SearchLites

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The Quarterly Newsletter of The SETI League, Inc.

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Reviewing the Review Process

by Dr. H. Paul Shuch, Executive Director

As a unifying voice for non-professional SETI research throughout the world, The SETI League receives a large number of submissions each year for Conference presentation and Proceedings publication, on a wide variety of topics related to the search for life in space. We are pleased to be able to include many of these submissions as presentations at our annual SETICon technical symposium, for publication in our Proceedings and Newsletter, and for posting to our extensive website.

In fact, our members' submissions have made The SETI League a prominent forum for open exploration of a variety of research topics, both traditional and unconventional. All we ask is that submitters adhere to the high standards of professionalism and scientific rigor that dedicated amateurs have long demonstrated. Our peer review process helps to ensure that these standards are met, without in any way inhibiting the free flow of ideas.

We welcome a diversity of views on scientific strategies for finding irrefutable evidence of ETI. But the resources for our conferences and publications are limited. Thus, we do not try to include the entire range of possible topics. Because there are other forums for UFO and abduction research, for instance, and for research based on ancient texts and ancient artifacts, we normally do not include these topics in our forums.

These policy decisions are adopted so that our forums can best fit the interests of the SETI League membership. We are not passing judgment on the value or the scientific methods of these topics and fields, simply their relevance to the SETI League's mission and membership.

Occasionally, a controversial paper on a SETI-related topic is submitted for consideration, about which the opinion of our reviewers is divided. In such cases it is our policy to err, if at all, on the side of acceptance, rather than exclusion. It is far easier for the reader to ignore a questionable or marginal presentation, than it is to infer meaning from a valuable but unconventional one that is omitted from the literature. In trying to err on the side of inclusion, we must emphasize that the opinions expressed in our Conference presentations, Proceedings, and the like are those of the individual authors, and may not necessarily represent the position or views of The SETI League, its members, officers, volunteers, donors, or commercial sponsors.

The SETI League endeavors to provide a solid scientific forum as well as a speculative one. Thus, inclusion of controversial material is often warranted in hindsight. After all, the early works of Hertz and Marconi were once considered controversial, as indeed were some of the SETI writings of Morrison, Drake… and yours truly.

Just What Is An Amateur Astronomer?

by Thomas R. Williams

One might hope to simply pick up a book and review the history of astronomy to understand the contributions of amateurs. However, amateur astronomers are less visible than they should be in the literature of astronomy. Significant contributions by amateur astronomers are generally recognized, but the identification of the individual contributor as an amateur is frequently unclear. As a consequence, amateur astronomers today have little sense of what the contributions of amateurs have been in a historical sense. In part, this problem stems from current usage of the word "amateurish" as a pejorative, representing something not well done or lacking in quality. This unfortunate usage has distorted the historical meaning of the word amateur, broadly someone who works for the love of the work being done. Therefore, it is appropriate to first clarify what is meant by "amateur astronomer".

There is a fairly simple ground rule which may be applied to identify an amateur astronomer. Such an individual must first be an astronomer. If that determination can be made, then it should be a simple matter to determine whether or not the astronomer is an amateur or a professional. The crucial decision is whether or not an individual is working at the science of astronomy. Using a few simple criteria to test this point will help us distinguish an astronomer from others who may, from time to time, look at the night sky. Here are some criteria to assist that identification:

1. First the individual must display a serious intent to contribute to the advancement of astronomy. He demonstrates this intent by performing work that will provide information to other astronomers. The intent is to answer some question of importance to astronomy, or to develop information that would not otherwise be available to astronomers.
2. There must be a regular effort to produce results over an extended period of time by gathering data through routine observations, or through discovery or search work which can be either theoretical or observational.
3. The work should be conducted using acceptable methods or techniques for the era, considering the application of the data.
4. The program and its results should be communicated to other astronomers who may have need for the information to further their contributions to astronomy. Such communication includes liaison with other astronomers with common interests, sharing the results through publication in a journal or by submitting the results for collation with efforts of others for eventual publication.

