



SearchLites

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The Quarterly Newsletter of The SETI League, Inc.

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Making the Tough Decisions

It's deceptively easy to run a nonprofit organization during good times. When the economy is booming, and the world is at peace, all one need do is identify a cause, articulate a worthy goal, assemble an enthusiastic team, give them a push in the right direction, and sit back, basking in the glory of their accomplishments. That's how it was with The SETI League during our first half-dozen years. The success of our Project Argus launch, hardware and software projects, moon-bounce beacon, SETICon symposia, and even the Very Small Array development all occurred relatively painlessly. You, our members, made your Executive Director look very good indeed.

Running the show during times of global conflict and general economic slowdown is another matter altogether. And, unfortunately, that's where we've been for the past year or so. Suddenly, those of us tasked with making policy decisions find ourselves agonizing over the really tough questions of what programs to retain, what benefits to cut, and which worthy efforts to sacrifice so that others might survive.

The SETI League's first casualty in this triage process was the monthly press release. For nearly eight years, we have been sending hard-copy announcements via post to seven hundred journalists worldwide, keeping the public abreast of our efforts and accomplishments. This has been beneficial in terms of publicizing the SETI enterprise. But printing and postage costs have escalated of late, making this practice a luxury we can ill afford. Fortunately, most media outlets today enjoy email and internet access, so we are still able to issue monthly press releases, by making the transition to electronic delivery. This change will save us several hundred dollars per month of your generously contributed dues, with (one hopes) little negative impact.

Technology similarly had a hand in our next economizing move. We recently established <<http://www.setileague.org/members>> as a password-protected "Members Only" section on our website. We'll be sending you a password with your next membership renewal. Now, we have a more economical way to distribute such proprietary material as our annual membership roster (which costs over \$1000 of *your* money to print and post), as well, possibly, as future issues of *SearchLites*, our quarterly newsletter. Those members lacking access to the Website will, of course, be given the option of continuing to receive such material in the mail. But as the technology becomes more pervasive, I can foresee a time when we need no longer spend our limited resources killing trees and shipping their remains around the world.

Our next such decision was a little more painful. Since the inception of our League, we have issued twelve-month memberships, with everybody's term expiring on the anniversary of joining or last renewing. Thus, we have been sending out renewal notices and processing responses year-round, which has proved administratively burdensome. In order to stretch our organization's limited resources by streamlining operations and reducing overhead, we recently made the difficult decision to transition SETI League memberships to a calendar-year basis. It has been my intention to make this process as painless as possible. Your SETI League is striving to ensure that no member will be financially disadvantaged in the transition.

Effective immediately, all new and renewing memberships processed in January through April will be at full dues, and will expire at the end of the year. Those processed in May through August are invited to remit *half* the normal dues (or such other amount as the member feels to be fair and equitable), for expiration at the end of the year. Members joining or renewing in September through December will pay the normal dues, with their memberships extended to expire at the end of the *following* year. This is detailed in our latest online membership application form, as well as in the Policy Manual posted to our website. It is my hope that, by 31 December 2003, all SETI League membership expirations will thus be synchronized with the secular calendar.

You'll notice that a dues increase (which has never occurred in the history of The SETI League) is *not* one of the options on the table. If we are struggling, it is not because you, our members, have been anything less than generous. It behooves us all, in difficult times, to do more with less. Thus, any suggestions which you may have will be very well received, and much appreciated.

SETI League Launches Free Web-Based Journal

Contact In Context Covers the Latest in Astrobiology and SETI

The SETI League, Inc., grassroots leader in the privatized search for life in space, is pleased to announce *Contact In Context*, a new peer-reviewed, web-based academic journal intended as a scientific forum for research in astrobiology and in the search for intelligent life in the universe. *Contact In Context* will cover these disciplines, in the areas of microwave spectrometry, optical spectrometry, electrical engineering, technology development and assessment studies, chemistry, physics, mathematics, and statistics. Papers on SETI-related hardware, software, search strategies, and philosophy are also welcome.

