

# SIDEREAL TIMES

*The Official Publication of the  
Amateur Astronomers Association of Princeton*

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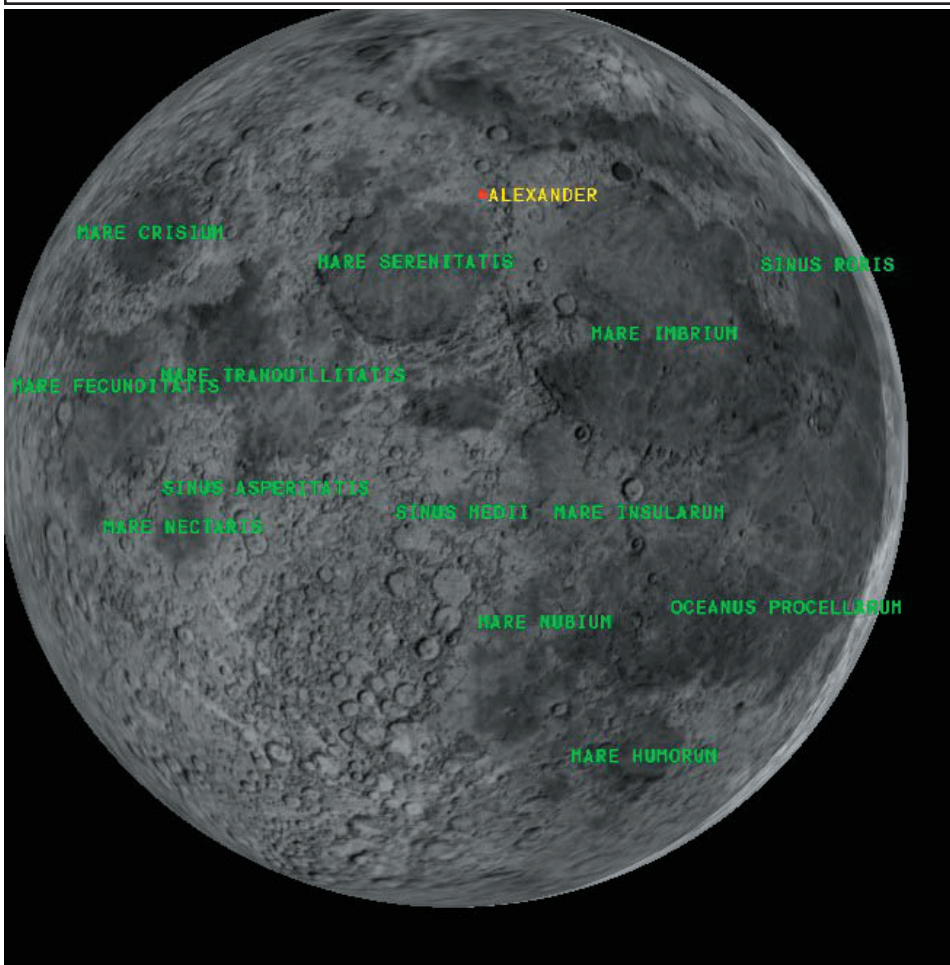
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## From the Director

### Lunar Discoveries on a Cloudy Night

So how many cloudy nights can there be in a single month anyway? Apparently it is only dependent on the number of days in the month with this past February trying hard to get a perfect score. On a recent night of particular frustration I decided I needed to do something about my knowledge of the moon and set about browsing my library of books and astronomy magazines to see what

would catch my interest. Things perked up when I decided to hunt around on the internet. Almost immediately I came across the *Earth and Moon Viewer* on the Fourmilab web site (<http://www.fourmilab.to/earthview/>) This is a really nifty web site on which (as the site says) “you can view either a map of the Earth showing the day and night regions at this moment, or view the Earth from the Sun, the Moon, the night side of the Earth, above any location on the planet specified by latitude, longitude and altitude, from a satellite in Earth orbit, or above various cities around the globe. In addition to the Earth, you can also view the Moon from the Earth, Sun, night side, above named formations on the lunar surface. or as a map showing day and night. A related document compares the appearance of the Moon at perigee and apogee, including an interactive Perigee and Apogee Calculator.” It is quite easy to use and prints great moon charts.

