

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		1			
Object	Epsilon (1 & 2) Lyra				
Date	4-Sep-17	Time	2040 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	2.5 of 5		
Obs Type	Binoculars & Naked Eye				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Could clearly see both halves of the double-double, but no splits in either component. Could have been some elongation in each disk, but too much wiggle in field to be sure. Stars oriented roughly North and South. See Observation 101 for Naked Eye Observation.					
Observation Number		2			
Object	Zeta (1 & 2) Lyra				
Date	4-Sep-17	Time	2120 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	2.5 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: View jiggling with heart beat. Finally made out two stars. Full Moon along with L.P. is a serious problem. Relatively close double for me. Primary brighter than secondary. Orientation is roughly NW to SE.					
Observation Number		3			
Object	Phi Casseopea				
Date	4-Sep-17	Time	2140 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	2.5 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Could only make out companion occasionally due to moonlight and wiggles. Companion roughly east of primary. Could barely see Beta and Gamma eyes only and this Moon. Nice wide split between them. Orientation NE to SW. Surprised I got this one tonight.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		4			
Object	Zeta (79) & 80 Ursa Major				
Date	5-Sep-17	Time	2105 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars & Naked Eye				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Hiding from full Moon behind privacy fence. 79 twinkling some with 80 winking in and out. 79 A and B possibly split but field wiggling too much to verify. 80 located above and a touch to the right of 79 (ENE?). Naked Eye Obs reported as observation 102.					
Observation Number		5			
Object	Alpha (1 & 2) Capricornus				
Date	6-Sep-17	Time	2110 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Full Moon. Alpha 1 & 2 very bright with Nu to the right and below and a lesser star above and to the right....all four stars in a line angling L to R 45 deg, a little N of W I think. Visual done on a separate night and reported as Observation 103.					
Observation Number		6			
Object	Beta (1 & 2) Capricornus				
Date	6-Sep-17	Time	2115 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Great night except for full moon. Beta can be seen in same field as Alpha. Alpha toward the top and Beta toward the bottom. Beta 2 to the right and above Beta 1 (west). Beta 2. Beta 1 bright, Beta 2 medium. Naked Eye Visual reported on Obs 104 (diff night)					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		7			
Object	Rho Capricornus				
Date	6-Sep-17	Time	2135 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Rho and Omicron in the same field. Rho, Omicron, and Pi form a triangle with Rho A noticeably brighter. Orientation roughly North/South with Rho A to the North.					
Observation Number		8			
Object	Omicron Capricornus				
Date	6-Sep-17	Time	2135 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Looked like an equal close pair below Rho. Both looked dimmer than Rho A but brighter than Rho B. Orientation was roughly east/west.					
Observation Number		9			
Object	Beta Cygnus				
Date	6-Sep-17	Time	2150		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Beta B looked dimmer to me than normal compared to Beta A...could be the moonlight. A star definitely bright, B star almost down to medium. No colors apparent. Split not wide, in fact seems fairly narrow in binoculars. B star NE of A star, I think.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		10			
Object	Alpha (6) and 8 Vulpecula				
Date	6-Sep-17	Time	2150 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binocular				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Below and to the right a little from Beta Cygnus. Opposite sides of the same field.					
Calling Alpha (6) on bright end of medium range and 8 dimmer end of medium.					
8 located a little east of straight north from Alpha. Wide split between the stars.					
Observation Number		11			
Object	Omega 1&2 Scorpius				
Date	14-Sep-17	Time	2032 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binocular				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Easily see Omega 1 & 2 South of Beta Scorpius and in same field.					
Nu Scorpius in same field as well to the east of Beta. Omega 1 NNW of Omega 2.					
I would call both stars bright. Wide split.					
Observation Number		12			
Object	Nu Scorpius				
Date	14-Sep-17	Time	2032 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: In same field as Beta, Omega 1 and Omega 2 Scorpius. Located east of Beta					
more than a degree. Nu A noticeably brighter than B. Fairly close double.					