When these characteristics are present, one can feel comfortable in classifying an individual as an astronomer. All that is necessary then is to decide whether this individual is a professional or an amateur astronomer.

We can now approach the decision of further classifying an astronomer as either a professional or an amateur astronomer. Again, we may adopt a fairly simple criterion, the pay/no pay test. Accordingly a professional astronomer is a person who practices the science of astronomy for his livelihood. An amateur astronomer does astronomy for pleasure rather than for money, and is likely to derive his income from other means than astronomy.

Some historians have noted that the definition of an amateur astronomer outlined above may rely on the existence of a body of professional astronomers. Prior to the nineteenth century there were substantial numbers of telescopes in the hands of gentlemen scientists, many of whom made serious efforts to contribute to astronomy. At that time however, there were relatively few astronomers actually being paid to practice astronomy. Accordingly, the year 1800 has been chosen as a nominal earliest point at which it is appropriate to reflect the existence of a difference between amateurs and professionals in astronomy.

There are some other classes of astronomers that it is convenient to recognize for historical purposes, in addition to amateur and professional astronomers. First, in addition to amateurs as described above, there have been a few individuals who, because of their education, could have qualified as professional astronomers in their era, but never occupied a paid position as an astronomer. Noteworthy in this regard are a few English women who made good contributions to astronomy. I identify these individuals as "Professionally Qualified Amateurs". A modern example might be Clint Ford, who received the ASP award as Amateur Astronomer of the Year for 1987. The historian may still find some other individuals difficult to classify, even when clear distinctions can be made between professional and amateur astronomers. For example, it is important to recognize that many individuals made very significant contributions as amateur astronomers, and were offered employment as professional astronomers as a consequence of those contributions. The list includes S. W. Burnham, E. E. Barnard, Robert Jonckheere and David Gill, all good examples in this category. I classify such individuals as "Amateur Turned Professional".

And finally, there still remains that largest group of all those who look at the night sky, the "Recreational Sky Observers". These individuals share the astronomer's appreciation for the esthetic beauties of the night sky and the multitude of discrete objects it contains, but are not further motivated to use their time under the stars to contribute to science. The skills exhibited by recreational sky observers, for example in locating and identifying faint or difficult objects, may be very significant. From time to time a recreational sky observer accidentally discovers a comet or a nova. But when this occurs it is a clear exception to the normal recreational routine. It is not my intent to demean in any way from the sincere interest and appreciation that all these individuals exhibit for astronomy. However, it does confuse the issue to classify them as astronomers, in the same category as those individuals who are equally sincere in their intent to contribute to the science of astronomy.

In summary, effort is needed to understand and appropriately classify astronomers as amateurs or professionals, and to distinguish this group from others who enjoy observing the

night sky or reading about astronomy for recreational purposes. The key to this problem is the recognition that doing astronomy is work, that certain features of this work fit a recognizable pattern that constitutes the practice of the science of astronomy, and that individuals who do not work within these recognizable patterns should not be considered astronomers, amateur or otherwise. ❖

