Saturday night, June 23, 2001. Arrived at Little Thompson Observatory to spend the evening viewing double stars and open clusters. A hour before sunset, there were many clouds, with a stiff south breeze. By sunset, the clouds were disappating and others were moving off to the east. The saky was fairly steady, but anything I looked at in Scorpio or Sagittarius was in a haze that was lit up by the light polution to the south. Tried to find the double globular people were talking about on the FRAC. These were 6522 and 6528. In the scope, one was fairly faint (6522) and I never saw 6528. This will have to wait for darker skies.

The 2 day old cresent moon was fun to look at. It showed many craters and contrast with the long shadows. Some craters had mountains in the middle of them with dimples in the top of the mountains. On the south limb, there were high mountains lit up that made just islands of light in the dark background of the moon.

Throughout the evening, looked a Mars a lot. At one point, with a blue filter, I could easily see the polar ice cap. Then after midnight, you could see a dark green band on the top of the planet. Brian Kimball stopped by and noted that the featureless side of Mars was facing us.

Also, I looked up through the slit to see a satellite tumbling and flashing as its solar panels caught the sunlight and reflected it back to my eyes. At first, it was a brilliant flash in Bootes, and while moving north in Ursa Major, the flashes dimed on each successive revolution of the satellite. Really cool to see this.

Notes about the double star observing and drawings. The drawings of the stars are relative to each other. There is no continuity of star sizes from drawing to drawing. Also, the yellow stars were hard for me to see if they were really yellow, or orange–ish red, so I reported them a yellow, which is how I observed them.

8:59 PM *38 Lyncis* magnitude 3.9, 6.6 with 30" separation
Drawing #1
One member is a lot bigger than the other and they are very close. The brighter is a blue–white star and the dimmer is so overpowered by the brighter one that it looks yellow or red. Definitely not blue–white.

9:02 PM *Alpha Leonis* magnitude 1.4, 7.7 with 2.7" separation
Drawing #2
Primary is very blue white with its mate very dim and a bit away from this star. Its companion looks white if you get the bright star out of the field of view. If you leave the bright star in the FOV, the dimmer star looks reddish.

9:25 PM *Gamma Leonis* magnitude 2.2, 3.5 with 4.4" separation
Drawing #3
The brighter star is yellow and the mate is a little dimmer and looks white.

9:42 PM *54 Leonis* magnitude 4.5, 6.3 with 6.5" separation
Drawing #4
One star is about 2x brighter than the other and both are blue–white stars.

9:46 PM *Delta Corvi* magnitude 3.0, 9.2 with 24.2" separation
Drawing #5
The primary is very bright and second is very dim. Primary is a blue–white star and mate is a white star.

9:55 PM *24 Comae Berenices* magnitude 5.2, 6.7 with 20.3" separation
Drawing #6
One star is a little brighter than the other. The brighter is a yellow star and the dim is a blue–white star.

10:33 PM *Gamma Virginis* magnitude 3.5,3.5 with 3.6" separation
Drawing #7
Two, very close, evenly bright blue–white stars.

10:35 PM *32 Camelopardalis* magnitude 5.3, 5.8 with 21.6" separation
Drawing #8
Two evenly bright, white stars. The bottom star just a hare brighter than the other.

10:48 PM *Alpha Canum Venaticorum* magnitude 2.9, 5.5 with 19.4" separation
Drawing #9
Two stars are blue–white, one being 2x as bright as the other.

10:54 PM *Zeta Ursa Majoris* magnitude 2.3, 4.0, 4.0 with 14.4", 709" separation
Drawing #10
Its a 3 star system. 2 stars are close together with one a bit brighter than the other. All the stars are blue right stars. The 3rd star is a bit off to the right of the doublet and is still in the same FOV. The 3rd is the same brightness as the bottom star of the doublet.

11:34 PM *Kappa Bootis* magnitude 4.6, 6.6 with 13.4" separation
Drawing #11
Two white stars fairly close. One is significantly brighter than the other.

11:53 PM *Iota Bootis* magnitude 4.9, 7.5 with 38" separation
Drawing #12
Two white stars. One is substantially brighter than the other.

11:55 PM *Phi Bootis* magnitude 4.9, 5.8 with 5.6" separation
Drawing #13
Two blue–white stars, very close together. The star on the left in FOV is just a hair brighter than the other.

11:59 PM *Epsilon Bootis* magnitude 2.5, 4.9 with 2.8" separation
Drawing #14
Two stars that are very close together. One is definitely a yellow star. It is very bright and overpowers the dimmer star. The dimmer star appears to be a blue–white star.

12:03 AM *Alpha Librae* magnitude 2.8, 4.9 with 231" separation
Drawing #15
Double star that is widely separated. The bottom left star is brighter and is a white star and the dimmer star is a bit off–white. Not as white as the brighter member.

12:06 AM *Xi Bootis* magnitude 4.7, 7.0 with 6.9" separation
Drawing #16
Two yellow, maybe dimmer one is red. Definitely not white. Pretty close together. The bottom right one is 2x as bright as the dimmer one.

12:09 AM *Delta Bootis* magnitude 3.5, 8.7 with 105" separation
Drawing #17
Widely separated double. Brighter is a yellow color. Fainter member is a white star.

12:12 AM *Mu Bootis* magnitude 4.3, 7.0 with 108" separation
Drawing #18
Neat double. There are 3 blue–white stars here. The brighter member is above a very close double on the bottom. The bottom doublet are of the same brightness.

12:15 AM NGC 6451 – Very tight, compact open cluster. Has 2–3 levels of magnitude in the cluster. About 7 stars of the brightest magnitude, 13 of stars at the 2nd magnitude and then a glow of stars that are very dim and is the 3rd magnitude. 1 and 2 levels of stars contains about 20 members. The glow might be the background Milky Way.

12:17 AM NGC 6520 – Very small cluster. 6 stars of the same brightness. In the central part of the cluster, there are several fainter stars. Probably about 30 members in this cluster.

12:19 AM NGC 6540 – Hard to see any stars of this cluster. It is in a star rich area. There appears to be 2 groupings of these stars. There are 10 stars that fill the FOV that are about the same brightness arranged in a linear fashion from top to bottom.

12:21 AM NGC 6568 – Very open set of stars. In a star rich field. About 15–20 stars of similar magnitude in the center of the FOV. This is very open and loose association.

12:22 AM NGC 6633 – Very open cluster that overwhelmes the FOV of this 40 mm EP. Very bright, blue stars. All over this area of similar magnitude. Slew the scope around to see all the members here. 15–25 stars.

12:24 AM NGC 6645 – Very faint, tigh, compact cluster that has about 15 members that are the same brightness. There is a 2nd and 3rd level of brightness of stars in this cluster also. Maybe 30–40 stars total in this cluster.

12:27 AM *Delta Serpentis* magnitude 4.2, 5.2 with 3.9" separation

Drawing #19
This is a very close double. The brighter star is white and the dimmer star is white.

12:30 AM *Zeta Corona Borealis* magnitude 5.1, 6.0 with 6.3" separation
Drawing #20
2 blue–white stars, close together. The star on the left is a bit brighter than the other star, but they are almost the same brightness.

12:33 AM *Xi Scorpii* magnitude 4.8, 7.3 with 7.6" separation
Struve 1999 magnitude 7.4, 8.1 with 11.6" separation
Drawing #21
Both are in the same FOV. Able to distinguish the two by the magnitudes printed here. Xi has a bright member, which is white, and a fainter member very near it that is blue–white. Then just below this is Struve 1999. The 2 stars are the same brightness and both are white stars.

12:38 AM *Beta Scorpii* magnitude 2.6, 4.9 with 13.6" separation
Drawing #22
The left star of the claw (T) of scorpious. These are 2 blue–white stars. The one on the left is 2x as bright as the one on the right.