Primary reasonably bright. Secondary dim and WNW of primary.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		13			
Object	Mu 1 &2 Scorpius				
Date	14-Sep-17	Time	2050 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Thought this would be too low, but found it beside neighbor's chimney.					
Both bright stars with Mu 1 a little brighter. Wide split with Mu 2 ENE of Mu 1.					
Somehow, a pretty pair to me.					
Observation Number		14			
Object	Rho Ophiuchus				
Date	14-Sep-17	Time	2108 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Located in the field and above Antares. Primary and SW secondary were easy to see. Secondary star to the North was tough. Finally got three glimpses of the North star.					
Wide fairly wide splits. Primary medium, SW star dim, N star dimmer than dim.					
Observation Number		15			
Object	15 Aquila				
Date	14-Sep-17	Time	2126 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Worked my way down Aquila from Alpha to Lambda. 15 was to upper right of Lambda. Stars oriented roughly North/South with primary to North. Secondary visible without too much trouble. Narrow split but not tight. Primary medium, secondary dim.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		16			
Object	57 Aquila				
Date	14-Sep-17	Time	2158 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Triangulated position from Alpha Capricornus and Theta Aquila.					
Two medium to dim stars, fairly close together, oriented in a NNW to SSE axis.					
Primary (NNW) shows a little brighter than secondary.					
Observation Number		17			
Object	16 Cygnus				
Date	14-Sep-17	Time	2205 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Straight overhead and very wiggly. Just east of Lambda Cygnus (west wing star)					
Believed two stars but could not confirm split due to wiggles. Finally got a calm moment and verified split. Two equal medium dim stars on SW/NE axis, fairly close together for situation.					
Observation Number		18			
Object	O1 (30) & 31 Cygnus				
Date	14-Sep-17	Time	2232 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Found O1, O2, and 31 easily. Dim component was hard. Finally saw a flicker to the South. Primary fairly bright, NW star medium, South star very dim to not there. South component split reasonably wide, with NW star about three times as far away from primary.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		19			
Object	Delta Cepheus				
Date	19-Sep-17	Time	2102 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	1.5 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Went from Alpha Cass to Beta Cass and about double that distance beyond to Delta Cepheus. A star is fairly bright and B star is medium. Split is fairly close but not tight. B star is pretty much South of the A star.					
Observation Number		20			
Object	Mu Cygnus				
Date	19-Sep-17	Time	2144 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	2 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Off SE Wing tip of the Swan about as far from Zeta as Epsilon is in the other direction. Good split, easy to make out. The primary is a medium star and the secondary dim. Wide split between the two with the secondary NE of the primary.					
Observation Number		21			
Object	79 Cygnus				
Date	19-Sep-17	Time	2241 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	2 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Started at Zeta Cygnus. Went WNW to Nu, then to 70, then to 72. Went east of 72 about the 70 to 72 distance and saw the pair. Both seem brighter than data says. I am calling the primary medium. The secondary is dim and ENE from the primary.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		22			
Object	61 Cygnus				
Date	19-Sep-17	Time	2220 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	2 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Used Zeta Cygnus to start (SW wingtip), then went North to find Nu, then Tau and Sigma. Went east from Tau to 61. Nice medium dim pair, very close for me, running NW to SE. Secondary definitely dimmer than primary, about what I would expect for one magnitude.					
Observation Number		23			
Object	48 Cygnus				
Date	19-Sep-17	Time	2232 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	1.5 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Equal dim pair SSE of Epsilon Cygnus. In same field with Epsilon with Epsilon on left and 48 on the right side. 52 Cygnus in field also, below 48. Wide split, running North and South.					
Observation Number		24			
Object	29 Cygnus				
Date	21-Sep-17	Time	2130 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Almost straight overhead. Started at Eta Cygnus and went NW to 27 and the cluster around it. Went NW again to 27. Looked like many dim stars around it, not quite resolved. Medium primary and very dim secondary running NW to SE with big split.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		25			
Object	S752 (in Delphinus)				
Date	21-Sep-17	Time	2150 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Started with Alpha Delphinus and went North until I saw a star pattern that					
matched my S&T Star Atlas. Double star in the right place. Very dim wide double with secondary					
barely distinguishable. Primary a little north of straight west and secondary a little south of east.					
