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Allen Telescope Disarray

By H. Paul Shuch, Executive Director Emeritus

The Allen Telescope Array was to have been the world's greatest radio telescope, a field of 6-meter parabolic dishes stretching across the California countryside, eventually growing to 350 in number, tasked with fulltime SETI observations. Thus, the dismay of the scientific community was palpable, when it was announced in April of 2011 that the whole facility was being temporarily put into cold storage.

Not that I was particularly surprised at this turn of events. The ATA was a joint initiative of two fine organizations. One player is the nonprofit SETI Institute (a California alliance of professional astronomers, engineers, physicists, and astrobiologists, not to be confused with The SETI League, our own global alliance of radio amateurs and experimenters). They partnered with the Radio Astronomy Laboratory at the University of California, Berkeley (my own alma mater, and arguably the world's premiere institution of higher learning). The project had received significant and generous funding from such industry icons as Paul Allen, co-founder of Microsoft, and Nathan Myhrvold, the Princeton astrophysicist turned intellectual property entrepreneur. It had received somewhat more modest funding from a host of enthusiastic donors, including The SETI League's own president, Richard Factor, WA2IKL. With 42 antennas up and running, the facility was already doing credible science, when the money ran out.

The array had set its donors back on the order of $50 Million, which works out to in excess of a megabuck per antenna (just a bit pricey for an oversized satellite dish). Still, one must consider that most of that sum was spent not on concrete and steel, but rather on research and development -- plus, the not inconsiderable cost of operations. And, eventual expansion of the array to its planned 350 elements notwithstanding, it was those operating costs (or rather, the lack thereof) that ultimately pushed the project into its present hiatus.

The SETI League can sympathize. A decade ago, we launched our own very modest effort at combining satellite dishes into a research-grade telescope. The Very Small Array was never completed, although we did get eight small dishes up and running, and proof-of-concept hardware and software tested, before we too ran out of money. Our budget was less than stellar -- the project consumed about ten thousand of your generously donated dollars. It wasn't nearly enough. Thus, we too had to put our array on hiatus -- but not before I managed to score a patent on the underlying technology. I assigned that patent to The SETI League, in hopes that commercializing it might generate revenues sufficient to support our humble scientific efforts. Unfortunately, the dot-com bubble burst before anyone beat a path to our door.

To turn their own array back on, our California colleagues need to raise some five million dollars. I just checked my wallet, and I don't have quite that much cash to spare. As for the VSA, the SETI League would need another $20k to finish the project. That sum too exceeds the contents of my wallet -- by several orders of magnitude.

So, I'm asking you to check your own wallet. Have you an extra 5 megabucks, to fund a couple of years of ATA operation? If so, I encourage you to step forward, and help restart SETI's finest observational instrument. Or, do you maybe have a couple of kilobucks to throw into the Very Small Array? Send it along to The SETI League, and I'll be happy to resume work on that suspended project.

You say neither project is within your financial reach? I understand completely -- I'm in the same situation. If possible, I'm asking you to dig not quite so deeply. A $50 membership in The SETI League (and an equivalent contribution to the SETI Institute's Team SETI) will be a worthy show of support. Besides, if a few thousand others will follow your lead, both organizations (and their respective technology projects) will find themselves back on the road toward SETI success.

Guest Editorial:

Rationale for METI

by Alexander L. Zaitsev
Institute of Radio Engineering
Russian Academy of Science

More than 40 years ago, Nicholay Kardashev expressed the profound idea that the transmission of information into the Cosmos, addressed to supposed "brothers on reason," is a vital and a natural need of highly developed civilizations. He wrote: "There are reasons to believe that transmission of information is one of the basic conditions of existence for super-civilizations". It is clear that Messaging to Extraterrestrial Intelligence (METI) is treated not as "bait" to attract other civilizations and to ensure the success of terrestrial searching, but as something immeasurably greater: namely, as one of the fundamental requirements of an advanced civilization.

Extremely interesting is the historical aspect of the problem. We give only two examples among many. In the early years of the 19th century, Carl Gauss was thinking about how to tell aliens of the existence of intelligent beings on Earth. In 1896 Konstantin Tsiolkovsky published in the weekly Kaluga Herald an article on the same topic. The main question related to these and many similar projects is how to understand the interest of the outstanding scientists of the past to this problem. The issue is not as simple as it seems at first glance. It cannot be attributed merely to possible eccentricities of those noted scientists.