I also discovered that there are pointers to three Lunar Atlases on the NASA site at the URL ([http://cass.jsc.nasa.gov/research/la\\_home.html](http://cass.jsc.nasa.gov/research/la_home.html)) For example, the *Lunar Orbiter Photographic Atlas of the Moon* by Bowker and Hughes (NASA SP-206) “is considered the definitive reference manual to the global photographic coverage of the Moon.” [http://www.lpi.usra.edu/research/lunar\\_orbiter/](http://www.lpi.usra.edu/research/lunar_orbiter/)

But I soon found that there was something better out there just waiting for me to invest a little time in some downloads. The *Virtual Atlas of the Moon* is now really one of my favorites ([http://astrosurf.com/avl/UK\\_index.html](http://astrosurf.com/avl/UK_index.html)). This software allows you to view the lunar globe in real time, in 2D or 3D and to study lunar formations—and it’s FREE! It’s interfaced with “*Sky Charts*” Patrick Chevalley’s free program to draw sky charts – “*Cartes du Ciel*” as it’s called in French in case you’re trying to “google it.”

Simpson Observatory (609) 737-2575

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# Baby, It's Cold Outside!

## How to Observe in the Winter without Freezing to Death.

It's that time of year again. Sparkling, clear winter nights, the return of the Orion Nebula, the Crab Nebula and all the star clusters of the winter Milky Way to entice amateur astronomers from the warmth of their homes to stargaze. It's even dark by 6 PM so you don't have to wait very long to haul your telescope out to observe the night sky. There's only one problem with observing at this time of year, IT'S COLD!

As a member of the AAAP for 15 years and Observatory Chairman for 8 years I have spent a substantial amount of time at the Washington Crossing Observatory in the winter. In the past many new members of the AAAP as well as the general public have come out to the observatory to view the winter sky. I can't count the number of times I have seen the following scenario repeated.

It's a clear winter night and I am using the observatory's telescopes to view the star clusters in Auriga. Temperatures are hovering in the low twenties. A person shows up and is interested in looking through the club's scopes. He's wearing a light winter parka, a wool hat, gloves, jeans and sneakers. After getting out of his heated car he's fine for about the first 15 minutes. After that, becoming increasingly chilled, it becomes impossible for him to sit for any long period of time, making observing difficult. After another 15 to 20 minutes he can't sit at all but must walk around to try to generate some heat in his body. He may try jumping up and down or even entering the warm room for an extended length of time but nothing helps. Within an hour of showing up at the observatory he's back in his car headed home because he can't take the cold.

After he leaves I go back to observing star clusters. I've already been at the observatory for a couple of hours and plan on staying for a couple of hours more before closing up. I'm not cold at all.

Here's some tips I've learned from many years of winter observing that will keep the authorities from having to dig your frozen carcass out of the ice next spring.

### 1) It's Colder at Night than in the Daytime.

This may seem obvious but many people don't realize that an outfit that is perfectly adequate to keep them warm on a day in January when the temperatures are in the low 40's will be inadequate to keep them warm later that night when the temperatures drop into the low 20's.

### 2) You May be Outside for Quite a While.

Again it may seem obvious that a light outfit that will keep you warm for 20 minutes will be inadequate to keep you warm if you plan on being outside for 3 hours.

### 3) Amateur Astronomy is not a Heat Producing Activity

If you're physically active outside during the winter your body will produce heat that will help to keep you warm. This will allow you to dress more lightly than you would have to otherwise. However, in a typical observing session you don't move around very much. You spend long periods seated at the eyepiece and your only movement may be to move the scope, look at a chart or change the eyepiece. This means that you will have to dress much warmer to observe than you would if you were shoveling snow or even just

walking.

### 4) Dress in Layers.

This is probably the most important piece of advice that I can give. The idea here is to trap the heat of your body next to your body and not allow it to leach out through your clothes. This is what I typically wear for a winter observing session. I start out with a layer of thermal long underwear and a pair of thin cotton sweat socks. On top of that I put on a pair of jeans, a flannel shirt and a pair of thick wool socks. A wool sweater goes over the shirt. Over the jeans goes a pair of Thinsulate ski pants. Finally I top all this off with a pair of thermally insulated boots and a down parka with a hood. Wool hat and gloves add the final touch. This may seem like overkill, it isn't. I've tried dressing lighter than this and end up becoming chilled after an hour or two. If it looks to be particularly cold out I may even add a SECOND pair of long underwear into the mix.

The only down side to dressing this way is that if you have to perform some physical activity you will be dressed too warmly. Typically I remove my parka to roll the roof off and put it back on when I'm done.

### 5) Dress the Bottom Half of Your Body as Thickly as You Dress the Top Half.

Many times I have seen people out at the observatory in the winter dressed in a thick parka, wool hat and gloves but only a thin pair of pants to cover their legs. This doesn't work. All the heat from your body just escapes through your legs. You need to dress as warmly on the bottom as you do on the top.

