



SearchLites

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The Quarterly Newsletter of The SETI League, Inc.

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One Huge Step for Man by Dr. H. Paul Shuch, Executive Director



James Cadle was, frankly, offended. It was July of 1969, and in the Sea of Tranquility, men from the planet Earth had first set foot upon the Moon. Then, they planted the US flag. The Illinois artist considered himself a loyal American. Still, he was disturbed by this blatant show of nationalism. True, it was nationalism that motivated the Space Race, but with the race now won, wasn't it time to put all that behind us?

Putting palette before patriotism, Cadle created the Flag of Earth, a banner which he hoped would grace future space missions. Its yellow, blue and white circles, on a field black as space, starkly represented the Sun, Earth and Moon. His dream was to further the sentiment expressed on the plaque left behind by Apollo Eleven: Here Men from the Planet Earth First Set Foot Upon the Moon.

The Flag never successfully penetrated the NASA bureaucracy, but it began to permeate public consciousness. Copyrighted in 1970 and distributed through Cadle's newly-formed company Flag of Earth International, it came to symbolize for me the global nature of SETI science. Today, the Flag of Earth flies from every major SETI facility in the world, including The SETI League's moonbounce beacon, the Very Small Array, and many of our Project Argus stations.

Although he copyrighted and commercialized his Flag, Cadle never envisioned it as a path to profits. He has always offered it at reasonable cost, never charged shipping or handling fees, and consistently maintained its quality by personally supervising the production of each and every Flag of Earth.

On November 1, 2003, James Cadle transferred the Flag of Earth copyright into the public domain. Soon, you may begin to see it appearing on bumper stickers, t-shirts, and coffee mugs sold at souvenir stands around the planet. Nothing could please the artist more than to see his symbol universally adopted.

Still, we in The SETI League will continue to purchase our flags from Flag of Earth International <www.flagofearth.com>, and we encourage our members to do the same. It's the least we can do for James Cadle, who gave us our global banner, and has now given us his copyright.

That's one *huge* step for man.



Executive Director's Annual Message

Dear SETI Supporters,

Although it always pleases me to address you about SETI science and technology, in recent years my annual messages have concentrated more on financial news. I am afraid this year is no exception, although I am glad to have good news to share with you this time around.

Good news, however, is a double-edged sword. I am pleased to be able to report that, for the first time in four years, The SETI League has concluded Calendar Year 2003 in the black. But I must honestly tell you that the only thing saving us from the prevailing deficit of the past several years is the uncommon generosity of a single individual. During 2003, with financial insolvency looming large, our most generous supporter dug deep, and increased his already substantial annual pledge of support by a whopping \$50,000. Thus, we live to carry on our search for another year.

It's been a good year, as far as our educational, scientific, and technological efforts are concerned, as you will read in the pages of our upcoming Annual Report. I am very proud of what you, our members and supporters, have accomplished on but a single strand of a shoestring. But as your reputed Chief Scientist, I continue to be frustrated by what has become the reality of the new century: an ever-increasing portion of my time and attention is being diverted away from SETI science, and toward financial crisis management.

Yes, we have managed to contain costs significantly, through expanded use of electronic media, and decreasing reliance upon printing and post to distribute SETI materials around the world. And yes, we continue to be the world's pre-eminent grassroots scientific endeavor. But the roots seem to be withering. During 2003, fully 86 percent of The SETI League's revenues came from the pockets of just three incredibly generous donors.

Not that I am ungrateful to these giants of SETI privatization. But if we, as a global organization, are to fulfill our mission, we are going to need the modest contributions of several thousand more supporters. Our membership is lagging alarmingly. Show me that our interest is not. Together, we will yet achieve Contact.

Yours for SETI Success,
H. Paul Shuch, Ph.D.

Editorial:

SETI and the Environment

by H. Paul Shuch, Ph.D.
Executive Director

The preservation of Earth's environment, and responsibly husbanding her finite resources, are concerns on the minds of every thinking and caring human. We in The SETI League are no exception, though we are not exactly environmental scientists. Or are we? While most believe that the answers to the preservation of our home world must come from the minds of women and men, let me posit the radical notion that some of those answers might come from space.