METI and the Great Silence

In 1999, after the development and transmission by us from Evpatoria of the first multi-page interstellar radio messages *Cosmic Call*, the late Steven Ostro, the American authority in the field of radar studies of asteroids and comets, sent us his unpublished work: Project Moonbeam: An Omnidirectional Radio Beacon for the Lunar Farside. In this JPL paper, he proposed to create a powerful beacon for regular interstellar broadcasts. Particularly memorable is a phrase that deserves to be a maxim: "We might conclude that it is better to give than to receive, and that the war on Great Silence must begin at home". The sooner that terrestrial planetary consciousness begins to understand and accept this idea, the better!

The various SETI programs have spent hundreds of times longer in searching than all METI programs have spent transmitting. This paradoxical disparity of effort, a passionate desire to receive and no corresponding attempt to give, I have subsequently called *The SETI Paradox*. A trivial consequence of this paradox is an explanation of the Silence of the Universe: "If not only earthly but also other planetary consciousness are so inclined that they prefer to receive rather than give, the search does not make sense, because the Universe is silent".

Another conceivable reason for Silence is intimidation of our society, by scientists and science-fiction writers who seriously consider the threat of alien invasion. In a previous article, we said about this, "we subscribe to one possible solution to the Fermi Paradox: Suppose each extraterrestrial civilization in the Milky Way has been frightened by its own SETI leaders into believing that sending messages to other stars is just too risky. Then it is possible we live in a galaxy where everyone is listening and no one is speaking. In order to learn of each others' existence - and science - someone has to make the first move."

It is necessary to understand and remember that the transmission of interstellar radio messages from the Earth is as meaningful as is our own search for radio messages from other civilizations. If because of hysteria over possible alien invasion we would ban those who engage in METI, calling their actions irresponsible and reckless to the point of idiocy, then the question arises - just whose messages are the various SETI groups seeking? Does the acronym "SETI" imply the Search for Extra-Terrestrial Idiots?

Isolationism as a possible cause of extinction of civilizations

Sebastian von Hoerner in the 1960s indicated that "apathy" or "Loss of Interest" could lead to the extinction of advanced civilizations. The Russian language has a colloquial phrase that translates to "one-man island." I cannot speak for all, but I do not want to live in a cocoon, in a "one-man island," without the option of sending a messages outside. Such a life is not particularly interesting!

Any prohibition of message transmission converts the Earth into a "one-civilization island." I think that it is not interesting for inhabitants to live in such enforced self-isolation, in such a lurker-like status. Any civilization which is forced to hide and tremble because of far-fetched fears, is doomed to extinction.

We conclude that the struggle against *one* mythical ET-threat by means of prohibition of any Radar Astronomy transmission, and any sending of messages to ETIs, creates *two* very real problems: defenselessness in the face of asteroid hazards, and the threat of extinction due to the self-isolated civilization's own apathy.

Space Renaissance: The beginning, not the end
by Space Renaissance International

Concluding its first conference, the Space Renaissance International (SRI) declared that no matter what some pundits claimed with the final flight of the U.S. Space Shuttle, the work of expanding human civilization beyond Earth is just beginning.

In his remarks to this, the first known such congress held entirely on the Internet, SRI founder and president Adriano Autino said: "This is the end of an age: the age of space used for Earth. And a new age is beginning: the age of space used for human development outside Earth -- the age of Space Renaissance."

The SRI Congress was represented not only by members of the young organization but by curious supporters of worldwide cooperation in matters of space development. In response to the current question "Why go there," SRI member Rob Hunt recalled a statement made by X-Prize founder Peter Diamandis in a TED talk a few years ago. Hunt reported that Diamandis said, "There are three motivators for space development: 1. Curiosity, 2. Fear of global disasters, and 3. Profit." Hunt concluded that all three can be addressed by SRI philosophy.

And what is "SRI Philosophy?" According to the SRI Manifesto, published in 2009, it is grounded in the concept of "Astronautic Humanism" described by Dr. Marco C. Bernasconi: "Astronautical Humanism is based on a scientific view of the Universe, and naturally arrives to a system-oriented, evolutionary approach." Characteristic of astronautic humanism is that human civilization must look up at the stars and not down at our feet. Efforts to conserve the finite resources of this one planet should, and must, continue, but with the clear understanding that Earth will inevitably exhaust them. Steps must be taken starting now to extend the reach of humanity not only to visit other worlds but to establish a permanent presence.

