

# Star Gazer News

Newsletter of the Delmarva Stargazers

www.delmarvastargazers.org

Volume 12 Number 03

September 2005

## From the President

Lyle Jones

Summer has past by quickly. I am glad to see this hot summer coming to an end.

Our fall star party is just 6 weeks away and our first meeting of this year is just over two weeks away. Joe Cain said that we have just a few registrations in for the No-Frills, so get your registration sent in. Remember, for club members who help with the star party, we don't charge a registration fee. When you send your registration in, just indicate what days you can work and for how long.

The Astro-Camp at Spruce Knob was fun! We had four nights to observe with two nights of great skies. Joe Morris coordinates the camp for the Mountain Institute. Dave Wells, Keith Lohmeyer, Pj Riley, Leonard White and myself were there with our telescopes to help the camper's with their night observing. One evening before the campers observed, my wife, Cherie, read some Greek mythology to the campers. While the campers did their afternoon activity (hiking, swimming or caving), one afternoon some of us took a train ride on the Cass Shay railroad. On another afternoon some others drove around that part of West Virginia to enjoy the area and others just rested to be able to stay up to observe. We had to wait until around 2AM to see Mars come over Spruce Knob, a nice view, even without a telescope. The Stargazers helping with the camp suggested that the Delmarva Stargazers should set up a scholarship for next year. I guess we need to talk about it at the next club meeting.

Paul said keep it short !! So -- I hope to see at our club meeting on September the 6. Don't forget to observe Mars in the morning sky!

## Spruce Knob Astronomy Camp

Leonard White

Let's see, hmmm.....

Keith & I left his house at approx. 0845 on Sunday morning. We arrived at the "Mountain Institute" in the late afternoon, dropped our scopes off at the observing field and unpacked our stuff at the "barracks". These were two buildings that had 5 rooms with 2 bunk beds each for a total of 20 beds per bldg. The bldg. that Keith & I occupied had very few people in it, 5 total. The "bath house" was up the hill about 50 yards or so from us. This had 4 toilets, 5 sinks, & 4 showers on the male side. There was plenty of hot water available but it was a little inconvenient to have to get "dressed" and walk up the hill in the morning to use the bathroom.

The main bldg. was called a "Yurt" which name & design comes from somewhere in the Himalayas I believe. It's shape is hard to describe. It contains a kitchen and classroom on the lower level and a library and dining booths above. All the meals were good & the staff was very pleasant. There were also quite a few small & medium-sized "yurts". Lyle & his spouse stayed in one of these. Dave Wells & Pj camped on the observing field.

Scopes:

Joe Morris had a 20" Obsession there and he stayed in his camper, which was parked a little ways from his telescope. Keith - medium dob - Lyle - medium dob & small refractor & small newt on EQ - Pj - medium dob & small ETX - Dave - TV 101 & large binos - Me - C-8 SCT

Some of our daytime activities were as follows:

On Monday we went to the summit of Spruce Knob, Spruce Knob Lake and the Seneca Rocks Visitor Center and looked at the displays there.

On Tuesday we went to the Cass Mountain Scenic Railroad where we toured the model railroad, shops & gift shop/snack bar before boarding the train for the trip up the mountain. The price was quite reasonable for this at around \$14 for a 2 hour trip including a tour of a "logging camp & machinery" at the end of our trip up.

On Wednesday we went to Elkins and stopped in the old railroad station, which is a tourist center, and had a buffet lunch at a place called the "Steer".

On Thursday we went to the National Radio Telescope site at Greenbank and saw the various radio telescopes and went into the exhibit hall where they had very interesting displays set up. They had a nice gift shop/snack bar as well.

Lyle left on Thur to go to Ohio. Keith & I left on Friday

(Continued on page 2)

With every passing hour our solar system comes forty-three thousand miles closer to globular cluster 13 in the constellation Hercules, and still there are some misfits who continue to insist that there is no such thing as progress.

- Ransom K. Ferm



### Upcoming Events:

- ★ ⇒ Monthly meeting September 6<sup>th</sup> ★
- ★ ⇒ Monthly field observing - Sept. 2<sup>nd</sup> ★
- ★ ⇒ NO FRILLS X Starparty (see pg. 5) ★



(Continued from page 1)

morning before the kids got back from Greenbank. Dave, Pj, & Joe stayed.

As far as observing goes we had 1 night that Joe describes as a 9 on a scale of 1-10 (10 being the best) and all the other nights were what I would call an 8. The Milky Way was so bright it looked like a long cloud.