Articles differ in scope and focus, but are intended for researchers in SETI and astrobiology, resource professionals, and scientists in general. *Contact In Context* encourages submissions of research articles, research reviews, meeting announcements, and book reviews on all topics related to SETI and astrobiology. The journal is published semiannually by the SETI League, and is distributed without charge through the World Wide Web. The first issue went online in July, 2002

Contact in Context is launched under the guidance of two distinguished academics, Editor-In-Chief Prof. Robert Lodder of the University of Kentucky (USA), and Editor Dr. Allen Tough, Professor Emeritus, University of Toronto (Canada). Both Lodder and Tough serve on The SETI League's Strategic Planning Committee, where the need for an online SETI journal was first suggested. Sponsorship of *Contact In Context* by The SETI League was approved by our Board of Trustees at the April, 2002 annual meeting following SETICon02.

The journal is published in English, but is intended for a global audience of professional and amateur scientists, academics from a variety of disciplines, and anyone interested in the scientific Search for Extra-Terrestrial Intelligence, popularly known as SETI. One need not be a SETI League member to submit or subscribe. Full details, including submission guidelines, may be found at <http://cic.setileague.org>. ❖

SETI League Discontinues Press Releases via Post

To all interested members of the Press Corps:

For the past eight years, the nonprofit, membership-supported SETI League has been distributing monthly Press Releases, detailing our members' progress in privatizing the scientific Search for Extra-Terrestrial Intelligence. We hope you have found these updates helpful in your media coverage of SETI science.

Unfortunately, rising printing and postage costs, as well as general economic conditions, will prevent us from continuing to distribute our press releases via post. Thus, barring special circumstances, you will no longer be receiving hard-copy press releases from The SETI League, Inc. I regret the inconvenience this change may cause you. There are, however, two ways you can continue receiving periodic SETI news:

1. You are welcome to check The SETI League's website every month, and to download our latest press releases in electronic form. There is never any charge for such electronic access. Go to <http://www.setileague.org/press> and follow the links to retrieve the latest SETI news, as well as all archived press releases back to 1995.

2. You are encouraged to subscribe for free electronic delivery of the latest SETI League press releases via email. To do so, browse to <http://www.setileague.org/admin/pressrel.htm> and follow the signup instructions.

The media's past coverage of SETI science is greatly appreciated. I hope all journalists reading this letter will choose to keep abreast of SETI developments, by subscribing to this free service. As always, I stand ready to answer your questions about SETI science and technology, and to grant personal interviews, as my work schedule permits.

H. Paul Shuch, Ph.D. (email: n6tx@setileague.org)

Executive Director ❖

Amateur Radio Astronomers Team Up With Alien Hunters

The SETI League, Inc., non-profit leaders in a privatized Search for Extra-Terrestrial Intelligence (SETI), announces its affiliation with the Society of Amateur Radio Astronomers (SARA), the world's leading advocate for amateur radio astronomy research. Plans were formalized at the annual SARA Conference at the National Radio Astronomy Observatory (NRAO) for each of the two organizations to join the other as a Member Society.

The two amateur groups have distinct but complementary missions. Founded in 1981, SARA (on the web at www.qsl.net/SARA) boasts several hundred members, mostly in the US, and focuses on developing technology to study natural astrophysical phenomena. The SETI League, with more than 1300 members in 62 countries, was organized in 1993 to help privatize the scientific search for technological civilizations in the cosmos. The two organizations have a substantial number of members in common.

"This affiliation has been a long time in coming," notes outgoing SARA President Tom Crowley, who has served as a SETI League volunteer Regional Coordinator for several years. "By moving slowly and deliberately, we have forged an alliance whereby each organization maintains its autonomy, while providing an unprecedented opportunity for scientific collaboration."

SETI League executive director Dr. H. Paul Shuch, who serves on the Boards of both organizations, has been a regular speaker at the annual SARA conference for the past eight years.

To better serve the interests of its worldwide membership base, The SETI League routinely affiliates with like-minded educational and scientific organizations. Other official SETI League affiliates include the Radio Amateur Satellite Corporation (AMSAT), the Artemis Society, and the Central States VHF Society, a leading US technical ham radio club. ❖

Book Review:

Probability 1: Why There Must Be Intelligent Life in the Universe

by Amir D. Aczel, 1998; \$22.00 US

Harcourt Brace & Company, ISBN 0-15-100376-9

Searching for extraterrestrial intelligence is no trifle of a search. Imagine searching through your local library for a particular book—without the aid of catalogues or data based searches. That is *easy*. Now try searching for a specific, distinguishable *character*—in every single library! If this analogy is somewhat disconcerting, keep in mind there are books along the way that you will find, books that will allay your fears of continually searching and turning up no results. What if you found a book written by a person with a similar quest as yours? A book that revives your seemingly vain efforts . . .