12:40 AM *Kappa Herculis* magnitude 5.3, 6.5 with 28" separation
Drawing #23
2 yellow–reddish stars. The one on the bottom is 2x bright as the mate. They are both brilliant points of light in the FOV.

12:44 AM *Nu Scorpii* magnitude 4.3, 6.4 with 41" separation
Drawing #24
2 white to yellow stars. The star on the left is about 3x as bright as the other star.

12:48 AM *Sigma Corona Borealis* magnitude 5.6, 6.6 with 6.2" separation
Drawing #25
2 little yellowish stars. The star on the top is about 2x as bright as the other. They are very close.

Note that is is hard to draw in the dark. I try to balance my red flashlight on the clipboard, but it is not working very well.

12:52 AM *16/17 Draconis* magnitude 5.4, 6.4, 5.5 with 3.4", 90" separation
Drawing #26
I like these multiple double double stars. There are 3 stars here. The separate star on the bottom and one of the doublet stars on the top are of the same brightness. Very close to the star on the top, is a star just a bit fainter than the mate. All stars are blue–white stars. This is a very neat star system.

12:55 AM *Mu Draconis* magnitude 5.7, 5.7 with 2.0" separation
Drawing #27

2 very close, same brightness stars in a vertical arrangement in the FOV. They may be a white or light yellow colored star set.

12:58 AM *Alpha Herculis* magnitude 3.5, 5.4 with 4.7" separation
Drawing #28
Very bright member to the left which is red, and the fainter member to the right which appears to be white. It is dominated by the bright mate and is hard to see color. I have noticed that if I don't put my eye right on the EP and keep it a bit off, the colors of the stars are easier to see.

1:01 AM *Delta Herculis* magnitude 3.1, 8.2 with 8.9" separation
Drawing #29
Very bright, blue–white dominate star to the right and the companion is very faint, to the left at about 8:00 in the FOV. This also is a blue–white star, but is very faint compared to the primary member.

1:04 AM *36 Ophiuchi* magnitude 5.1, 5.1 with 4.4" separation
Drawing #30
2 very close, same magnitude, yellow looking stars.

1:05 AM *Omicron Ophiuchi* magnitude 5.4, 6.9 with 10.3" separation
Drawing #31
2 stars somewhat close. Easy to see. The star on the left is 2x as bright as the mate. The star on the left is a yellow, maybe a light red star. The mate is definitely a blue–white star.

1:09 AM *Rho Herculis* magnitude 4.6, 5.6 with 4.1" separation
Drawing #32
2 little blue–white stars. The one on the bottom is a bit frighter than the one on the top. They are very close to each other.

1:11 AM *Nu Draconis* magnitude 4.9, 4.9 with 62" separation
Drawing #33
2 white stars almost equal in magnitude. The star on the bottom is just a little brighter than the one on the top. They are both blue–white stars with a good bit of separation between them.

1:12 AM *Psi Draconis* magnitude 5.7, 6.1 with 30.3" separation
Drawing #34
2 stars that are easy to see. The one on the left is a hair brighter than the mate. They are both white stars, maybe a light yellow in color.

1:14 AM *40/41 Draconis* magnitude 5.7, 6.1 with 19.3" separation
Drawing #35
2 stars, almost equal in brightness. They are both white, maybe a bit yellowish.

1:18 AM *95 Herculis* magnitude 5.0, 5.1 with 6.3" separation
Drawing #36

These are faint stars. Not like the last 2. The top is a bit brighter than the bottom one. They are very close to each other. They are both blue–white stars.

1:20 AM *70 Ophiuchi* magnitude 4.2, 6.0 with 2.8" separation
Drawing #37
2 VERY close. The fainter member is hard to see. Both are yellow to red stars. The top star is brighter than the bottom. They are so close it is hard to see the mate.

1:24 AM *Epsilon Lyrae* magnitude 5.0, 6.1, 5.2, 5.5 with 208", 2.6", 2.3" separation
Drawing #38
Really cool. All 4 are hot little blue–white stars. The top two have a vertical arrangement, and the bottom two have a horizontal arramgement in the FOV. Both sets are very close, but they are easy to see all 4 stars. SO COOL!!!

1:26 AM *Zeta Lyrae* magnitude 4.3, 5.9 with 44" separation
Drawing #39
2 blue–white stars, with a good separation between them. The star on the top is much brighter than the star on the bottom.

1:29 AM *Beta Lyrae* magnitude 3.4, 8.6 with 46" separation
Drawing #40
2 blue–white stars. Star on the top is substantially brighter than the star on the bottom.

1:31 AM *Struve 2404* magnitude 6.9, 8.1 with 3.6" separation
Drawing #41
2 very close. Star on top is brighter than the star on the bottom. The top star is a red star and the bottom star is a white star.

1:35 AM *Struve 525* magnitude 6.0, 7.7 with 45" separation
Drawing #42
Double star with bottom member brighter than the top star. Bottom star is a red star and the top star is a blue–white star.

1:37 AM *Theta Serpentis* magnitude 4.5, 5.4 with 22.3" separation
Drawing #43
2 white or light yellow, evenly bright well spaced stars.

1:40 AM *Beta Cygni* magnitude 3.1, 5.4 with 34.4" separation
Drawing #44
Alberio, one of my favorites. Easy to see. The bottom star is a much brighter, red star and the top star is a blue–white. The red star is 2x as bright as the one on the top.

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Double Star Club Chair:

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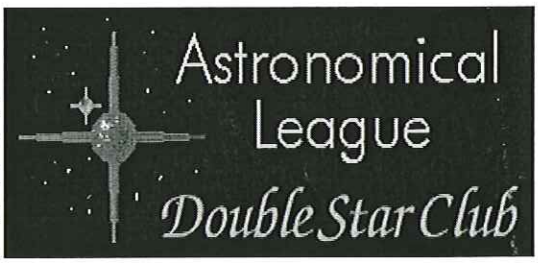
(615) 883-6571
E-mail: ocentaurus@aol.com

Observing List:



All objects are listed in Right Ascension order so that you can view them as they rise, and so that you can properly plan your observing sessions to make the most of your time. Information provided on each object includes: a check box, object to be obs Right Ascension, Declination, magnitudes of the component stars, separatio position angle from the primary star in the double or multiple system. I realize th objects out of many thousands in the heavens are only a small representation o can be seen, and I have probably missed a few of your favorite doubles. If so, know which objects you recommend, and if there is enough interest, then just we will have a second double star club.

Double Star Observing List (Epoch 2000.0)

	Object	Right Ascension	Declin-ation	Magni-tude.	Separ-ation	Po
[60]	Eta Cassiopeiae	$00^h\ 49^m.1$	+57° 49'	3.4, 7.5	12"	
[61]	65 Piscium	$00^h\ 49^m.9$	+27° 43'	6.3, 6.3	4.4"	
[62]	Psi 1 Piscium	$01^h\ 05^m.6$	+21° 28'	5.6, 5.8	30"	
[63]	Zeta Piscium	$01^h\ 13^m.7$	+07° 35'	5.6, 6.5	23"	
[64]	Gamma Arietis	$01^h\ 53^m.5$	+19° 18'	4.8, 4.8	7.8"	