### The Solar System in September

Mercury cannot be observed this month. Venus is in conjunction with Jupiter on the 2<sup>nd</sup> (1.4 deg. S). Mars rises around 8:30 PM. Jupiter fades in the evening twilight in the second half of the month. Saturn rises high in the east before dawn. Uranus is at opposition on the 1st, but will be low in the southern sky (22h43m, -9deg.). See pg. 195 of your Observer's handbook for a finder chart.

### Sun and Moon Data for September 2005

Tuckahoe MD  
38.98°N 75.93°W 5hrW  
Daylight Time Astronomical Twilight

Date	Twilight	Rise	Sun Transit	Set	Twilight	Rise	Moon Transit	Set	%
9/1/2005	4:59a	6:33a	1:04p	7:34p	9:07p	4:12a	11:40a	6:57p	4
9/2/2005	5:00a	6:34a	1:03p	7:32p	9:05p	5:14a	12:23p	7:21p	1
9/3/2005	5:01a	6:34a	1:03p	7:31p	9:04p	6:15a	1:05p	7:44p	0
9/4/2005	5:02a	6:35a	1:03p	7:29p	9:02p	7:15a	1:45p	8:04p	1
9/5/2005	5:04a	6:36a	1:02p	7:28p	9:00p	8:15a	2:25p	8:25p	3
9/6/2005	5:05a	6:37a	1:02p	7:26p	8:58p	9:16a	3:06p	8:46p	8
9/7/2005	5:06a	6:38a	1:02p	7:25p	8:56p	10:19a	3:49p	9:10p	14
9/8/2005	5:07a	6:39a	1:01p	7:23p	8:55p	11:24a	4:35p	9:37p	22
9/9/2005	5:08a	6:40a	1:01p	7:21p	8:53p	12:33p	5:25p	10:10p	31
9/10/2005	5:09a	6:41a	1:01p	7:20p	8:51p	1:43p	6:20p	10:52p	41
9/11/2005	5:10a	6:42a	1:00p	7:18p	8:49p	2:52p	7:19p	11:45p	52
9/12/2005	5:11a	6:43a	1:00p	7:17p	8:47p	3:55p	8:22p	****	63
9/13/2005	5:13a	6:43a	1:00p	7:15p	8:46p	4:50p	9:25p	12:50a	74
9/14/2005	5:14a	6:44a	12:59p	7:13p	8:44p	5:35p	10:25p	2:04a	84
9/15/2005	5:15a	6:45a	12:59p	7:12p	8:42p	6:12p	11:22p	3:23a	91
9/16/2005	5:16a	6:46a	12:58p	7:10p	8:40p	6:42p	****	4:43a	97
9/17/2005	5:17a	6:47a	12:58p	7:09p	8:38p	7:10p	12:16a	6:01a	100
9/18/2005	5:18a	6:48a	12:58p	7:07p	8:37p	7:35p	1:07a	7:16a	100
9/19/2005	5:19a	6:49a	12:57p	7:05p	8:35p	8:01p	1:56a	8:30a	97
9/20/2005	5:20a	6:50a	12:57p	7:04p	8:33p	8:28p	2:45a	9:43a	91
9/21/2005	5:21a	6:51a	12:57p	7:02p	8:32p	8:59p	3:35a	10:55a	84
9/22/2005	5:22a	6:52a	12:56p	7:00p	8:30p	9:35p	4:27a	12:05p	75
9/23/2005	5:23a	6:52a	12:56p	6:59p	8:28p	10:17p	5:19a	1:12p	66
9/24/2005	5:24a	6:53a	12:56p	6:57p	8:26p	11:06p	6:13a	2:14p	56
9/25/2005	5:25a	6:54a	12:55p	6:56p	8:25p	****	7:07a	3:07p	46
9/26/2005	5:26a	6:55a	12:55p	6:54p	8:23p	12:01a	7:59a	3:52p	37
9/27/2005	5:27a	6:56a	12:55p	6:52p	8:21p	1:01a	8:49a	4:29p	28
9/28/2005	5:28a	6:57a	12:54p	6:51p	8:20p	2:02a	9:36a	5:00p	20
9/29/2005	5:29a	6:58a	12:54p	6:49p	8:18p	3:04a	10:20a	5:26p	13
9/30/2005	5:30a	6:59a	12:54p	6:48p	8:16p	4:05a	11:02a	5:49p	7

### How I spent My Summer

James Morgan

Well, this summer is proving to be vexing at times. Some of the best things that I have done have been from my own light polluted back yard. Usually these are prompted by the potential clearness of the night as noted on the Clear Sky Clock. The best view I have is to the north looking over the light dome of the city of Newark because of the trees in my backyard.

