

Bays Mountain Astronomy Club

☞ *Next Meeting: May 3* ☞

REFLECTIONS

Greetings fellow star watchers, another month has come and gone. I know I was disappointed with the weather during March for the public StarWatches. Weather is one factor that we cannot control. I want to thank Joel, Bays Mountain Planetarium Intern, for his good planetarium shows presented to all that showed up for cloudy StarWatches.

April's meeting highlighted the planetarium show "Under the Milky Way." Our host was BMAC'er Jason Dorfman, Astronomer, Bays Mountain Park. This was one of the shows that Jason produced, just another example of the wonderful talented members in our club. After the planetarium show, this Month's constellation was "Coma Berenices" or Berenice's Hair, presented by Nate Wentzel, professor at Milligan College. This was a new constellation to me. I learned a lot from both of April's programs.

I hope that you are adding the constellations presented in the constellation quest section of our meetings to your viewing objects list. This year so far I have learned a lot about some of the favorite

BY WILLIAM TROXEL

constellations as well as new ones. I also want to encourage you to use a wonderful resource "Illustrated Guide to Astronomical Wonders" by Robert Bruce & Barbara Fritchman Thompson. Another good resource is www.constellation-guide.com.

Both have some good information to help with the understanding of the constellations. Following the presentations, we continued with the April business meeting inside the planetarium and our focus was on the upcoming Astronomy Day on April 20 at Bays Mountain. I want to get some pictures so that we can submit our effort to the Reflector, maybe get the club recognized. I would like for the club to start planning ahead for Astronomy Days in the future like we plan for StarFest each year. Astronomy Day programs could be one of the outreach events for the club. I hope that someone will take on the roll as team leader for this program, it could be a very great program for the club and the park in our effort to get more awareness to the public.

This year's theme is "Bringing Astronomy to the Masses." We



Calendar

Special Events

Jul. 13 6 p.m.; BMAC Annual pot-luck Picnic in the gazebo at Natural Tunnel State Park.

SunWatch

Every Sat. & Sun., 3 - 3:30 p.m.,

Mar. - Oct., weather permitting.

BMACers are always welcome to help.

BMAC Meetings

7 p.m., Discovery Theater

May 3 Dr. Joseph Pollock from the Appalachian State University Astronomy Department will speak on "Specifically Paired & Binary Asteroids." Const. Quest: Sally Hale - Ursa Minor the Small Bear.

June 7 Robin Byrne from Northeast State Community College will present "Where Am I? Finding Our Place in the Milky Way." Const. Quest: TBA.

offered four concept tables for the public to learn about astronomy. I am happy to report that our efforts toward Astronomy Day was an overall success this year. The totals for the events were 150 visitors to the Astronomy Day Concept tables, 110 for the extended SunWatch event and 85 for StarWatch. Over the next few weeks, we will be looking at the overall events from this Astronomy Day in order to make next year's event better. Hopefully, we can get a team of club members focusing toward future plans for upcoming Astronomy Days. Maybe this is the team you see yourself a part of, if it is let me know. A big thank you goes out to all the members that came out and shared our hobby with the public. I also want to thank the park staff for their support.

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STAR STUFF

BY TERRY ALFORD

Up until 5 or 6 years ago, I would attach a counterweight shaft to the long arm of a binocular mount by drilling into the wood and screwing on a hanger bolt (this is a bolt with wood threads on one end and regular machine threads on the other). Then a long coupling bolt would be attached and the counterweight rod could be threaded on. This worked pretty well except almost every time I drilled into the wood end grain of the red oak, the drill bit would wander off center. Sometimes the hole would not only be off center but canted at a slight angle. I marked the wood carefully and center punched the starter hole but that nasty end grain would usually do its thing.

One day a flyer from the local Woodcraft store arrived in the mail. Inside was an ad for self centering doweling jigs. Mmm... it looked like this could be an answer to my problem. Soon I visited the store and looked at several different sizes of doweling jigs. I chose the largest one on display, a "Pro Center" model made by the TASK company. It had aluminum jaws and a large steel clamping screw. Drill guide holes were "precision drilled" through hardened steel. The five drill hole sizes ranged from $\frac{1}{4}$

to $\frac{1}{2}$ -inches in $\frac{1}{16}$ -inch increments. This model would open to $5\frac{1}{2}$ inches so a precisely centered hole could be drilled in a 1x6 board or anything narrower. Eagerly I bought the jig and went

straight to my shop for a tryout. The aluminum jaws held the oak securely and a test hole was drilled. The hole was nice and straight but did not appear to be centered. What? I carefully measured the position of the hole and it was off by almost $\frac{1}{16}$ th inch. This was too far off for my intended use of the jig so I called the toll-free number on the package. I told the guy who answered what the situation was and asked if he could give me some guidance on adjusting the jig. His response was that it took special tools and I would need to send it back. It turned out

he was the company's owner and he/they paid for shipping both ways.