### 6) Protect your Joints.

Even if you are dressed warmly in layers heat from your body can escape at the joints where different parts of your clothing meet. These are the points where your boots meet the bottom of your pants, where your coat meets the top of your pants, where your gloves meet your sleeves and around your neck. Always make sure that one set of clothes is tucked into another (i.e. tuck pants into boots, tuck gloves into sleeves, etc.) in order to prevent this.

### 7) Protect your Extremities.

If you want to stay warm for a long time outside pay special attention to keeping your head, hands and feet warm. Most of the body's heat is lost through the head. Make sure to wear a wool hat and also make sure that your ears and neck are covered as well. The only thing exposed should be your face.

Several tons of ice cold concrete are an excellent heat sink. Make sure to wear at least two pairs of socks and insulated boots, if you have them.

One of the most irritating problems with trying to stay warm in the winter is trying to keep your hands warm. Nothing will chill you faster than having to grab an ice cold eyepiece with your bare hands to put into your scope. You need to have your hands covered but you also need the manual dexterity to adjust small screws and knobs on your scope and turn the pages of star atlases. This is a dilemma and constantly removing your gloves and putting them back on doesn't work either. I solved this problem several years ago by getting a pair of rag wool gloves that have the fingertips cut

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*(Cold Weather, continued from page 2)*

off. This gives me the dexterity I need to operate the equipment and keeps my hands warm at the same time. In addition I keep a pair of chemical hand warmer packs going in the pockets of my parka. Whenever I am not using my hands I keep them in these pockets for additional warmth.

#### 8) Having a Warm Drink Nearby Never Hurts

Having a thermos of hot chocolate or coffee available is a great way to add heat to your body. A hot mug also acts as an excellent impromptu hand warmer.

That's it. Follow this advice and you too will be able to brave the elements to observe the wonders of Orion, Canis Major and Gemini. If after doing all of the above you're still cold I have one final piece of advice if you want to observe the winter sky – Move to Florida!

Here's hoping that everybody in the AAAP has a Happy Holiday and a Happy, Healthy New Year!

Bill Murray

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*(Director, continued from page 1)*

Patrick is one of the collaborators in the creation of the Virtual Atlas. You can find this on the web at <http://www.stargazing.net/astropc/>. I have not tried this feature but I am anxious to. However, AAAP member Bob Vanderbei uses "Sky Charts" for locating the deep sky objects that he has been photographing with his CCD camera and 3.5" Questar.

What is really great about the Virtual Atlas is you can set the display to be oriented and/or inverted to match exactly what you can observe in your telescope.

It will show a Phase display even on 2D map (in case you don't have a 3D graphics card in your computer). A simple click on a crater identifies it on the screen and shows a detailed display window with many facts about the crater. If you have downloaded all the free images from the Lunar Orbiter Photographic Atlas of the Moon (see above) a quick click will bring up a high-resolution image of the identified crater. I started working with this program in order to predict the terminator crossing times for the craters Pitatus and Hesiodus so that I could watch for the light shaft that flows through the gap in the crater wall between them which was written up in Sky and Telescope a few years ago. It also came in handy when my daughter wanted more precise information about the moon phases for a school project. Of course, the most fun was discovering that there is actually an Alexander crater on the moon (see image below). Fun, at least until I read in the description that my fame on the moon is actually a "completely wrecked formation!" But then I learned all that on a completely cloudy night...

Kirk

**Deadline  
for the April Issue  
of the Sidereal Times  
March 28, 2003**

## Minutes of the AAAP Board Meeting February 6, 2003

Director Kirk Alexander called the meeting to order at 7:35 PM.

StarQuest chairman Don Monticello began a discussion about publicity for this year's Starquest. The dates for Starquest this year will be June 27-29. Don stated that last year 40 families attended Starquest and that 60 families attended in 2001. After a discussion the board agreed that Starquest flyers would be mailed to all 2002 attendees, 2001 attendees and astronomy clubs in the area. Cost for publicity last year was \$175. The general program format for this year's Starquest will be the same as last year. All publicity will be mailed out by April 1<sup>st</sup>. The cut off date for late registration is June 13<sup>th</sup>.