One product of the SRI Congress was the adoption of three specific and concrete projects: first, to assess global civilization risk and countermeasures and communicate with all the scientific and nonscientific communities potentially interested in analyzing the future of civilization and the related challenges; second, to investigate different space business lines and provide solid analyses and priorities for industrial development outside the Earth envelope; third, develop a "Virtual Orbital Space Settlement Project," which will provide a realistic dream environment to communicate with all who would like to experiment with life in an orbital city. This will provide a virtual model upon which a real orbiting space settlement can be constructed in actual space. This project is already under way and attracting attention.

Plans are to make a transcript of the entire four-day SRI Congress available online, but in the meantime, anyone interested in the goals and ambitions of SRI and becoming a member can go to the Space Renaissance Initiative website, www.SpaceRenaissance.org, for more complete information. ❖

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.

October 3 - 7, 2011: *62nd International Astronautical Congress*, Cape Town, South Africa.
April 21, 2012, 0000 UTC - 2359 UTC: Thirteenth annual SETI League Ham Radio QSO Party: 3.551, 7.0309, 7.2039, 14.084, 14.204, 21.306, and 28.408 MHz.
April 22, 2012: Eighteenth SETI League Annual Membership Meeting, Little Ferry NJ.
August 30 - September 3, 2012: Chicon 7 70th World Science Fiction Convention, Chicago IL.
September 2012 (dates TBA): *Sixth International Congress for Radio Astronomy* , Medicina, Italy.
October 1 - 5, 2012: *63rd International Astronautical Congress*, Naples, Italy.
April 20, 2013, 0000 UTC - 2359 UTC: Fourteenth annual SETI League Ham Radio QSO Party: 3.551, 7.0309, 7.2039, 14.084, 14.204, 21.306, and 28.408 MHz.
April 21, 2013: Nineteenth SETI League Annual Membership Meeting, Little Ferry NJ.
October, 2013 (dates TBA): *64th International Astronautical Congress*, Beijing, China.
April 19, 2014, 0000 UTC - 2359 UTC: Fourteenth annual SETI League Ham Radio QSO Party: 3.551, 7.0309, 7.2039, 14.084, 14.204, 21.306, and 28.408 MHz.
April 20, 2014: Nineteenth SETI League Annual Membership Meeting, Little Ferry NJ. ❖

Delaware Valley Amateur Astronomers listen to the folk songs of the spheres

by Joe Barron
News Editor, Springfield Sun

Perhaps only a select group of enthusiasts would enjoy a rousing sing-along about the search for life in outer space, but Paul Shuch certainly knew his audience. Shuch, the director emeritus of the SETI League Inc., spoke — and sang — to a gathering of the Delaware Valley Amateur Astronomers June 17 at the Greater Plymouth Community Center, and after more than an hour of regaling members with the history of the search for extraterrestrial intelligence, he had inspired at least a few to think about joining the effort.

"I'm game," said club President Len Jensen. "I think this is great. I think this is really one of the best [presentations] we've ever had."

SETI stands for the search for extraterrestrial intelligence, and it began, really, with the invention of radio astronomy in the 1930s, Shuch said. If other civilizations do exist somewhere else in the universe, and if they do feel like getting in touch with us, then scientists expect them to broadcast their radio signals along a fairly narrow bandwidth in which there is little background interference, Shuch said.

Astronomers listening for signals have, therefore, tuned their radio telescopes to this bandwidth, which is centered around 1420 MHz. They have not heard any unmistakable greetings so far, although in 1977 they were thrilled when a telescope at Ohio State University picked up a burst of radio waves right at where they would have expected it to be.

The so-called Ohio State Wow Signal came from a cluster of stars about 200 light years away, Shuch said, but it never happened again, and its origin and purpose, if any, remain an enigma.

He did offer his own theory, which may be as plausible as any other: Since the signal occurred the night Elvis Presley died, it might have been the King's farewell as he returned to the mother ship.

It was that kind of evening — hard science punctuated with silliness. Throughout his presentation, Shuch commented on the history of SETI with songs that set his own lyrics to existing melodies, accompanying himself on guitar. He ended by inviting his audience to join the SETI League and take part in the search.

"Be a believer," he sang, "get a good receiver."

The federal government funded the search for extraterrestrial intelligence in the 1990s, but Congress pulled the plug abruptly after only a year. Since then, Shuch said, the effort has relied on private donations and amateur astronomers with small radio telescopes in their backyards.

