Sunset Astronomical Society

# The Sunset *Gazette*

*Serving the Tri-Cities since 1975*

Volume 6, Issue 9 May, 2009

**Meeting information**

Meetings are generally in the theater in the Delta College Planetarium in Bay City. The meetings will usually be on the 2nd Friday of each month at 7:00 PM. Watch the newsletter for changes in dates and times. Membership is not required to participate in meetings and activities. See Page 6 for this month's meeting site.

**Membership Information**

**Student / Senior**: (17 years & younger, 65+ years)

1 year - $15

2 year - $20

**Regular:** (18+ years)

1 year - $20

2 year - $30

**Family**: 1 year - $25

2 year - $40

New Members receive a New Member Observing Kit at their first meeting, courtesy of SAS. Membership includes voting privileges, the newsletter and free admission into Delta College Planetarium shows.

**Subscription Information**

Subscription prices available at club rate with the purchase of individual or family membership.

"Sky and Telescope" Magazine:
1 year - $32.95 + Membership

2 year - $65.90

"Astronomy" Magazine:

1 year - $34.00 + Membership

2 year - $60.00 + Membership

## Reminder: Next SAS Meeting Elections!

## President's Message

Clear Skies, Astro-Enthusiasts! And we did have them for the AU-organized Messier Marathon this past Friday night, April 24th. Earlier in the day high haze and scattered lower clouds threatened to eradicate hope of seeing all but the brightest M-objects. Even with the bleak observing prospects, I joined sixteen others with about a dozen scopes at the boat launch at the end of Filion Road overlooking Saginaw Bay from the thumb. As the sky darkened after sunset we were overjoyed to see ALL the clouds disperse and were treated to crystal clear dark sky filled with stars and M-objects. Most participants used the Messier Score Cards I provided to check off each object as it was observed. I personally got one-third of the 100 objects - the most I've ever observed in one session. Many were familiar 'friends' but several I had never looked for before. I think the thing I enjoyed most was the conversation and excited shouts "Here's M-67" or a very common phrase, "Axel (Mellinger) has M-XX in his scope." We all shared views through our scopes and our verbal impressions. Even the rather strong wind did not chill the air nor dampen our spirits although we did have to hang onto our charts at times. It was a really fun observing session and I'm now a Messier Marathon enthusiast and will make it an annual event.

This month we have the annual SAS election of officers. I have chosen not to run for next year but we have a slate of volunteers for each of the positions. I want to thank my fellow officers Steve VanTol - VP and Webmaster and Martin Grasmann - Secretary and Newsletter Editor. Both have gone above and beyond their official duties to bring you a well-rounded program and excellent communications with you, our members. I also thank Garry Beckstrom, Bill Mitchell and the rest of the Planetarium organization for their generosity in hosting our meetings and providing opportunities for us to meet with the public, one of our goals. And finally, I want to thank Dale Sisson for his wonderful 'Constellation of the Month' presentations - one of the highlights of each meeting and for his spearheading the Astronomy Essay contest. I am particularly proud of the many ways that the leadership and members of the Sunset Astronomical Society and the Astronomical Unit of Michigan have worked and enjoyed together our Astronomical hobby over this last year and look forward to combining our efforts even more so in the future.

Peace and Clear Skies,

Bill Albe

## **ARE WE ALONE?** or

"The discovery of one-cell organisms on a distant planet in our solar system or beyond would have an impact as big as the Copernicus revolution"

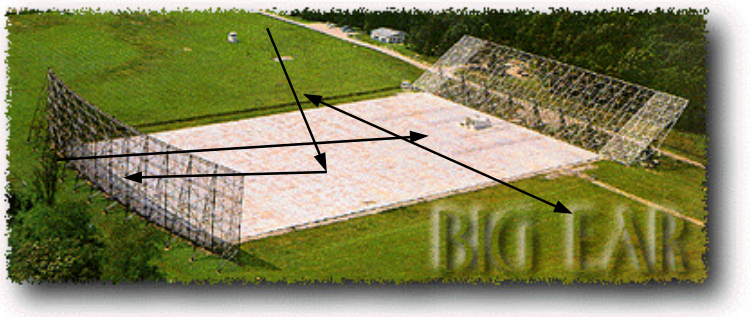
By Martin Grasmann. This is the 12th part of an extended summary of a lecture about Astrobiology that Dana Bachmann, SETI Institute/SOFIA-Ames gave on Wednesday, March 26th 2008 at the CMU.

