Membership Meeting Scheduled

In accordance with Article IV, Section 1 of our duly approved Bylaws, the Trustees of The SETI League, Inc. hereby announce our Third Annual Membership Meeting, scheduled for 2 PM Eastern time on Saturday, March 22, 1997, at SETI League Headquarters, 433 Liberty Street, Little Ferry NJ 07643. Please mark your calendars. As attendance by one percent of the League's membership constitutes a quorum, all members in good standing are encouraged to attend. The preliminary agenda for this meeting, per Bylaws Article X, is as follows:

Agenda

Call to Order
Minutes of 1996 Membership Meeting
Financial Report
Committee Reports
Old Business
New Business
Good and Welfare
Adjournment

Members are encouraged to submit Old Business and New Business items for inclusion in the Agenda. Please email your agenda items to our Executive Director, at n6tx@setileague.org, as soon as possible. In accordance with our Bylaws, written notice of this Meeting, along with a full Agenda and driving directions to SETI League headquarters, will be mailed to all members in good standing, not less than ten days nor more than sixty days prior to the meeting date.

433 Liberty Street
PO Box 555
Little Ferry NJ 07643

SearchLites

the Quarterly Newsletter of The SETI League, Inc.

Volume 3 Number 1
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Ham SETI Nets Expand

Although a ham radio license is certainly not a prerequisite to SETI League participation, many of our members do happen to be active radio amateurs. In order to improve communication, coordination and cooperation between those members worldwide, our Area Coordinators have established the following regular on-the-air gatherings. All interested radio amateurs are invited to participate.

Day	Time	Freq	Net Control
Sunday	1000 Z	14.204	DJ0BI
Sunday	1100 Z	14.204	DJ0BI
Sunday	1200 Z	14.204	DJ0BI
Sunday	1300 Z	14.204	DJ0BI
Monday	1800 Z	3.775	G4KIR

Those members who read about the DJ0BI SETINet in the previous issue of *SearchLites* will observe that Peter has significantly expanded his operation, monitoring at the top of four separate hours. It is his hope that this will enable him to determine times for suitable propagation between Germany and North America.

Note also that the German operation occurs on 14.204 MHz, the "official SETI League frequency," selected as being equal to exactly one percent of the neutral Hydrogen line much used for radio astronomy and SETI. Members worldwide may wish to seek contacts with other SETI enthusiasts on this frequency, any time favorable propagation occurs. Try calling "CQ SETI" if the frequency is not in use.

Members are encouraged to inform us of other nets which should be posted here. Please email info@setileague.org, fax to (201) 641-1771, or drop us a note in the mail.

Guest Editorial

The Folly of Giordano Bruno

by Prof. Richard W. Pogge, Ohio State Univ.

Fillipo Bruno (1548-1600) was born in Nola near Naples. Taking the name Giordano upon becoming a member of the Dominican order, he was educated in the Aristotelian and Thomist traditions and eventually came to espouse a mystical Neoplatonism mixed with ideas imbibed from a resurgent interest of that time in the works of the apocryphal Hermes Trismegistus. His heterodox beliefs soon attracted the attention of the Inquisition, first in Naples and then in Rome. To avoid prosecution, he renounced his Dominican vows and fled from Italy in 1576. Between 1576 and 1591, he traveled widely about Europe, writing and teaching under the sponsorship of various patrons. In 1591, he was invited to Venice to be tutor to a prospective patron who shortly thereafter denounced him to the Inquisition. He was sent to Rome in 1592 where he was put on trial and then imprisoned and interrogated intermittently for eight years. Unrepentant, he was convicted of heresy by the Inquisition and executed by burning at the stake in the Piazza Campo di Fiore in Rome in 1600. Among his writings, which cover a wide range of topics of only academic interest to us today (chiefly, Neoplatonism, Hermetical philosophy, and pantheism in a decidedly mystical blend), was an espousal of Copernicanism and an assertion that the stars were an infinity of suns like our own, each circled by worlds inhabited by intelligent beings like ourselves.