Observation Number		26			
Object	Delta 2 & 1 Lyra				
Date	21-Sep-17	Time	2210 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: NW corner stars of Lyra's parallelogram. Dimmer component on line to Zeta, ENE.					
Primary (Delta 2) fairly bright with secondary (Delta 1) medium. Split very wide in binoculars.					
Was able to see with naked eyes and recorded as a separate observation, No 105.					
Observation Number		27			
Object	Beta Lyra				
Date	21-Sep-17	Time	2235 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: SE corner star of Lyra's parallelogram. Bright primary and dim secondary					
Secondary located fairly close to primary toward the SE. Had trouble locating secondary until					
I referred to specs and saw how dim it was and its direction.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		28			
Object	Pi (2 & 1) Pegasus				
Date	21-Sep-17	Time	2324 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Could just see Pi, the end star in NE Leg of Pegasus with naked eye and averted vision. Very wide pair in binoculars, with Pi 1 to the west of Pi 2. Pi 2 brightest star in field. Pi 2 medium bright with Pi 1 being medium. Very wide split with Pi 1 to the west.					
Observation Number		29			
Object	54 Sagittarius				
Date	22-Sep-17	Time	2045 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Went from teapot handle to Pi Sag to Rho 1 & 2, to 54 & 55. After several attempts, referring to Atlas and specs between each, I finally made out the B component, NE and close to A. B component most difficult to see so far. Not sure how I did it....right time and conditions?					
Observation Number		30			
Object	Theta Sagitta				
Date	22-Sep-17	Time	2100 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Found main figure of Sagitta. Went straight out from Gamma to Chi to Theta. B star was just South of a line from Chi to Theta A. A star medium dim and B star dim. Nice wide split, but not a massive one.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		31			
Object	Gamma (5) & 6 Equuleus				
Date	22-Sep-17	Time	2125 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Found Altair. Went NE to Delphinus. Went east from Gamma Delphinus until I reached Gamma and 6 Equuleus. Delta in field as brightest star. Gamma was next, then 6. Gamma medium bright and 6 somewhat dim. Very wide split in NNW to SSE direction.					
Observation Number		32			
Object	Theta Serpens				
Date	22-Sep-17	Time	2145 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Went from Altair down to Delta Aquilla, then west to Theta Serpens. Relatively bright close equal pair, running roughly east and west.					
Observation Number		33			
Object	56 Andromeda				
Date	22-Sep-17	Time	1005 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Went down Andromeda's southern star string. Went South to 59, curved to the east to 58, then 56. Wide pair, medium bright, running up and down field, WNW to ESE.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		34			
Object	Psi 1 Pisces				
Date	7-Oct-17	Time	2008 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Star hopped from Alpha Andromeda to Delta, Epsilon, Zeta, Eta Andromeda.					
Psi 1 was next as the northern star in three Psi stars and Chi formation.					
Psi 1 is two even, medium bright, close stars, oriented NNW to SSE					
Observation Number		35			
Object	Rho and 94 Pisces				
Date	7-Oct-17	Time	2021 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Went southwest from the Chi-Psi formation a little over a field width to Rho & 94.					
Medium bright, even, wide double just off of neighbor's tree branches to the east.					
Orientation of the pair was SW to NE. Similar brightness to Psi 1, just very wide.					
Observation Number		36			
Object	75 Draco				
Date	7-Oct-17	Time	2045 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Went almost straight up from Polaris a little over two fields to find 75 Draco.					
Wide pair. Primary medium with secondary dim and to the west.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		37			
Object	41, 40 Draco				
Date	7-Oct-17	Time	2100 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Went to tail of Ursa Minor and the star Epsilon Ursa Minor. From there, down and a little to the right (SW) about a field width to 41,40. Found a close medium, equal pair oriented NE to SW.					