Observatory chairman Rex Parker reported that several people had experienced a problem with the door lock on the observatory being frozen, Rex had lubricated the lock to prevent this. Also the door to the computer room has become badly jammed due to the floor heaving up because of the very cold weather we've been having. Rex has a space heater on in the observatory to try to warm up the floor enough to un-jam the door. When the door is free it will be removed and cut shorter to eliminate this problem. A new list of keyholders and a public night duty roster will be published in the next issue of Sidereal Times. Public nights this year will run from the beginning of April to the end of October. Friday nights in March (the 7<sup>th</sup>, 14<sup>th</sup>, 21<sup>st</sup> and 28<sup>th</sup>) will be dedicated to keyholder training. A special training date will be held on Friday March 7<sup>th</sup> for all keyholder team leaders as a refresher for how to handle problems at the observatory.

A discussion was held about whether to hold a workshop for new telescope users at Starquest. No Definitive decision was reached.

Sidereal Times Editor Vic Belanger reported that the deadline for the March issue of ST would be Feb. 28<sup>th</sup>.

The meeting was adjourned at 8:45 PM.

Bill Murray

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## Minutes of the Regular meeting of the AAAP February 11, 2003

Director Kirk Alexander called the meeting to order at 8:00 PM. He began the meeting by sharing some exciting news. Earlier today, there had been a press conference on the Princeton campus announcing an important finding from the Wilkinson MAPS Satellite. This finding was that the age of the universe is 13.7 billion years old +/- 200 million years.

Program chairman Mark Lopez introduced the evening's speaker, Mr. George Dyson, who is a visitor at the Institute for Advanced Study. The title of Mr. Dyson's talk was "Project Orion". Mr Dyson gave a fascinating talk about the history of Project Orion, a top-secret United States project to build an interplanetary spaceship powered by nuclear bombs which was active from 1957 to 1965. The talk had personal significance to Mr. Dyson because his father, Dr. Freeman Dyson, was selected to be one of the passengers on board. The talk was well received.

*(Minutes, continued on page 4)*



*(Minutes, continued from page 3)*

Kirk reminded the club about the upcoming StarQuest event this summer to be held June 27-29, 2003.

Observatory Chair Rex Parker reported that the door to the computer room at the observatory is stuck and ways to resolve this were discussed briefly. The keyholder Duty Roster for 2003 was contained in the February issue of Sidereal Times. For March, the plan is to have the first Friday night (March 7) be devoted to current keyholders and will be held rain or shine. The subsequent three Friday nights (March 14, 21, 28) will be targeted to keyholder training and will be held weather permitting. After a couple of formal training sessions, keyholder trainees are to seek out further help from current keyholders in informal viewing sessions at the observatory.

Assistant Director and Webmaster John Miller mentioned that the "Announcements" section of the web site is updated frequently and includes information such as the keyholder training dates. He has also included information on star parties as well as daily updates of astronomy news.

Sidereal Times Editor Vic Belanger said the deadline for the next issue is February 28. Also, he explicitly encouraged contributions from other people who might be interested in submitting an article.

Larry Smith, who is helping to organize the next StarQuest, asked for assistance for the site committee which will be putting up signs and other activities.

Club membership has declined from 160 to about 120 members. Some discussion occurred about how to reverse this trend.

Press releases are going out electronically now and this seems to be going well.

Program Chair Mark Lopez mentioned that the March speaker will be our own Bill Murray and that in May, we will be hearing about MAPS.

The meeting was adjourned at 10:20 PM.

Lisa I. Yeh, Secretary

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### From The Program Chairman

The sky is a dark gray and it is a solid mass of clouds. More snow is on the way. Where is the sun? It seems that lately it hasn't been around too often. Spring is less than a month away and I am looking forward to the sunshine, warmer temperatures, and longer days. Speaking of the sun, have you ever wondered how astronomers figured out that the average distance to the sun is 98 million miles? Have you also ever wondered how ancient astronomers measured the distance to the sun? If you have pondered these questions, then this month's lecture should not be missed. Once again, we are very fortunate to have as a guest speaker, our own Bill Murray. Bill will answer these questions for us all in a talk that he has entitled "**A Plumb Line to the Sun: A History of Transits in Astronomy from Eratosthenes to the AAAP**". Bill will speak to us about the methods astronomers have used since ancient times to measure the distance to the Sun. In addition, he will also trace the history of attempts to measure the astronomical unit (the Earth-Sun distance) from the ancient Greeks through Copernicus, Kepler, Cassini, the Venus transit expeditions of the 1760's and 1880's up to the Mer-

