



# SearchLites

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**The Quarterly Newsletter of The SETI League, Inc.**

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## **Raising a Virtual Glass**

**by H. Paul Shuch, Executive Director Emeritus**

As autumn approaches and the days grow short in the Northern Hemisphere, your SETI League begins to take stock of this unusual year we have all been living through. The COVID-19 pandemic has definitely changed the way we operate. Working from home has become the norm for all of us, as we have had to become accustomed to social distancing and wearing of masks in public. We are beginning to find new ways to collaborate, and perhaps to suspect that we may never be able to return to life as we previously knew it. How can there possibly be a silver lining to these unexpected storm clouds?

If any good has come out of all this turmoil, it might be that we have all been dragged, kicking and screaming, into the twenty-first century. We may lament the lack of in-person scientific meetings and conferences, but this has not deterred us from maintaining contact with our colleagues worldwide.

Certainly, the pandemic has changed the way this contact is achieved. We have been forced to adopt and embrace technologies that we had previously scarcely heard of. Zoom meetings, teleconferences, and webinars are now the mainstay of global collaboration, a reality which is likely to sustain long after the virus subsides. And, truth be told, few of us miss the rigors of physical travel! It is a relief to sit comfortably at our desks, a cup of our favorite beverage in hand, and discuss matters great and small with our extended families around the globe.

For SETI science in particular, with its emphasis on electromagnetic communication across vast distances, this seems a natural turn of events. We SETIzens have always been among the first of our species to embrace new technologies. We are adaptable, and that is our greatest strength.

The SETI League would not even exist but for the existence of the Internet. When we first contemplated a global, coordinated search effort, we realized that this emerging reality would enable a new type of collaboration, in which physical distance was no longer a barrier. Data and designs shared by digital means meant that nobody would ever again feel isolated from his or her colleagues.

And yet, the present isolation still gnaws at us. We miss the firm handshake, the fond embrace, the glass raised in solidarity, the toast to better times. And so, The SETI League now raises a virtual glass to you, our hundreds of members in dozens of countries, who have kept our dream alive, our efforts vital, and our optimism unbounded. May we meet again in the flesh, some day. May we enjoy meetings and conferences and celebrations of our upcoming successes, and may the technology which we all embrace help us to transcend our present isolation.

Yours for SETI Success, Paul

**Guest Editorial:**

**Life As We Know It**

by Dan Duda

from the May, 2020 issue of Penn Central,  
the monthly newsletter of Central PA  
Mensa, used by permission

*I have steadily endeavored to keep my mind free so  
as to give up any hypothesis, however much be-  
loved, as soon as facts are shown to be opposed to  
it.*  
Charles Darwin

Darwin had a great idea. But maybe he didn't extend it far enough. He said that life evolves in response to the environment in which it finds itself. Those who are "fittest" to address the challenges of their environment are the most likely to succeed and thrive. And, importantly, the ability to adjust to changes in the environment allows a species to prosper over time.

Let's apply that concept to the search for extra-terrestrial intelligence. We feel that our earthly environment is special. Some say it was "designed" specifically for us. But Darwin's idea turned that upside down. He felt that we developed to fit the environment.

I'm fascinated by this wild idea that the universe itself favors life. In fact, it might be that the universe is a conscious entity that somehow encourages the generation of life (and perhaps sentient life) throughout its domain (whatever that is).

Now, let's put all that together into a question. Could the universe be encouraging life to spring up in environments that we label as hostile, or downright impossible? Remember, Life As We Know It (LAWKI) sprang from the environment in which we find ourselves. Maybe it's not so much that the environment was generated for us, but rather that we evolved in response to the environment that we inherited.

Right here on Earth we find life in surprising places, like the hot and poisonous vents at the bottom of the ocean; or in glaciers frozen for millennia; or just below the surface of tundra plains in Siberia; etc. As for life elsewhere in the universe, we

could be making a big mistake by looking only for creatures like us (LAWKI). In fact, that sounds egotistical to me (or anthropomorphic, if you prefer).

The universe may very well have encouraged life to form based on a wide range of environments totally different, even hostile to us. The New Horizons Probe, for example, recently discovered what is believed to be tholins on Pluto. Tholins are complex carbon chains made when ultraviolet light strikes carbon-rich molecules like methane or ethane. Carl Sagan named the substance in his research to see how life may have started on Earth.

I had the great privilege a few years back of debating this topic with Neil DeGrasse Tyson at Millersville University. He stuck with his LAWKI argument at the time. But in recent television appearances he seems to have softened his perspective somewhat, allowing that we might want to broaden our search criteria.

Like moths to a flame, scientists are drawn to "classical" solutions to most enigmas. In other words, they prefer solutions that land close to their familiar range, and that works well in most instances. Talk about "unfamiliar"; Einstein was never awarded a Nobel Prize for his huge revolution in science - relativity, which rewrote our understanding of reality. His colleagues just could not bring themselves to take seriously an idea so distant from their comfort zone.

Likewise, we tend to look for familiar forms of life, and maybe sentience, elsewhere in the universe. This ignores an ocean of possibilities for the forms that life might take in different environments. In the words of Einstein "Blind belief in authority is the greatest enemy of truth." And the most significant advances in science and technology tend to be the ones that break the rules of authority at the time. Just ask Darwin.

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## Hubble Turns Thirty

by Seth Shostak

Senior Astronomer, SETI Institute

From SETI Institute *Journey* eNewsletter,  
27 April 2020, used by permission

It was never the world's biggest telescope, and it can't see as far as some. But for the public, the Hubble Space Telescope is undoubtedly the most famous astronomical instrument ever. True, most people couldn't tell you the first thing about Edwin Hubble. But all have seen the spectacular photos made with his optical namesake. It's plausible to claim that this orbiting spyglass has done as much to spur interest in science as to reveal the secrets of the cosmos.