The jig came back in a little over a week. In it was a note from the guy I had talked to. He apologized for only being able to adjust the jig



to a precision of within .003 inch! I tried the jig again and it was v-e-r-y close. I put a few strips of metal mending tape (like that used on AC/heating ductwork) on one side and then got perfect results.

A self centering dowel jig was initially designed to drill the edge of boards to glue in wooden dowel pins to make planks into wide boards. But it is very useful for making a straight hole in the center of any piece of wood or metal that the jaws can clamp to. This includes wooden dowels as seen in the photo. I used this jig to make the sunfinder on my 60 mm refractor converted to a white light solar scope. FWIW I wished I had purchased a dowelling jig much earlier. As an aside, the easy way to drill a hole centered on the end of a dowel is to simply use a Forstner bit of the proper size and drill into a piece of scrap wood until the center point of the bit just pokes through. This hole will hold the dowel firmly and center the drill bit.



*HAPPY BIRTHDAY FRANK DRAKE**BY ROBIN BYRNE*

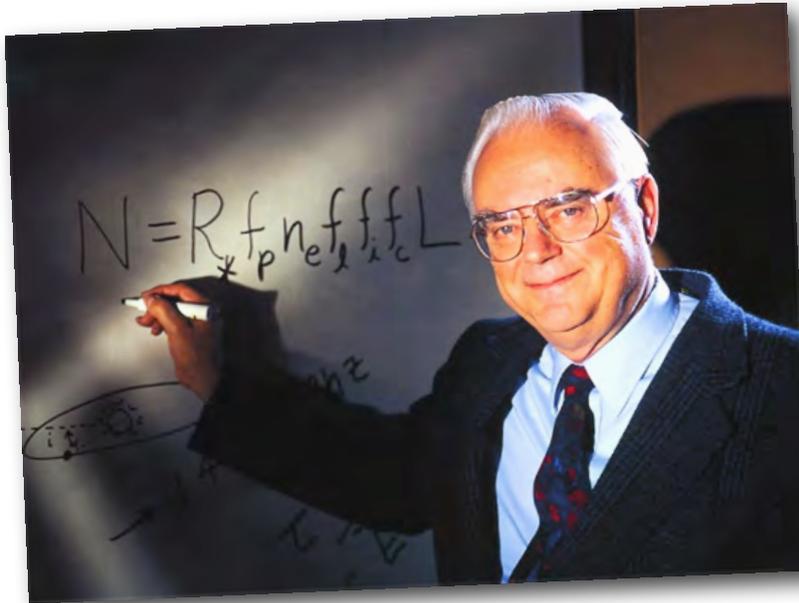
This month we celebrate the birthday of a man whose name has become synonymous with the search for extraterrestrial intelligence (SETI). Frank Drake was born May 29, 1930 in Chicago, Illinois. As early as age 8, he was already thinking about the possibility of life on other planets, but the religious atmosphere of his family prevented him from sharing that idea with anyone. Still, his scientific interests found expression through chemistry and electronics.

When it was time to go to college, Drake received a Navy Reserve Officer Training Corps scholarship to Cornell University. At Cornell, he majored in astronomy. In 1951, Otto Struve gave a lecture on campus about the possibility of extraterrestrial life. Drake felt vindicated, and his enthusiasm for pursuing evidence for life elsewhere was rekindled. Upon graduation, Drake fulfilled his Navy scholarship obligation with a tour of duty as an electronics officer on the USS Albany. Once free from the military, Drake went to graduate school at Harvard, where he received his doctorate in radio astronomy.

Drake's first professional position put his radio astronomy background to good use at the National Radio Astronomy Observatory (NRAO) in Green Bank, WV. He then moved on to

the Jet Propulsion Laboratory (JPL). During this time, Drake was using radio telescopes to observe Jupiter's ionosphere and magnetosphere.

In 1960, Drake finally began the area of research for which he will always be remembered. The goal of Project Ozma was to try to detect radio signals from another intelligent civilization. Using one of the radio telescopes at Green Bank, Drake chose two stars with characteristics similar to the Sun to observe: Tau



Frank Drake image from 66south.com.

Ceti and Epsilon Eridani. The hope was that since the stars are Sun-like, they would host planets that are Earth-like. Over the course of four months, Drake spent a total of 150 hours looking for some kind of signal. Although unsuccessful, Project Ozma is remembered as the first experiment to hunt for extraterrestrial life.