In this part of our ongoing series we will look at the history of the search for intelligent life starting with Ozma, a pioneering SETI experiment (Search for Extra-Terrestrial Intelligence) started in 1960 by Cornell University astronomer Frank Drake and leading to modern day efforts and theories about the possibility of other intelligent life besides ourselves. The Ozma project was named after Princess Ozma, a character of the fictional land Oz by L. Frank Baum, and used a radio telescope with a diameter of 85 feet (26 meters) to examine the stars Epsilon Eridani and Tau Ceti at a 400 kHz band near around the near the 1.420 gigahertz frequency marker.

## **ARE WE ALONE?** continued

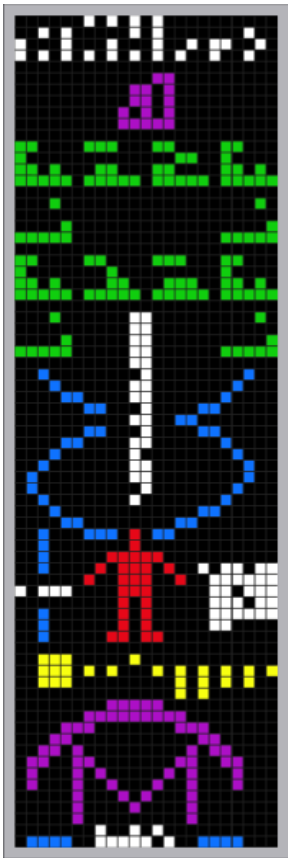
Epsilon Eridani and Tau Ceti were chosen because they were near-by, 10.5 respectively 11.9 light-years, Sun-like stars and it was assumed that they could harbor intelligent life. It was later found that Epsilon Eridani is indeed surrounded by an extensive disk of fine-grained dust, detected 1983 by NASA's infrared telescope IRAS. Two planets orbiting Epsilon Edina have so far been proposed but not 100% confirmed. The Ozma project invested ca 150 hours of intermittent observation during a four-month period but detected no recognizable signals. In a second attempt called Ozma II (1973 -76) more than 650 nearby Sun-like stars were investigated over a 4 year period with the same radio telescope.

Today the activities to detect intelligent extraterrestrial life are collectively named SETI and the general approach is to survey the sky (mainly with radio telescopes) to detect the existence of transmissions from a civilization on a distant planet. The US Government supported this approach early on but recently it has become primarily funded by private sources.




**History:** It all started with the Ozma project (see above) and the fist SETI conference took place at Green Bank radio observatory in 1961. It was this conference were Frank Drake presented his famous equation (Drake equation) to give an estimate of the number of intelligent civilizations in our galaxy (see Bill Albe's presentation last SAS meeting). The first continuous SETI program was carried out a omni directional antenna (a so called Kraus-style radio telescope) constructed by the Ohio State University (OSU). 360 feet wide, 500 feet long and 70 feet high it did not look like your usual dish like telescope (see left). It was build as a transit telescope where the flat primary reflects radio light towards the spherical secondary which focuses it towards a mobile focal carriage. (see arrows symbolizing incoming radio waves) The primary tilts North-South to select any object near the meridian, while the focal carriage moves East-West along railroad ties to track objects near transit. The OSU SETI program gained fame on August 15, 1977 when Dr. Jerry R. Ehman witnessed a startlingly strong signal received by the telescope. This signal, dubbed the Wow! Signal has not been detected again in several additional searches.