A summary of all things leading up to the scientifically credible belief of other intelligences, *Probability 1: Why There Must Be Intelligent Life in the Universe* goes beyond the standard “historian” approach and proves (?) the existence of extraterrestrial intelligence.

Amir D. Aczel asserts in *Probability 1*, that *our* existence as an intelligent, evolved species mathematically guarantees the outer-space existence of at least one other equally intelligent civilization. Author of *Fermat's Last Theorem*, Dr. Aczel approaches the ubiquitous question of ETI with a firm grasp on the concepts of mathematical probability.

This book takes a comprehensive tour of all factors involved in “the search,” from Fermi's Paradox and Drake's equation to evolution and DNA to the Inspection paradox and even chaos theory. For the learned reader, already immersed in the world of ETI, this book will most likely summarize much of what you already know. For you, your quest starts with chapter 8: “Does God play Dice?” For the newcomer -- or the forgetful incumbent -- the book as a whole serves as a great introductory course in amateur exobiology, although sometimes the trip is a bit circuitous, and a bit apocalyptic, introducing a subtle, unthinkable question: Is it only a matter of time before the colossal forces of the universe indifferently wipe out 3.5 billion years of trivial evolution? But Aczel's digressions are never more than a *recto/verso*, and at 216 pages, the book is swift-paced and certainly enjoyable.

For me the book became more interesting as Aczel introduced mathematics (don't worry -- the concepts don't transcend high-school algebra and probability), and the combination of science and a statistical framework to find solutions to problems that were thought to contain no answer. The focus of this book, and what makes it different from all of the others, once again, is the attempt Aczel makes at *mathematically proving* extraterrestrial existence—and the kind of existence SETI is looking for. Think of the book as a eulogy to Carl Sagan, who himself wished to write an analogous book, but unfortunately never got around to writing it. Aczel is no Sagan, but then again, who really is?

Einstein once stated “God does not play dice with the universe.” Aczel compares the outlook of a deterministic universe with one that is probabilistic, leading down the road of Cantor, Lorenz, and Mandelbrot, to chaos theory. As in the classic episodes of *Star Trek* or *Twilight Zone*, the real shocker comes

at the end. So even if you do not plan on reading this book in its entirety, I strongly urge you to look at the last three or four chapters, for their implications are reassuring to those who believe.

Reviewed by Brent Bedford <brentbedford@hotmail.com> ❖

Event Horizon

SearchLites' readers are apprised of the following conferences and meetings at which SETI-related information will be presented. League members are invited to check our World Wide Web site (www.setileague.org) under *Event Horizon*, or email to us at info@setileague.org, to obtain further details. Members are also encouraged to send in information about upcoming events of which we may be unaware.

November 7 - 10, 2002: AMSAT Symposium, Ft. Worth TX.

November 22, 2002: Radio Club of America Annual Banquet, New York NY.

November 23 - 24, 2002: ARRL International EME Competition, second weekend.

December 13 - 15, 2002: Philcon '02, Philadelphia PA.

January 17 - 19, 2003: Arisia '03, Boston MA.

February 7 - 9, 2003: Dr. SETI @ to keynote at HamCation 2003, Orlando FL.

March 21 - 23, 2003: Lunacon 2003, Rye Brook, NY.

April 19, 2003: Fifth Annual SETI League Ham Radio QSO Party; 14.204, 21.306, and 28.408 MHz.

April 25 - 26, 2003: Southeastern VHF Conf., Huntsville AL.

April 25 - 27, 2003: SETICon03 Technical Symposium and Annual Membership Meeting, Ewing NJ.

May 3 - 4, 2003: Trenton Computer Festival, Edison NJ.

May 16 - 18, 2003: Dayton Hamvention, Dayton OH.

May 17, 2003, 0700 hours: SETI Breakfast, Marriott Hotel, Dayton OH.

May 23 - 26, 2003: Balticon 37, Baltimore MD.