So far, some exciting things have occurred this summer but the cost of gas and the weather have conspired against me. I have not been able to hold many public events. The last one that I was able to get the weather to cooperate with was in Middletown, at the library there. That was in June and was well attended. There is a demand on the part of the public in that area of the county for observing and I will be back down again before the observing season is over. In September I will be at the library in Odessa and also at Lums Pond. For me the public observing season ends with the Leonids Meteors in November and I will be spending that night at Appleton Road North parking lot.

I made a trip along with two other DAS members, Marc Hutton and Bill McKibben to Skies Unlimited up in Gelnmoore, PA. There I met Al Nagler, was able to shake his hand and get some questions about two inch eyepieces answered. The only Televue eyepiece I own is a 6mm Radian that I use from time to time. I am saving my pennies for a 17mm two inch Nagler. The only other eyepiece that I have that comes close to it is a 20mm Pentax that is a 1-1/4". I am very happy with it

and it does a great job. I did notice that Orion is now selling the Radians and the prices are lower than what I paid for mine.

While at Skies Unlimited I purchased three things. The re-issued "Atlas of the Moon by Antonin Rukl," the new laminated quadrant "Field Map of the Moon" illustrated by Antonin Rukl and the "Bright Star Atlas 2000.0" by Wil Tirion and Brian Skiff. I had held off purchasing these until I could examine them. When they are shown online you cannot really get a good idea of what they are like. I would recommend all of them. They are well worth the money if you are interested in the Moon as I am becoming. I have a complete set of Tirion's Sky Atlas but also have the "Cambridge" one which is in book form but the Bright Star Atlas is very well organized and inexpensive compared to it. I have loaned out the Cambridge one several times and the people that have borrowed it always appreciated it but they found it to be overwhelming. This one is very nice, compact and easy to find your way around the information.

Well tonight (21-Aug-05) I set up a small scope and tried to separate Polaris and its companion but could not do so.

The sky was clear with very little water vapor which helps with the dome over Newark. If there is little then there is very little reflection off of it. I could see Kochab and Pherkad from the Little Dipper which meant that the sky was great. I usually can't see them. I am not sure why I was not able to split them but will have to get more information on this and try again on Tuesday or Wednesday with a larger scope. This is what I have on the two stars: SAO 209 is supposed to be the companion according to The Sky with a Magnitude of 6.46. SAO 308 is Polaris with a magnitude of 1.97.

(Continued on page 4)

## Observing Notes - The Perseids

### Don Surlles

Back in late June, I reluctantly agreed to do a Perseid program for the Audubon Society Pickering Creek facility (close to Easton, MD). Experience has taught me not to go to rivers, bays, swamps, and bayous to watch anything in the sky during the months of July and August. This week's experience seemed to say, "Dumb Axx, haven't you learned YET?".

I spent the better part of Thursday afternoon loading my pickup for a night of meteor watching and some stargazing and a slide presentation just in case the sky didn't cooperate with the first two activities. I took the 17.5" Odyssey, a ladder, pillows, sleeping bags (I coerced Karen into going so she could keep me awake...ha!). Coolers, cameras, tripods, eyepiece case, a small gas grill, large cooler with the food, slide projector, screen, slides...folks, I could barely close the lid when all that stuff was finally in the truck. And I had lost about a gallon of fluid thru perspiration, remember it was 95F with high humidity.

The drive to Pickering Creek was pleasant; we enjoyed Talbot County scenery and especially the last few miles. There are some fine haciendas in this area.

When we finally arrived at the PC site we were directed to drive to the end of the road...500 holes in the 1 mile road...that's where the creek is. The meteor watching would be done from the dock that juts out into the creek. And I thought..."Mosquito Bait"!

There were only four of the supposedly ten "interested" Star Gazers brave enuf to make the trip. So the four of us had our hamburgers and hot dogs in the shade of some very old trees behind the spooky old house nearest the creek.

This was also the location where I set up the slide show...kinda picturesque if I do say so. There were approximately 15 people in attendance. Most of them enjoyed the slides and information about our universe that I could remember. All of them enjoyed the aurora slides.

Then it was time to face the sky and the inevitable muck associated with "hazy, hot, and humid" near bodies of water in the summertime. Pickering Creek is probably 1/4 - 1/2 mile wide at this spot, the pier jugged out about 150 feet and had a large area at the end that was obviously made for sky watching by some forward thinking boat enthusiast. In this case it was muck watching. But, honestly, there were no mosquitoes! Actually it was quite pleasant sitting on the dock, listening to the jumping fish, and straining the He77 out of my eyes just to see the summer triangle.