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[65]	Lambda Arietis	$01^h\ 57^m.9$	+23° 36'	4.9, 7.7	37"	
[66]	Alpha Piscium	$02^h\ 02^m.0$	+02° 46'	4.2, 5.1	1.7"	
[67]	Gamma Andromedae	$02^h\ 03^m.9$	+42° 20'	2.3, 5.5	9.8"	
[68]	Iota Trianguli	$02^h\ 12^m.4$	+30° 18'	5.3, 6.9	3.9"	
[69]	Alpha Ursa Minoris	$02^h\ 31^m.8$	+89° 16'	2.0, 9.0	18.4"	
[70]	Gamma Ceti	$02^h\ 43^m.3$	+03° 14'	3.5, 7.3	2.8"	
[71]	Eta Persei	$02^h\ 50^m.7$	+55° 54'	3.8, 8.5	28.3"	
[72]	Struve 331	$03^h\ 00^m.9$	+52° 21'	5.3, 6.7	12.1"	
[73]	32 Eridani	$03^h\ 54^m.3$	-02° 57'	4.8, 6.1	6.8"	
[74]	Chi Tauri	$04^h\ 22^m.6$	+25° 38'	5.5, 7.6	19.4"	
[75]	1 Camelopardalis	$04^h\ 32^m.0$	+53° 55'	5.7, 6.8	10.3"	
[76]	55 Eridani	$04^h\ 43^m.6$	-08° 48'	6.7, 6.8	9.2"	
[77]	Beta Orionis	$05^h\ 14^m.5$	-08° 12'	0.1, 6.8	9.5"	
[78]	118 Tauri	$05^h\ 29^m.3$	+25° 09'	5.8, 6.6	4.8"	
[79]	Delta Orionis	$05^h\ 32^m.0$	-00° 18'	2.2, 6.3	52.6"	
[80]	Struve 747	$05^h\ 35^m.0$	-06° 00'	4.8, 5.7	35.7"	
[82]	Lamda Orionis	$05^h\ 35^m.1$	+09° 56'	3.6, 5.5	4.4"	
[81]	Theta 1 Orionis	$05^h\ 35^m.3$	-05° 23'	6.7, 7.9, 5.1, 6.7	8.8",13", 21.5"	
[83]	Iota Orionis	$05^h\ 35^m.4$	-05° 55'	2.8, 6.9	11.3"	
[84]	Theta 2 Orionis	$05^h\ 35^m.4$	-05° 25'	5.2, 6.5	52"	
[85]	Sigma Orionis	$05^h\ 38^m.7$	-02° 36'	4.0, 7.5, 6.5	12.9",43"	
[86]	Zeta Orionis	$05^h\ 40^m.8$	-01° 57'	1.9, 4.0, 9.9	2.4", 58"	
[87]	Gamma Leporis	$05^h\ 44^m.5$	-22° 27'	3.7, 6.3	96"	
[88]	Theta Aurigae	$05^h\ 59^m.7$	+37° 13'	2.6, 7.1	3.6"	
[89]	Epsilon Monocerotis	$06^h\ 23^m.8$	+04° 36'	4.5, 6.5	13.4"	

[90]	Beta Monocerotis	$06^h\ 28^m.8$	-07° 02’	4.7, 5.2	7.3"	
[91]	12 Lyncis	$06^h\ 46^m.2$	+59° 27’	5.4, 7.3	8.7"	
[92]	Epsilon Canis Majoris	$06^h\ 58^m.6$	-28° 58’	1.5, 7.4	7.5"	
[93]	Delta Geminorum	$07^h\ 20^m.1$	+21° 59’	3.5, 8.2	6.8"	
[94]	19 Lyncis	$07^h\ 22^m.9$	+55° 17’	5.6, 6.5	14.8"	
[95]	Alpha Geminorum	$07^h\ 34^m.6$	+31° 53’	1.9, 2.9	2.2"	
[96]	Kappa Puppis	$07^h\ 38^m.8$	-26° 48’	4.5, 4.7	9.9"	
[97]	Zeta Cancri	$08^h\ 12^m.2$	+17° 39’	5.6, 6.0	5.9"	
[98]	Iota Cancri	$08^h\ 46^m.7$	+28° 46’	4.2, 6.6	30"	
[1]	38 Lyncis	$09^h\ 18^m.8$	+36° 48’	3.9, 6.6	2.7"	
[2]	Alpha Leonis	$10^h\ 08^m.4$	+11° 58’	1.4, 7.7	177"	
[3]	Gamma Leonis	$10^h\ 20^m.0$	+19° 51’	2.2, 3.5	4.4"	
[4]	54 Leonis	$10^h\ 55^m.6$	+24° 45’	4.5, 6.3	6.5"	
[99]	N Hydrae	$11^h\ 32^m.3$	-29° 16’	5.8, 5.9	9.2"	
[5]	Delta Corvi	$12^h\ 29^m.9$	-16° 31’	3.0, 9.2	24.2"	
[6]	24 Comae Berenices	$12^h\ 35^m.1$	+18° 23’	5.2, 6.7	20.3"	
[7]	Gamma Virginis	$12^h\ 41^m.7$	-01° 27’	3.5, 3.5	3.6"	
[8]	32 Camelopardalis	$12^h\ 49^m.2$	+83° 25’	5.3, 5.8	21.6"	
[9]	Alpha Canum Venaticorum	$12^h\ 56^m.0$	+38° 19’	2.9, 5.5	19.4"	
[10]	Zeta Ursa Majoris	$13^h\ 23^m.9$	+54° 56’	2.3, 4.0, 4.0	14.4", 709"	
[11]	Kappa Bootis	$14^h\ 13^m.5$	+51° 47	4.6, 6.6	13.4"	
[12]	Iota Bootis	$14^h\ 16^m.2$	+51° 22’	4.9, 7.5	38"	
[13]	Pi Bootis	$14^h\ 40^m.7$	+16° 25’	4.9, 5.8	5.6"	
[14]	Epsilon Bootis	$14^h\ 45^m.0$	+27° 04’	2.5, 4.9	2.8"	

[15]	Alpha Librae	$14^h\ 50^m.9$	-16° 02'	2.8, 5.2	231"	
[16]	Xi Bootis	$14^h\ 51^m.4$	+19° 06'	4.7, 7.0	6.9"	
[17]	Delta Bootis	$15^h\ 15^m.5$	+33° 19'	3.5, 8.7	105"	
[18]	Mu Bootis	$15^h\ 24^m.5$	+37° 23'	4.3, 7.0	108"	
[19]	Delta Serpentis	$15^h\ 34^m.8$	+10° 32'	4.2, 5.2	3.9"	
[20]	Zeta Corona Borealis	$15^h\ 39^m.4$	+36° 38'	5.1, 6.0	6.3"	
[21]	Xi Scorpii	$16^h\ 04^m.4$	-11° 22'	4.8, 7.3	7.6"	
[21]	Struve 1999	$16^h\ 04^m.4$	-11° 27'	7.4, 8.1	11.6"	
[22]	Beta Scorpii	$16^h\ 05^m.4$	-19° 48'	2.6, 4.9	13.6"	
[23]	Kappa Herculis	$16^h\ 08^m.1$	+17° 03'	5.3, 6.5	28"	
[24]	Nu Scorpii	$16^h\ 12^m.0$	-19° 28'	4.3, 6.4	41"	
[25]	Sigma Corona Borealis	$16^h\ 14^m.7$	+33° 52'	5.6, 6.6	6.2"	
[26]	16/17 Draconis	$16^h\ 36^m.2$	+52° 55'	5.4, 6.4, 5.5	3.4, 90	
[27]	Mu Draconis	$17^h\ 05^m.3$	+54° 28'	5.7, 5.7	2.0"	
[28]	Alpha Herculis	$17^h\ 14^m.6$	+14° 23'	3.5, 5.4	4.7"	
[29]	Delta Herculis	$17^h\ 15^m.0$	+24° 50'	3.1, 8.2	8.9"	
[30]	36 Ophiuchi	$17^h\ 15^m.3$	-26° 36'	5.1, 5.1	4.4"	
[31]	Omicron Ophiuchi	$17^h\ 18^m.0$	-24° 17'	5.4, 6.9	10.3"	
[32]	Rho Herculis	$17^h\ 23^m.7$	+37° 09'	4.6, 5.6	4.1"	
[33]	Nu Draconis	$17^h\ 32^m.2$	+55° 11'	4.9, 4.9	62"	
[34]	Psi Draconis	$17^h\ 41^m.9$	+72° 09'	4.9, 6.1	30.3"	
[35]	40/41 Draconis	$18^h\ 00^m.2$	+80° 00'	5.7, 6.1	19.3"	
[36]	95 Herculis	$18^h\ 01^m.5$	+21° 36'	5.0, 5.1	6.3"	
[37]	70 Ophiuchi	$18^h\ 05^m.5$	+02° 30'	4.2, 6.0	2.8"	
[38]	Epsilon Lyrae	$18^h\ 44^m.3$	+39° 40'	5.0, 6.1, 5.2, 5.5	208", 2.6", 2.3"	
[39]	Zeta Lyrae	$18^h\ 44^m.8$	+37° 36'	4.3, 5.9	44"	