June 20 - 22, 2003: ARRL National Convention and HamCom 2003, Arlington TX.

July 13 - 16, 2003: SARA Conference, NRAO Green Bank WV.

July 24 - 27, 2003: Central States VHF Conference, Tulsa OK.

August 28 - September 1, 2003: Torcon 3 World Science Fiction Convention, Toronto ON Canada.

September 5 - 7, 2003: Third European Radio Astronomy Congress, Heppenheim Germany.

September, 2003 (dates TBA): UKW-Tagung 48th VHF Convention, Weinheim Germany.

September 25 - 28, 2003: Microwave Update, Seattle WA.

September 29 - October 3, 2003: 54th International Astronomical Congress, Bremen, Germany.

October 9 - 12, 2003 (tentative): AMSAT Space Symposium, Toronto Canada.

April 21, 2004: Sixth Annual SETI League Ham Radio QSO Party; 14.204, 21.306, and 28.408 MHz.

August 12 - 15, 2004 (tentative): SETICon 04 SETI League Technical Symposium and Annual Membership Meeting, in conjunction with the 11th International Ham Radio Moonbounce Conference, The College of New Jersey, Ewing (Trenton area) NJ. ❖

Remembering: Phylis Morrison

by H. Paul Shuch

I am deeply saddened to report the passing in July of award-winning author and educator Phylis Morrison. Best known to our members as the wife of SETI patriarch Prof. Philip Morrison, Phylis was a staunch SETI League supporter. Shortly after we made Phil an honorary member in recognition of his having co-authored the first modern SETI article, Phylis sent us a check in the mail, explaining that she wanted to be a SETI League member in her own right.

Phylis Morrison was a teacher of art and science in grades K through 9. But her true gift was teaching other teachers how to teach. The two Morrises were collaborators for over thirty-five years, having served together on the Commission on College Physics, work which has had a profound effect on the teaching of physics ever since. They subsequently co-authored many books, worked closely on education reform initiatives, narrated and scripted films, and appeared widely on science programs for the BBC, Canadian Broadcasting, and American television's NOVA series on PBS. The Morrises became widely recognized for their presentation of a six-part PBS series, "The Ring of Truth," aired in 1987. They coauthored and collaborated on the book and film adaptation, "Powers of Ten," which present compelling visual images of the world around us, from the most minute objects to the unimaginably vast.

As a longtime reviewer of children's science books, Phylis Morrison was on every publisher's distribution list. In consequence, her small Cambridge flat was overflowing with thousands of volumes, which she gave away to neighborhood children every Halloween in lieu of candy. On one visit to the Morrison's home in early November, my wife Muriel saw the stacks of books, said the magic words "Trick or treat," and went home with two suitcases full of leftovers. It was, Muriel told Phylis, like having Halloween, Christmas and the Easter Bunny all rolled together.

In May of 2000, Phylis Morrison was honored, along with her husband, with the National Science Board's Public Service Award. Of the Morrises, NSB awards chair Michael Ambrosino said: "their ability is to see things whole, not from a single perspective. They focus on teaching freshmen courses that empower students to learn through experimentation. Their reviews of children's science books and their giveaways of these books to children each year are all indicative of how special they are." The Morrises, he added, maintained a vast interest in international education, especially in India and Africa.

Throughout her life, Phylis Morrison maintained a child-like sense of wonder at the universe around her. She proudly wore a massive, angular magnetite ring, hewn out of a meteorite fragment that she and her husband found on a trip.

Phylis Morrison was decidedly a techie. I remember watching her standing in a courtyard at Pompeii a few years back. She and Harvard grad student Darren Leigh were both holding portable GPS receivers and arguing about their respective units' relative accuracy. Phylis frequently browsed The SETI League's website, and used an early digital camera to take several of the photos posted there. But she also voiced strong concerns about the rightful role of technology in education.

"Passive learning, where a child sits still, with little activity except that of the ear and the eye and perhaps the hand

marking the paper, is not wrong," Phylis Morrison said in a presentation to the National Academy of Sciences in the late 1980s. "Video, video tape, video games, computers -- all are easily operated and produce interesting results with a modest amount of activity. But how much better if children learn how to make them behave. How much better if they learn that in order to find something out about a system, they must inquire of it, and that the best kind of evidence comes from scientific experiments and their confirmation."