The long-held conviction of humankind being alone in the cosmos is finally falling into disfavor. Once solely the province of science fiction authors, today the concept of a universe teeming with life is becoming the accepted scientific paradigm. And since even the most skeptical astronomers note that ours is a relatively young planet orbiting a merely middle-aged star, it is generally held that neighboring civilizations, warmed by the fusion fires of distant suns, are likely to be far older than we.

Does older necessary denote wiser? Just possibly, if other worlds have been faced with their own fair share of environmental crises. Because only the wise survive, and those who have answered nature's challenges may well build stable societies that can live for as long as stars burn.

So where does SETI fit into this picture? By adopting a perspective broader than John Lennon's. Imagine a cosmic community of older, wiser civilizations, who have learned to preserve the resources of their home worlds, and live in harmony with nature. Imagine that they have devised means to communicate, and have pooled their collective knowledge into something akin to the fabled Encyclopedia Galactica. Now imagine that our technology will enable us some day to tap into that database. Might we find there the wisdom of the ages, and learn to apply it to planetary protection?

I live on Earth's northern hemisphere, where it is now getting to be spring. Spring is the season of renewal. It is at this time of year that we celebrate Earth Day, and it was on Earth Day just eight years ago that The SETI League launched its *Project Argus* all-sky survey. We began by seeking mere existence proof, evidence that our cosmic companions choose to communicate by means which we can recognize. We have yet to detect that evidence, but that does not deter us. Because beyond contact lies communication, and the opportunity to avail ourselves of the collective wisdom and knowledge of countless worlds.

Or, perhaps there is no Encyclopedia Galactica. Maybe they aren't there at all, because they squandered their planet's resources as foolishly as we seem to be squandering ours. In which case, we're all alone, and on our own. And if, through lack of evidence, SETI science eventually reaches that pessimistic conclusion, then don't we have an obligation to treat our fragile spaceship Earth with a bit more reverence? ❖

EuroSETI04 Science and Technology Workshop

March 26-28, 2004, Heppenheim Germany



EuroSETI04, The SETI League's first European **SETI Science and Technology Workshop**, is scheduled to run from 26 to 28 March 2004. The *EuroSETI04* program will include a keynote speech, lectures, workshops, panel discussions, and related activities. Academic papers will be presented on a variety of topics related to the scientific Search for Extra-Terrestrial Intelligence. A formal Proceedings is being published, and various social events are scheduled, to encourage further collaboration between SETI researchers, enthusiasts, and SETI League members throughout Europe.

EuroSETI04 is being hosted by the Starkenburg Observatory, Heppenheim Germany. Full *EuroSETI04* details, including registration and lodging, transportation, and special activities, are posted to The SETI League website, at <http://www.setileague.org/seticon/euro2004.htm>. ❖

What Do You Want From Your Website?

by Dr. H. Paul Shuch, Executive Director

Perhaps you are familiar with GuideStar, the nonprofit organization that exists to serve the organizational and financial needs of other nonprofit organizations (including The SETI League). They conducted an interesting survey recently, of both those who run nonprofit websites and those who contribute to nonprofits. I was one of the webmasters asked to participate. The survey found an interesting disconnect in the two groups' expectations for a website.

The GuideStar survey listed about a dozen areas of website content, and asked members of both groups to rank them in terms of importance. The donor group ranked "information about how the charity spends my contributions" firmly in first place. By contrast, that was number 7 on the list for nonprofit webmasters.

This got me to thinking. There's a wealth of financial information on The SETI League website, but it's scattered all around, and it takes a good detective to sleuth it all out.

Not any more. Last year we added a new section of The SETI League website, pulling all our financial information together in one place. Browse to www.setileague.org/finances and it's all linked from there. Everything from budgets to audits to grants to tax returns to annual reports. We even list you, our generous donors (unless you prefer to remain anonymous). Let me know if you find this section useful, and if there's anything else you'd like to see added.

Now that you know how we use your generous membership contributions, it's up to you to keep them coming! ❖

Announcing our SETICon04 Banquet Speaker

The SETI League and the 11th International Ham Radio Moonbounce Conference are pleased to announce that they have scheduled **Prof. Joseph Taylor, K1JT** as featured speaker at their joint Banquet on 7 August 2004. Dr. Taylor, Professor of Physics and former Dean of Faculty at Princeton University, shared the 1993 Nobel Prize in Physics with his former student Russell Hulse, for research stemming from their discovery at the Arecibo Observatory of binary pulsars.