In 1961, Drake wondered what the odds were that intelligent life would arise on a planet and how plentiful would it be in our galaxy. To answer this, he set out to think of all the factors that would need to be in place for life to evolve to the point of having a technological means to send out a signal that we could detect. Among the factors considered were: the rate of star formation, how many stars have planets, how many planets would be conducive to life, how many of those would actually have life develop, what are the odds that the life will evolve to become intelligent, and of those, how many develop technology that can send a signal into space, and has enough time elapsed for that signal to reach Earth. Multiplying all of these factors together will then tell you how many civilizations we should expect to find. Now known as the Drake Equation, the answer you get is highly dependent on the assumptions made for each of the variables. Depending on what numbers you use, you can get results that range from only one technologically advanced planet in the galaxy (earth) to millions of such planets existing.

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NASA SPACE PLACE

Exploring the Water World by Diane K. Fisher

In some ways, we know more about Mars, Venus and the moon than we know about earth. That's because 70% of our solar system's watery blue planet is hidden under its ocean. The ocean contains about 98% of all the water on Earth. In total volume, it makes up more than 99% of the space inhabited by living creatures on the planet.

As dominant a feature as it is, the ocean—at least below a few tens of meters deep—is an alien world most of us seldom contemplate. But perhaps we should.

The ocean stores heat like a “fly wheel” for climate. Its huge capacity as a heat and water reservoir moderates the climate of Earth. Within this earth system, both the physical and biological processes of the ocean play a key role in the water cycle, the carbon cycle, and climate variability.

This great reservoir continuously exchanges heat, moisture, and carbon with the atmosphere, driving our weather patterns and influencing the slow, subtle changes in our climate.

The study of Earth and its ocean is a big part of NASA's mission.



Before satellites, the information we had about the ocean was pretty much “hit or miss,” with the only data collectors being ships, buoys, and instruments set adrift on the waves.

Now ocean-observing satellites measure surface topography, currents, waves, and winds.

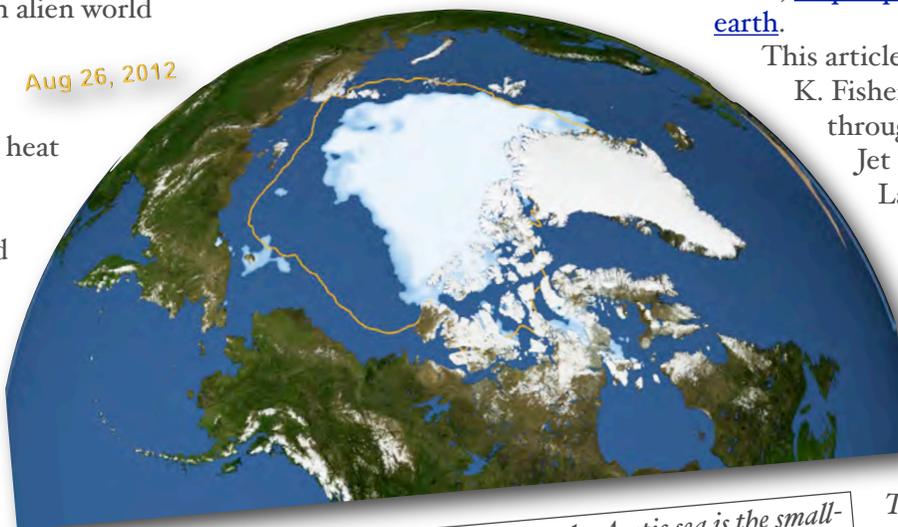
They monitor the health of phytoplankton, which live in the surface layer of the ocean and supply half the oxygen in the atmosphere. Satellites monitor the extent of Arctic sea ice so we can compare this important parameter with that of past years. Satellites also measure rainfall, the amount of sunlight

climate. In just a few months, one satellite can collect more information about the ocean than all the ships and buoys in the world have collected over the past 100 years!

NASA's Earth Science Division has launched many missions to planet earth. These satellites and other studies all help us understand how the atmosphere, the ocean, the land and life—including humans—all interact together.

Find out more about NASA's ocean studies at <http://science.nasa.gov/earth-science/oceanography>. Kids will have fun exploring our planet at The Space Place, <http://spaceplace.nasa.gov/earth>.

This article was written by Diane K. Fisher and provided through the courtesy of the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



This image from September 2012, shows that the Arctic sea is the smallest recorded since record keeping began in 1979. This image is from NASA's Scientific Visualization Studio at Goddard Space Flight Center.

reaching the sea, the temperature of the ocean's surface, and even its salinity!