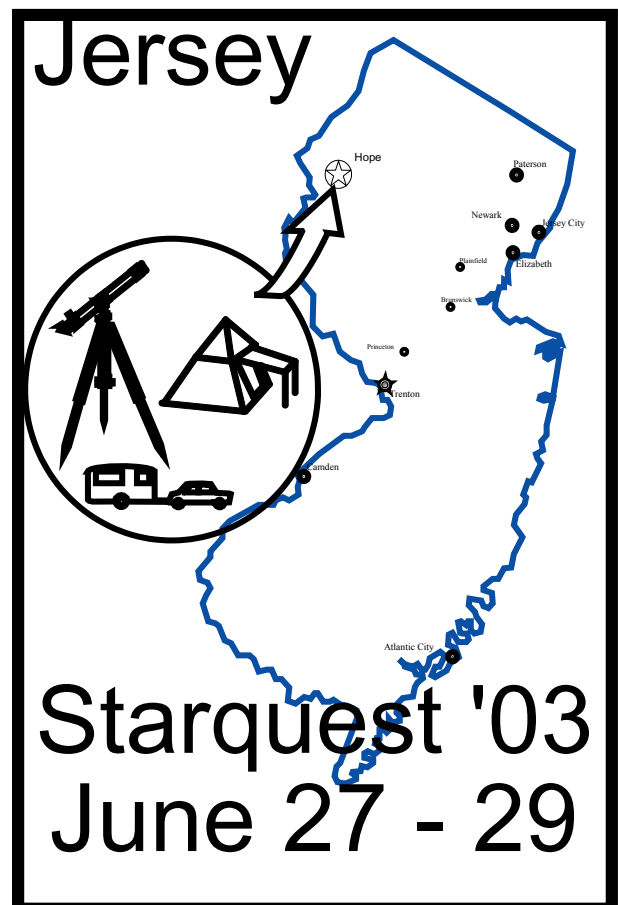
cury transit measurements made by John Church with the AAAP's 6 1/4" refractor in the 1970's. At the close of his talk, Bill will discuss the upcoming transit and opposition events that will take place later this year and next year.

Bill graduated from Iona College with a degree in Physics and Mathematics and he has been employed for eighteen years as a software engineer in the field of electron optics at Sarnoff Corporation in Princeton, NJ. He is also a part-time console operator at the NJ State Museum Planetarium in Trenton, NJ. In addition to his very active role in the AAAP, Bill is also a member of the Princeton University OSETI group and the Minor Planet Search Team both of which are located at the Fitzrandolph Observatory.

Bill's interest in astronomy goes back to his early teens. He has been a member of the AAAP for 17 years. During this time, he has served as Director, Assistant Director, Program Chairman, Observatory Chairman, Starquest Chairman, and Publisher of the Sidereal Times. In addition to all of his work with the club, Bill has been an avid astro-photographer. You can check out some of Bill's handiwork by going to the club's website. You won't be disappointed if you do.

If you don't know Bill Murray, this month's meeting and pre-meeting dinner will be a perfect opportunity to meet and talk to one of the most knowledgeable amateur astronomers that I have had the pleasure to meet. Besides being a top amateur astronomer, Bill is one of the nicest guys you would ever want to get to know. If you never have had the pleasure of meeting our guest speaker, or you are an old friend of Bill's, coming to the pre-meeting dinner would

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*(Program, continued from page 4)*

be a great way to start off your evening. As usual, dinner will take place on Tuesday evening, 6:00 PM, at The Annex Restaurant, 128 ½ Nassau St. If you would like to attend, please email me at [mal455@earthlink.net](mailto:mal455@earthlink.net) or telephone me at 609-393-2565 by Tuesday morning, March 11. I hope to see you there.

Note: The guest speaker for April is Robert Gendler. Rob is an expert astro-photographer and he will be showing us some of his best work. Mark your calendars. You won't want to miss this one. You can check out some of Rob's work by going to the club's website ([www.princetonastronomy.org](http://www.princetonastronomy.org)) and click on the link for guest speakers.

Mark Lopez

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### Claudius Ptolemaeus

Ptolemy, the great second century astronomer, worked at the Library of Alexandria. Thought to have lived between c. 100 and 178 (little is known of his actual life) authored the *Almagest*, a compilation of most of the astronomical knowledge of his time. He is known for his geocentric model of the universe which accounted for the retrograde motion of the observable planets. He actually built upon the work of Hipparchus (160-127 BCE), who was first to model the geocentric universe but struggled with an explanation of retrograde motion. Ptolemy also wrote extensively in geography, optics, and the now scientifically discredited study of astrology.

Earlier Greek scholars had envisioned a the more correct heliocentric universe but it was supplanted by religious philosophies



until the waning of the Inquisition and the release of Copernicus' writings after his death. Giordano Bruno and Galileo attempted to restore the heliocentric model to scholarly study earlier but were also suppressed by religious persecution in the last years of the Inquisition.

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March 2003

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