[40]	Beta Lyrae	$18^h\ 50^m.1$	+33° 22'	3.4, 8.6	46"	
[41]	Struve 2404	$18^h\ 50^m.8$	+10° 59'	6.9, 8.1	3.6"	
[42]	Otto Struve 525	$18^h\ 54^m.9$	+33° 58'	6.0, 7.7	45"	
[43]	Theta Serpentis	$18^h\ 56^m.2$	+04° 12'	4.5, 5.4	22.3"	
[44]	Beta Cygni	$19^h\ 30^m.7$	+27° 58'	3.1, 5.1	34.4"	
[45]	57 Aquilae	$19^h\ 54^m.6$	-08° 14'	5.8, 6.5	36"	
[46]	31 Cygni	$20^h\ 13^m.6$	+46° 44'	3.8, 6.7, 4.8	107", 337"	
[47]	Alpha Capricornus	$20^h\ 18^m.1$	-12° 33'	3.6, 4.2	378"	
[50]	Beta Capricornus	$20^h\ 21^m.0$	-14° 47'	3.4, 6.2	206"	
[48]	Gamma Delphinus	$20^h\ 46^m.7$	+16° 07'	4.5, 5.5	9.6"	
[49]	61 Cygni	$21^h\ 06^m.9$	+38° 45'	5.2, 6.0	28"	
[51]	Beta Cephei	$21^h\ 28^m.7$	+70° 34'	3.2, 7.9	13.3"	
[52]	Struve 2816	$21^h\ 39^m.0$	+57° 29'	5.6, 7.7, 7.8	11.7", 20"	
[53]	Epsilon Pegasi	$21^h\ 44^m.2$	+09° 52'	2.4, 8.4	142"	
[54]	Xi Cephei	$22^h\ 03^m.8$	+64° 38'	4.4, 6.5	7.7"	
[55]	Zeta Aquarii	$22^h\ 28^m.8$	-00° 01'	4.3, 4.5	1.8"	
[57]	Delta Cephei	$22^h\ 29^m.2$	+58° 25'	3.9, 6.3	41"	
[56]	8 Lacerta	$22^h\ 35^m.9$	+39° 38'	5.7, 6.5	22.4"	
[58]	94 Aquarii	$23^h\ 19^m.1$	-13° 28'	5.3, 7.3	12.7"	
[59]	Sigma Cassiopeiae	$23^h\ 59^m.0$	+55° 45'	5.0, 7.1	3"	

Double Star Certificate Introduction and Rules;

Double Star Club Log Sheet;

Double Star Club Awardees;

Return to the Astronomical League Observing Club Page;

December 3, 2001. Went to LTO to host a group. Got the idea that I will continue with my double star observing before and after the group. Before to get those stars about to set and after to continue east with the double star observing. At sunset, temperature was about 50 degrees and there was a high haze in the SE with overhead and to the NW clear.

6:05 PM *57 Aquilae* Magnitude 5.8, 6.5 with 36" separation
Drawing #45
Two evenly bright white stars.

6:15 PM *31Cygni* Magnitude3.8, 6.7, 4.8 with separation 107", 337"
Drawing #46
This is a 3 star system. Near the top of FOV is a white star, a bit dimmer than the middle star which is a red-orange star. Then on a line at 7 o'clock is a dim white star compared to the other two. The 1st and 2nd stars are about 3x times the separation as the 2nd and 3rd stars.

6:20 PM *61 Cygni* Magnitude 5.2, 6.0 with separation 28"
Drawing #47
Two evenly bright, dim red stars. The top star is a bit brighter than the bottom star.

6:25 PM *Gamma Delphinus* Magnitude 4.5, 5.5 with separation 9.6"
Drawing #48
The yellow star on the right is 2x as bright as the blue-white star on the left. These are pretty close together.

6:43 PM *Alpha Capricornus* Magnitude 3.6, 4.2 with separation 378"
Drawing #49
Two really bright stars with the one on the bottom noteably brighter then the star on the top. These are off-white, almost yellow stars with a good separation.

6:46 PM *Beta Capricornus* Magnitude 3.4, 6.2 with separation 206"
Drawing #50
The star on the bottom right is a yellow star substantially brighter than blue star that is above it and to the left.

9:09 PM *Beta Cephei* Magnitude 3.2, 7.9 with separation 13.3"
Drawing #51
Very bright blue-white and a very small, dim blue companion star , close together and below the brighter.

Seeing is fairly good. Sky is clear. Wind is calm.

9:13PM *Struve 2816* Magnitude 5.6, 7.7, 7.8 with separation 11.6", 20"

Drawing #52

Multiple star system. The center is the brightest. Very blue star. The one at 11 o'clock is 2x the separation as the companion at 3 o'clock. All look like blue stars. The 11 o'clock star is a bit brighter than the 3 o'clock star.

9:15 PM *Epsilon Pegasi* Magnitude 2.4, 8.4 with separation 142"

Drawing #53

Two stars with one on bottom a very bright red-orange star and the one a fair distance from it is very dim and is hard to see its color. Probably blue-white. It is much dimmer than the other brighter star.

9:18 PM *Xi Cephi* Magnitude 4.4, 6.5 with separation 7.7"

Drawing #54

2 blue stars. Very close together. One on right is 2x as bright as one on the left.

9:26 PM *Zeta Aquarii* Magnitude 4.3, 4.5 with separation 1.8"

Drawing #55

Very hard to see. Very close. Its on the horizon and is boiling a bit. Can see two blue stars of about the same magnitude. Most of the time it is an elongated oval, but then the seeing steadies and you can see two eyes together.

9:28 PM *94 Aquarii* Magnitude 5.3, 7.3 with separation 12.7"

Drawing #56

Two off-white stars. Low on horizon. Star on left is substantially brighter than the star on the right and there is a bit of separation between them.

9:31 PM *Delta Cehpei* Magnitude 3.9, 6.3 with separation 41"

Drawing #57

Easy to see two blue stars. The one on the top is maybe an off-white even yellow star. The one on the bottom is definitely blue-white and is a bit dimmer than the one on the top.

9:34 PM *8 Lacerta* Magnitude 5.7, 6.5 with separation 22.4"

Drawing #58

Had to look at instructions to see how many stars were here. There are two evenly bright blue-white stars and a fainter one below these and to the right. Then there is a bit brighter one to the right of the main two.

NOTE: Its hard to draw these stars in the dark, balancing a red light on my chin and trying to see where the pencil tip is on the paper.

9:45 PM *Sigma Cassiopeiae* Magnitudes 5.0, 7.1 with separation 3"
Drawing #59
This one is close. The star on the right dominates the star on the left. It's a bright blue-white star. Keeping my eye off the eyepiece a bit, I can easily see the much dimmer and possible red in colored star. It is off to the left at about 10 o'clock.

9:48 PM *Eta Cassiopeiae* Magnitude 3.4, 7.5 with separation 12"
Drawing #60
Easily seen double. The brighter star is a yellow star and the companion on the left is much dimmer and maybe a red star. It is definitely a different color than the 1st.