About 140 radio astronomers around the world are taking part in SETI League's Project Argus — named for the Greek mythological giant with 100 eyes — although so far, all they seem to have picked up is interference from satellites, Shuch said.

Given the vastness of the universe and the time radio waves take to travel across the light years, Shuch said, the first signal astronomers receive will likely come from a long-dead civilization.

Dialogue with aliens will, therefore, be impossible, but the mere proof of their existence will be "worth the price of admission," he said.

Dr. Len Jensen (left), president of the Delaware Valley Amateur Astronomers, welcomes SETI League executive director emeritus Dr. H. Paul Shuch at the group's June 2011 meeting. Joe Barron photo.

Ask Dr. SETI ®
Updating Drake Equation Estimates

Dear Dr. SETI:

I've just read your response in the article entitled "Estimating Drake Equation Factors", which was last updated in 2002. I'm wondering if you could revisit and revise this response to reflect our current knowledge of how prodigiously populated the Universe is with planets. Surely, we've found hundreds of planets since that had been written several years ago. Can you elaborate on how this would impact the outcome of the Drake Equation?

Steve B.

The Doctor Responds:

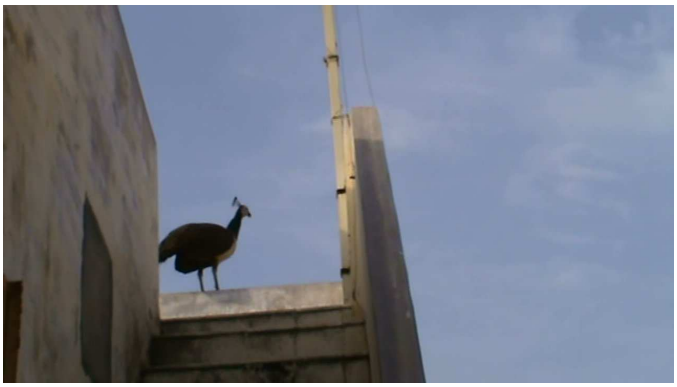
It's true, Steve, that we are entering a golden age of exoplanet discovery, with the Kepler spacecraft now giving us thousands of candidates, and potentially hundreds of newly discovered habitable planets. So, we have probably nailed down the second and third Drake Equation factors: lots and lots of planets (f_p approaching unity), and at least one "good Earth" per solar system (n_e pretty close to one). But this doesn't really bring us any closer to a "solution" to the Drake Equation then we were a decade ago! Let me explain:

When Frank Drake first penned this equation in 1961 (as simply an agenda for the world's first scientific SETI meeting), the only factor about which we could formulate even an educated estimate was the first one, the rate of stellar formation. Anything else was anybody's guess. We were, after all, multiplying seven things together (only one of which was even approximately known). Thus, estimates of N, the number of communicative civilizations in the milky way galaxy, ranged all over the map, from "none" to "billions and billions."

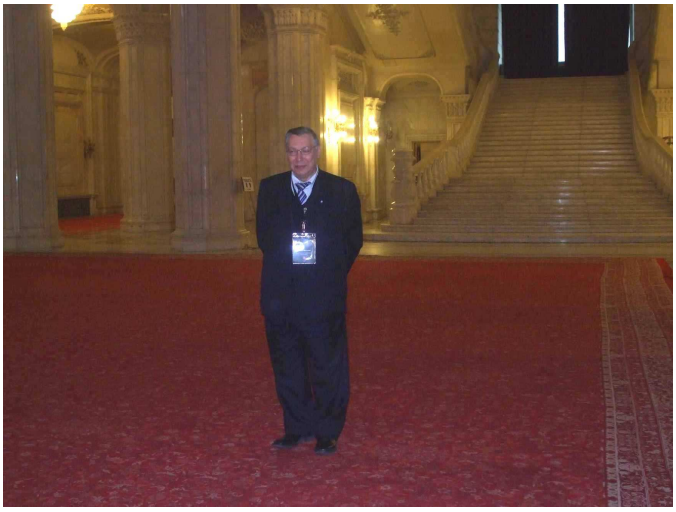
Well, it's been a productive half-century, and now we can make a reasonable guess as to the first three Drake factors. So, we can confidently multiply three things we know by four others that remain purely speculative. Estimates of N are still all over the map!

