

Greg Smith – editor

**Volume 26, No.9
January 2021**

**Program: "The Star of Bethlehem:
What was it?"**

**Meeting: January 20, 2021
Online at 7:00 p m**

A New Look at Mars.

All the news is not bleak. This will be a year of intense exploration of Mars.

Haven't we explored Mars enough? Heck, we have hardly even started.

First there are three missions to Mars during the first half of the year. First is the orbiter launched by the United Arab Emirates will get to the red Planet in February. Its mission is to do extensive examination of the Martian atmosphere and seasonal weather cycles and how the weather differs in the various parts of Mars.

This will be the first non-western world nation to send a space craft to Mars. This may not seem to some as a big deal. But it is. This is the first non-super- power to step into the space exploration club. This opens the door for other nations to join.

Next comes the Chinese rover Tianwen-1 arriving also in early February. This mission is a two-fer. First is the orbiter which carries the rover. It will examine the surface and atmosphere of Mars for two to three months before sending the lander and its rover to the surface.

The US is the only nation to have successful long term survival of its orbiters,

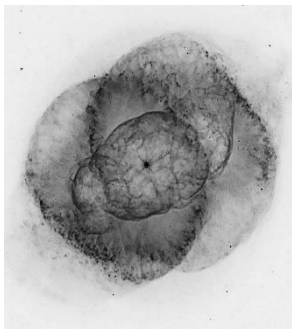
landers, and rovers. If the Chinese success of lunar rovers and landers can be repeated, they will join the US in having accomplished one of the hardest jobs of planetary exploration, getting a craft on the Martian surface and have it function for a longer period of time.

Then on February 18th the US rover Perseverance lands and begin its exploration of Mars.

What is unique is that there is a drone helicopter that will test the ability to fly in the Martian atmosphere. The rover will also create caches of rocks to be picked up at a later date to be brought back to Earth for examination. A coring drill is also included to get samples of below surface soils. Another job for the rover is to see if it can separate oxygen from the atmosphere to supply future human explorers with a fresh supply of breathable air.

There is much to look forward to this year.

**Every Day is a Star Filled Day,
Every Night is a Starry Night**



ET Committed Suicide?



The Milky Way is probably full of dead civilizations.

By Rafi Letzter

Most of the alien civilizations that ever dotted our galaxy have probably killed themselves off already.

That's the takeaway of a new study, published Dec. 14 to the arXiv database, which used modern astronomy and statistical modeling to map the emergence and death of intelligent life in time and space across the Milky Way. Their results amount to a more precise 2020 update of a famous equation that Search for Extraterrestrial Intelligence founder Frank Drake wrote in 1961. The Drake equation, popularized by physicist Carl Sagan in his "Cosmos" miniseries, relied on a number of mystery variables — like the prevalence of planets in the universe, then an open question.

This new paper, authored by three Caltech physicists and one high school student, is much more practical. It says where and when life is most likely to occur in the Milky Way, and identifies the most important factor affecting its prevalence: intelligent creatures' tendency toward self-annihilation.

Since Carl Sagan's time, there's been lots of research," said study co-author Jonathan H. Jiang, an astrophysicist at NASA's Jet Propulsion Laboratory at Caltech. "Especially since the Hubble Space Telescope and Kepler Space Telescope, we have lots of knowledge about the densities [of gas and stars] in the Milky Way galaxy and star formation rates and exoplanet formation ... and the occurrence rate of supernova explosions. We actually know some of the numbers [that were mysteries at the time of the famous 'Cosmos' episode]."

The authors looked at a range of factors presumed to influence the development of intelligent life, such as the prevalence of sunlike stars harboring Earth-like planets; the frequency of deadly, radiation-blasting supernovas; the probability of and time necessary for intelligent life to evolve if conditions are right; and the possible tendency of advanced civilizations to destroy themselves.

Modeling the evolution of the Milky Way over time with those factors in mind, they found that the probability of life emerging based on known factors peaked about 13,000 light-years from the galactic center and 8 billion years after the galaxy formed. Earth, by comparison, is about 25,000 light-years from the galactic center, and human civilization arose on the planet's surface about 13.5 billion years after the Milky Way formed (though simple life emerged soon after the planet formed.)

In other words, we're likely a frontier civilization in terms of galactic geography and relative latecomers to the self-aware Milky Way inhabitant scene. But assuming life does arise reasonably often and eventually becomes intelligent, there are probably other civilizations out there — mostly clustered around that 13,000-light-year band, mostly due to the prevalence of sunlike stars there. Most of these other civilizations that still exist in the galaxy today are likely young, due to the probability that intelligent life is fairly likely to eradicate itself over long timescales. Even if the galaxy reached its civilizational peak more than 5 billion years ago, most of the civilizations that were around then have likely self-annihilated, the researchers found .

This last bit is the most uncertain variable in the paper; how often do civilizations kill themselves? But it's also the most important in determining how widespread civilization is, the researchers found. Even an extraordinarily low chance of a given civilization wiping itself out in any given century — say, via nuclear holocaust or runaway climate change — would mean that the overwhelming majority of peak Milky Way civilizations are already gone.

The paper has been submitted to a journal for publication and is awaiting peer review.
Originally published on Live Science.

Minutes of the December Meeting

Ted Gruber opened the meeting at 7pm and welcomed the zoom attendees. He then introduced Greg Cermak, who has presented many time previously.

His of "Ocean Worlds exploration by NASA" was detailed examination of how we are going to be searching the ice covered worlds of Enceladus, Europa, Ganymede, and Callisto. The discovery of life forms on Earth that do not use sunlight and live hear heat vents on the bottoms of the ocean, give rise to the hope that life may be found in the seas of these dark sunless oceans of the solar system.

There is much more to explore in the dark depths of oceans, here on Earth and the icy worlds of the solar system.

Ted was not able to personally give the star report, so it was to be posted on the website.

It was hoped that we could see the conjunction of Jupiter and Saturn, but the weather was not cooperating.

☞ January 2021 Meeting ☞

DATE: **Wednesday January 20, 2021**
TIME: 7:00pm
PLACE: Your Laptop / Tablet / or Smartphone.

A **Zoom** enabled meeting

PROGRAM: **"The Star of Bethlehem: What was it?"**
Presented by Mark Thorson

Drinks : Your Choice
Snacks : Whatever is in your Cupboards

Friends of Galileo Club Officers

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Next Month's Newsletter Deadline

The deadline for items in next month's newsletter is:
Wednesday: seven days before next meeting.

Please feel free to send in your thoughts and experiences about your astronomical adventures.

Submit your material by E-mail to: gryth@msn.com

Greg Smith
 1622 22nd Ave
 Longview, WA