9:54 PM *65 Piscium* Magnitude 6.3, 6.3 with separation 4.4"
Drawing #61
2 evenly bright blue stars. Can see the separation between them but are very close. Again, holding my eye off the EP and waiting for the seeing to steady, I can easily see the separation and 2 stars. Can see the separation most of the time. 2 little eyes.

9:55 PM *Psi 1 Piscium* Magnitude 5.6, 5.8 with separation 30"
Drawing #62
2 evenly bright blue-white stars with s good separation between them.

9:58 PM *Zeta Piscium* Magnitude 5.6, 6.5 with separation 23"
Drawing #63
2 blue-white stars. Easy to see because of the separation. The one on the bottom is about ½ as bright as the one on the top.

10:00 PM *Gamma Arietis* Magnitude 4.8, 4.8 with separation 7.8"
Drawing #64
The 3rd star in the constellation. Two little blue-white stars. close together but a definate separation between them. 2 little eyes.

10:05 PM *Lambda Arietis* Magnitude 4.9, 7.7 with separation 37"
Drawing #65
2 stars, a good distance apart. The one on the bottom is a much brighter white star than the one on the top. Maybe 2x as bright. The one on the top is an off-white star.

10:08 PM *Alpha Piscium* Magnitude 4.2, 5.1 with separation 1.7"
Drawing #66
Star is right where the 2 fish lines connect. This is a hard one to see. Two equally bright, blue-white, very shiney stars. They overwhelm each other. Keeping eye off EP and waiting for seeing to steady, can see the separation. Most of the time it is an elongated figure 8. They are up and down in the EP and right on top of each other. I liked this one.

10:12 PM *Gamma Andromedae* Magnitude2.3, 5.5 with separation 9.8"
Drawing #67
This is a pretty one. Its like Alberio. Very bright red star on the bottom and a little bit dimmer blue companion on the top. Nice color contrast.

10:16 PM *Iota Triangui* Magnitude 5.3, 6.9 with separation 3.9"
Drawing #68
Close pair. The one on the left is a bit brighter than one on right. Left is an off-white, even a red star with right a blue-white star.

10:21 PM *Polaris* Magnitude 2.0, 9.0 with separation 18.4"
Drawing #69
Polaris is a very bright blue-white star. Its companion is very dim and overpowered by Polaris. Its hard to tell its color but is an off-white colored star. It is not red by no means. Much dimmer than primary.

10:24PM *Gamma Ceti* Magnitude 3.5, 7.3 with separation 2.8"
Drawing #70
Bottom star of bowl of neck where body and head meet. Seeing must not be as good as I thought for these close guys are hard to separate. These are two blue-white stars. The one on the right is definitely a lot brighter than the one on the left. When the seeing got good once, the dim star on the left looked almost red in color and not white. Most of the time it is one smudge of a star.

10:30 PM Saturn.
Saw lane in ring. Planet is more golden then rings. Planet sticking out underneath the rings. There are 9 points of light all around the planet. The ones on the right are much brighter. 2 are close to the planet and underneath. Can see the band on the planet.

10:33 PM *Eta Persei* Magnitude 3.8, 8.5 with separation 28.3"
Drawing #71
Definitely a red star on the right and its companion at 10 o'clock, much fainter and is a blue star.

10:35 PM *Struve 331* Magnitude 5.3, 6.7 with separation 12.1"
Drawing #72
Close double. Star on left is 2x as star on the right. Both blue-white stars. Fairly close.

Moon is a 3rd quarter moon adding to the sky glow tonight.

10:38 PM *32 Eridani* Magnitude 4.8, 6.1 with separation 6.8"
Drawing #73
Two closely spaced stars. One on bottom is brighter than the other and is an orange-red star and the one on the top is a blue star. Easy to separate.

10:41 PM *Chi Tauri* Magnitude5.5, 7.6 with separation 19.4"
Drawing #74
Dimmer set. One on bottom is 3x the mag as one on the top. Both are white stars.

10:43PM *1 Camelopardalis* Magnitude 5.7, 6.8 with separation 10.3"
Drawing #75
2 close, white stars. One on right is a hair brighter than the on top-left. Same color, basically white.

10:47PM *55 Eridani* Magnitude 6.7, 6.8 with separation 9.2"
Drawing #76
2 evenly bright, pale white stars. Easy to see.

10:52 PM *Rigel* Magnitude0.1, 6.8 with separation 9.5"
Drawing #77
Definitely see star on right is a blue-white star. The star on left is a yellow or red star. Sky is boiling and can see elongated figure 8. Brighter star dominates the dimmer star. Played with focus and watched star to see the separation when seeing cleared.

10:55 PM *118 Tauri* Magnitude 5.8, 6.6 with separation 4.8"
Drawing #78
Very dim, close pair. Easy to separate. One on right is maybe 2x as bright as one on left. Both blue-white stars.

10:57 PM *Delta Orionis* Magnitude 2.2, 6.3 with separation 52.6"
Drawing #79
Upper most right belt star. Easy to see. One on left is substantially brighter than the one on the right. Left star is a blue-white star and right star is just a white star. Lots of separation between these two as compared to the most recent ones I have been looking at.

11:00 PM *Struve 747* Magnitude 4.8, 5.7 with separation 35.7"
Drawing #80
Looks like in Orion Nebula area. See nebulosity in EP. Several pairs of stars in FOV but one in center matches the magnitude and separation in instructions. One on bottom is a hair brighter than one on top. Both blue-white stars.

January 10, 2002. Went to LTO to host a group. At 9:20 PM, the group just left..

9:21 PM *Theta 1 Orionis* Magnitude 6.7, 7.9, 5.1, 6.7 with 8.8", 13", 21.5" separation

Drawing #81
This is the trapezium in the Orion Nebula. Nebula looks fabolous. The bottom left is the brightest of the 4 stars. The top left and the bottom right are of equal brightness. The top tight is a bit dimmer.

9:24 PM *Lambda Orionis* Magnitude 3.6, 5.5 with separation 4.4"
Drawing #82
Two very close stars. Can't breathe on the EP or it fogs up. Star on left is 2x as bright as star on the right. 2 blue-white stars.

9:28 PM *Iota Orionis* Magnitude 2.8, 6.9 with separation 11.3"
Drawing #83
Two blue white stars. Very neat. The one on the top is very bright compared to the one on the bottom. Hard to see at first, but now its easy to see. A bit of separation btw them.

9:30 PM *Theata 2 Orionis* Magnitude 5.2, 6.5 with separation 52"
Drawing #84
Two blue stars, evenly spaced. Just down below the trapezium and the glow of the Orion Nebula. Star on right is just a bit dimmer than star on left. Trapezium was in the same FOV.

9:34 PM *Sigma Orionis* Magnitude 4.0, 7.5, 6.5 with separation 12.9", 43"
Drawing #85
I first thought Zeta Orionis was in same FOV, so I drew both triangles. The top triangle has 3 stars about the same brightness. All blue-white stars.

9:38 PM *Zeta Orionis* Magnitude 1.9, 4.0, 9.9 with separation 2.4". 58"
Drawing #86
I was wrong in the above assumption. The telescope slewed to a new position. Now have a different set of stars. Bright member, faint member and one in-between. Bright member is dominates the middle one and the faint one is off by itself. Use the OIII filter and can easily see the middle member. The bright one is blue-green and the middle is red in color thru this filter. The middle is at 10 o'clock right near the bright star.

9:45 PM *Rigel*
Drawing #100
Using the OIII filter, get the bright member as blue-green and the faint one is red in colors. Companion is very close and is at a 9 o'clock position to bright member. Very small compared to the brighter member.

Seeing is fairly good. Sky is clear. Wind is calm.

9:49PM *Gamma Leporis* Magnitude 3.7, 6.3 with separation 96"
Drawing #87
Easy one to see. Widely separated. Off white, maybe yellow in color. Brighter is about 2x as bright as dimmer one. Brighter is on the left. Dimmer may be redder in color than brighter. Definitely not blue-white in color.