Joe Taylor is both a world-class radio astronomer and a lifelong radio amateur, well known for his development of the WSJT and JT-44 digital communications modes being used for moonbounce, meteor scatter and tropo-scatter contacts worldwide. Using his own software and a modest station, he regularly places well in ARRL VHF/UHF and Moonbounce Contests. He routinely acknowledges the prominent role which his amateur radio background has played in his professional and academic success, and can be expected to touch on the important contributions still to be made by dedicated amateurs in the fields of radio astronomy and SETI.

The SETICon04 banquet is sure to be a sellout, and tickets will likely not be available at the door. You are encouraged to pre-register for this year's banquet by 30 June 2004. ❖

Event Horizon

March 12 - 14, 2004: Contact 2004 - Mars, Myth and Reality, Mountain View CA.

March 19 - 21, 2004: Lunacon 2004, Rye NY.

March 26 - 28, 2004: EuroSETI04 Science and Technology Workshop, Heppenheim Germany.

March 30, 2004: Dr. SETI ® presents *Sing a Song of SETI* at the Starkenburg Observatory, Heppenheim Germany.

April 16 - 18, 2004: 30th Annual Eastern VHF/UHF Conference, Enfield CT.

April 17, 2004, 0000 UTC - 2359 UTC: Sixth annual SETI League Ham Radio QSO Party, 14.204, 21.306, and 28.408 MHz.

April 23 - 24, 2004: 8th Annual Southeastern VHF Society Conference, Atlanta GA.

May 1 - 2, 2004: 29th Annual Trenton Computer Festival, Edison NJ.

May 28 - 31, 2004: Balticon 38, Baltimore MD.

June 28 - 30, 2004: SARA Conference, NRAO Green Bank WV.

July 12 - 16, 2004: Bioastronomy 2004: Search for Habitable Worlds, Reykjavik Iceland.

July 22 - 25, 2004: Central States VHF Conference, Mississauga, Ontario, 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 4 World Science Fiction Convention, Boston MA.

October 4 - 8, 2004: 55th International Astronautical Congress, Vancouver BC Canada.

December 10 - 12, 2004: Philcon '04, Philadelphia PA.

August 4 - 8, 2005: Interaction World Science Fiction Convention, Glasgow, Scotland UK.

October 17 - 21, 2005: 56th International Astronautical Congress, Fukuoka, Japan. ❖

Ask Dr. SETI®

Dear Dr. SETI:

How far is a parsec?

Anonymous

The Doctor Responds:

Short, sweet, and to the point, Anonymous.

Usually, when someone declines to sign a name to a query, it is because he or she is afraid to show ignorance. In this case, however, your question reveals a good deal of knowledge, so you should not have been hesitant to sign your name. Specifically, the wording of your question shows that you know a parsec is a unit of distance. This puts you at the head of the class -- and way ahead of those scriptwriters in Hollywood who seem to think that parsec is a unit of time.

The above is, of course, a direct reference to everybody's favorite science fiction action-adventure movie, the 1977 classic "Star Wars." In illuminating the speed of his beloved ship, pilot Han Solo boasts that the Millennium Falcon completed the Kessel run in under twelve parsecs. Any space pilot worth his wings would have known better. Star Wars fans have ever since tried to rationalize the error, by claiming that the shortest distance between two points in hyperspace is not a straight line at all, and thus by reducing the distance to 'under twelve parsecs', Solo was proving the abilities of his ship, and his piloting skills. But, I digress.

The short answer, Anonymous, is that one parsec equals about 3.26 light years. But you probably wanted to know how it was derived. (If you didn't, you wouldn't still be reading this, would you?) OK, so here's the long answer.

Parsec stands for *parallax-second*. Let's define the *parallax* part first, and then deal with the *second* (which I'll admit sounds like a unit of time, thus confusing Han Solo, but really isn't. Bear with me, please.)

It's pretty hard to directly measure interstellar distances from Earth. I mean, who are you going to get to hold the other end of the tape measure? So, we measure them indirectly. One useful technique involves the concept of parallax. But before we go there, we have to talk about the orbit of the Earth.