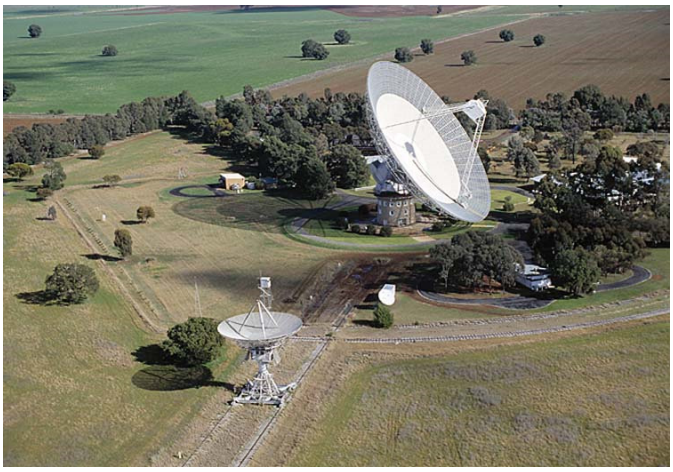
The "Cyclops Project" was a NSAS funded study of 1971 to build a giant array with 1,500 dishes to the enormous price tag of $10 billion US dollars. Apparently it was never build but the report issued a range of conclusions which even today have stood the test of time and formed the basis of much SETI work that followed. In short form these conclusions are: 1. Looking for or sending signals is tremendously cheaper than sending probes or building spaceships. 2. An expendable search system would start with our local stellar neighborhood and with better technology be expanded and the search carried farther into space until success is achieved or a new search strategy is initiated. 3. Microwaves are the best form of communication (least amount of energy) with the "microwave window"- frequencies from about 1 to 2 or 3 GHz being the best part of the microwave region. 4. The region between the spectral lines of hydrogen (1420 MHz) and the hydroxyl radical (1662 MHz) is especially suited for interstellar contact as these two emissions of the disassociation products of water would be familiar to all water-based life. 6. A total collecting areas of 100 or more square kilometers is technologically feasible when operated in the 1- to 3 GHz region. The proposed Cyclops system is not nearly this large, but there are no technological limits that would prevent its expansion to such a size. 7. Antennas of a few kilometers in diameter would allow microwave communication is possible over intergalactic distances, and high-speed communication over large interstellar distances. Thus rapid information transmission can occur once contact has been confirmed between two civilizations. 8. In the search phase receiving signals beamed at us by directive antennas (by other civilizations) are probably highly unlikely but should not be overlooked. Beamed signals can be radiated at relatively low powers races to as many as a thousand nearby likely stars and for very long times. Long range beacons set up by communicative races and intended to be detectable at any of the million or so likely stars within 1000 light-years, will probably be omni directional and very high powered. 9. The search will not a short-term one and will take years, perhaps decades and possibly centuries. This requires automation and long term funding = faith: "Faith that the quest is worth the effort, faith that man will survive to reap the benefits of success, and faith that other races are, and have been, equally curious and determined to expand their horizons. We are almost certainly not the first intelligent species to undertake the search. The first races to do so undoubtedly followed their listening phase with long transmission epochs, and so have later races to enter the search. Their perseverance will be our greatest asset in our beginning listening phase".



In 1974 the newly re-modeled Arecibo radio telescope (see left page) sent a message to the M13 globular star cluster ca 25,000 light years away. The reason to choose M13 was that its diameter of ca 30 arc seconds just covered the beam aperture of the telescope and that it was available at the time of the ceremony. The message consisted of 1679 binary digits and the entire transmission lasted 1679 seconds, so ca 1 bit was sent every second (see the pictogram of the binary message left. The original message did not contain color).

The next step in the SETI programs was to greatly improve the number of channels a radio telescope and its analyzers were able to observe at the same time. In 1982 a portable spectrum analyzer named "Suitcase SETI" was developed which had a capacity of 131,000 narrow band channels and was put into use in 1983 with the 26-meter Harvard/Smithsonian radio telescope at Harvard, Massachusetts. The name of the project was "Sentinel" and continued into 1985. But even this large number of channels were not enough to carry out a detail search of the sky at a fast rate so Suitcase SETI was followed in 1985 by Project "META", for "Megachannel Extra-Terrestrial Assay". This spectrum analyzer had a capacity of 8.4 million channels and a channel resolution of 0.05 hertz and it used frequency Doppler shift to distinguish between earthly radio sources and those of extraterrestrial origin. On META followed BETA for "Billion-channel ExtraTerrestrial Assay", and it started operation on October 30, 1995. The technology of BETA allowed to scan between the microwave spectrum from 1.400 to 1.720 gigahertz and to receive 250 million simultaneous channels with a resolution of 0.5 hertz per channel. An important capability of the BETA search was rapid and automatic re-observation of candidate signals, achieved by observing the sky with two adjacent beams, one slightly to the east and the other slightly to the west. On March 23, 1999 disaster struck and the 26-meter radio telescope on which Sentinel, META and BETA were based was blown over by strong winds and seriously damaged. This forced the BETA project to cease operation.

