebula, Sh 2-100. Through the eyepiece you can see how this misclassification was made as the object takes on the appearance of a planetary nebula, first showing as a round patch of light about 1' in diameter with a bright central star. However, closer examination will show the dimmer part of Sh 2-100 extending about 3' southwestward from the brighter portion of the nebula. Try using different powers and filters to see if it helps bring out the full extent of this interesting object.

**IC 4996** A nice little open cluster located in the constellation Cygnus about 5,600 light years distant. It consists of about a dozen stars in an area of about 5' in diameter. The brightest star is approximately magnitude 8 and located in the center of the cluster. A string of six stars are arranged in a smile on the south side of the cluster.

**Collinder 419** An open cluster in the constellation Cygnus located about 2,500 light years from us. A bright magnitude 5.8 yellowish star is surrounded by 6 dimmer magnitude 10 to magnitude 12 stars arranged in a circle about 4' in diameter. The bright center star shows some nebulosity around it. At 95x with a UHC filter there is more nebulosity showing across the entire field of view giving the background a somewhat mottled appearance.

**Berkeley 86** An interesting looking assemblage of about 30 stars ranging from magnitude 9 to magnitude 13. Berkeley 86 is an open cluster in the constellation Cygnus about 3,600 light years from us. A circular asterism of stars on the western side of the cluster is made up of about 10 stars arranged in a distorted circle about 3' in diameter. About 4 stars stream off from this circle in the northeastern direction. About 3' in length, this string of stars looks like a tail attached to the circle of stars.

**NGC 6910** A beautiful field of about 50 stars in the constellation Cygnus located about 3,700 light years away. Two bright stars of magnitude 6 and magnitude 7 anchor the cluster. The magnitude 7 star is yellowish. The stars in the cluster appear to form a stick figure with the magnitude 6 star being a foot. About 3' to the southeast of this star is the magnitude 7 star located at the neck of the stick figure. There is some faint nebulosity that gives the stars in the open cluster a dim halo. The whole cluster is about 7' in size. Try using different powers and filters to see if you can enhance the nebulosity associated with this open cluster.

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**M 29** M29 is a bright open cluster in the constellation Cygnus about 3,700 light years distant. Seven bright magnitude 9 stars dominate the cluster but stars ranging down to magnitude 14 or 15 are contained in the cluster bringing to total count of cluster stars to probably around 30 or 50. The brighter stars are arranged in a pattern reminiscent of the Pleiades making it look to some people as the “Little 7 Sisters”.

**V Cygni** A carbon-Mira variable star located about 880 light years away in Cygnus. V Cygni varies in brightness from magnitudes 7.7 to 13.9 with a period of 193.8 days. It should be around magnitude 10.8 during ESP 2020. See if you can estimate its brightness when you observe it. V Cygni usually shines with a nice red to red-orange color. Compare its color and brightness to the other variable star, V Aquilae, which is the first entry on this observing list.

**B 352** Barnard 352 is a dark nebula in Cygnus estimated to be about 1,900 light years distant. In the eyepiece it looks like a dark patch of sky against the background stars of the Milky Way. It is about 20' x 10' in size and oriented in a SE to NW direction. A curving arc of 5 stars runs north-south right through the center of B 352. The SE edge of the nebula is darker and more distinct than the northwest side. The nebula is actually larger than it may first appear in the eyepiece. See how far you can trace the extent of the dark nebula to the northwest as it becomes less dense and less dark than the portion of it that first pops into view.

**NGC 7008** An interesting planetary nebula in Cygnus about 2,800 light years away! Using some power you should be able to detect the two main lobes of the nebula. The lobe on the NE side appears brighter than the one on the SW side. The two lobes are connected on the NW side and the nebula appears open on the opposite SW side. The shape is reminiscent of a packman. The whole nebula is about 1.5' in diameter. The central star is easily located in the middle with the dark lane. Two stars of magnitude 9.5 and magnitude 11 are located about 1' to the south, just outside the extent of the nebula.

**NGC 7013** A galaxy in the constellation Cygnus located about 40 million light years away for us. It's a nice little galaxy about 3' x 1' in size and oriented in the NNW to SSE direction. The core appears somewhat concentrated but not stellar. A bright magnitude 10 star is on the NNW end of the galaxy makes it easy to find.

**NGC 7026** The “Cheeseburger” is a planetary nebula located in Cygnus about 4,500 light years from Earth. In the eyepiece it looks like a little hamburger just 30” SW of a magnitude 10 star. It's about 20” x 10” in size and oriented in the north-south direction. Use moderate to high power to reveal the dark lane that runs north-south through the nebula and splits it into the two halves of a bun. In the 14” I can easily see the meat but not the cheese. The edges of the bun are somewhat fuzzy. Try using UHC or OIII filters to see if more of the nebulosity can be detected.

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**NGC 7027** Another interesting planetary nebula in Cygnus. NGC 7027 is about 2,600 light years from us. It has a rectangular shape that is about 10" x 20" in size and is oriented mostly NW to SE. It appears to be pinched in the middle, looking sort of like a tiny pillow. The NW side of the nebula is brighter and appears to have a knot in it. No central star visible in the 14".

**NGC 7062** An open cluster in Cygnus about 4,800 light years from us. It's about 5' in size and in a 14" telescope it shows about 30 stars ranging from magnitude 10 to magnitude 12. They appear to be arranged in a pattern that is reminiscent of an arrow head. The arrow is pointing east.

**NGC 7177** A galaxy in the constellation Pegasus located about 56 million light years away for us. In the eyepiece, the glow of the galaxy has an oval shape about 2' x 1.5' in size and oriented in an east to west direction. In a 14" telescope, averted vision seems to reveal a brighter bar like structure running north-south through the galaxy. This portion appears mottled with 3 bright knots or stellar like things embedded in it.

**NGC 7479** A nice barred spiral galaxy in the constellation Pegasus located about 110 million light years away for us. NGC 7479 is fairly bright about 3' x 2' in size and oriented in a north-south direction. In a 14" telescope the bar is obvious running north-south. With averted vision, an arm appears extending from the south end of the bar arcing west and then back to the north. A dimmer and somewhat broader arm is attached on the north end of the bar and arcs east and then back to the south. NGC 7479 is not only a great example of a barred spiral galaxy; it is also a good example of its classification as a Seyfert galaxy or a galaxy with a very active galactic nucleus. The bright stellar nucleus that NGC 7479 presents to us gives away this classification away.

**NGC 625** Okay, we need to have at least one challenging object on the list and we also need to have at least one object from the bird we can see grazing the southern skies at the Eldorado Star Party. NGC 625 is a galaxy in the constellation Phoenix and is located about 13 million light years from Earth. It is a dwarf barred spiral galaxy and a member of the Sculptor group. It will transit at ESP 2020 around 1:40 AM. At that time it will be due south and about 18 degrees above the horizon. So stay up past midnight and see if you dig this guy out of the southern skies. It showed as a dim patch of light just above the background glow, but was fairly easy to detect in a 14" telescope. It appeared elongated in the E-W direction and about 3.5' x 1.5' in size. Slight to moderate brightening toward the core was detected but the core did not appear stellar.