In popular accounts of the life of Bruno, it is often said that he was condemned for his Copernicanism and his belief in life on other worlds. He is portrayed as a martyr to free thought, and an early, prosecuted proponent of the modern view of the universe, hounded across Europe by the Inquisition for his beliefs and finally paying the ultimate price for them in a fiery public death. He has become a symbol of the intolerance of authority in the face of new ideas. These accounts, however, often leave out two fundamental aspects of the case of Giordano Bruno that cast matters in a somewhat different light. The first calls into doubt how closely we should link Bruno with the history of astronomy and what came to be called the "Scientific Revolution", and the second offers a perspective on the undeniable tragedy of his life that make him less of a symbol, but in the balance makes him more human.

The one key fact of the study of Bruno's life is that we do not actually know the exact grounds of his conviction on charges of heresy. The simple reason is that the relevant records have been lost. This is quite unlike the state of affairs in the later trial of Galileo, where we have extensive documentation including the forgeries that played a role in the case against him

Further, Copernicanism was not actually specifically proscribed as heretical as late as 1616. In that year Copernicus' *De Revolutionibus* (among others) was placed on the *Index of Forbidden Books*, where it was to remain subject to specific, minor revisions (a few words deleted and some passages excised, but on the whole leaving the basic ideas intact). An official response to be sure, but still a long ways from a definitive ban on Copernicanism in general. Indeed, copies of *De Revolutionibus* were published in Italy after 1616 (with the prescribed revisions, of course), and the situation was sufficiently ambiguous that Galileo felt free to proceed with his work until his trial in 1633. Had Bruno been executed for heresy on the grounds of Copernicanism, there would have been no room for doubt as to where the Church stood on the matter. Final condemnation did not come until 1664 when Pope Alexander VII prefixed a papal bull to the *Index* specifically condemning the idea of heliocentricism in general by explicitly banning "all books which affirm the motion of the earth".

The second often overlooked fact of Bruno's life concerns his period of exile between 1576 and 1591. Most brief popular accounts state the bare facts of his peregrinations around Europe, but what is left unsaid is that his wanderings appear to have had less to do with his being hounded by the Inquisition as it did with his own rather difficult personality. An examination of his actions during this period of exile makes clear that almost all of his misfortunes were brought down upon himself without the Inquisition's help. He outraged the faculty at Oxford with his lectures, he became embroiled in violent quarrels over trivial matters, and generally succeeded in alienating those people best able to protect him. His actions during this period reveal the very hallmark of folly, namely repeated failure to act in his own best interests even when reasonable alternatives were available. His final return to Italy (which resulted in his arrest in Venice a year later) can be seen as being motivated in part by the fact that by 1591 he had effectively burned most of his bridges behind him and thus he had little choice. In many ways, Bruno thrust himself into the flames that rose into the winter skies of the Campo di Fiore on the 17th day of February in 1600.

Bruno was brilliant, contentious, and ultimately self-destructive. There is nothing in his writings that contributed to our knowledge of astronomy in any substantial way, indeed his astronomical writings reveal a poor grasp of the subject on several important points. I think we pay attention to him today in large measure because among other things he vocally espoused (but apparently did not really understand) Copernicanism, an idea which was to become the key insight that led to our view of the world. In addition, his *On the Infinite Universe and Worlds* appeals to many today because of its apparent resonance with the deeply held conviction that life exists elsewhere in the Universe, despite the fact that proponents of extraterrestrial life would find little of interest within its difficult pages. It also does not hurt his mystique that he came to a rather spectacular and violent ending, ostensibly in punishment for these beliefs by the reigning authorities of his day. In the end, Bruno bet on the right horse (if perhaps for questionable reasons), and thus has become a kind of culture hero instead of a footnote in books on Renaissance philosophy.

History is funny that way.

Technical Feature

What About Antenna Rotors?

A SETI League member writes to ask:

I am wondering if there is any detailed description of how to mount a parabolic dish properly. Is it sufficient with one motor- / rotor-mechanism or are two motors required? Is computer guidance of the dish necessary, and if so, what is / are the proper program(s)?

Actually, no motors at all are required! The beauty of operating a radio telescope in drift-scan mode is that it is in meridian transit mount, and requires no computer control, or even any active steering. You merely mount the dish in the fixed position of azimuth (on a north-south line) and assigned elevation angle, and let the earth be your antenna rotor. So no right ascension adjustment is required at all. Although an elevation rotor would allow you to readily change declination settings, it is by no means a necessity. If you tell us (via your Project Argus Participant Survey form) what are your aiming constraints, we will assign you an elevation angle which is practical for your location and mechanical limitations.

Now, what if you in fact want to cover the whole sky which can be seen from your location, not just an assigned strip of sky? You can do so with just one rotor, this to control elevation, while the earth's rotation gives you azimuth control. The physical rotor mechanism used is not likely to be an "elevation" rotor at all, but rather an "azimuth" one. Here's how that works:

Consider how the typical satellite TV antenna is mounted and rotated, using an equatorial (also called polar) mount. A fixed elevation angle is set, typically by adjusting a turnbuckle. This elevation angle represents the elevation to a Clarke orbit (geosynchronous) satellite at zenith, or on a north-south line from your location. The actual angle above the horizon is found as 90 degrees minus your station latitude (that is, 90 degrees on the equator, or 0 degrees if you're at one of the poles), with a minor correction for the fact that the satellites are relatively close to the earth, not out in deep space. Once this correct elevation (or declination) setting is established, it is locked down and not moved.

The single rotor associated with tracking of Clarke satellites is one which moves the antenna in right ascension, or hour angle. This is essentially an azimuth rotor, with its axis tilted so as to more or less parallel that of the earth. This rotor might be implemented by an electrically driven jack screw which pivots the dish on its mount, or a more complex and stable "horizon-to-horizon" arrangement might use a chain drive, gears and pulleys. It is this latter mount which we have found most useful for SETI in particular, or radio telescopes in general. But it is not mounted or used in the usual way.

The scheme we describe here has been used by several SETI League members, as well as on Project Argus Station #1 at SETI League headquarters. It is depicted in the SETI League Technical Manual, and photos appear there as well as on our Web site. We used a commercial Paraclipse 3.7 meter dish on a horizon-to-horizon mount. The "elevation" turnbuckle was first set to its shortest length, which pointed the dish straight up (the correct setting for geosynchronous satellite reception by a station on the Equator). Next, the mount was rotated on the mast, ninety degrees from its normal position, so the chain drive wheel is oriented north-south, not east-west. This turns what is normally the horizon-to-horizon declination rotor into a very robust elevation rotor. Finally, the stops on the motor control mechanism must be adjusted so the dish swings in a 180 degree arc from the northern to the southern horizon. In the case of the Paraclipse rotor we used, pointing is accomplished by applying a 24 volt DC power supply to the chain-drive motor. Reversing polarity reverses direction. An inclinometer or protractor with plumb-bob can be mounted on the dish for accurate elevation angle readout.

The declination to which the antenna is aimed is easily computed as a function of latitude and elevation angle. In meridian transit mount, Right Ascension is simply local sidereal time. This involves first computing Julian date. From this you can get Greenwich Sidereal Time (GST), and if you know your longitude, you can get Local Sidereal Time (LST). Applicable formulas can be found on our Web site. Among the many computer programs which will give you real-time readout of LST is *Atomic Clock* from Parsons Technology.

Ask Dr. SETI

[Reprinted from The SETI League's Web site, http://www.setileague.org/]

In 1974, Frank Drake sent a radio signal from the Arecibo radio dish to M13 (a globular cluster about 20,000 light years away.

I don't know about anyone else, but I have a problem with Drake's transmission. I am not worried about the religious implications behind a successful SETI project, nor am I worried about the political differences that would result from such a project.

No one could argue that a successful SETI project would have worldwide impact. I am worried about Drake's transmission, however, because he crossed national boundaries. The people of Papua/New Guinea were not consulted regarding the transmission, yet Drake's decision affected them. Isn't Earth their planet too?

An extra-terrestrial civilization might be well aware of these ethical problems, and refrain from transmission until they have attained the degree of unity required to accept the consequences of transmission together. Ethical behavior may not always be convenient or cheap, but perhaps a high sense of ethics contributes to long-term survival.

I also think that any civilization that doesn't care about the ethical problems associated with transmission would be more likely to destroy themselves.

If we are to accept this argument, then we must add another factor to the Drake equation to serve as a filter for those civilizations that don't achieve ethical unity.

If we are to use our United Nations as an example (and we use ourselves as an example with many factors of the Drake equation), then is it any surprise that many civilizations may be listening while very few may be transmitting?

Sincerely, K.L

The Doctor Responds:

Thanks, KL, for your interesting thoughts, which add a new dimension to The Fermi Paradox. I should point out that the question of transmitting is highly controversial, and in fact international protocols are currently under consideration. One model has recently been proposed by Dr. John Billingham, who chairs the International Astronomical Union's committee on SETI. Although I have just received a draft of JB's proposal on this subject, I have not had a chance to study it yet, so will reserve comment. However, I can tell you that the Arecibo message was the *only* deliberately beamed interstellar microwave communication from Earth to date, and was primarily a stunt (I use the term advisedly) to mark the ceremonies associated with the re-dedication of the refurbished 305 meter reflector surface.

Interestingly, as this is being written, Arecibo is undergoing another major upgrade. I asked Arecibo director Paul Goldsmith just recently whether another transmission was planned for the re-re-dedication ceremonies, and he told me that none was in the works. So there is some thought being given to the concept of presenting a unified planetary front.

On the other hand, for the past 50 years Earth has been radiating microwave signals of sufficient amplitude to be easily detectable at interstellar distances. These have not been beamed transmissions at all, but rather our radio pollution from radars, UHF TV, and satellite uplinks. It is just such incidental radiation (the likes of which now makes Earth detectable out to 50 light-years) which SETI hopes to encounter from other civilizations. We hypothesize that, at least at some stage of its technological development, most civilizations will go through an RF polluting stage. So even if your line of reasoning proves true with regard to beamed transmissions, there is still hope that we can gain the existence proof we seek, to discredit the notion of our uniqueness in the Universe.

Send your questions to Ask Dr. SETI, PO Box 555, Little Ferry NJ 07643, or email your question to askdrseti@setileague.org. Remember, he's not a real doctor (rather, he's the kind who actually has to work for a living!). For health questions, consult a competent medical professional.

Project Argus Pioneers

The SETI League gratefully acknowledges the technical contributions of the following members. Their stations were either on the air or in the planning and construction phase when we launched the *Project Argus* Sky Survey, as indicated by timely return of their Project Argus Participant Survey forms.

- Don Adams, WA8QZZ, Chagrin Falls OH
- Wayne G. Ahlers, Succasunna NJ
- Magin Casanitjana, EA3UM, Barcelona Spain
- Ken Chattenton, G4KIR, Cleveland England
- Skip Crilly, KC7KQ, Liberty Lake WA
- Bob Davis, Lexington KY
- Ian Drummond, VE6IXD, Alberta Canada
- Buddy Fitch, Arlington WA
- Santiago Marquet Groells, EA3DXF, Barcelona Spain
- Bill Ives, KF9KC, Lake Tomahawk WI
- Denis Jakac, VE3ZXN, Ontario Canada
- Ken Knight, N0YGM, Colorado Springs CO
- Ron Leeseberg, N8LPB, Fresno OH
- Claudio Brasil Leitao Jr., Sao Paulo Brasil
- Anthony Minniti, Livingston NJ
- Richard Pering, KB6GVP, Palo Alto CA
- Carter Pfaelzer, W1TDC, Weston MA
- Bernocco Silvio, I1FBJ, Torino Italy
- Trevor Smithers, G0KTN, Wiltshire England
- Rachel Tortolini MD, Mililani HI
- Leo Toussaint, KC4DE, Sun City Center FL
- Charles C. Trice, Jr., WA4RRB, Miami FL
- Trevor Unsworth, G0ECP, Cleveland England
- Peter Wright, DJ0BI, Mannheim Germany

Obviously, with only 24 participating stations, we are a long way from our goal of 5,000 Project Argus participants and full-sky coverage. But these dedicated experimenters are developing technology which all future participants will employ, and are to be commended for their truly pioneering efforts.

We suspect that other members have stations either operational or under construction, and urge all *Project Argus* participants to return their survey forms promptly. Forms can be obtained off the Web at http://www.setileague.org/admin/survey.htm, or you may email to info@setileague.org or fax to (201) 641-1771, requesting that one be mailed to you. Be sure to include your postal address.

Conference Calendar

SearchLites' readers are apprised of the following conferences at which SETI-related information will be presented. League members are invited to check our World Wide Web site (www.setileague.org/) under Membership Services and Activities, 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.

February 1 - 2, 1997: *Tropical Hamboree***,** Miami FL.
February 13 - 18, 1997: *AAAS Annual Meeting and Science Innovation Exposition*, Seattle WA.
February 14 - 16, 1997: *Boskone 34*, Framingham MA.
March 7 - 9, 1997: *Lunacon '97*, Rye Brook NY.
March 22, 1997: *SETI League Third Annual Membership Meeting*, Little Ferry NJ.
March 28 - 30, 1997: *Balticon XXXI*, Baltimore MD.
April 6 - 7, 1997: *Southeastern VHF Conference*, Atlanta GA.
May 8 - 11, 1997: *High Frontier Conference*, Space Studies Institute, Princeton NJ.
May 16 - 18, 1997: *Dayton Hamvention*, Dayton OH.
May 23 - 26, 1997: *BayCon '97*, San Jose CA.
May 30 - June 1, 1997: *Rochester Hamfest and ARRL Atlantic Division Convention*, Rochester NY.
July 24 - 27, 1997: *Central States VHF Conference*, Hot Springs AR.
August 28 - September 1, 1997: *Lonestarcon 2* / 1997 Worldcon, San Antonio TX.
October 23 - 26, 1997: *Microwave Update '97*, Sandusky OH.
May 15 - 17, 1998: *Dayton Hamvention*, Dayton OH.
May 29 - 31, 1998: *Rochester Hamfest and ARRL Atlantic Division Convention*, Rochester NY.
July 23 - 26, 1998: *Central States VHF Conference*, Kansas City KS.
August 5 - 9, 1998: *BucCONeer* / 1998 Worldcon, Baltimore MD.
May 14 - 16, 1999: *Dayton Hamvention*, Dayton OH.
September 2 - 6, 1999: *Aussiecon Three* / 1999 Worldcon, Melbourne Australia.

Roster Reminder

The SETI League's membership roster, originally distributed in September 1996, is now due for its semi-annual revision. If you prefer not to have your name and address supplied to other members, please advise Headquarters preferably by email (info@setileague.org), or by fax (201 641-1771) or voice-mail (201 641-1770) before the next directory update goes to press on February 15, 1997. For those who do wish to be included in the next roster, now is the time to update your membership records. Simply email or phone in your current address, phone number, email address and ham call by the February 15 deadline. Thank you for your cooperation.

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Who's Who in The SETI League

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To:

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SETI League Memberships Make Great Gifts!

Household Member (same address as a Full Member)	$15
Scholarship Member (full-time students only)	$25
Full Member	$50
Life Member (until we make contact)	$1,000
Patron (priority use of The SETI League's radiotelescope)	$10,000
Director (Patron membership plus seat on advisory board)	$100,000
Benefactor (a major radiotelescope named for you)	$1,000,000

Tax Deductible gifts are always welcome!

Payment in US Dollars only, please.
Foreign checks must be payable through a US bank.

Order Your SETI League Goodies:

	(u)	**(o)**
T-shirts, specify M, L, or XL	$14	$16
Coffee mugs	$ 6	$ 8
Pocket protectors	$2.50	$ 3
Buttons:		
"We're All Ears"	$1.50	$ 2
"We Know We're Not Alone"	$1.50	$ 2
"*Project Argus* Launch "	$1.50	$ 2
Sing a Song of SETI (Songbook)	$10	$12
SETI League Technical Manual	$10	$12
Project Cyclops 2nd Printing	$20	$24

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