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.