Try to picture the Earth orbiting the Sun. Let's assume we go around in a perfectly circular orbit. (OK, I know Kepler said it's really an ellipse with the Sun at one focus, but humor me here...) The radius of the Earth's orbit (or, more properly, the distance from the center of mass of the Earth to the center of mass of the Sun) is a distance which we call one Astronomical Unit, or AU. Remember that it takes us one year to orbit the Sun. So, if you picture the position of the Earth right now, where will it be in exactly six months? Why, on the exact *opposite* side of the Sun, of course. So the Earth has moved to a new location in six months' time. And how far is that location from where we started? Two orbital radii, or one orbital diameter, or two AU away.

In case you were wondering, one AU is about 150 million kilometers, so the opposite sides of the Earth's orbit are about 300 million kilometers apart.

Now, we have established that in a six month period, the position of the Earth shifts two AU. Because of the Earth's motion around the Sun, if we look at a distant star right now, and then sight the exact same star six months later (from our new vantage point of two AU away), then the location of that star will appear to have moved. Actually, it is we who have

moved, but being geocentric creatures, we perceive stellar motion. We call this apparent motion the star's *parallax*. The angular change in apparent position of that distant star is called *parallax angle*.

We could choose to measure the parallax angle in radians, or degrees, or arc-minutes, or arc-seconds, or any other unit of angular measure. Let's agree to measure parallax angle in seconds of arc (one arc-second is 1/3600 of a degree, or about five millionths of a radian -- in other words, a small angle!) Notice that I'm saying seconds of *arc*, not seconds of *time*.

Parallax angle can be used as a rough measure of distance, because the closer to Earth the object being viewed, the greater the observed parallax (and conversely, the further the object is from Earth, the less parallax will be observed). You can prove this to yourself by holding your thumb up at arm's length, and looking at it alternately with your right eye and your left eye. See, your thumb seems to move! Now, bring your thumb closer to your face, and repeat the experiment. Your thumb seems to move *even more*.

Similarly, as the Earth goes around the Sun, a very nearby object would have a very large parallax angle -- perhaps measured in degrees. Conversely, a very distant one -- say, another galaxy -- might exhibit a tiny parallax angle -- maybe on the order of a millionth of a degree, or less. (This is, in fact, exactly how we know the relative distances to different objects in interstellar space.) Well, it stands to reason that, at some intermediate distance, there could be an object which exhibits exactly one arc-second of parallax over a six month period. We call this unique distance one *parallax-second*, or *parsec*.

Finally, since one light year equals about 9.46 million million kilometers, and we said a parsec is 3.26 light years, simple multiplication tells us that one parsec is a distance of almost 31 million million kilometers. A long distance, to be sure!

But don't forget that our nearest neighboring stars are about 4.2 light years away. And that's greater than a parsec (actually, it's nearly 1.3 parsecs). So how many stars are there within one parsec of Earth?

Only one: the Sun.

No Chance for a Dialog

Dear Dr. SETI:

I read with interest your analysis of a twin Acrecibo communication system. One thing puzzles me. Although the reception of SETI signals would be very interesting, how could any two way communication be of any interest when there is likely to be a human lifetime between question and answer?

Peter, via email

The Doctor Responds:

Yes, Peter, it's true that interstellar propagation can take decades, or centuries. So think of interstellar communications not as a dialog, but rather as a series of successive monologues. Or, perhaps, not as a dialog between individuals, but rather as a dialogue between cultures. One needs to adopt the long view, and approach the enterprise from a societal perspective. The whole SETI effort is rather like the ancient fable of the old man planting a tree, even though he knows he will never sit in its shade.

With that in mind, let's go plant a tree!



Book Review

The Listeners, by James E. Gunn (2004 edition)

Reviewed by H. Paul Shuch, Ph. D.

The search for intelligent signals from space was Robert MacDonald's lonely life's work. Today, he would not be quite so alone, as many of us have been privileged to follow in his fictional footsteps. Indeed, in the three decades since The Listeners was first published, SETI has grown from an obsession of a handful of scientists working at the fringe, into a household word pursued by literally millions of amateur and professional enthusiasts. And yet, we have yet to uncover the Call from Capella, which was central to the plot of this science fiction classic. Perhaps we never will.