Most of the folks were disappointed that the sky wasn't ablaze with meteors and had left by 11:00 pm. They were the wise ones in this case. The four diehard Gazers hung around telling lies and hoping for clear skies until midnight. By then the summer triangle had hidden behind the muck and we decided to exit the premises.

My intention was to stay awake until we could find a greasy spoon truck stop for some coffee and lite breakfast...the truckstop on 301N close to Tuckahoe was our first opportunity and Karen and I sampled their selection of fine foods. Then we had another hour of driving during that sleepy time from 1:30-2:30 AM. But we made it home safely and after a few hours of sleep I went outside to unload my loaded pickup and put things back in their place. This took another 2-3 hours of unpacking and putting away (into my garage, basement, trailer, and the other garage...). Then there was the matter of removing Pickering Creek mud from my normally clean wheels - so I just gave the truck a complete bath.

Did I mention we did not see a Perseid?

### A Report from the Globe Trotter-

On August 11/12 I spread across my bed aboard the Amtrak train California Zephyr heading for California. I turned all the lights out in my room, lay across the cozy bed and gazed skyward. As darkness fell on the evening of August 11th the California Zephyr pulled out of Salt Lake City, Utah. The light pollution was terrible but in a few hours I was in the most desolate place you can imagine, somewhere in the state of Nevada. There were NO light domes anywhere. The train was snaking its way around tall hills and valleys. The Milky Way could be seen brilliantly, despite the slightly tinted window on my train car. This has got to be the most comfortable way I have ever observed the night sky. In fact, as suddenly as I saw the first Perseid I fell asleep. Oh no! I awakened early the next morning to catch one more. Imagine, falling asleep under such a magnificent sky.

*Kent Blackwell* - Somewhere on the rails of Amtrak in Western USA

**How to Join the Delmarva Stargazers:** Anyone with an interest in any aspect of astronomy is welcome

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE & ZIP \_\_\_\_\_

E-MAIL ADDRESS (If any) \_\_\_\_\_

Please attach a check for \$15 made payable to Delmarva Stargazers and mail to Kathy Sheldon, 20985 Fleatown Rd, Lincoln, DE 19960. Call club President Lyle Jones at 302-736-9842 for more information.

Here is the upcoming year's meeting schedule and proposed outline:

Delmarva Stargazers Meeting Outline for July 05 - Jun 06					
Month	Help me with equipment that I have! (7:00-7:15)	Special Interest Groups	Monthly Program	The Sky at 10:00 PM and NASA Update	Myths and History
Sep-05	"	Other organizations - why, what and where?	Doug Miller-- Southern skies	Discussion of the S&T monthly sky chart -Jerry Truitt	Capricorn
Oct-05	"	Star Charts & Their Use	Greg Lee -- Transit of Venus	"	Aquarius
Nov-05	"	Solar Observing	Off- axis scopes (D. Groski)	"	Andromeda
Dec-05	"	Events next year?	What is new?	"	Taurus
Jan-06	"	Comets-- ?	Principles of optics	"	Lepus
Feb-06	"	Computer operated scopes	Planning a Newtonian	"	Canis Major and Minor
Mar-06	"	Mirror and optic coatings	Guest speaker	"	Hydra & Lynx
Apr-06	"	Attending a star party	Schmidt-Cassegrains	"	Leo
May-06	"	TBD	CCD	"	Virgo
Jun-06	"	NASA Programs for Space Exploration	Programs for 2005-2006	"	Bootes

"Help me with equipment that I have!" is a fifteen minute time slot when a club member can bring a piece of equipment that he or she may need help in figuring how to operate, set-up or understand. If no help is needed, the time slot will be used in talking to fellow members. The Club **needs** some assistance and is looking for volunteers. This is **your** chance to give to the Delmarva Stargazers and make it more worthwhile for everyone.

*(Continued from page 2)*

According to The Sky the separation is 00 degrees 19 minutes 42 seconds. I will have to check other reference materials to confirm this.

What prompted all of this is the past two times I have been out with Marc Hutton and Bill McKibben. One of the things that they have to do is to polar align their scopes and it is not as simple as you would think. We had spent time when it was difficult to see enough stars to get a good alignment. I am working on a barn door and have purchased a polar alignment scope for it so I will need to have to learn about this. We spent two times together fooling around with DSI cameras they purchased to do some imaging. Bill was successful and has some of his images located at: <http://billmck.home.comcast.net/web/astro/astro.html> Bill has done alot of work and it really is neat. I look forward to going out with the both of them along with Mike Borgia again. I will have to have Bill take a picture of Polaris for me. More after I get out again to try and split Polaris.