Still, the now-famous telescope's first months were inauspicious. On April 26, 1990 it was gently set into orbit from the cargo bay of the space shuttle *Discovery*. For the next few weeks, it underwent equipment checks and efforts to refine the focus. By late May, preliminary photos showed that the imagery was about twice as sharp as any ground-based telescopes. That may sound cheery, but in fact fell far short of expectations.

Something was wrong. For days HST scientists futzied around trying to sharpen the pictures made by the 300-mile high instrument. Then one morning as I sat at a desk at the State University of Groningen, a fellow astronomer charged into the office shouting "Hubble is [expletive]!"

Bad news, and soon the astronomical community realized that the 95-inch primary mirror had an optical defect known as spherical aberration – the surface was wrongly shaped. Of course you couldn't tell by looking at it: The error amounted to two percent the width of a human hair.

Overnight, NASA's premier astronomical instrument, decades in the making, became an embarrassment and a joke. In the satiric 1991 movie *Naked Gun 2-1/2*, a photo of the HST could be seen hanging on the wall of the "Loser's Bar" alongside pictures of the Edsel, the airship Hindenburg, and other notable debacles. A low point.

## Making repairs

By the end of 1993, space shuttle astronauts taking part in the first Hubble servicing mission had installed a device made by the Ball Aerospace Corporation called COSTAR (a shorter way to say Corrective Optics Space Telescope Axial Replacement.) It was described at the time as "contact lenses" for Hubble. In addition, a separate instrument, the Wide Field Planetary Camera 2, was installed. There was no simple contact lens fix for this, Hubble's principal imaging device. The shuttle astronauts replaced it with a new model the size of a workbench, quickly constructed at the Jet Propulsion Laboratory.

SETI Institute astronomer Bill Sparks was part of the team waiting to see what WFPC2 would do as 1994 began. Staring at screens in HST's Baltimore headquarters, he and the crowd held its collective breath as the first image from the refitted telescope came up.

"It had nothing in it," recalls Sparks. "My mind was racing: 'I checked that a thousand times' I thought. But before I fainted away, the correct image appeared on the screen, and it was one of those OMG moments. It was sharp and detailed."

"In the blink of an eye, the world changed, and we knew this was special. That picture was on the cover of *Time* Magazine, and since then Hubble images have become part of everyday life." Most of the famous ones were made with the replacement WFPC.

The HST was intended to do cosmology research; to measure how fast the universe is expanding and investigate how galaxies form. It did that work of course, but as with all new astronomical instruments its greatest triumphs were discovering the unexpected – such as evidence that the cosmos is suffused with dark energy.

The drumbeat of Hubble's triumphs has been incessant, not because the telescope is large, but because – despite its unlucky beginnings – it's sharp. Earth's turbulent atmosphere inevitably blurs the images made with any instrument on the ground, even if that ground is high up on a mountain. Hubble's vision is typically ten times better than its ter-

restrial brethren. What it lacks in aperture, it makes up in location.

Thirty years later, Hubble, slightly hamstrung by the aging gyroscopes that stabilize its pointing, is still doing top-drawer science. It's likely to continue to delight astronomers and the public for another decade or two. But a year from now, its successor – the James Webb Space Telescope – will be boosted into high orbit. Unlike Hubble, the JWST will operate at infrared wavelengths. This will permit it to more effectively look to greater distance (the expansion of the universe shifts all light and radio to longer wavelengths) and probe the universe's early history.

Yes, JWST will be more sensitive and in many ways more ambitious than its forebear. But Hubble will always have the right of progenitor. It is one of science's immortals. ❖



SETI League members are encouraged to nominate SETI-relevant websites for our monthly SETI SuperStar Award. Nominating emails to our Awards Committee may be sent to: [Awards\\_at\\_setileague\\_dot\\_org](mailto:Awards_at_setileague_dot_org). Please be sure to indicate the URL of the candidate website you are nominating, and a brief explanation as to why you consider the site worthy of recognition.



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## Event Horizon

SearchLites readers are apprised of the following conferences and meetings at which SETI-related information will be us at [info@setileague.org](mailto:info@setileague.org), to obtain further details. Members are also encouraged to send in information about upcoming events of which we may be unaware.

**August 29 - September 5, 2020:** International Union of Radio Science General Assembly and Scientific Symposium, Rome, Italy. **Postponed due to COVID-19 emergency presented**

**October 12 - 16, 2020:** 71st International Astronautical Congress, Dubai, United Arab Emirates. **Postponed due to COVID-19 emergency**

**October 15 - 18, 2020:** Microwave Update, Sterling, VA. **Canceled due to COVID-19 emergency**

**October 16 - 18, 2020:** Capclave, Rockville, MD. **Canceled due to COVID-19 emergency**

**November 20 - 22, 2020:** Philcon 2020, Cherry Hill, NJ. **Canceled due to COVID-19 emergency**

**January 28 - February 4, 2021:** 43rd COSPAR Scientific Assembly, Sydney Australia.

**April 18, 2021, 1300 EDT:** Twenty-Seventh SETI League Annual Membership Meeting, Little Ferry, NJ.

**June 21 - 24, 2021:** Penn State SETI Symposium, State College, PA.

**August 25 - 29, 2021:** 79th World Science Fiction Convention, Washington, DC.

**October 25 - 29, 2021:** 71st International Astronautical Congress, Dubai, United Arab Emirates.

**2022 (dates to be announced):** 72nd International Astronautical Congress, Paris, France.

**2023 (dates to be announced):** 73rd International Astronautical Congress, Baku, Azerbaijan. ❖



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