Our deepest sympathies are extended to Phil Morrison on the loss of his lifelong partner. ❖

SETI League Director Honored by Radio Club of America

The Radio Club of America, the world's oldest radio society, has elected Dr. H. Paul Shuch, executive director of the membership-supported, nonprofit SETI League, as a Fellow of the Club. Shuch will be honored at the Club's annual awards banquet, to be held on 22 November 2002 at the New York Athletic Club.

Dr. Shuch, a lifelong amateur radio operator, has headed The SETI League, Inc. since its formation eight years ago. Paul is a retired engineering professor credited with designing the first commercial home satellite TV receiver. A Fellow of the British Interplanetary Society, he is the author of more than 300 publications. In addition to his professional honors and accomplishments, he has received numerous amateur radio awards, including the Central States VHF Society's John T. Chambers Memorial Award, the Dayton Hamvention Technical Excellence Award, a QST Cover Plaque, and an American Radio Relay League (ARRL) Technical Achievement Award. He is a frequent Keynote Speaker and Banquet Speaker at ARRL Conventions, ham radio clubs, and on college campuses around the world.

Paul's amateur radio station, N6TX, has operated in all 20 ham bands between 1.8 MHz and 24 GHz. He was first licensed as WV6UAM in 1961, and has served as Technical Director and Chairman of the Board of Project Oscar Inc., predecessors to AMSAT. He has chaired the ARRL VHF/UHF Advisory Committee, and served on the Board of Directors of several prominent ham radio clubs, including the Central States VHF Society, Project OSCAR, and The SETI League. He lives on a radio-quiet hilltop in northern Pennsylvania (Grid Square FN11lh) with his biologist wife, five of their seven recombinant DNA experiments, ten networked computers, three motorcycles, ten radio telescopes, and an antique MG-TD.

Formed by a small group of dedicated radio amateurs and experimenters nearly a century ago, The Radio Club of America would soon count among its membership the very best in the radio communications industry. Edwin Armstrong, David Sarnoff, Louis Hazeltine, John V. L. Hogan, Paul Godley and Allen B. DuMont, to name just a few -- these were pioneers who would shape the industry.

Today the Club is composed of modern pioneers, advancing the field of radio communications in ways undreamed of on that January day in 1909, when the first meeting of The Radio Club of America was called to order. ❖

SETI Radio Telescope Wins ARRL Grant

The ARRL Foundation, charitable arm of the US national association for amateur radio, has issued a \$3,000 grant to The SETI League, Inc. The funds are being used in the design and construction of a next-generation radio telescope prototype. The Very Small Array (VSA), now under construction combines eight standard satellite TV dishes to form a radio telescope of unique flexibility.

The VSA is being built in the backyard of SETI League executive director H. Paul Shuch's rural Pennsylvania home. The ARRL Foundation grant follows an earlier \$2,000 NASA Small Research Grant administered by the American Astronomical Society. Matching funds from over fifty SETI League members around the world have brought total VSA funding up to \$10,000, which was sufficient to complete all required physical structures last summer. Two more rounds of funding, for front-end electronics and back-end electronics, will be required to complete the VSA during the next year.

Once the array becomes operational, Shuch hopes its success will enable the grassroots science group to attract major corporate funding for its much more ambitious Array2k, a massive radio telescope array first contemplated in 1999. "The bargain-basement VSA will be used to test engineering concepts for the planned \$250,000 Array2k," reports Shuch, "which is itself a hundred times cheaper than conventional radio telescope designs. Thus, we hope to help bring radio astronomy and SETI research to the masses." Already, several SETI League members in the Third World have used similar techniques to build the first radio telescopes in their respective countries. ❖

Holographic Interstellar Message Plaques by Dr. Gregory L. Matloff and C Bangs

No, we're not talking about the holographic doctor from *Star Trek Deep Space Nine*, or the holographic message from Princess Leia in *Star Wars*. Our NAS-funded research project during the summer of 2001 investigated the possibility of a thin-film white-light holographic message plaque that could be affixed to a future interstellar space probe. The work of many artists could be included in such a cosmic message, that would be about the size of a piece of paper and far less massive, and could be viewed in ordinary light.