**Eureka!** (Stardate 22-Aug-05)

I was able to split it. I used a 6 MM Radian and also a 10MM Sirius Plossel did the job as well.

What a dunce I am. I am trying to make sure that I really have Polaris in the eyepiece and I keep going into the house to look at charts as I did not bring any outside. I had the 6mm in the scope (my 10" dob) and I think that it is amazing because usually when I use this eyepiece I have to keep moving the scope to center the star. Here I am going in and out of the house and coming back look at it and find it centered. The light bulb finally came on. This is Polaris which is very close to the point where all the stars rotate around! What a dunce I am. Too many things that I am trying.

In any case I have loaded up a file (to the Yahoo groups) that contains a description of Polaris as a double with a photo and this confirms what I saw in the eyepiece. This at 200x! The file is in a folder called MORGAN and is called "Polaris as a double star"

Clouds moved in and caused me to call it a night. This is a good object to teach people how to use averted vision to help see an object. The difference in brightness between Polaris and its companion is great. I could not detect color too well this time but will look again hopefully this Wednesday.



are pleased to announce their Tenth annual No-Frills Star Party  
 from September 28 through October 2, 2005 at  
 Tuckahoe State Park's Equestrian Center near Queen Anne, MD.

The registration fee includes camping fee for the observing area. ALL NIGHT STARGAZER COFFEE, as always, will be free and usually corn-on-the-cob and watermelon as well. Sodas and hot dogs will be available at minimal cost. Campers will be permitted to park and set up by their scopes, but there are no hookups or electricity in the observation area. This year's **No-Frills** will be at to the **Equestrian Center** and **Not at the Youth Camping Area (See map on back of registration form)**. **All attendees are encouraged to register in advance for this event. Your entrance-parking permit will be sent to you on receipt of payment and your badges will be given to you when you arrive.**

Number in party	2-3 Days	2-3 Days	4 Days	4 Days	5 Days	5 Days
	Preregistration	After Sept 9	Preregistration	After Sept.9	Preregistration	After Sept. 9
1 Person	\$25	\$40	\$30	\$45	\$35	\$50
2 Persons	\$40	\$55	\$50	\$65	\$55	\$70
Family (3 or more)	\$55	\$70	\$60	\$75	\$65	\$80

**REGISTRATION for No-Frills X**

For more information, visit our web site at: [www.delmarvastargazers.org](http://www.delmarvastargazers.org) , call or e-mail:  
 Lyle Jones, President, (302) 736-9842 E-mail: [worm1647@comcast.net](mailto:worm1647@comcast.net)  
 Joe Cain, Reservations, (302) 998-4534 Email: [joecainjr@cs.com](mailto:joecainjr@cs.com)

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**REGISTRATION FORM**

**Make check payable to Delmarva Stargazers**  
**Mail to Joe Cain, 2219 Henlopen Ave., Wilmington, DE 19804**

Name \_\_\_\_\_ What Day Will You Arrive? \_\_\_\_\_  
 Evening/ Weekend Phone \_\_\_\_\_  
 Address \_\_\_\_\_ City \_\_\_\_\_  
 State \_\_\_\_\_ Zip Code \_\_\_\_\_

Year & Make of Automobile \_\_\_\_\_  
 Number in your party \_\_\_\_\_  
 Attendee #2 \_\_\_\_\_ Attendee #3 \_\_\_\_\_  
 Attendee #4 \_\_\_\_\_ Attendee#5 \_\_\_\_\_  
 Attendee #6 \_\_\_\_\_ Attendee#7 \_\_\_\_\_

**Use TABLE above to calculate Registration Fee(s). TOTAL ENCLOSED \_\_\_\_\_**  
**Are you interested in giving a presentation at the No-Frills? \_\_\_\_\_**

What is the title on the presentation?