The widespread public interest and support which SETI now enjoys is indeed a tribute to human optimism. It also speaks volumes about Gunn's novel, recently reissued by BenBella Books, of Dallas TX, for this is the book that inspired a generation of SETI scientists to pursue the seemingly impossible. Many of us decided early on that we wanted to be Robert MacDonald when we grew up. And, if we ever do grow up, one or more of us may someday achieve that goal.

The SETI Institute's Tom Pierson notes in an insightful Introduction to this new edition that the growth in our technological prowess since Jim Gunn first penned this book has been astronomical. Our searches today are just beginning to approach the sensitivity of Big Ear (Gunn's fictional space-based one, not the recently demolished radio telescope of the same name at Ohio State University). Our computerized signal analysis hardware and software are expanding the search space to include most of the microwave spectrum, as well as significant segments in the infrared and optical regions. Soon, the entire electromagnetic realm will reveal her secrets to us -- all we need do is wait. Perhaps, as MacDonald did, for most of our lives.

More important, maybe, than our technological prowess is our societal progress. For the notion of humankind's uniqueness in the Universe is falling into disfavor (due, in large part, to this very novel!) The idea that we are but one civilization amongst the many is fast becoming the accepted paradigm. For my children's generation, the burning question is no longer *whether* we will achieve contact with our cosmic companions, but rather *when*.

A major shift in funding has occurred in the years since The Listeners first saw print. What Jim Gunn envisioned as a massive Government-sponsored project has gone grass-roots. Indeed, since the lamented day over ten years ago that Congress cancelled the NASA SETI program, thousands of radio amateurs and signal processing experimenters have turned their own modest backyard dishes toward the stars. Millions of ordinary citizens have lent their spare computer cycles to the process of analyzing data from the world's greatest radio telescope (the very one Robert MacDonald used in Gunn's story). And a handful of dedicated industrialists have financed the design and construction of arrays grander and more sensitive than those contemplated in fiction. SETI is truly the science that refuses to die.

We who dedicate our lives to The Search well realize that ours may be, like MacDonald's, a multi-generational effort. We can only dream large, as Jim Gunn has taught us to do, and count the days (or centuries) until our dreams are realized.

Tutorial:

Levels of Significance

As most Project Argus participants already know, what our radio telescopes receive, most of the time, is noise (Karl Jansky, arguably the world's first radio astronomer, called it 'Cosmic Static'). The noise level coming out of your receiver is not constant. Rather, it varies up and down around an average level (the mean), by an amount determined by the variability of the noise (its standard deviation). Sigma is statistical terminology for the number of standard deviations away from the mean a given observation is.

When we do statistical analysis of signals, we typically measure the variability of the background noise, calculate how much signal strength one standard deviation (one sigma) would be, and then determine by exactly how many times that amount the signal exceeds the noise. This is the signal's significance: the more sigmas, the more credible the signal.

For example, if the receiver had a fixed noise level that varied within the range of plus or minus 3 dB, about 98% of the time, we would calculate that one standard deviation (one sigma) of change would be about one dB. Now, if a signal were 10 dB out of the noise, with one sigma being 1 dB, we could say that the signal was ten sigma above the noise.

For your information, the famous Ohio State University "Wow!" signal of 15 August 1997 was about 30 sigma -- a really strong signal! The probability that a 30-sigma event could occur at random is pretty close to zero. For our purposes, a signal that is six standard deviations above the background noise (that is, a six-sigma event) is generally considered to be credible, non-random, and worthy of further analysis.

Why six sigma? It's admittedly arbitrary, but if we set our decision rule too low (say, three sigma), we run the risk of having too many false positives. That is, every noise spike that comes along gets tagged as a real signal, and we spend all our time and resources chasing ghosts. On the other hand, if we set the decision rule too high (say, twenty sigma), we run the risk of throwing out the baby with the bath water, have an unacceptably high incidence of false negatives, and may thus miss ET's call altogether.

Unfortunately, since most of us doing amateur SETI have not done statistical analysis on the receiver noise, we are generally not equipped to quantify the statistical significance of a detection, in terms of how many sigma a given event may have reached. It's much easier for us to calculate how many dB out of the noise a signal is than by how many sigma it exceeds the noise. That is why we test significance of our signals in other ways, such as by striving for multiple, independent confirmations by distant stations.