Event Horizon

August 22 - 24, 2003: 29th *Eastern VHF/UHF Conference*, Enfield CT.
August 28 - September 1, 2003: *Torcon 3* World Science Fiction Convention, Toronto ON Canada.
August 30 - 31, 2003: *UKW-Tagung* 48th VHF Convention, Weinheim Germany.
September 5 - 7, 2003: *Third European Radio Astronomy Congress*, Heppenheim Germany.
September 19 - 21, 2003: 22nd Annual *Digital Communications Conference*, Hartford CT.
September 25 - 28, 2003: *Microwave Update*, Seattle WA.
September 29 - October 3, 2003: 54th *International Astronautical Congress*, Bremen, Germany.
October 11 - 12, 2003: *Mid-Atlantic VHF Conference* and *32nd Annual Pack Rat Flea Market*, Trevose PA.
October 17 - 19, 2003: *AMSAT Space Symposium*, Toronto Canada.
October 18 - 19, 2003: *ARRL EME Contest*, first weekend. Listen for the W2ETI Moonbounce Beacon on 1296.000 MHz.
November 15 - 16, 2003: *ARRL EME Contest*, second weekend. Listen for the W2ETI Moonbounce Beacon on 1296.000 MHz.
December 12 - 14, 2003: *Philcon '03*, Philadelphia PA.
February 6 – 8, 2004: *Tropical Hamboree*, Miami FL.
February 13 – 15, 2004: *HamCation 2003*, Orlando FL.
March 12 – 14, 2004: *Contact 2004 – Mars, Myth and Reality*, Mt. View CA.
April 17, 2004: *Sixth Annual SETI League Ham Radio QSO Party*; 14.204, 21.306, and 28.408 MHz.
May 28-31, 2004: *Balticon 38*, Baltimore MD.
July 11 - 14, 2004 (tentative): *SARA Conference*, NRAO Green Bank WV.
July 22 - 25, 2004 (tentative): *Central States VHF Conference*, Toronto area, Canada.
August 6 - 8, 2004: *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.
September 2 - 6, 2004: *Noreascon Four* World Science Fiction Convention, Boston MA.
October 4 - 8, 2004: 55th *International Astronautical Congress*, Vancouver BC Canada.
August 4 - 8, 2005: *Interaction* World Science Fiction Convention, Glasgow, Scotland UK.
October 17 – 21, 2005: *56th International Astronautical Congress*, Fukuoka Japan. ❖

Backyard Beacon Bolsters SETI Science

Last April, scientists from California's prestigious SETI Institute began two weeks of astronomical observations at Arecibo, Puerto Rico. But before they could start their search for intelligently generated signals from the stars, they had to find one from ... the Moon. For the second time in two years, the world's largest radio telescope received calibration assistance from a group of radio amateurs comprising the grassroots, nonprofit SETI League.

The SETI League operates a low-cost, high-tech moonbounce beacon that aims a stable microwave signal at the Moon. The weak echoes of that signal return to Earth, giving radio astronomers everywhere on this planet a precise source against which to check the operation of their equipment. The amateur scientists built their beacon in 2001, funded by a $5000 grant from the American Astronomical Society. Since then, a number of SETI League members around the world have used it to calibrate their amateur radio telescopes, and professional searches have found it useful as well. "Before you can search for the unknown," explains SETI League executive director Dr. H. Paul Shuch, "you have to make sure you can receive and recognize the known." ❖

'Best Ideas' Honored

At The SETI League's annual Awards Banquet last April, the editors of *Contact In Context*, an online academic journal published by the nonprofit SETI League, announced the first winners of their newly established "Best Ideas Awards". The aim is to highlight recent publications that have contributed especially fresh, bold, profound ideas that are valuable to people engaged in the scientific search for extraterrestrial intelligence. Each award consists of a large plaque and a check for $500. One such award is given annually for a paper or essay published in Contact in Context during the previous 12 months. Another is issued to any type of publication (such as a book, chapter, journal article, conference paper, journal, web document, or monograph) relevant to SETI research.

The winner in the *Contact in Context* category was a paper on "Solar System SETI Using Radio Telescope Arrays" by Bruce Cornet and Scot L. Stride. At the SETI League's annual banquet, these two co-authors each received a plaque and half of the $500.