**YOUR BADGES AND ENTRANCE PARKING PERMIT IS YOUR RECEIPT. Sorry no refunds.**

## Directions to Tuckahoe State Park

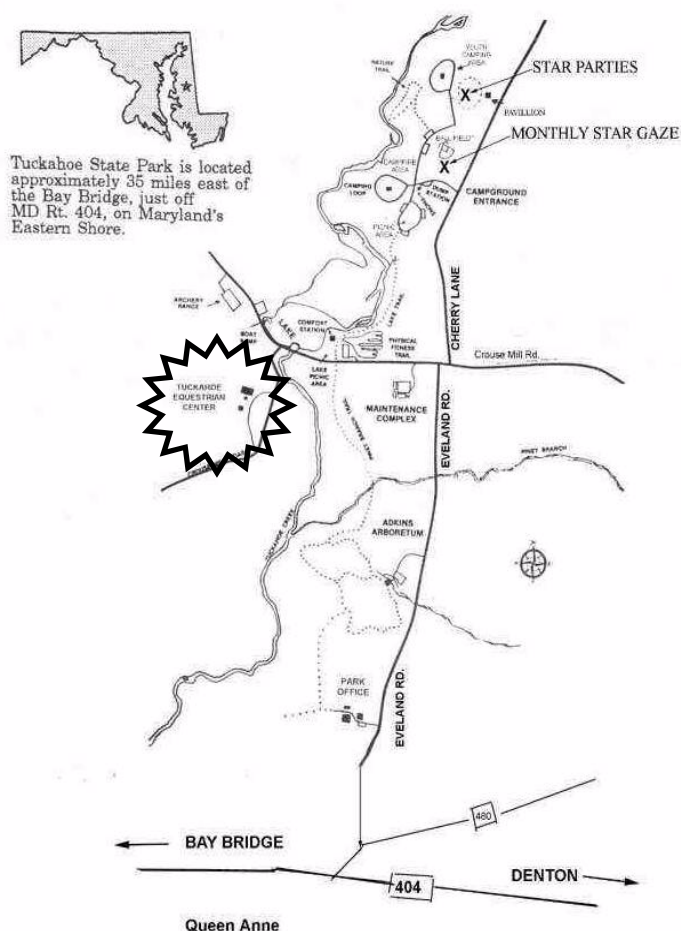
**From Bay Bridge:** Take Route 50 to Route 404 east to Queen Anne; turn left on 480 and up Eveland Road to Crouse Mill Rd., turn left, go across the lake and immediately after the lake turn left again (still Crouse Mill Rd.), and continue ahead to Equestrian Center (less than ¼ mile).

**See map at right for star party observing area.**

**From the North:** From 301 South take MD 313 South (Millington) to Baltimore Corner. Turn Right onto MD 312 South and continue 3.3 miles through Bridgetown. One mile past Bridgetown: turn right onto Cherry Lane. Go 4.6 miles to Crouse Mill Rd., turn right, go across the lake, and immediately after the lake turn left (still Crouse Mill Rd.) and continue ahead to Equestrian Center (less than ¼ mile).

**From Dover:** Take Route 8 to Marydel. Turn south on MD 311 to Goldsboro. At Goldsboro take MD 313 North (Millington) to Baltimore Corner. Turn Right onto MD 312 South and continue 3.3 miles through Bridgetown. One mile past Bridgetown; turn right. onto Cherry Lane. Go 4.6 miles to Crouse Mill Rd., turn right, go across the lake, and immediately after the lake turn left (still Crouse Mill Rd.) and continue ahead to Equestrian Center (less than ¼ mile).

## TUCKAHOE STATE PARK, MD



Mortal as I am, I know that I am born for a day. But when I follow at my pleasure the serried multitude of the stars in their circular course, my feet no longer touch the earth.