Of course, those of our members who have the ability to do statistical analysis of receiver noise are encouraged to do so. That would give us just one more analytical tool for testing the significance of a detection. ❖

Editor's Note: Through a special arrangement with the publisher, members in good standing of The SETI League, Inc. may order copies of Jim Gunn's *The Listeners* (see review at left) for \$15.00 US, postpaid worldwide. Please use the ordering form on the back page of this issue of *SearchLites*. ❖

Is Mars Ours?

**The logistics and ethics of colonizing the red planet
by David Grinspoon**

from Slate Magazine, used by permission

What a joy and a relief that we're back on Mars. The fourth stone from the sun has taunted us for centuries with shifting but persistent visions of nearby alien life. Finally, after several conspicuous failures, we have a conspicuous success: a six-wheeled, mini-Cooper-sized robot preparing to crawl across an ancient lake-bed, scratching and sniffing for subtle signs of past habitability.

What we will do on Mars for the next few months and, with future missions, for the rest of the decade, is clear: dig in the dirt and take in the air to learn the history of landscapes far more ancient than any left on Earth.

But what should we plan to do on Mars over the following decades, centuries, and millennia? The Mars Society, an organization dedicated to the proposition that we must send people to Mars ASAP, has an answer: build enclosed colonies there in the next few decades. Then, later in the century, begin to "terraform" Mars—this means altering the air and surface, turning the red planet blue and green, making it habitable and remaking it in the Earth's image. After that, we'll wander there without giant protective domes or even Mars suits.

Reflexively, I am sympathetic. After all, I was a teenage space activist. I grew up high on the miracle of Apollo and the wonders of Clarke's 2001. My high-school friends and I felt part of a community of smart, forward-looking space and technology freaks. We flocked to grok Spock at science fiction conventions, and we eagerly joined the L5 Society, which is committed to beginning the human migration to space. L5—a stable point in empty space where the gravities of Earth and Moon are balanced, so objects, including space colonies, will stay put forever—was where we would build the first colony. We thought that we might live up there as adults. Our slogan then was "L5 in '95!"

Yet the disconnect between my youthful space idealism and at least some of today's more zealous advocates of the "humans to Mars" movement became evident when I attended the "Ethics of Terraforming" panel discussion at the founding convention of the Mars Society, held in Boulder, Colo., in August 1998. This event was hailed as the "Woodstock of Mars," and although there wasn't any rolling in the mud, there may have been some bad acid in the water supply, judging from some of the loose talk spilling from the stage.

Bob Zubrin, Mars Society President, stated that mankind has a duty to terraform Mars, that given the choice between letting Mars remain the sorry planet that it is and transforming it in Earth's image, we have a moral obligation to do the latter. He added that it is the

Western tradition to expand continually and to value humans above nature, that "this is the only system of values that has created a society worth living in."

These comments were amplified by panelist Lowell Wood, an architect of Reagan-era "Star Wars" space-based weapons plans. Wood stated confidently that terraforming Mars will happen in the 21st century. "It is the manifest destiny of the human race!" he declared and went on to boast, "In this country we are the builders of new worlds. In this country we took a raw wilderness and turned it into the shining city on the hill of our world." To hell with terraforming: It seemed that we were discussing the Ameriforming of Mars.

Hearing these words, my heart sank. Is this really the way we want to frame our dreams of inhabiting Mars? Maybe these guys are simply not aware of the historical use of this phrase and its negative connotations, I thought. This hope vanished when Zubrin leapt to the defense of Manifest Destiny, shouting, "By developing the American West we have created a place that millions of Mexicans are trying to get into!" to a smattering of applause (and some gasps of disbelief) from the crowd.

Zubrin has written that we need to go to Mars because it will serve the same function that "pioneering the West" did for American civilization, creating jobs and opportunity and relieving population pressure. If there were an award for "most unfortunate choice of analogies," this should win. It is historically inaccurate, culturally clueless, and fails to capture some of the most compelling reasons why we really should consider someday bringing Mars to life by inhabiting it and perhaps eventually altering its environment with (and for) living creatures.

As of this writing, Mars has no people to be displaced. A better analogy is the original peopling of the Earth. The Mars colonists will be more like those brave souls first venturing from Africa 50,000 years ago than the European invaders of the American West. On Mars and beyond, we may have the opportunity to explore lands that are truly unoccupied, giving outlet to our need to explore without trampling on others.