Some of you may still remember the controversy to which the U.S. government funded SETI program, the "Microwave Observing Program (MOP)" lead in Congress 1992/93. This NASA program should have been a "targeted search" of 800 specific nearby stars as well as a general "sky survey" and was to be performed with the 43-meter dish at Green Bank, the big Arecibo dish as well as the NASA Deep Space Network. After being ridiculed in the Congress the program was canceled a year after its start. The "Phoenix" program was the resurrection of the program by the nonprofit SETI Institute of Mountain View, California and backed by private sources of funding. Roughly 1,000 nearby Sun-like stars were observed between 1995 through March 2004 with the 64-meter Parkes radio telescope in Australia (featured prominently in the movie "The Dish", see right), the Arecibo Observatory and the 43 m Telescope of the National Radio Astronomy Observatory in West Virginia. 800 stars were observed over the available channels in the frequency range from 1200 to 3000 MHz. The search was sensitive enough to pick up transmitters with 1 GW to a distance of about 200 light years. The cancellation of NASA's MOP program sparked another non-profit organization, The SETI League, Inc. It has 1500 members in 62 countries and is mainly a grass-roots alliance of amateur and professional radio astronomers. This organization pioneered the conversion of 3 - 5 meter diameter backyard satellite TV dishes into research-grade radio telescopes of modest sensitivity therefore greatly reducing cost and effort. This network of small amateur-built radio telescopes are organized under the umbrella project Argus, an all-sky survey seeking to achieve real-time coverage of the entire sky. The instruments typically exhibit a sensitivity on the order of 10–23 Watts/square meter, which is equivalent to that achieved by the OSA Big Ear radio telescope in 1977.



You certainly also have heard of SETI@home, the extremely popular volunteer computing project that was launched by U.C. Berkeley in May 1999 and where any individual can become involved with SETI research. Just download and run the SETI@home software package, which then runs signal analysis on a "work unit" of data recorded from the central 2.5 MHz wide band of the SERENDIP IV instrument. The over 5 million computers currently used by SETI@home achieve an average throughput of 387 TeraFLOPS making it equivalent to the second fastest supercomputer on Earth. The radio source SHGb02+14a is the most interesting signal analyzed to date.

The next parts will talk more about SETI, take a closer look at the Drake equation, the Fermi paradox, the Kardashev rating of civilizations, von Neuman machines, Dyson spheres and the possibility of interstellar travel. Interested? Then watch this space! The next parts of this gripping story of 'Are We Alone?' will follow in the next issues of the Sunset *Gazette*!

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SUNSET ASTRONOMICAL SOCIETY
THE SUNSET GAZETTE
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This issue can now be accessed in color on the website of the SAS!!!

## SAS Meeting

**May 8, 2009**

**Delta College Planetarium Theater**

7:00 Welcome, new members

7:10 **Dale Sisson's**

**Constellation of the month**

**"Canes Venatici"**

**Dick Van Effen**

**"THE APOLLO LANDING SITES"**

Dick Van Effen will give us a tour of the six Apollo landing sites and what can be seen of them through a good telescope.

**Break:** Refreshments served

**Elections!**

**9:00 Don't forget it's the first Friday of the month, so weather permitting it's Public Observing at the Planetarium**

## UPCOMING EVENTS

**May 9:** Full Moon.

**May 17:** Last quarter Moon. Shadows of Io and Callisto are visible simultaneously on Jupiter from 3:56 to 5:16 EDT. Moon roughly 3° left of Jupiter.

**May 20:** In the early morning Jupiter passes 4' south of 5.1 mag Mu Capricorni and just 0.6° you will find 8th mag Neptune.

**May 21:** The waning crescent Moon forms a 6° triangle with Venus and the much fainter Mars.

**May 24:** New Moon.

**May 26:** In the early morning Jupiter passes less than 25' south of 7.9 mag Neptune. You will need a telescope!

**May 27:** Castor and Pollux form an arc above the western horizon 1 to 1.5 hours after sunset.

**May 29 - 30:** The Moon is about 5° below Regulus on 29th and 8° below Saturn on the 30th.

**May 6:** Evening/Night: Moon occultes 1 mag Antares aa 10:30 pm EDT. Reapearance at ca 11:35 pm EDT

**May 7:** Full Moon

## UPCOMING MEETINGS

**Supporting the International Year of Astronomy 2009:**

**First Friday of each month: Public Observing at the Planetarium**

**May 1 - 31:** Possible Star Party at the 30" Observatory of Garry Beckstrom. Weather permitting on short notice.

**If you are interested in presenting to our club, please contact**

**Bill Albe: (989) 835-4142**