- Ptolemy, c.150 AD

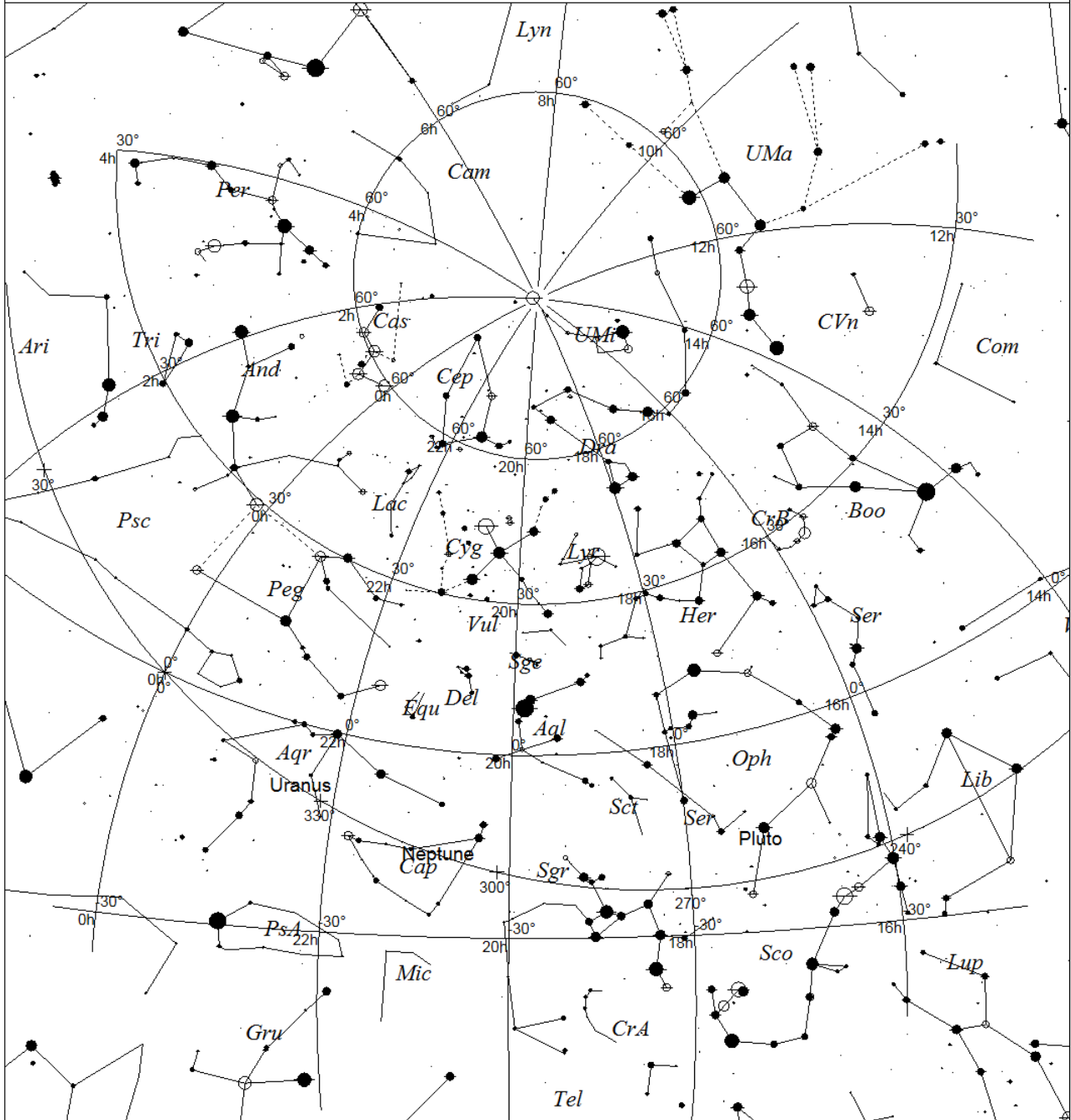
-----cut here-----



c/o LYLE A. JONES  
230 N. BRADFORD ST.  
DOVER, DE, 19904

Joe Cain  
2219 Henlopen Ave.  
Wilmington, DE 19804

# Skymap September 2 2005 10 PM



<p><b>STARS</b></p> <ul style="list-style-type: none"> <li>● &lt;1    ● 3.5</li> <li>● 1.5    ● 4</li> <li>● 2      ● 4.5</li> <li>● 2.5    ● &gt;5</li> <li>● 3</li> </ul>	<p><b>SYMBOLS</b></p> <ul style="list-style-type: none"> <li>● Multiple star</li> <li>○ Variable star</li> <li>☄ Comet</li> <li>○ Galaxy</li> <li>□ Bright nebula</li> <li>☉ Dark nebula</li> <li>⊕ Globular cluster</li> <li>○ Open cluster</li> <li>○ Planetary nebula</li> <li>□ Quasar</li> <li>△ Radio source</li> <li>× X-ray source</li> <li>○ Other object</li> </ul>	<p><i>Tuckahoe State Park, MD</i></p>
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Local Time: 22:00:00 2-Sep-2005      UTC: 02:00:00 3-Sep-2005      Sidereal Time: 19:41:30  
 Location: 38° 58' 0" N 76° 56' 0" W      RA: 19h41m30s Dec: +38° 57' Field: 182.0°      Julian Day: 2453616.5833

## Moondark for September: Tracking the Starry Sphere

Astrophotographers [have to](#) track the sky. Capturing faint stars and wispy detail depends critically on accumulating starlight on the precise spot on the focal plane that exactly compensates for the daily rotation of the Earth. Long exposures require accurate guiding—whether by [eye and hand](#) or specialized [auto-guiders](#)—to obtain the [best results](#).