Observation Number		38			
Object	59 Andromeda				
Date	8-Oct-17	Time	2050 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Failed on this previously, but made the split this second attempt. Located a little over a field width south of Gamma Andromeda. Two stars, dim and dimmer, close together. Oriented SSW to NNE.					
Observation Number		39			
Object	Kappa 1 & Kappa 2 Taurus				
Date	13-Oct-17	Time	0450 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	5 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Waning crescent Moon. Great morning! Straight North from Epsilon Taurus a little over a field width. K2 dimmer and south of K1. K1 relatively bright. Upsilon in field is brighter. Kappa 1 and 2 orientation is N/S with Upsilon to the NW.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		40			
Object	Theta 2 & Theta 1 Taurus				
Date	13-Oct-17	Time	0520 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	5 of 5	Transp	4 of 5		
Obs Type	Binoculars and Naked Eye				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: About a half field WSW of Alderbaran. Nice wide bright pair. Theta 1 does look dimmer than Theta 2. Orientation is pretty much S to N from Theta 2 to Theta 1.					
Was able to get Naked Eye Split, back and forth from single to double stars. (Observation 106)					
Observation Number		41			
Object	Sigma 2 and Sigma 1 Taurus				
Date	13-Oct-17	Time	0535 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	5 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Located SE in field with Alderbaran. Wide pair looking fairly equal to me though magnitudes listed are more different than I would have thought. Orientation of Sigma 1 is a little east of straight south of Sigma 2.					
Observation Number		42			
Object	Delta Orion				
Date	13-Oct-17	Time	0601 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	4 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: NW star in Orion's Belt. Dim secondary just above (North) of bright primary. Split was not really close, but was not wide either....call it medium.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		43			
Object	42 & 45 Orion				
Date	20-Oct-17	Time	0450 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Two bright stars , fairly wide spaced between Great Orion Nebula and star cluster above in Orion's Sword. Pair oriented WNW to ESE with western star brighter. Chart shows several stars in and around them, but I saw only one dim star between.					
Observation Number		44			
Object	Theta 2 Orion				
Date	16-Oct-17	Time	0456 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	5 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Located below and to the left of the Trapezium (Theta 1). Two stars listed but there are three. Two closest to Trapezium elongated with occasional split. (Imagination?) The third was farther away to the left (east) with a wide split. All looked brighter end of medium to me.					
Observation Number		45			
Object	Gamma Lepus				
Date	16-Oct-17	Time	0456 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	5 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Southeastern star in the Lepus figure normally drawn. Fairly bright primary and medium dim secondary from my position and LP. Relatively wide split. Secondary above (almost North) of primary.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		46			
Object	Eta Canis Major				
Date	16-Oct-17	Time	0510 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	5 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Rear foot of the "Big Dog." Low & just above neighbors roof. Got winks of secondary to the right of the primary star. Primary is a nice, bright star. Secondary showed very dim at time of observation. Wide split with secondary roughly west of primary.					
Observation Number		47			
Object	17, 16 Draco				
Date	16-Oct-17	Time	2145 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Followed line from Gamma to Beta Draco (in Dragon's Head) and on past about two fields or so to 17, 16. Really pretty medium equal pair with nice reasonably wide split. Oriented on SW NE line. Had not thought to look in area lower than Polaris until now.					
Observation Number		48			
Object	Nu 1 & 2 Draco.				
Date	16-Oct-17	Time	2200 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Dimmest of four stars in Dragon's Head, across from Gamma the brightest. Equal pair, quite nice. Brighter than 17, 16 Draco and with a narrower spread...maybe 2/3rds. Oriented on a SE/NW line.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		49			
Object	Psi (31) and (34) Draco				
Date	16-Oct-17	Time	2015 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Used Beta and Gamma Ursa Minor as pointers to Eta Draco. Went up Draco to Zeta then Chi. Put binoculars on Chi, went WSW to Psi & 34. Psi close pair with brighter star on South. 34 located off to the east. Psi A somewhat bright and the other two medium.					