After serving as curator of an art show on messages to extraterrestrials ("Messages from Earth") at a Summer 2000 International Academy of Astronautics conference in Aosta, Italy, Ms. Bangs was funded through Dr. Matloff's Marshall Space Flight Center (MSFC) University Grant to construct a prototype holographic message plaque. Created with the aid of the Center for Holographic Art in Long Island City, NY, the 16" x 20" prototype plaque is now in the permanent collection of the Space Transportation Directorate at MSFC in Huntsville AL. Based in part upon the message plaques affixed to the Pioneer 10 and 11 extra-solar probes launched in the 1970s, the MSFC plaque contains six separate two- and three-dimensional images, presenting the appearance of humans, our size compared to the hypothetical spacecraft to which the plaque would be affixed, and Earth's location in the galaxy.

During the summer of 2001, we tested commercial holographic samples for space-radiation tolerance, with the coop-

eration of the Space Environments team at MSFC. In agreement with previous studies, we learned that holograms are highly radiation resistant. Prof. John Caulfield, an expert in holography affiliated with Fisk and Alabama A & M Universities, informs us that a holographic message plaque the size of a typical piece of paper could be as thin as a millionth of a meter and could contain hundreds of thousands of images.

Details of this research were presented during March 2002 workshops in Paris co-sponsored by the International Academy of Astronautics and the SETI Institute. Ms. Bangs is soliciting artists interested in submitting work for future "Messages from Earth" exhibitions, through the Art Resource Transfer Inc. website at www.artretran.com. ❖

Software Corner

Project Argus Accessory Programs by Peter Cheasley, VE2TPR

I thought other Project Argus participants might want to know about several of the programs I am using for record keeping, sky mapping, and spectrographic analysis. They are inexpensive, and work well for me. They may or may not work in your station configuration – some experimenting will be necessary, but isn't that what The SETI League and Project Argus are all about?

Active Diary: Priced at \$25 for a trial download. I use the free-form diary with a folder for each RA. Using input always starting with the RA I can then use sticky notes for details which files RA numerically. I have a daily diary for SETI observations. For further details, email info@windine.com.

Acoutisca Spectrogram: This program takes a bit of looking at, but it is only \$15.00. It records observations into WAV files which can be sent back and forth by E mail.

<http://www.aconas.com/>

Widi 2.7: Widi records audio data into midi files, etc. which can then be picked up and transferred to written data by programs such as **Cakewalk**. <http://www.widisoft.com/>, \$33.00.

I use **Cakewalk** for audio signal analysis (search the Web for availability). Please note that Cakewalk is a very expensive program. The version I am using is quite old, but it does the job. I have no idea what the new one is like.

Cakewalk (my version - maybe not any more) requires **Music Write**. I picked up my program for \$5 at a flea market. It provides the notes, staff etc for Cakewalk.

<http://www.voyetra.com/site/>

I find that **RedShift 3** is terrific for plotting RA action. However it is complemented by **RedShift 4** - The more I work at this program the better I appreciate it. I imagine eventually I will have files for each RA (like the active diary). The more I use RedShift, the more indispensable it becomes.

<http://www.redshift.maris.com/index.php3> (\$39 - Amazon)

As I advance in years, I realize a little help is required in the vision department. One useful accessory is a magnifier that is always on screen. It enlarges to the level of individual pixels. I run this as I look at spectrograms, etc. **PowerMagnifier** v. 1.0 – © 2002 Dag Fjel (search the Web for availability).

Other SETIzens are encouraged to share your software recommendations and experiences with your fellow experimenters, through the pages of SearchLites. ❖

Awards Committee Corner:



In Search of Winning Websites

For the past two and one-half years, The SETI League has favored one SETI-related World Wide Web site per month with the SETI SuperStar award. This monthly honor goes to sites nominated by our members, which best promote the goals and objectives of SETI science in general, and The SETI League in particular. You are invited to nominate sites which you feel best promote SETI.

Noncommercial websites devoted to the scientific Search for Extra-Terrestrial Intelligence (SETI) are eligible for consideration for this award. Sites nominated are evaluated by our Awards Committee for information content, scientific accuracy, positive portrayal of SETI subjects, service to the SETI community, ease of navigation, and overall presentation.