Thankfully, wide-angle imaging is much less demanding, and it can even be an easy way into astrophotography. A simple, "[barn-door](#)" type tracker is a do-it-yourself hardware-store technology project. Even a camera fixed on a tripod, with no mechanical action, can be made to "track" the stars—in a "[virtual equatorial mount](#)"—and can produce great astrophotos of constellations and sweeping celestial vistas.

The "[barn-door](#)" refers to the hinged arms that open (or close) at the sidereal rate of  $15.04^\circ$  per hour. Originally developed by [Scotsman G. Y. Haig](#) in the early 1970's and known variously as a [Scotch](#) or [Haig](#) mount, there are [many variants](#) and claims of invention. I built a heavy-duty version from wood scraps and a wide hinge chosen to have minimal play. The hinge is set to the local latitude by an angled cut in a 4x4 post, and the only critical dimension of the arm is the 11.42 inch (29.0 cm) hinge to knife-edge pivot distance for the  $\frac{1}{4}$ -20 screw-bolt driven by a 1-rpm timing motor. Under the stars, I level the mount, eyeball the hinge on Polaris with a finder scope, and the mount tracks sufficiently well for exposures of several minutes in length. While the pivot-knife edge (a nylon wing nut in a slot routed in the wood arm) and screw does not exactly provide a constant angular rate, the mount works amazing well for such a simple and roughly built device.

A "[virtual equatorial](#)" takes advantage of modern imaging processing capabilities. Many images taken in succession, each short enough to give good star images, are digitally de-rotated and combined to compensate for the Earth's motion. This methodology is featured in Christian Buil's freeware [IRIS](#), but could be implemented in almost astroimaging processing software, even Photoshop. Star trail photos—what would normally result from extended tripod shots—can be obtained digitally as well. [IRIS](#) can do this, as can a stand-alone program [Startrails](#). The trick here is using a function that retains the maximum value for any pixel position over the entire series of images, recording the trailing stars while the background sky stays dark. Simply adding the images digitally would raise the sky background unacceptably and destroy contrast.

Fortunately, digital cameras with suitably long exposure capability, low image noise, and generous pixel count are readily available. Indeed, amateur astrophotography is popular enough to drive market segments. And what's next? A [dedicated DSLR](#) for [astronomical imaging](#)? [Feature-laden commercial software](#)? Stay tuned...

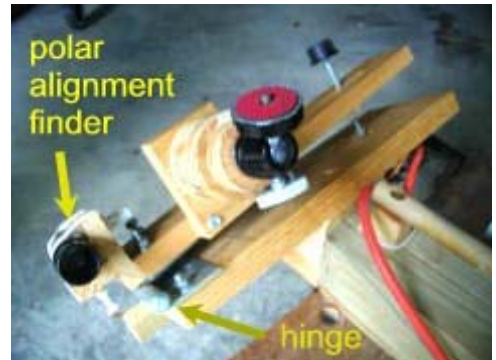
Clicking on the [online](#) images at right will load animated versions showing the hinge arm tracking action and a full  $360^\circ$  view. Moondark is written by Doug Miller, published at the Moondark web site, and printed in the Delmarva Star Gazers' Star Gazer News. This document was last revised on 28 August 2005. Text and images copyright © 2005 by Douglas C. Miller, All Rights Reserved. This material may not be reproduced in any form without prior permission.

### Three thoughts - James Morgan

This would help a lot of folks who are up here in the northern territory. First, I want to mention that Mike Borgia, Bill Mckibben, Marc Hutton and myself regularly get out and do astro photography at Fair Hill Maryland. We are able to get to a site that has a great horizon and sometimes I have brought my 20" Obsession and we have a great night. Here is Bill McKibbens website where they can find some of the photos: <http://billmck.home.comcast.net/web/astro/astro.html> Second, We are working on a site that is south of Northeast Md, where you can make out the Milky Way. It is the darkest site around here and we will be starting to get down there after the first of September. Lastly, all of us have been impacted by higher gas prices and we have a carpool from the Newark area to get us to the Stargazer meetings. If folks are interested in any of these things all they have to do is to email me at "[morganjt56@yahoo.com](mailto:morganjt56@yahoo.com)"



Looking down the Haig mount hinge axis at the hinge/alignment scope (left), camera (above and left of center) and knife-edge/screw (right).



Consult these books for more information: "[Astrophotography](#)" (2003, Firefly), pp. 104-107 by H.J.P. Arnold, and "[Introduction to Digital Astrophotography](#)" (2005, Willmann-Bell), Chapter 12.9 by Robert Reeves. "[Wide-Field Astrophotography](#)" (2000, Willmann-Bell), also by Robert Reeves, has additional useful information: see Chapter 1.13 for barn door tracker details.