Observation Number		50			
Object	Kappa (5) & 6 Draco				
Date	16-Oct-17	Time	2025 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	4 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Located directly under Beta Ursa Minor about 2 1/2 fields. Very distinct stars in a row going from SE to NW. Actually looked like three stars in the relation, 4, Kappa, & 6. Kappa was the brightest, with 6 next, then 4. Wide splits with 4 to 6 taking up over half the field.					
Observation Number		51			
Object	Delta Cepheus				
Date	17-Oct-17	Time	2140 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Delta on opposite side of Cepheus' base from Alpha, and farthest of three major stars. Two stars, close together, but not the closest I have split with binoculars. The primary I would call bright and the secondary medium. Secondary south of primary and a tinge west.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		52			
Object	65 & 64 Gemini				
Date	20-Oct-17	Time	0504 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Binoculars				
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description: Located WNW and in the field of Iota Gemini. Iota visible by naked eye, just barely.					
Medium bright stars oriented NNW to SSE. Iota had a neighbor opposite side of 65 and 64.					
Looked like two wide doubles in same field.					
Observation Number		53			
Object					
Date		Time			
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing		Transp			
Obs Type					
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description					
Observation Number		54			
Object					
Date		Time			
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing		Transp			
Obs Type					
Equipment	Meade 15 x 70 Binoculars				
Method	O: Home-Made Monopod				
Description					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		101			
Object	Epsilon (1 & 2) Lyra				
Date	21-Sep-17	Time	2040 CDT		
Location	Lawton, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Naked Eye Visual				
Equipment					
Method	Used hands to block some L.P.				
Description: Tried to see double with eyes only as conditions were reasonable with no Moon.					
Light pollution gets worse as object goes west. With effort and patience, could see two tiny disks in occasional glimpses several times. Orientation roughly North and South.					
Observation Number		102			
Object	Zeta (79) & 80 Ursa Major				
Date	5-Sep-17	Time	2105		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Naked Eye Visual				
Equipment					
Method	Used hands to block some L.P.				
Description: Hiding from full Moon behind privacy fence. 79 twinkling some with 80 winking in and out above it. 80 located above and a touch to the right of 79 (ENE).					
Split fairly wide and comfortable for naked eye observing.					
Observation Number		103			
Object	Alpha (1 & 2) Capricornus				
Date	14-Sep-17	Time	2140 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Naked Eye Visual				
Equipment					
Method					
Description: Brain has to work on this one as well as Beta due to L.P. Could not see both all the time, but did see two maybe half the time. Both reasonably bright and on a line about 45 deg above horizontal, left to right. Rotated head to check for eye lens reflections.					

Observer: Bill Steen		Astronomy League Binocular Double Star Program			
Observation Number		104			
Object	Beta (1 & 2) Capricornus				
Date	14-Sep-17	Time	2141		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Naked Eye Visual				
Equipment					
Method					
Description: This one was really tough, requiring lots of study. Observed along with Alpha Cap.					
Beta 1 was there all the time but Beta 2 was not. Only got an occasional wink from Beta 2.					
Looked away and back several times and rotated head to check for reflections.					
Observation Number		105			
Object	Delta Lyra				
Date	21-Sep-17	Time	2210 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing	3 of 5	Transp	3 of 5		
Obs Type	Naked Eye Visual				
Equipment					
Method					
Description: Primary visible all the time, but secondary only winked occasionally. Waited until I definitely saw it three times. Rotated head and waited for another wink to check for reflection.					
Observation Number		106			
Object	Theta 2 and Theta 1 Taurus				
Date	13-Oct-17	Time	0520 CDT		
Location	Broken Arrow, OK- 700 ft elevation				
Latitude	36:05:56N	Longitude	95:45:25W		
LP Zone	Dark Red	Bortle	6+		
Seeing		Transp			
Obs Type	Naked Eye Visual				
Equipment					
Method					
Description: Made Naked Eye Visual observation at same time as Binocular, then did it again on 10/20/2017 at 0510 CDT to verify observation. Two stars looked about the same, but Theta 1 winking in and out. PA a little west of straight North. Checked for reflections.					