Of course, it's possible that Mars is already inhabited by some kind of creature, and that could radically change the ethical landscape for future human activities. Perhaps some primitive bacteria, or the Martian equivalent, are living large in an underground hot spring, safe from the dry, freezing, irradiated surface. This is why we need to first proceed with our current robotic explorers, to make sure that Mars, today, really is as dead as it looks.

If it is, then bringing life there—humans, trees, fish, and slime-mold, say—will be the right thing to do. Why? If you find an unused, vacant lot, isn't it worthwhile to plant a garden there? Furthermore, as long as we are a single-planet species, we are vulnerable to extinction by a planetwide catastrophe, natural or self-

induced. Once we become a multiplanet species, our chances to live long and prosper will take a huge leap skyward.

Today on Earth we are grappling with the fact that you cannot "conquer" a planet, even if—especially if—it is your home and your life support system. If we go to Mars with the idea that we can charge ahead and subdue a new world, our efforts are doomed. We should rather study how we might learn to help cultivate a Martian Biosphere that is balanced and self-sustaining, as is the Earth's. (On the other hand, the conquering mentality would save us time and money. We could skip planting the Martian forests, which would eventually be chopped down anyway, and go straight to sprawling developments of condos, strip malls, Starbucks, and Blockbuster Videos.)

But the future peopling of Mars is much more than a scientific endeavor. It is a step of historic and spiritual importance for the human race. Any group that seeks to garner support for human journeys to Mars must reassure people that this goal is broadly humanistic and environmentally conscientious. There is no reason why this can't be the case. The fanatical comments quoted above do not represent the majority view of Mars Society members; some are credible, thoughtful activists with an inclusive vision more likely to win wide support for continued Mars exploration. I hope they succeed in burying the "pioneering the West" analogy before it does any more damage to the cause. While we're at it, let's retire the word "colonization," which carries a permanent stain, and talk instead about the "cultivation" or "animation" or "peopling" of Mars. I know that some of you Mars hounds will dismiss the above as a bunch of PC nonsense. Fine, but it's your movement that is not yet taking the world by storm.

Some extremists have even proposed that we "claim" Mars for the United States, although there is a U.N. (remember them?) treaty that expressly forbids this. Many others have been engaged, at Mars Society conventions, in thoughtful discussions about what kind of governing constitution would be appropriate for the first settlements beyond the Earth.

Is Mars ours for the taking? Do we have a right to it? Not to be too Clintonian, but the answer may depend on what we mean by "we." Mars does not belong to "America," nor to Earth, nor to human beings. But if by "we," we mean "life," then yes, Mars belongs to us because this universe belongs to life. I mean, without us, what's the point? But before we go there and set up greenhouses, dance clubs, and falafel stands, let's make sure that, in some subtle form that could be harmed by the human hubbub, life does not already exist there. If not, then by all means build cities, plant forests and fill lakes and streams with trout—bring life to Mars and Mars to life. We'll then be the Martians we've been dreaming about for all these years. ❖

Introducing:

The SETI League's Volunteer Coordinator for Tunisia

Name: Hamdi Mani

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Interests: I am a University student extremely interested in Radio Astronomy, SETI, cosmology, mathematics, electronics and computer science.

SETI Activities: I am building my first amateur radio telescope; it will be used to do radio astronomy and SETI, and I hope to be part of the Argus Project. I am a member in SARA, the Society of Amateur Radio Astronomers. I will fill out the Project Argus Participant Survey form as soon as I finish building the first version of my Argus station.

I am subscribing to the ARGUS technical email list because I believe it can be a very interesting source of ideas and help for me.

Future Plans: convincing the government of my country to start building a professional research facility that will be used for radio astronomy and SETI. I am also looking to make my country participate in international projects like the Square Kilometer Array radio telescope and other research projects.

I am looking to become a very active member within the SETI League. Finally, I would like to thank you again for accepting me into your organization. I am proud to be the first member from Tunisia.

Best Regards,
Hamdi



Executive director H. Paul Shuch presents the European Radio Astronomy Club's DSP-FFT Award, their highest honor, to SETI League founder and president Richard Factor (see the Winter 2004 *SearchLites* for details). ❖



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