Nominees need not be members of The SETI League, Inc. Membership status is not a criterion in selection for this Award (although SETI League membership is of course encouraged). Best of all, if you are a SETI League member and have developed a website promoting SETI, you are encouraged to nominate your own site!

Nominations may be made via The SETI League's website, by using the online nominating petition, found at www.setileague.org/awards/starnom.htm. SETI SuperStar sites are listed on, and linked from, The SETI League website at www.setileague.org/awards/starsite.htm. Be sure to visit our past SuperStar winners, for a great overview of SETI activities around the world.



Calling All Bruno and Orville Candidates

The 31 December 2002 deadline is fast approaching to nominate worthy candidates for The SETI League's two highest honors, the Giordano Bruno Memorial Award, and the Orville N. Greene Service Award. Both of these prestigious awards will be presented at our annual Awards Banquet, to be held in conjunction with the SETICon03 Technical Symposium on 26 April 2003.

The Bruno award, which honors the memory of the Italian monk burned at the stake in 1600 for postulating the multiplicity of inhabited worlds., is presented annually to a person or persons making significant technical contributions to the art, science, or practice of amateur SETI. The first Bruno was presented in 1996

The more recently established Orville N. Greene Service Award honors the memory of SETI League supporter and co-founder Orville N. Greene, and is presented annually to a person or persons making unusual volunteer contributions, or providing extraordinary service, to The SETI League, Inc.

Past Bruno and Greene recipients are listed on our website, where you will also find nomination forms for both awards. Or, mail your nominations to SETI League headquarters now. Be sure to detail the accomplishments of your nominee.



On Being a Good Neighbor

by Dr. H. Paul Shuch, N6TX

Those SETIzens who happen to be licensed radio amateurs have likely dealt with curious neighbors' questions about our antennas. Although most of us tend to consider a large dish antenna in our gardens to be a thing of beauty, it should come as no surprise that many of our neighbors do not. How, then, do we deal with our neighbors' aesthetic concerns, without jeopardizing our activities?

The question of community aesthetic standards raised its head when recently I began construction of the Very Small Array (VSA), an eight-dish Array2k prototype, in the backyard of my semi-rural Pennsylvania home. No sooner had surveyors set up their theodolites on my property, than my neighbors protested the whole project to my local Township Board of Supervisors. The resulting interchange was educational for my neighbors, my township, and me.

We radio amateurs in the United States enjoy a degree of legal protection which our counterparts in other countries well may envy. As the holder of a US Amateur Radio license, constructing an antenna to be used under the rules of the Amateur Radio Service in the allocated ham bands, my antennas fall under the protection of PRB-1, the FCC's federal pre-emption of local zoning regulation over ham radio antennas. Since the VSA is designed to operate within the 23 cm amateur radio band, for reception tests in connection with our W2ETI moonbounce beacon (clearly a ham radio educational and scientific activity), I invoked PRB-1 to my local Township Supervisors.

In brief, PRB-1 recognizes the value to the community of the Amateur Radio Service, acknowledges the importance of antennas to achieve effective ham radio communications, and prohibits local governments from unrealistically restricting ham antennas. And, to my surprise and delight, the local township Solicitor informed my Supervisors at a local Township meeting that PRB-1 did indeed apply, protecting the VSA from zoning restrictions and local regulation.

If you think that ruling allayed my neighbors' concerns, you overestimate the power of reason. Federal regulations notwithstanding, they argued to our Township Supervisors, they moved onto our scenic hilltop to enjoy the wonders of nature, not the terrors of technology. Since membership on the Township Board is an elected position, whose voice do you suppose carries best, that of one lone ham, or a dozen voter/neighbors?

Without belaboring the ensuing legalities, suffice it to say that compromise carried the day. Since an amateur radio telescope points generally 'up', and since moonbounce activities can be conducted with the Moon high in the sky, it was practical to mount the dishes of the VSA close to the ground, pointing up. This permitted me to plant a ring of trees around the dishes, shielding them from the view of my neighbors. The sad irony is that the cost of the shrubbery ended up exceeding the cost of the sheet metal. But I have to admit that the forty arbor vitae recently planted in my backyard are attractive -- almost as pretty to my eye as the dishes they mask!

We each can choose between confrontation and conciliation. Our legal rights notwithstanding, as good neighbors it behooves us, and benefits our hobby, to choose the latter.