Using remote sensing data and computer models, scientists can now investigate how the oceans affect the evolution of weather, hurricanes, and

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MISCELLANEOUS

Reflections**by William Troxel***(continued from page 1)*

We also got started on the planning for the annual picnic. We will be going back up to the Natural Tunnel State Park. The date for the event is July 13 at the gazebo. Greg is the leader for the planning of the event so updates will be given on the web site, bmastro and at the upcoming meetings. I want to send out a big thanks to Greg for his willingness to be the lead on this event. Our tradition is to have great pot-luck food and if the weather is on our side, we will be having a star party in which we welcome the campers in the park to come up and be a part of the program.

The May meeting will welcome our keynote speaker, Dr. Joseph Pollock from Appalachian State University. He will discuss specifically paired and binary asteroids. Sally Hale will be our constellation quest presenter on Ursa Minor, the small bear. Hope to see you at the meeting. Until next time, clear skies.

Happy Birthday**by Robin Byrne***(continued from page 3)*

In 1964, Drake became a faculty member at Cornell University. He would remain there until 1984, when he moved to the University of California at Santa Cruz. While here, he used radio telescopes to study the rotation rates of pulsars. It was also during this time that Cornell was involved in the construction of the radio telescope at Arecibo in Puerto Rico, which was to be named the National Astronomy and Ionospheric Center (NAIC). Drake was a key player in developing the radio dish and later became Director of the NAIC.

In 1972, Drake and Carl Sagan designed a plaque to be carried on the Pioneer spacecraft. On the plaque were images of a man and woman, our solar system's location relative to several known pulsars, and earth's location in the solar system. This would be our first message sent out to any alien civilization that may find it. In 1974, Drake created a digital message that carried similar information, and used the Arecibo telescope to send it out. Pointed toward the globular cluster M13, the message contained: a binary representation of the numbers 0 - 10, the atomic numbers of the elements found in DNA, a representation of the DNA double helix, a representation of a person with his height measured relative to a standard wavelength, a representation of our solar system, the relative sizes of the planets, and an indication of which planet sent the signal. In 1975, Drake was

Regular Contributors**WILLIAM TROXEL**

William is the current chair of the club. He serves as activities coordinator for a local retirement living community.

TERRY ALFORD

Terry is also a founding member since 1980 and has been chair many times, as well. He has worked as an astronomy lab instructor at ETSU since 2001.

ROBIN BYRNE

Robin has been writing the science history column since 1992 and was chair in 1997. She is an Associate Professor of Astronomy & Physics at Northeast State Community College (NSCC).

ADAM THANZ

Adam has been the Editor for almost all of the years since 1992. He is the Planetarium Director at Bays Mountain Park as well as an astronomy adjunct for NSCC.

involved in a similar project: the golden record to be carried by the Voyager spacecraft.

Frank Drake is still active in SETI today. He is an Emeritus Professor at UC Santa Cruz and serves on the Board of Trustees of the SETI Institute. Using the 40-inch Nickel telescope at Lick Observatory, Drake is involved in a project to search for optical signals that would indicate intelligent life elsewhere. Meanwhile, he continues to work on improving radio telescope designs to increase the chances of picking up an alien radio signal. Drake has also proposed that planets orbiting low mass red stars might be good candidates for hosting life. Given the vast number of these stars, should his hypothesis be correct, the odds of finding a habitable planet would increase tenfold.

Almost every experiment in the area of SETI can be linked to Frank Drake. If you want to mathematically prove life exists elsewhere or want to prove it does not, you will use the Drake Equation. Whether you are a firm believer that extraterrestrial life exists, or are strongly convinced that it does not, you cannot deny the impact Frank Drake has had upon this controversial idea. There is no way to separate Frank Drake from the idea of life elsewhere in the universe, and I think he would be quite pleased that this is the case.

References:

Frank Drake - Wikipedia

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Drake, Frank Donald (1930 -)

<http://www.daviddarling.info/encyclopedia/D/DrakeF.html>

Father of SETI Honored 50 Years After First Search for Alien Life Space.com; by Clara Moskowitz

<http://www.space.com/8952-father-seti-honored-50-years-search-alien-life.html>

Arecibo message - Wikipedia

http://en.wikipedia.org/wiki/Arecibo_message



Here we see only two of the many BMACers who helped out with Astronomy Day 2013. Terry Alford, above, and Jon Peters, right, are providing both H-alpha and white-light views of the sun to the over 100 visitors who came by.

photos by Robin Byrne

The Bays Mountain Astronomy Club



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Dues:

The Bays Mountain Astronomy Club requires annual dues for membership. It covers 12 months and is renewable at any time.

Rates:

\$16 /person/year

\$6 /additional family member

If you are a Park Association member, a 50% reduction in fees is applied.

Find out more at our website:

<http://www.baysmountain.com/astronomy/astronomy-club/>

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