The fact is, we may never get a good estimate of N, until we've seen our own civilization live and die (providing us with an estimate of L, the longevity of technological civilizations in their communicative phase). When that happens, we will probably no longer care. So, the Drake Equation remains a marvelous tool for quantifying our ignorance.

Does this make the Drake Equation useless? Not at all! It was never intended for solving, but rather for helping us to know what we *don't* know. As such, it continues to guide and motivate our research, and in so doing, increase human knowledge (or, at least, decrease human ignorance, if only slightly.) ❖



From Vadodara, India, amateur radio astronomer Divyadarshan Purohit sends along this picture of a peacock, India's national bird, eyeing the Gurudev Observatory's Radio Jove antenna. Peacocks are especially significant to The SETI League, since our All Sky Survey is named Project Argus, for the Greek guard beast who had 100 eyes and could see in all directions at once. Mythology tells us that when Argus died, the gods put his eyes on the tail of the peacock. ***Gurudev Observatory photo***



SETI League advisory board member Dr. Claudio Maccone is seen at Parliament Palace (formerly known as Ceausescu's palace) in Bucharest, Romania, attending the 2nd IAA Planetary Defense Conference in May 2011. More information about this important conference may be found online at http://iaaweb.org/content/view/426/589/.

Anatoly Zaitsev photo

Will the Allen Telescope Array Soon Resume its Scrutiny of the Skies?

By Seth Shostak
Senior Astronomer, SETI Institute

On April 15, the Allen Telescope Array – a massive instrument designed from the pedestal up to be optimized for SETI experiments – was turned off. There was ironic synchrony in this unfortunate event, since April 15 is the deadline for Americans to file their income tax returns, and the ATA was shuttered for lack of monies.

The Array is a joint project of the SETI Institute, in California's Silicon Valley, and the radio astronomy lab at the University of California at Berkeley. Historically, the Institute raised the capital costs for construction of the Array, and UC Berkeley paid for the telescope operations at their Hat Creek Observatory, sheltered in the Cascade Mountains about 300 miles north of San Francisco. Unfortunately, the financial circumstances of the Berkeley radio astronomy group have worsened in recent years: National Science Foundation grants dwindled, and California's legendary fiscal woes meant that the university was compelled to reduce annual spending by hundreds of millions of dollars, with inevitable knock-on effects to research projects. The lugubrious bottom line is that – as of Spring 2011 – there were insufficient funds to keep the Observatory staffed and operational.

Reluctantly, the decision was made to put the ATA into a so-called "hibernation" mode: safely maintained, but not actually taking data. A skeleton, part-time staff of two oversees the site, but no observations have been made. The dishes are permanently aimed at the southern horizon.

Now, however, there's reason to expect photons at the end of the tunnel. A recent, two-month, crowd-sourced funding initiative, called SETIstars, raised more than $200 thousand from the public to help get the ATA back on-line. With additional monies – the most promising being payment for part-time use of the Array by the U.S. Air Force for tracking satellites and space debris – it's quite possible that this instrument will resume scanning the skies for extraterrestrial signals as early as the end of September or shortly thereafter.

Funding will remain an ongoing concern of course, and it's also possible that the SETI Institute will find a replacement partner for the Berkeley radio astronomers who are, regrettably, no longer involved. But SETI experiments have historically (and frequently) been the victim of funding hiccups. So if past is prologue, the search for signals will resume soon.

Book Review

Cosmos and Culture

edited by Steven Dick and Mark Lupisella

Reviewed by Larry Klaes

It is often difficult to get a wider perspective on existence, especially when you and the rest of your species have been stuck in one place for all but the smallest and most recent of times. This has certainly been the case with the species known as humanity. While a few ancient philosophers guessed that we live on a world surrounded by an immense amount of stars and space, it has only been in the last few centuries that both the scientific and general communities came to accept this state of existence as a fact. It has been an even shorter period of time - mere decades - since we have sent our mechanical emissaries and a relative handful of actual humans into the nearest regions of our cosmic neighborhood.

Why are we fascinated with a realm that is unimaginably vast, difficult to attain, and even dangerous? Does that which occurs in space affect life on Earth and in what ways? Are there other intelligent beings in the Universe and what may result if we should ever encounter one another? What will be the fate of all life far down the cosmic road? Tackling these mighty subjects is a book titled Cosmos & Culture: Cultural Evolution in a Cosmic Context (NASA SP-2009-4802), edited by Steven J. Dick and Mark L. Lupisella.