A Teen-Age Message to the Stars

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In 2001, a group of Russian teens from Moscow, Kaluga, Voronezh, and Zheleznogorsk participated directly and via the Internet in composing a Teen-Age Message (TAM) to extraterrestrial intelligence, and in the selection of target stars. Their message was transmitted in the Autumn of that year, from the Evpatoria Deep Space Center. This brief paper describes the composition of that Message.

Two previous interstellar radio messages (IRM), one transmitted from Arecibo in 1974 and the one from Evpatoria in 1999, had digital format and represented binary scans of one (Arecibo) or 23 (Evpatoria) black-and-white stylized images. But one might suppose that transmission of analog IRMs is also possible. So, before composing the message's content (as well as trying to decode future signals from ETI), let us try to determine such a message's possible format and structure.

We can think of three kinds of information which our IRMs can deliver to the proposed addressee:

1. Astrophysical characteristics of interstellar medium
2. our feelings
3. our thoughts

Thus, section (1) of our IRM has to be a coherent-sounding radio signal, which will give to aliens an opportunity to investigate the interstellar medium by examination of small variations in phase/amplitude/polarization of the received wave. Section (2) of our message has to carry analog information about our internal emotional world. It may be music and other possible displays of Art. Section (3) is well-known digital information as a sum of knowledge and understanding about ourselves and nature.

The spectral approach is a universal tool of both astronomical observations and SETI. Besides, it has a clear physical meaning -- spectrometers find the energy distribution of photons; in human sensing and art, spectra represent color and pitch. Under the hypothesis that physical laws are identical throughout the Universe, it may be proposed that spectrometry is being used by those aliens who know radio and conduct their own SETI activities. Also, in order for them to easily understand our spectral information, it will be best to present it as a

single-valued function of time. An additional argument for such a function is that a transmitter's energy be concentrated in a narrow band, solving for the aliens some of their own SETI problems.

We conceived three types of single-valued functions -- constant, continuous, and discrete. A radio signal with constant frequency and so, with zero initial information content, uses the "language of nature" to report to Them some useful astrophysical data about the interstellar medium. A message with discrete variations can be used to convey the "language of logic", and a continuous one may be used as an instrument to convey the "language of emotions" in order to inform extraterrestrials about our unique inward experiences. Examples of these three signal types appear in the accompanying graphic.

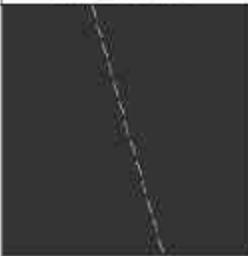
We used the idea of such a three-section structure to design of what we've called a Teen-Age Message to ETI. Section 1 of the TAM had a duration of ten minutes and represented a monochromatic radio wave with Doppler correction of the Earth's rotation and motion around the Sun, in order that They would receive the signal with a "constant" frequency. Analog information selected for Section 2 consisted of a 15-min concert, performed on a Theremin musical instrument, which generates optimal waves with minimal levels of overtones, i.e. a single-valued continuous frequency function. There were seven musical melodies selected for this 1st Theremin Concert for Aliens. Digital information in Section 3 contained the binary scans of TAM's Logotype, texts of Greeting to ETI, written both in Russian and English, and an Image Glossary of basic terrestrial concepts.

There were six sessions of TAM transmission, on August 29, September 3 and 4, 2001 from 70-m dish of the Evpatoria Deep Space Center, to six nearby Sun-like stars, some of which have own planet or planetary system (47Uma). More info about the TAM may be found at these links:

- http://ebe.allwebco.com/Science/Reaching_Out/TAM.shtml
- http://www.seti.housenet.org/msg_idx_tam.html
- <http://evpatoria.asteroids.ru/SETI.ENG/index.html>
- <http://evpatoria.asteroids.ru/DSCC.ENG/tam10-eng.htm>
- <http://www.matessa.org/~mike/tam.html>

Spectral Structure of Interstellar Radio Messages

Three Types of Single-valued Frequency Functions:

Type	1. Constant	2. Continuous Function	3. Discrete Function
Author	Radio Engineer	Artist	Scientist
Sonogram			
Name	Language of Nature	Language of Emotions	Language of Logic
Decoding	Astrophysical	By Art Jury	Linguistic



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