9:50 PM *Theta Aurigae* Magnitude 2.6, 7.1 with separation 3.6"
Drawing #88
Two little blue-white stars very close together. Used OIII filter. The one on the left is a bit dimmer and is red in color. The one on the right is blue-green in color. Filter knocks glare down and makes them easy to see.

9:55 PM *Epsilon Monocerotis* Magnitude 4.5, 6.5 with separation 13.4"
Drawing #89
Off-white, maybe yellow in color. One on left is more than 2x as bright. Easy to see with good separation between them.

9:58 PM *Beta Monocerotis* Magnitude 4.7, 5.2 with separation 7.3"
Drawing #90
Two evenly bright stars. Blue-white.

10:00 PM *12 Lycnis* Magnitude 5.4, 7.3 with separation 8.7"
Drawing #91
Two stars that are blue-white in color. One on right is a lot brighter. Easy to see.

10:03 PM *Epsilon Canis Majoris* Magnitude 1.5, 7.4 with separation 7.5"
Drawing #92
Another bright mismatched pair. Used OIII filter. Bottom star is the bright one and blue-green in color. Dimmer is right on top of brighter one and is red in the filter. Sits at 11 o'clock. Seeing steadies and it comes right in. Without filter, bright one is boiling and covers up the dim one.

10:09 PM *Delta Geminorum* Magnitude 3.5, 8.2 with separation 6.8"
Drawing #93
Hard to see and keep my eye off EP. Bottom one on right is very bright. Close, but not too close is the fainter member on the top.

Jupiter has lots of band on it tonight. Have never seen this many bands on Jupiter before. See two big bands. Band on left is then split into two. OIII filter shows the bands easily.

Snowed a lot yesterday.

10:14 PM *19 Lyncis* Magnitudes 5.6, 6.5 with separation 14.8"
Drawing #94
There are three stars that could be part of the double. But it's the two stars on the left that are the double. The one on the bottom is a bit brighter than the star on the top.

10:16 PM *Alpha Geminorum* Magnitude 1.9, 2.9 with separation 2.2"
Drawing #95
I think this is Castor. Two, evenly bright, blue-white stars. Real close together and very shiney. OIII filter they are both blue-green in color and the one on the bottom is a bit dimmer than the one on the top.

10:20 PM *Kappa Puppis* Magnitude 4.5, 4.7 with separation 9.9"
Drawing #96
2 evenly bright white stars.

Saturn is gorgeous. See Cassini's divison, bands on the planet and several points of light all around it.

Can't do N Hydra tonight for it is still below the horizon. Telescope slewed there without hitting limits but was pointing into the floor.

10:28 PM *Zeta Cancri* Magnitude 5.6, 6.0 with separation 5.9"
Drawing #97
2 close, easy to separate stars. The one on the bottom is just a hair brighter. Definitely white stars. Not blue-white.

10:29 PM *Iota Cancri* Magnitude 4.2, 6.6 with separation 30"
Drawing #98
Well separated. Star on right is reddish-orange and maybe 2x as bright as blue-white star on the left.

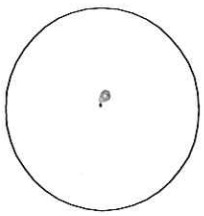
March 10, 2002. Went to Brian Kimball's in Longmont. Used his 6", f/7 AstroPhysics refractor at 54 power to look at N Hydrae and Rigel.. There were high, thin clouds in the south, where these stars were.

9:42 PM *N Hydrae* Magnitude 5.8, 5.9 with 9.2" separation
Drawing #99
Saw two blue-white stars, even in brightness, close together, but easy to separate..

9:45 PM *Rigel*
Drawing #100
With Brian's scope, there were easy to separate, unlike LTO's 18" scope. The primary star was very bright and the companion was very dim, but easy to see.

Did the same on March 11, 2002. Less clouds, but there was a high haze. N Hydrae, at 9:41 PM, was easier to see for it was much brighter than the night before. We also looked at several double stars in Gemini, Ursa Major and Taurus. Anything over 2" separation were easy to split. Anything less, it was even hard to tell if there was a figure 8 shape. Some stars had companions very faint, but since I had gone through the AL list, I could easily see them with AV.

6/23/01



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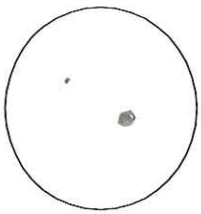

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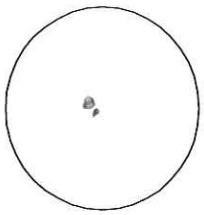

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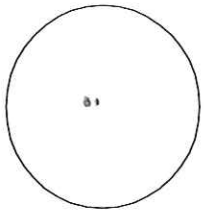

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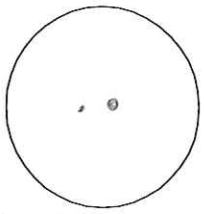

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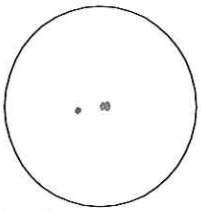

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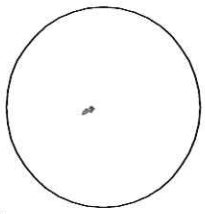

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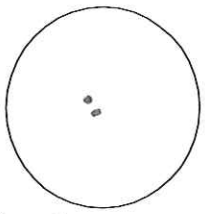

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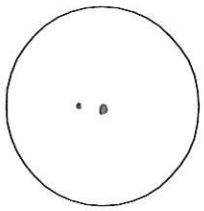

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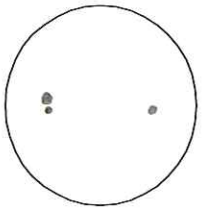

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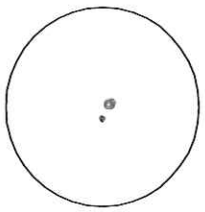

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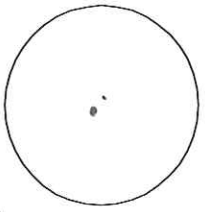

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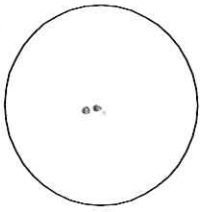

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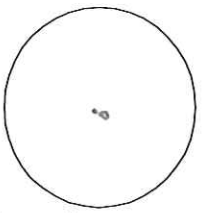

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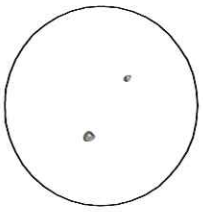

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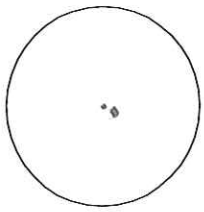

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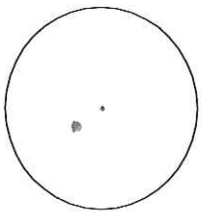

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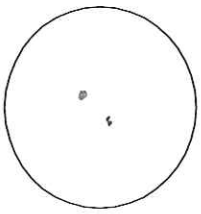

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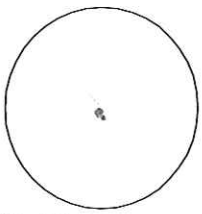
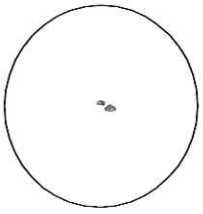
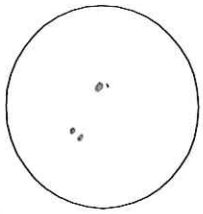