Most NASA publications deal with the illustrious history of the United States space program, often going into great detail about the people, processes, and machines. Cosmos & Culture looks at the ultimate reasons why we want to explore and settle space and how that decision will affect our society and species.

This topic is refreshing to see in a work from the space agency: With many space missions, one can sometimes get only vague platitudes as to why we seek to know what is out there. This sometimes creates a sense that the rest of the Universe and why science goes about studying it has no real, immediate relation to human society. With Cosmos & Culture, professionals from a variety of fields look at the Universe from their particular perspectives and attempt to bring it all together to show why and how the evolution and development of the Cosmos is anything but esoteric for our own biological and cultural development.

The result is a combination of fascinating ideas that go beyond the usual NASA literature, though sometimes they tend to get rather bogged down into their own explanations. Add to this the fact that many of the ideas presented in this book are admittedly speculation tends to make one worry that the results will be akin to reading a tract on a new form of religion. Nevertheless, the authors are sincere and excited in their efforts here and one knows that even if some of the answers are not what the questioners assumed or hoped for, they do succeed in bringing home the fact that we are an integral part of a much larger world than most of our forbearers could even consider. This is an idea that could literally and ultimately be the difference between either evolution or extinction for humanity.

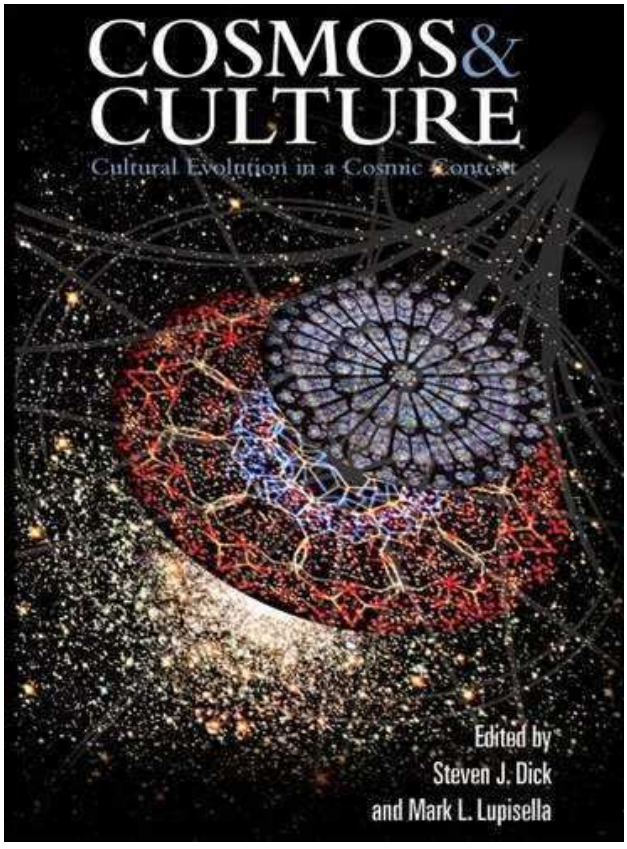
One of the more important themes in this book is that of extraterrestrial life. The authors on this subject want to know if alien beings exist for three main reasons: To see how other creatures have evolved, if we can communicate with each other, and how our interactions will change us as we expand into the galaxy and beyond. The authors not only examine what kind of minds could exist besides our own and how they might affect us on various levels, but some also see how our attempts and plans to explain ourselves and our world to alien intelligences shapes our perspectives and ultimately our very existence in the process. As Douglas A. Vakoch, the Director of Interstellar Message Composition at The SETI Institute, says in Chapter 12: Encoding Our Origins:

"Although the focus of SETI is on making contact with intelligence beyond Earth, the exercise of portraying ourselves in interstellar messages provides us with an opportunity to cultivate greater intelligence on our own planet."

Though some chapters are easier to digest than others at a first sitting, Cosmos & Culture makes for a fascinating read. One is guaranteed to learn quite a few new facts and concepts even from a brief swim in these waters thanks to the variety of professionals who have come together to share their ideas. One also realizes how important this book is for our species to grasp the grander picture of reality, for we cannot even afford to pretend to be the focal point of existence any more if we want to avoid societal stagnation or worse. Cosmos & Culture does not claim to have all the answers, but this collection has certainly pointed the way towards some very interesting paths.

Cosmos & Culture: Cultural Evolution in a Cosmic Context, is available online for free at:

http://history.nasa.gov/SP-4802.pdf.



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	(u /c)*	**(o)***
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