The other Best Ideas Award recognized a book by British physicist Stephen Webb called "If the universe is teeming with aliens, where is everybody?". This year the editors also awarded Honorable Mentions (a plaque plus $200) to John R. Rice for his paper "ET: Come and Gone Unnoticed?", to historian Stephen Dick for his keynote address "The Post-Biological Universe" at last year's SETICon02 Symposium, and to Chandra Wickramasinghe for his paper on panspermia published last year in SearchLites, the quarterly journal of The SETI League, Inc. Several of these papers are available free on the *Contact in Context* website: cic.setileague.org, and others are summarized in the SETI Bookshelf column found on that site. ❖

Editorial:

We're Not At Home

by Dr. H. Paul Shuch, Executive Director

Two years ago, in my editorial "A Science, Not A Search," I pointed out that there are now several different organizations around the world engaged in various credible forms of SETI research. I am privileged to head up one of those organizations, the grass-roots, nonprofit SETI League. Although we and our various sister organizations share the common goal of extraterrestrial existence proof, we are by no means monolithic, employing a variety of methods and research strategies in working toward that goal. And while it can be argued (and, in fact, is often debated in scientific meetings) which strategies are most likely to achieve SETI success, the simple fact is, we just don't know. Thus, the greater the variety of techniques employed, and the greater the diversity within the SETI community, the sooner humankind is likely to gain entry into the Cosmic Community.

Perhaps the most highly visible of the various SETI experiments is SETI@home, a distributed computing project involving over four million participants. SETI@home is a professional search, to be sure, ably conducted by amateurs. It has afforded the general public an unprecedented opportunity for direct participation in space science. And if this approach sounds a little familiar to SETI League members, it should: your SETI League pioneered the concept of direct public SETI participation back in 1995. Thus, it still surprises many of our members to learn that the SETI@home experiment is *not* a SETI League initiative.

The SETI@home concept was first articulated by Prof. Woody Sullivan of the University of Washington, at the Capri Bioastronomy Conference in 1996. His notion was that if 100,000 volunteers could be recruited to crunch data with their spare computer cycles, collectively they could drink from the fire hose, keeping up with the enormous output from the Serendip experiment at Arecibo, in near-real time. One of the attendees at the Capri conference was my old friend and former grad school classmate Dan Werthimer, who then just happened to be heading up the Serendip project for the University of California, Berkeley. Dan was quick to embrace Woody's concept, and soon SETI@home was born as a UC Berkeley project, with generous funding from the Planetary Society and various commercial sponsors.

SETI@home succeeded far beyond Dan's and Woody's expectations, as its four million users attest. In fact, its success was nearly its undoing, as the computer resources at Berkeley proved hopelessly inadequate to the task of keeping up with the high level of public involvement. Numerous server and bandwidth upgrades were required, after which the system still continues to go down occasionally due to excess demand. In fact, SETI@home is now the single largest user, by far, of all University of California computer resources. Who says the public isn't interested in SETI?

And where does The SETI League fit into the picture? On the outside, very happily looking in. For SETI@home, despite its stated goal, is primarily an experiment in distributed computing, *not* radio astronomy. And we in The SETI League are primarily amateur radio astronomers, *not* computer geeks. So it's entirely appropriate that Dan and his four million colleagues continue to crunch data, and that you and I and our 1350 fellow SETI League members continue to learn and design and build and operate amateur radio telescopes. Different techniques, working toward a common goal, remember.

Sure, most of us in The SETI League participate in SETI@home. It's easy, and fun, and practically free (rather unlike the daunting task of building a radio telescope). But let's not lose sight of our primary mission. After all, if everyone in the world crunched downloaded data, and nobody built radio telescopes to generate it, how useful would those four million computers be?

No, we're not SETI@home. We're The SETI League, the world's largest grass-roots radio astronomy organization, with well over 100 instruments on the air right now, and hundreds more under construction in 63 countries on six continents. Even if you never plan to deploy your own dish, your SETI League membership is helping to make sure that projects like SETI@home will continue to have interesting data to analyze. Dan and his Berkeley crew are working where the rubber meets the road. We're poised where the photon hits the fan.

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Film Review:

Touched

Reviewed by Nick DiCiaccio

Recently, I attended the world premiere of "Touched" at Boston's Museum of Fine Arts. The "MFA" as it's known, has a film program that screens many films most people otherwise wouldn't see, including many hard-to-find foreign and artistic films. Imagine my surprise when I found out that "Touched," which tells the stories of people who believe they've had contact with extraterrestrials, was on the schedule. I'd thought to myself that the MFA had sunk to a new low, pandering to popular fads instead of showing worthwhile films. However, upon looking more closely at the schedule, I found out that a couple of special guests would be at the premiere, which excited my interest in attending. The first would be the filmmaker herself, Laurel Chiten; the second would be John Mack, MD, the psychiatrist on the Harvard University medical school faculty who believes the stories of those who claim to have been in touch with, even abducted by, aliens from another world or dimension. The more I thought of it, the more I knew I couldn't pass up the chance to see "Mack-o the Wacko" (as he's been described in a column by Boston Globe writer Alex Beam) in person.

My wife and I purchased tickets online a month in advance, and on the appointed Thursday night we braved late rush-hour Boston traffic to drive into the MFA for the 8PM showing of the film. It was a good thing we'd bought our tickets early; a sign on the parking lot booth as we drove into the MFA lot stated that "Touched" was sold out. We crowded into our seats in the packed auditorium, comprised mostly of

"normal-looking" people, and then we were treated to the showing of "Touched."

Truthfully, the film itself was quite good. It wasn't the sideshow I'd feared; on the contrary, it was quite artistically done and in my opinion shone as a piece of filmmaking. As for its content, it wasn't pro-or-con as far as whether extraterrestrials exist and love to snatch people in the middle of the night, a point stressed by Ms. Chiten when she spoke at the conclusion of the film. The film was about telling several stories surrounding the phenomena of alien contacts and kidnappings and how this affected various peoples' lives.

The film showcased the stories of two people, Karin and Peter, and how they feel they've had contact with and been abducted by aliens, and the effects on their families. (Peter attended the premiere with his wife, Jamy, and was introduced after the showing.) The film also prominently featured Dr. John Mack, and his relationships not only with his patients who'd claimed to have had alien contact, but also with his peers at Harvard and in the medical community at large. Other people, including the Vatican's own "demonologist", one Father Balducci, were interviewed and gave their opinions on the subject of alien visitations. (Father Balducci allowed for that possibility.) The filmmakers also journeyed to Brazil, to interview people there who'd claimed contact with aliens, including one musician who'd claimed that extraterrestrials had planted a device in his ear, which they'd extracted through his nose at a later visitation. I suppose this was to show that delusions are cross-cultural...?

As for Dr. Mack, in the film he came across as quite sane and cultured, and it was easy to see how members of the general public could be swayed into believing alien abductions are real phenomena. His academic "vitals" were even brought up by a Dr. Relman, a fellow member of the Harvard med school faculty interviewed in the film who doesn't share Dr. Mack's views on aliens — his publications, his Pulitzer prize, etc.

At one point, Dr. Mack scoffs at the late Carl Sagan's views that many stories of alien abductions were in fact recountings of hallucinations." What does [Carl Sagan] know about hallucinations," growled Dr. Mack in the film. (Personal note: Apparently more than you, MD and all, Dr. Mack.) Audio tapes of the psychiatric sessions with Peter were also featured in the film; these were quite disturbing, to say the least. On the tapes, Dr. Mack was leading Peter through "regression therapy" using hypnosis. The screams and cries as Peter remembered, or imagined he remembered, abductions and various discomforts at the hands of the "aliens" were disturbing to hear. Through the film's playing of those tapes, I thought not only how deluded Peter was, but how deluded Mack was.

I almost wish I could say that the tapes showed a self-serving psychiatrist exploiting a patient for his own special notoriety, but I didn't get that impression. What I got was the impression of a doctor who had been sucked (at least partially) into the fantasy world inhabited by his patients (another phenomenon cited by the late Dr. Sagan in his book, "The Demon-Haunted World") and was questioning them as though the delusions really occurred. As any psychiatrist, psychologist, or even reasonably intelligent lay person could tell you, a doctor who's been drawn into the delusional world of his obviously disturbed patient, isn't doing that patient any good and at the same time is doing himself quite a bit of harm.

While I didn't get the sense that Dr. Mack was completely drawn into the world of his patients, I did get the sense that he would at least consider that the worlds they described were real — dangerous enough in and of itself.

Both in the film, and in the post-showing Q&A session that followed, when Dr. Mack spoke about his beliefs I honestly got the feeling he was somewhat, umm, fluid. He didn't come right out and say that these people were abducted by aliens who came down from spaceships; he allowed for the possibility that they came from other dimensions or planes of existence, somewhere out of normal time and space, places that were ethereal, without physical substance perhaps. (Convenient explanation for the utter lack of any convincing physical evidence, eh, doc?)

I got the sense that Dr. Mack was espousing the viewpoint, "Well, science can't disprove the existence of other dimensions, planes of existence, etc." True enough, Dr. Mack, but as is often pointed out, the one claiming a particular view who wants the approval of the scientific community of that view, must be the one to prove that view; it's not up to the community to disprove it. And when the mental health of several persons is at stake, taking jaunts into the "alternate" world is irresponsible at best. In the film, Dr. Mack also poo-poohed "Western science" for its lack of imagination, for its supposed refusal to allow anything into its circle of thought that couldn't be proven. Isn't that what science is about? Also, just like there's no such thing as "conventional" vs. "alternative" medicine (just medicine that works vs. medicine that doesn't) there's no "Western" or "Eastern" science. There is just "science."

One may believe what one wants, in the metaphysical or spiritual sense, but if one wants to claim the "approval" of science then one has to do better than Dr. Mack has done.

From my sense of the audience, the film didn't seem to convince anyone there that extraterrestrials have visited Earth and have abducted people, including those who appeared in the film. There was a lot of laughter throughout the film, though not directed at those who shared their stories; there were many humorous moments, thanks to the filmmaker's talents. One such moment was when Ms. Chiten showed images of newspaper articles on Dr. Mack, including one titled "Should Harvard Beam Him Up?" It was my sense that, during the sequences when tapes from Peter's sessions with Dr. Mack were played, people were made very uncomfortable by what they heard. I honestly don't believe Dr. Mack won over any fans with those sequences.

I'd recommend the film highly, if someone wants to hear human stories about seemingly normal, yet torn people, and the people in their lives. I'd also recommend it as a superb piece of documentary filmmaking, and Ms. Chiten is to be commended for her artistry. I don't believe this film would convince any skeptics that aliens walk among us, and to Ms. Chiten's credit that's not what she set out to do. The film tells

human stories, the physical truth behind them is left to the viewer, and I honestly don't see any rational viewers coming away from the film scared they'll be abducted from their beds. I felt it was also educational to see how very well-schooled people with great credentials, like a John Mack, can fall into a pool of delusion themselves; odd beliefs are not the exclusive province of the "crazy" or eccentric people among us, but are shared even among well-educated, prominent people. ❖

Quantifying our Ignorance

by Dr. H. Paul Shuch, Executive Director

A standard tool of the SETI trade is under constant attack. And although I enjoy a good argument as much as the next ham, it's clear to me that the detractors are clueless as to the very purpose of the tool they so eagerly denigrate. A case in point is a recent critique on the Forbidden Knowledge website describing the Drake Equation as "a statistical analysis of the number of possible 'intelligent communicating civilizations' there are in the universe." This summary misses the whole point of a powerful scientific tool, which is not really an equation at all in the strictest sense, and was never intended for the solving. A brief history of the Drake Equation should help to illuminate its true utility.

The modern search for life in space began just over forty years ago, when in 1960 Dr. Frank Drake, a young astronomer at the newly established National Radio Astronomy Observatory (NRAO) in Green Bank, WV, launched a microwave scan of two nearby, sun-like stars. To nobody's surprise, Drake employed the very best ham microwave practices of his day, in seeking the ultimate DX. His Project Ozma search came up dry, but demonstrated practical techniques for seeking out intelligently generated signals from space.

A year after Project Ozma's brief tenure, Drake convened at Green Bank the first scientific conference devoted to modern SETI. The handful of scientists who assembled there called themselves the Order of the Dolphin, choosing recent studies into human-dolphin communication as a worthy metaphor for the challenge of interspecies communications on a grander, cosmic scale.

Drake chalked on a blackboard seven topics for discussion, which would comprise the agenda for the weeklong meeting. They included stellar formation, planetary formation, the existence of habitable zones, the emergence of life, the evolution of intelligence, communications technology, and the longevity of technological civilizations.

Then Drake did something almost whimsical, which assured his lasting fame: he strung these seven factors together into an equation.

The idea was to multiply seven unknowns together, and in so doing, to estimate N, the number of communicative civilizations in our Milky Way galaxy. The Drake Equation, as it is now called, appears in every modern astronomy textbook. It is a marvelous tool for quantifying our ignorance: never intended for quantification, but quite useful in narrowing the search parameters. We still use it, not to seek a solution, but rather to help us in designing our searches for life.

Drake's seven factors are cleverly ordered, from solid to speculative. Today's astrobiology meetings are similarly sequenced. When first published, only the first factor (the rate of stellar formation) was known to any degree of certainty. In the intervening decades, the Equation has guided our research in an orderly manner, from left to right, so that today we have a pretty good handle on Drake Factors two and three (planetary formation, and habitable zones). The remaining four factors are still anybody's guess, and it may well take decades more before our research begins to quantify those areas of our ignorance. But the Drake Equation is most valuable in guiding our research, because it asks the important questions. It is still up to us to answer them.

Although the Drake Equation detractors miss the mark with regard to the intent of the tool, they do raise a valid point which is central to astrobiology: how can life, the chance result of a painfully long chain of highly improbably events, have possibly evolved elsewhere? One testable hypothesis, which the SETI experiment contemplates, is that it didn't have to.

The odds of life evolving elsewhere may be pretty long indeed. The best chance for SETI success may depend on the idea that life did not evolve *independently*, but was seeded everywhere through the mechanism of panspermia. No bioastronomer has yet disputed the possibility that microbial life can successfully traverse the distance between the stars, and thrive in a new planetary environment. So life need not generate in disparate regions independently -- a universe teeming with life merely requires one genesis event, coupled with a transport mechanism. That mechanism has been tentatively demonstrated in research by Chandra Wickramasinghe and the late Sir Fred Hoyle.

To me, microbial panspermia is a far more compelling explanation than the alien-progenitors-in-spaceships scenario, because it does not require that we warp the laws of nature, or contemplate technologies not in evidence. Perhaps we really *are* all brothers beneath the skin.

Were it not for Drake's Equation, astrobiologists today wouldn't even know which of these assumptions to attack. As it stands, Drake has given us a handle on where to start. Meanwhile, there remain those who quibble about quantifying seven factors which Drake intended us merely to contemplate. They help us to establish a low value for at least one Drake Equation factor: the fraction of lifeforms that manifest intelligence. ❖

Annual Report Available for Download

The SETI League's 2002 Annual Report, an overview of educational, scientific, technological and fiscal happenings during our eighth year of operation, was issued on 30 June 2003, and posted to our extensive website. It includes our independently audited financial statements for 2001 and 2002. From the main page <http://www.setileague.org>, scroll down to "Administrivia" and follow the Annual Report link. The 20-page Portable Document Format file is optimized to be printed on a color ink-jet printer. ❖

SETI League Director Elected to Astronautics Academy

Little Ferry, NJ.., August 2003 -- H. Paul Shuch, the author, educator and engineer who heads up a grassroots Search for Extra-Terrestrial Intelligence, has been elected a Corresponding Member of the International Academy of Astronautics (IAA). Dr. Shuch left a successful academic career in 1995 to become Executive Director of the newly founded SETI League, an international nonprofit organization. Since then, he as been responsible for planning and implementing The SETI League's educational, scientific, technology and outreach programs.

The IAA is a scientific institution devoted to fostering the development of astronautics for peaceful purposes, recognizing individuals who have distinguished themselves in a branch of science or technology related to astronautics, and providing programs through which the membership can contribute to international endeavors in the advancement of aerospace science. It was founded in Stockholm in 1960 by the noted aerodynamicist Dr. Theodore Von Karman.

With his election, Dr. Shuch joins 1141 distinguished space scientists and engineers from 60 countries, including four other SETI League members, in IAA membership. The Academy cooperates, exchanges and conducts joint meetings with national Academies, and prepares cosmic planning studies through its six Commissions. The Academy also organizes many independent international scientific meetings, such the Human in Space, Small Satellite Symposia, Low Cost Planetary Missions, Realistic Near-term Advanced Scientific Space Mission and Impact of Space Technology Innovation on Economic Development conferences.

Dr. Shuch ws appointed to the IAA's SETI Permanent Study Group in 2000, and serves as its Webmaster. He has presented papers at several IAA meetings in Europe, South and North America. He will be officially inducted into Academy membership at a luncheon to be held in Bremen, Germany in September.

SETI scientists seek to determine through microwave and optical measurements whether humankind is alone in the universe. Since Congress terminated NASA's SETI funding in 1993, The SETI League and other scientific groups have been attempting to privatize the research. Experimenters interested in participating in the search for intelligent alien life, or citizens wishing to help support it, should email to join@setileague.org, check the SETI League Web site at http://www.setileague.org, send a fax to +1 (201) 641-1771, or contact The SETI League, Inc. membership hotline at +1 (800) TAU-SETI. ❖

Patent Issued for VSA Technology

Little Ferry, NJ.., 15 July 2003 -- The SETI League, Inc., nonprofit leaders in a global Search for Extraterrestrial Intelligence, today received a US patent for a new microwave antenna design being used in the next generation of radio telescopes. The patent will enable SETI scientists to pursue commercial application of their technologies, hopefully generating funding to support their scientific efforts.

Patent Number 6,593,876, "Adaptive Microwave Antenna Array," covers circuitry for combining the signals from multiple small antennas (such as backyard satellite TV dishes) to economically duplicate the performance of much larger, costly single-dish antennas. The technique allows the array to reconfigure itself automatically under computer control, without physically moving individual antennas. It has been tested over the past three years by SETI League volunteers in their Very Small Array (VSA), a research prototype funded in part by grants from the American Astronomical Society and the American Radio Relay League. The grassroots organization currently lacks funding to implement its design in the long-planned Array2k telescope, but hopes that revenues generated by the new patent can bring it closer to full-scale realization of this new design.

The SETI League's patent application was not without controversy. Educational and scientific organizations typically share their technology freely, without seeking legal protection for their intellectual property. "Let me emphasize," states executive director Dr. H. Paul Shuch, "that it is the full intention of The SETI League, Inc. to offer blanket licensing of all our designs, at no fee whatever, to all bona-fide nonprofit users, worldwide and on a non-discriminatory basis. Just as other scientific organizations have freely and generously shared their technology with us, so will we continue to make available to our colleagues anything of value which we happen to develop."

Then why did he choose to pursue the patent on his design? Shuch explains, "Simply because The SETI League (like most such ventures) is operating on the slimmest strand of shoestring. Lacking government or corporate support, we are dependent upon our members for their modest membership dues and such additional contributions as their individual finances dictate. If there is, in fact, a potential for commercial exploitation of our work, we hope that it will generate sufficient funding to allow our continued existence as a viable organization."

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