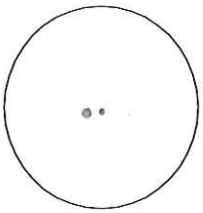
Date: 19
Time: 12:27
Power: 160x



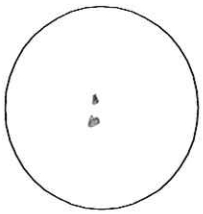
Date: 20
Time: 12:30
Power: 160x



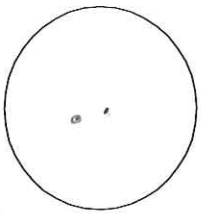
Date: 21
Time: 12:33
Power: 40



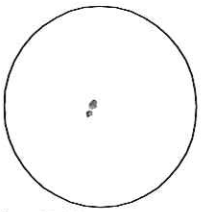
Date: 22
Time: 12:38
Power:



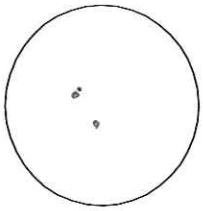
Date: 23
Time: 12:40
Power:



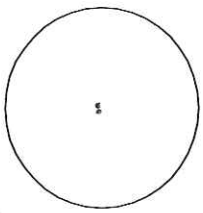
Date: 24
Time: 12:44
Power: 40



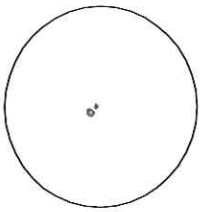
Date: 25
Time: 12:48
Power:



Date: 26
Time: 12:52
Power:

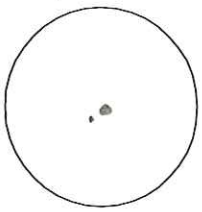


Date: 27
Time: 12:55
Power:

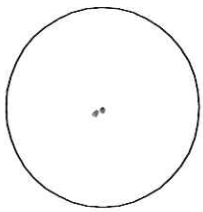


Date: 28
Time: 12:58
Power:

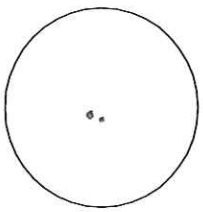
6/24/01



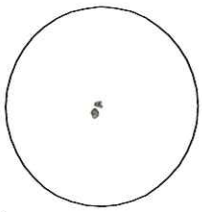
Date: 29
Time: 1:01
Power: 40



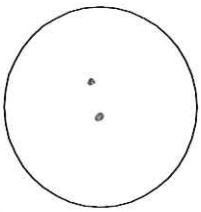
Date: 30
Time: 1:04
Power:



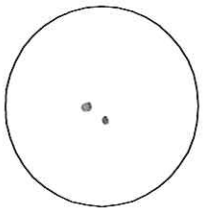
Date: 31
Time: 1:05
Power:



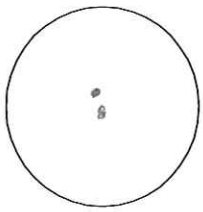
Date: 32
Time: 1:09
Power:



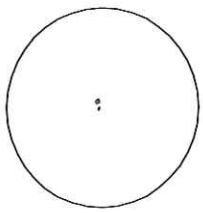
Date: 33
Time: 1:11
Power:



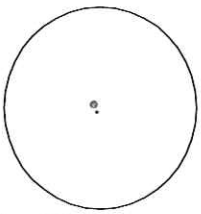
Date: 34
Time: 1:12
Power:



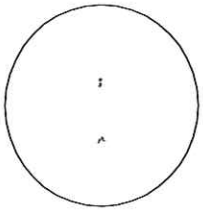
Date: 35
Time: 1:14
Power:



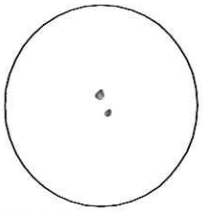
Date: 36
Time: 1:18
Power:



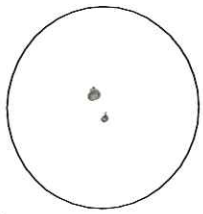
Date: 37
Time: 1:20
Power:



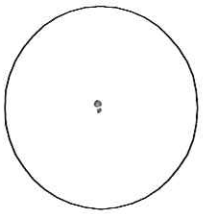
Date: 38
Time: 1:24
Power:



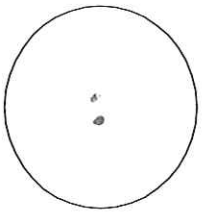
Date: 39
Time: 1:26
Power:



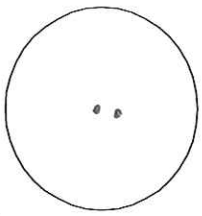
Date: 40
Time: 1:29
Power:



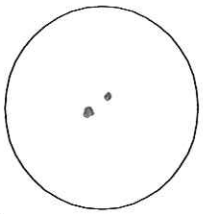
Date: 41
Time: 1:31
Power:



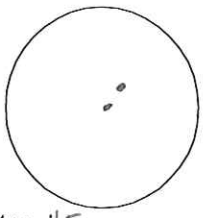
Date: 42
Time: 1:35
Power:



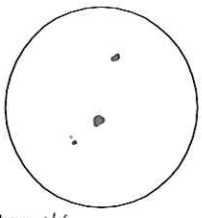
Date: 43
Time: 1:37
Power:



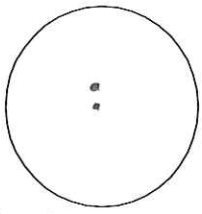
Date: 44
Time: 1:40
Power:



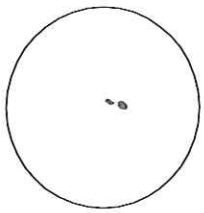
Date: 45
Time:
Power:



Date: 46
Time:
Power:

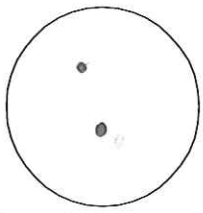


Date: 47
Time:
Power:

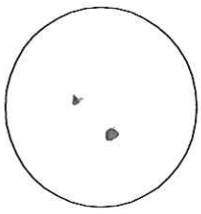


Date: 48
Time:
Power:

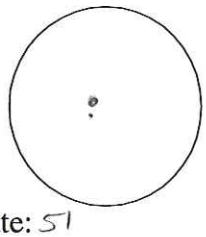
12/3/01



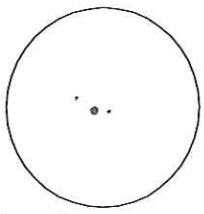
Date: 49
Time: 6:43P
Power:



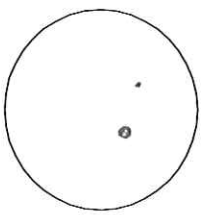
Date: 50
Time: 6:47P
Power:



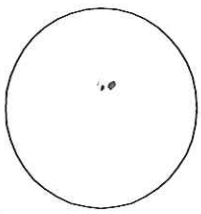
Date: 51
Time: 9:09P
Power:



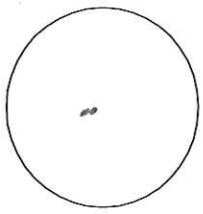
Date: 52
Time: 9:13P
Power:



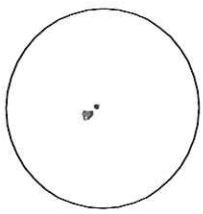
Date: 53
Time: 9:15P
Power:



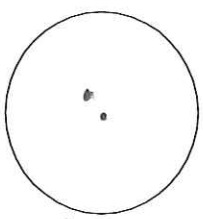
Date: 54
Time: 9:18P
Power:



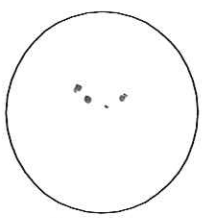
Date: 55
Time: 9:26
Power:



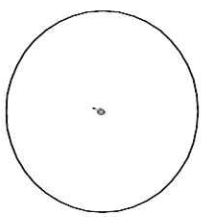
Date: 56
Time: 9:28P
Power:



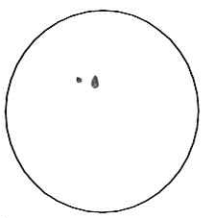
Date: 57
Time: 9:31P
Power:



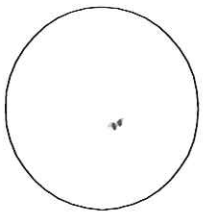
Date: 58
Time: 9:34P
Power:



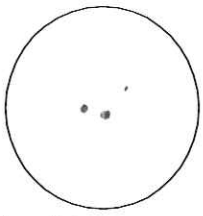
Date: 59
Time: 9:45P
Power:



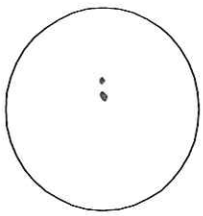
Date: 60
Time: 9:48P
Power:



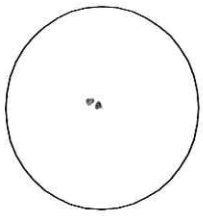
Date: 61
Time: 9:53P
Power:



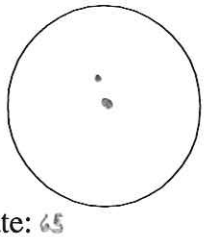
Date: 62
Time: 9:55P
Power:



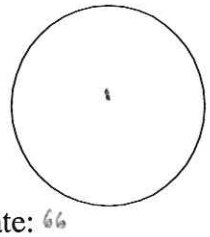
Date: 63
Time: 9:58P
Power:



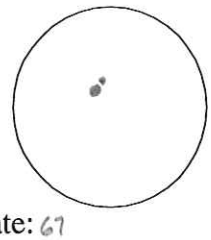
Date: 64
Time: 10:02P
Power:



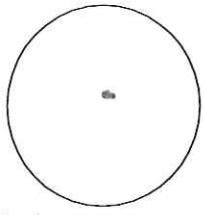
Date: 65
Time: 10:05P
Power:



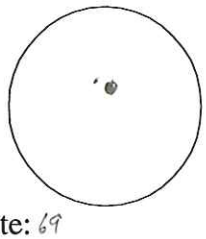
Date: 66
Time: 10:08P
Power:



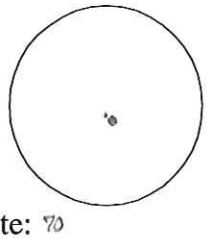
Date: 67
Time: 10:13P
Power:



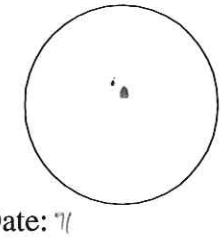
Date: 68
Time: 10:16P
Power:



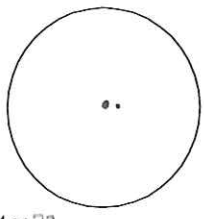
Date: 69
Time:
Power:



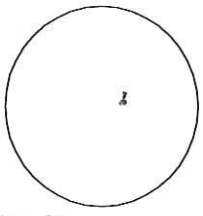
Date: 70
Time: 10:24P
Power:



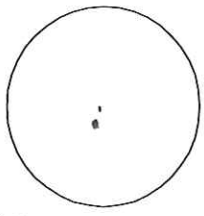
Date: 71
Time: 10:33P
Power:



Date: 72
Time: 10:35P
Power:



Date: 73
Time: 10:37P
Power:



Date: 74
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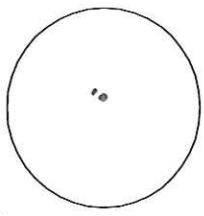

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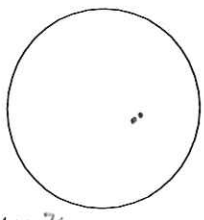

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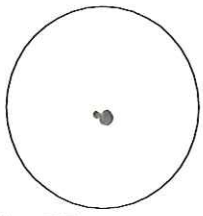

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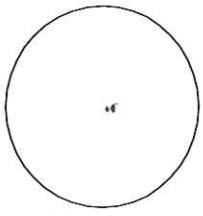

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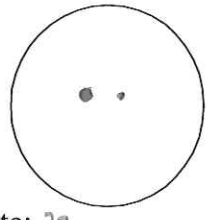

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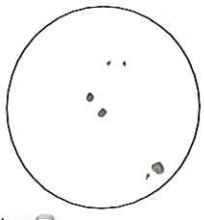

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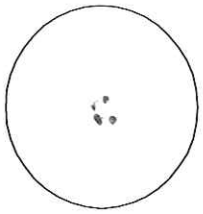

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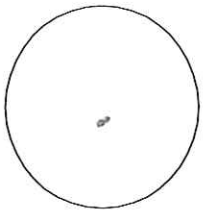

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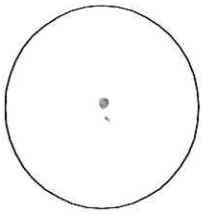

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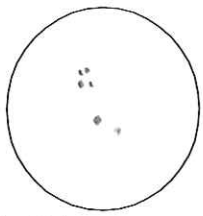

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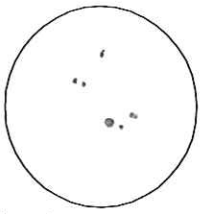

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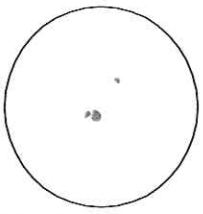

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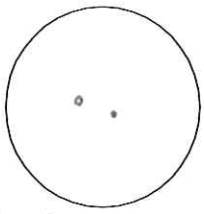

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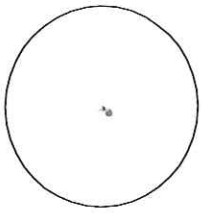

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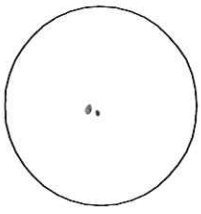

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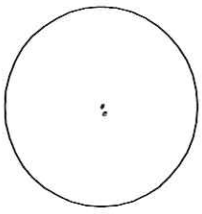

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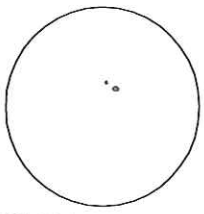

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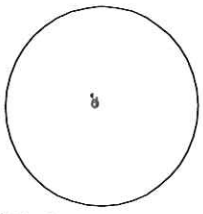

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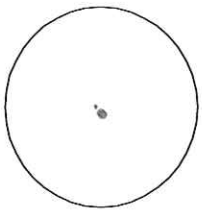

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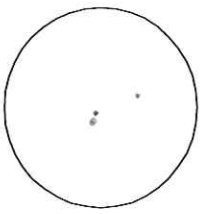

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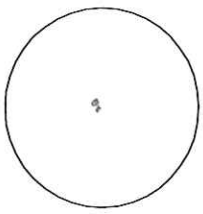

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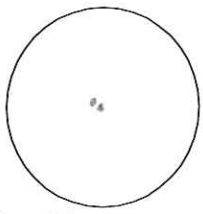

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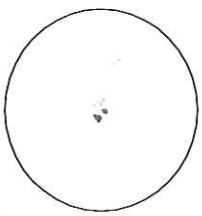

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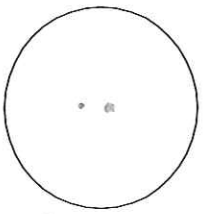

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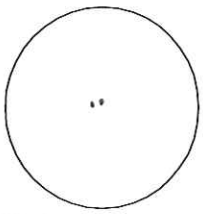

Date: 99
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Power: 54x

Rigel

Date: 100
Time:
Power: